



# OPERATING INSTRUCTIONS



# FX-30

No. F 8050 2,4 GHz

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## SAFETY NOTES: OBSERVE AT ALL TIMES

Please take the trouble to read right through these instructions before attempting to use the equipment for the first time, paying particular attention to the Safety Notes. If you are a beginner to radio-controlled model aircraft or helicopters, we recommend that you ask an experienced modeller for help, as you are bound to need support and advice initially.

This radio control system is designed and approved exclusively for use with radio-controlled models. If you use the equipment for any other purpose, Robbe Modellsport will accept no liability for the consequences.

## SAFETY NOTES

Radio-controlled models are not toys or playthings in the usual meaning of the term, and they should not be operated by young people under fourteen years of age unless an experienced adult is available to supervise them. Building and operating these models requires technical expertise, manual skills, a cautious attitude and safety-conscious behaviour. Errors, negligence and omissions in building or flying these models can result in serious personal injury and damage to property.

The manufacturer and vendor of the equipment have no means of checking that your models are built and operated correctly, and for this reason we can do no more than bring these hazards expressly to your attention. We deny all further liability.

Technical faults, whether electrical or mechanical, can result in electric motors bursting into life unexpectedly, causing other parts to come loose and fly around at high speed. Switching on the receiving system when the transmitter is not active can also have the same effect.

In either case there is a serious risk of injury. Propellers, helicopter rotors and all other rotating objects, which are driven by motors or engines, represent a constant hazard and a potential source of injury. Avoid touching such parts at all costs. It is a sobering thought that a propeller revolving at high speed could cut off your finger.

Do not stand in or close to the primary danger area around the propeller or other rotating parts whenever the electric motor is connected to a drive battery. Take care to keep all other objects from making contact with revolving parts.

Protect your radio control system from heat, dust, dirt and damp, and do not subject your equipment to excessive heat, cold or vibration. Radio control systems should only be used in "normal" conditions, i.e. within a temperature range of -15°C to +55°C.

Use only the recommended battery chargers, and supervise the procedure when charging batteries. Please read and observe our safety notes regarding charging the batteries. Overcharging, or incorrect charging methods can result in the batteries exploding or bursting into flames.

## Always maintain correct polarity.

Avoid subjecting this equipment to undue shock or pressure. Check your system regularly for damage to cases and wiring. If a unit gets wet or is damaged in a crash, it should not be used again even after you have dried it out and checked it thoroughly. The only safe course of action is to replace damaged items, or at least have them checked by a Robbe Service Centre.

Faults caused by damp or crash-induced shock may not be obvious to the layman, but after a short period of further use they may cause catastrophic failure. It is important to use only the components and accessories which we expressly recommend, and always use genuine robbe-Futaba connectors. It is not permissible to make modifications of any kind to the system components.

## ROUTINE PRE-FLIGHT CHECKS

If there are several modellers at your site, ensure that yours is the only transmitter on "your" frequency before you switch the transmitter on.

- Always extend the transmitter aerial fully before operating your model, and check that it is firmly engaged in its socket.
- Ensure that the throttle stick is at the stop / idle end-point before you switch the receiver on.
- Always switch the transmitter on first, then the receiver.
- Always switch the receiver off first, then the transmitter.
- Carry out a range check before the flight or run.
- Have you selected the correct model memory?
- Check all the working systems. Ensure that the control surfaces respond to the stick commands in the correct "sense" (right stick = right rudder etc.), and that the travels are as recommended.
- Are all the mixer functions and switches set correctly?
- Are the batteries sufficiently charged?
- If you are not sure of any point - don't fly, as this would endanger yourself and anybody else at the site.

## OPERATING THE MODEL

- Never fly above spectators or other pilots.
- Do not fly in any way, which could endanger humans or animals.
- Never fly close to high-tension overhead cables or residential areas.
- Don't operate your model in the vicinity of canals, locks or other public waterways.
- You must not operate your model from public roads, motorways, paths, squares etc.

## Never operate your equipment in stormy weather.

The transmitter aerial must always be extended fully when you are actually controlling a model. Don't "point" the transmitter aerial straight at the aeroplane when flying. The signal generated by the transmitter is at its weakest in an imaginary line extending straight from the aerial. It is always best for the pilot to stand in a position where the long side of the aerial points towards the model.

If several radio control systems are in use at the same time on adjacent channels, the operators or pilots should always stand together in a loose group. Pilots who insist on standing away from the group endanger their own model as well as those of other pilots.

## INSURANCE

Ground-based models are usually covered by standard personal third-party insurance policies. To fly powered model aircraft you will need to extend the cover of your existing policy, or take out a specific policy. Check your insurance and take out new cover if necessary.

## 1. SET CONTENTS



## SET CONTENTS: FX-30

No. F 8050

- 1 FX-30 transmitter
- 1 FX-FM TM14 module
- 1 LiPo transmitter battery, 7.4 V / 3400 mAh
- 1 R 6014HS receiver
- 1 Switch harness with charge socket
- 1 12 Volt Lithium battery charger, 2 A
- 1 110 ... 230 Volt AC switch-mode PSU, for charging from the mains supply

## RECOMMENDED ACCESSORIES:

- |   |            |
|---|------------|
| Trainer lead, FF9 -> FF9                                      | No. F 1591 |
| Trainer lead, FF9 -> DIN (6-pin)                              | No. F 1592 |
| Trainer lead -> FX series (2.5 mm)                            | No. 8236   |
| Trainer lead -> F-series (3.5 mm)                             | No. 8238   |
| Flight simulator adaptor lead, FF-9                           | No. 8239   |
| FX-30 transmitter tray, carbon fibre                          | No. 8491   |
| FX-30 transmitter charge lead                                 | No. 8260   |
| Receiver battery, 4.8 V / 1400 mAh                            | No. F 1307 |
| Replacement transmitter battery                               | No. 4846   |
| Stick switch, 2-position                                      | No. 8315   |
| Stick switch, 3-position                                      | No. 8316   |
| Stick switch, push-button                                     | No. 8317   |
| Aero-Team aluminium transmitter case (Transmitter excl. tray) | No. F 1556 |
| Aluminium case (FX-40), for transmitter with tray             | No. F 1565 |

## 2. GENERAL DESCRIPTION

The FX-30 is a high-class radio control system that sets new standards in many areas.

### 2.1 FX-30 TRANSMITTER

- With the latest 2,4 GHz FASST system (Futaba Advanced Spread Spectrum Technology), interference rejection of remote control models has become significantly improved
- Maximum protection from same-channel interference
- Insensitive to impulse and electrical smog interference
- No crystals, no need to change crystals
- Effectively interference free because of digital signatures of transmitter and digital filters in receiver
- Broad bandwidth for greater security
- Real-Time Response
- The response speed (between moving the transmitter stick and the servo's movement) of the FASST system is twice as fast as that of previous systems.

As comparison:

PCM 1024=28,5 ms 1024 steps

2,4 GHz FASST=14 ms 2048 steps

This is double the number of steps in half the time.

Moreover, the response time from moving a control to the servo reacting is reduced by 25%.

The result is virtually equivalent to real-time control, i.e. a new, extremely direct feeling of being in command. The control signals arrive simultaneously with effectively no delay at the servo. A totally new and direct control feeling.

- The system is unusually easy to use thanks to the clearly arranged graphical user interface, which is very easy to understand, and is of consistent, uniform design throughout. The system includes a completely new, extremely simple mixer select system based on an initial selection of the model type using a graphic image of the layout. Simply select the wing and tail type, and the transmitter sets up the correct mixers and channel sequence automatically. The primary means of data input is the 3-D hotkey, with integral 'EDIT' function.
- The transmitter spot frequency is generated using a Direct Digital Synthesizer (DDS), i.e. no crystals are required. It is possible to select all channels approved for use in Europe in the 35 (A + B), 40 and 41 MHz bands if the appropriate RF module is installed. The selected spot frequency is amplified selectively in the RF amplifier module, which generates the level of output power approved for radio control use.
- Thirty internal model memories provide ample space for model-specific data, but in any case additional model memory capacity for up to 1958 models is possible on a 1 GB SD card. The SD card can also be used as a simple method of transferring model data from one transmitter to another. SD cards are available in any specialist photographic or electronic shop.
- The transmitter is fitted with new precision-made dual-axis stick units featuring four ballraces and special long-life potentiometers of industrial quality. The potentiometer cable guidance system is very elegant: the cable only moves through about 45°, which helps to avoid cable fractures.

- The FX-30 transmitter features the new Rotary Trim System, which combines the traditional method of operation with the advantages of digital storing. When you switch model memories, or switch the system on again after a pause, the correct trim values are immediately available again automatically. Trims are provided for all stick functions, and each can be set to normal, centre or ATL (asymmetrical) function. The integral screen provides a clear on-screen display of trim positions. Trim values are stored in the model memory, either globally (for all flight modes) or separately (for each flight mode individually).
- Freely programmable 17-point AFR transmitter control curves, with separate speed adjustment for each of the twelve proportional channels.
- Ten freely programmable 17-point curve mixers; six different D/R settings can be superimposed on them, with separately variable delay and speed for both directions of the servo ('there' and 'back'). 'Stick-to-stick' or 'stick-to-servo' mix mode, with separate delay and speed adjustment when the mixer is switched on and switched off. The mixers can be connected in series (cascaded), and switches, transmitter control functions or virtual functions can be selected as transmitter controls. With Offset function and fine-tuning adjustment: mixer inputs can be adjusted externally using assigned rotary controls, switches or transmitter sticks.
- Eight flight modes with selectable priority and variable transition delay plus unrestricted name and copy functions.
- Trainer (teacher - pupil, buddy-box) facilities fitted as standard, plus integral DSC socket. The Trainer system features individual channel transfer and optional mix operation.
- Li-Po battery technology; mains battery charger included in the set.
- Programmable count-up or countdown stopwatch with operating hours timer and model memory timer.

#### Note:

The FX-30 transmitter features an energy-saving measure in the form of an automatic RF cut-off circuit. If no transmitter control (stick, switch, adjuster etc.) is operated for a period of thirty minutes, the transmitter switches the RF section off, the screen displays the message "PLEASE SWITCH TRANSMITTER OFF", and the green LED indicator goes out. This is particularly relevant when you are using the transmitter in Trainer mode; please bear in mind that it is essential to operate one control occasionally (at least once every thirty minutes), otherwise there is a danger of the Teacher transmitter switching itself off.

### 2.2 R-6014HS Receiver

The R6014 HS receiver can be switched from analogue to digital servos

Receiver output channels 1 to 6 can be set to generate faster output signals, and this results in an even faster response if digital servos are used. (See section 30 chapter 8.1)

## 3. SPECIFICATION

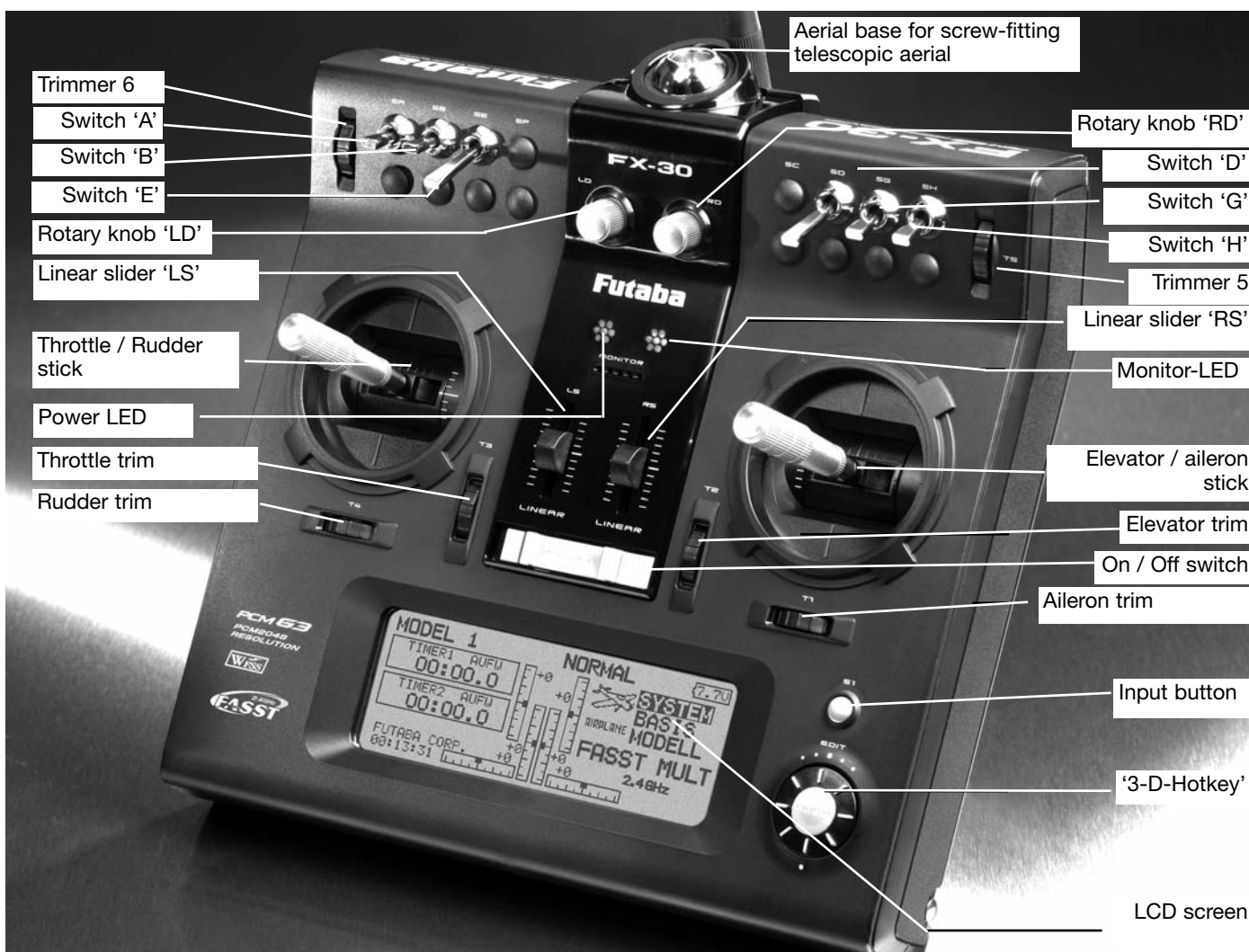
### 3.1 FX-30 transmitter

Control channels: .....12+2 channels  
Frequency bands: .....2,4...2,4835 GHz  
Alternatives: .....2,4...2,454 GHz  
Transmission system: .....FSK  
Channel spacing: .....2048 kHz  
Power supply: .....7.4 V LiPo battery / 3.4 Ah  
Current drain: .....approx. 320 mA  
Dimensions: .....205 x 220 x 55 mm  
Weight (incl. battery): .....approx. 1035 g

### 3.2 R-6014 HS Receiver

No. of channels: .....14  
Frequency bands: .....2,4...2,4835 GHz  
Alternatives: .....2,4...2,454 GHz  
Transmission system: .....FSK  
Channel spacing: .....2048 kHz  
Power supply: .....4.8 ... 6 Volts (4 ... 5 cells, NC / NiMH)  
Current drain: .....approx 50 mA  
Dimensions: .....52,5 x 37,5 x 16 mm  
Weight: .....21 g

## 4. FX-30 TRANSMITTER CONTROLS



### 4.1 LiPo transmitter battery, 7.4 Volt / 3400 mAh, No. 4846



### REMOVING / CHANGING THE TRANSMITTER BATTERY

- First switch the transmitter off.
- Remove the RF module.
- Unlatch the back panel at the top and fold it open, taking care not to damage the lower locating lugs.
- Undo the retaining bands.
- Disconnect the battery connector from the transmitter by pulling on the connector itself (not on the wires).
- When re-installing the battery in the transmitter please note that the battery lead must face the right.
- Plug in the connector, taking care to maintain correct polarity.
- Re-fit the retaining bands.
- Engage the lower locating lugs of the back panel. Fold the back panel up into the correct position and engage the top latch. Ensure that no wires are snagged between the panels.

## Note:

Never disconnect the battery from the transmitter when the monitor LED is still flashing, as this could corrupt stored values or cause damage to memory modules. If this should occur, cease using the transmitter and send it to your nearest robbe Service Centre.

## 4.2 RC charger, charging the transmitter battery

The RC charger included in the set is suitable for charging 7.4 Volt Lithium batteries, and features a voltage-controlled automatic cut-off circuit (8.4 Volts). The charge current is approximately 2 A.

It can be connected:

- to a 12 V car battery or 12 V DC mains PSU via the car cigar lighter adaptor (supplied);
- or to a mains socket (110 ... 230 V AC) using the mains adaptor (also supplied).



Notes on handling and charging the transmitter battery

- Connect the 230 V mains charger to a mains power socket.
- Connect the plug to the 12 V Lithium charger.
- The red monitor LED will now light up.
- Locate the charge lead attached to the 12 V charger, and connect it to the transmitter.
- The charge monitor LED now lights up red to indicate that charging is in progress; the charge current is around 2 Ampere.
- The charge time is around 3.5 hours if the battery is initially discharged.
- When the charge process is almost complete (90%), the colour of the charge monitor LED changes colour to green; the charge monitor LED goes out when the charge is 100% complete. The battery can safely be disconnected at around 90%, since the remainder of the charge to 100% takes approximately a further thirty minutes using the CC-CV charge method.

## Caution:

The LiPo transmitter battery is fitted with an integral balancer and a protective electronic circuit, which protects against over-voltage and deep-discharge.

**The battery must only be charged using the RC charger supplied in the set! Chargers such as the Power Peak Infinity and similar are not suitable, as these devices are designed for high cell-count packs, and generate a very high voltage at the cut-off point, which could destroy the protective battery circuit.**

- Li-Poly cells feature an extremely low self-discharge rate of around 0.2% per day, and for this reason they can be stored for long periods without problems. However, deep discharging must be avoided, as the pack will sustain permanent damage in the form of loss of capacity if discharged too far (the protective electronic circuit avoids this). After about five months of storage - but at the latest when the pack voltage falls to 2.5 Volts / cell - it is essential to recharge the pack. Before any protracted period of storage you should recharge the battery to at least 50% of nominal capacity. After about five months the pack should be recharged again.

- The theoretical useful life of a Lithium cell when operated at low discharge currents is around 500 charge / discharge cycles.
- Since Li-Poly cells do not suffer from the memory effect (lazy battery effect); it is not necessary to discharge them before charging (cycling, balancing, as required with NC and NiMH batteries). In fact, it is harmful to discharge the packs first, and this should be avoided. The capacity of Li-Poly cells declines slightly with each charge cycle, so prior discharging would result in premature capacity loss.

## Safety Notes:

- Do not submerge the battery in water or any other liquid.
- Do not heat or incinerate the battery, or place it in a microwave oven.
- Do not short-circuit the pack or charge it with reversed polarity.
- Do not subject the battery to physical pressure; do not deform or throw it.
- Do not solder directly to the battery.
- Do not modify or open the battery.
- Do not charge the battery to a voltage higher than 4.2 Volts per cell, or discharge it to a voltage lower than 2.5 Volts per cell.
- LiPo batteries may only be charged using a charger designed expressly for this purpose. Never connect the battery directly to a mains PSU.
- Never charge or discharge the battery in direct sunshine, or close to a heater or fire.
- Do not use the battery in any location that is subject to severe static discharges.
- Any of these errors may cause the battery to be damaged, explode or catch fire.
- Keep the battery well out of the reach of children.
- If electrolyte should escape, keep it well away from fire; the substance is highly inflammable and may burst into flames.
- Avoid the fluid electrolyte contacting your eyes. If this should occur, rinse the affected part immediately with plenty of clean water before seeking medical attention.
- If the fluid electrolyte should contact your clothes or any other object, wash it off immediately using plenty of water.
- Never leave the battery on charge unsupervised.
- Charge the battery only on a fireproof surface.

To protect the environment, take defective and exhausted packs to your local free battery collection point after ensuring that they are completely discharged. On no account, dispose of exhausted batteries in the domestic waste. Exhausted batteries can be recycled.

## Operating times:

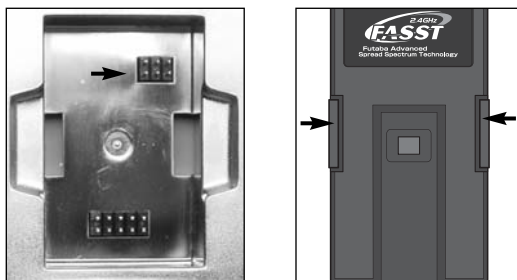
With a fully charged battery, the transmitter's operating time is around ten hours when used with the transmitter battery No. 4846.

The operating time of the receiver battery varies greatly according to several factors: the number of servos connected to the system, the stiffness of the control linkages, and the frequency of control commands (servo movements). When the servomotor is running, a servo draws a current of between 150 and 600 mA, whereas its consumption falls to around 5 to 8 mA when the motor is stopped. Once the servo reaches the position dictated by the transmitter stick, the motor switches off, and the servo only draws its idle current. It makes no difference whether the servo is at neutral, one end-point or any intermediate point.

For this reason it is very important that mechanical linkages work smoothly and freely, and that the servo is not mechanically obstructed at any point in its travel.

**When the receiver battery is almost discharged, you will notice that the servos run more slowly than usually. If you ever reach this point, cease operations immediately, and recharge the battery.**

## 4.3 INSERTING / REPLACING THE RF MODULE



- Always switch the transmitter off before inserting the RF module.
- Position the RF module squarely before pushing it into place; press it in until the side lugs engage.
- Take care that no pins are bent when you insert the connector.
- To remove the RF module squeeze the side lugs inwards and pull it out, keeping it straight and "square".

## 4.4 STICK ADJUSTMENTS

The FX-30 transmitter is fitted with new precision dual-axis stick units featuring quadruple ballraces and industrial-standard long-life potentiometers.

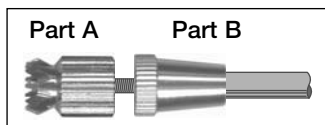
In designing these sticks we placed particular emphasis on smooth, accurate control around the centre position.



### ADJUSTING THE STICK LENGTH

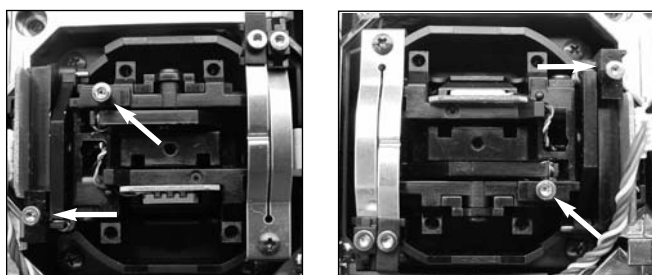
The length of the primary sticks is infinitely variable, and can be adjusted to suit the pilot's preference.

- Loosen parts A and B
- Set the stick-top to the desired length
- Lock part B against part A.



### CENTRING FORCE ADJUSTMENT

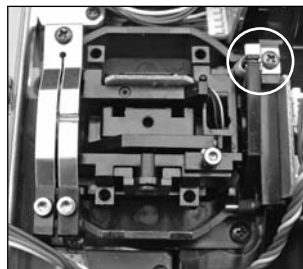
On both stick units the centring force of the springs is infinitely variable, and can be adjusted to suit your personal preference. The first step is to remove the transmitter back panel. Adjust the centring spring force at the positions indicated using the 1.5 mm A/F Allen key supplied.



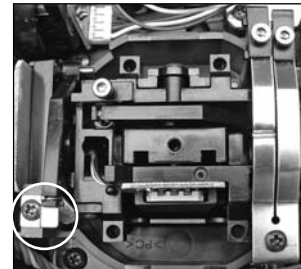
## 4.5 CONVERTING THE THROTTLE FUNCTION

As supplied, the transmitter is set up in Universal mode, i.e. both sticks have a self-neutralising action. Most users will wish to convert one of the two sticks to a ratchet or brake function in the vertical plane, to produce a non-neutralising function for the throttle channel.

The first step is to locate a small bracket in the transmitter accessory bag. Attach the bracket as shown, using the spring force adjustor screw; this lifts the return spring.

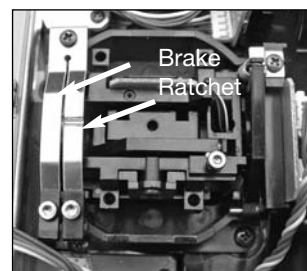


Raised centring spring  
for throttle right  
(modes 1 + 3)



Raised centring spring  
for throttle left  
(modes 2 + 4)

You can now activate the ratchet or brake spring and adjust the force using the 1.5 mm A/F Allen key supplied.



### ACTIVATING THE RATCHET FUNCTION

For fixed-wing model aircraft applications the throttle stick is usually employed with a ratchet spring. The ratchet is applied by carefully tightening the ratchet spring screw (rotating it to the right) until the throttle stick "feels" right to you. Take care not to activate the brake function at the same time; you may need to unscrew the brake spring screw slightly.

### ACTIVATING THE BRAKE FUNCTION

- The ratchet function should first be disabled by unscrewing the ratchet spring.
- Now tighten the brake spring carefully (to the right) until the throttle brake "feels" right to you.

The ratchet and brake function cannot be activated at the same time, as they effectively overlap.

The stick mode is selected in the Transmitter Control Settings / Stick Mode sub-menu of the System menu. If you convert the throttle function, you will also need to check the stick mode and change it if necessary (stick mode 1 to 4). The default software setting is Stick Mode 2 (throttle left); see also the System Menu, page 23.



## 4.6 SD CARD MEMORY MODULE

Model data relating to the various models can be stored on an SD card (max. capacity 2 GB), which can be purchased separately. We recommend the use of high-speed SD cards such as the Sun-Disk type.

SD cards of other makes designed for digital cameras can also be used, but we are unable to guarantee that all will work perfectly since so many different types are available.

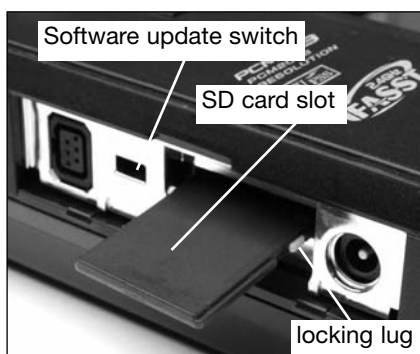


### INSERTING THE SD CARD

This is the procedure for inserting and replacing the SD card:

- Switch the transmitter off.
- Open the side flap by pulling gently at the marked point.
- The SD card slot is now visible.

Hold the SD card with the locking lug on the underside. Push the card into the slot as far as it will go; you should distinctly hear the card click into place.



### Important note:

The SD card must be initialised (formatted) before you can store model data on it. This is the procedure:

- Insert the card in the transmitter, and switch it on.
- The following message appears: 'Card not initialised. Stop / Format'
- Select the Format field to initialise the card, and press the 3-D hotkey button.
- A security query appears; confirm this with 'OK'.
- The message 'Formatting card' appears, and the screen shows the progress of the procedure in bar-graph form.
- This process may take several minutes, depending on the size of the card.
- When formatting is complete, you will see the message 'Formatting finished'; confirm this with OK.
- The transmitter now automatically switches to the familiar Start screen.

### REMOVING THE SD CARD

Push the end of the SD card inward with a fingertip until it moves slightly; you should hear a click. The SD card will now be ejected automatically, and you can take the card out of the slot.

### Note:

Do not remove the SD card during a read or write process, as this may corrupt the data stored on the card.

### TRANSFERRING DATA TO A PC

You will need a card reader device that supports SD cards in order to transfer data to or from a PC. These are available from electrical suppliers as digital photo accessories.

The files stored on the SD card are not in Windows format, and are not visible on a PC.

A special software program called the "Futaba File System Utility" is available for viewing and erasing these files. It can be downloaded from the Download area of the robbe Support Server at <http://Support.robbe.com>.

Another program whose purpose is to convert model data between T12Z / T12FG / T14MZ / FX 30 and FX 40 transmitters is in preparation, and will also be available for downloading from the robbe Support Server in due course.

### DATA SECURITY

The lifetime of an SD card is more than 100,000 write cycles. If you experience read / write problems after a very long period of frequent use, the card should be replaced. We are unable to accept responsibility for the security of the data on the card, and we always recommend that you create a back-up copy to be on the safe side.

Once data is stored on a DP card - or in the transmitter - it does not require electrical current, so you will not lose data if you remove the transmitter battery.

### MEMORY CAPACITY

- The transmitter's internal memory is sufficient for thirty models, and an optional SD card can be used as an expanded memory medium. The transmitter can manage cards with capacities of 32 MB to 1 GB. A 1 GB card has sufficient capacity for 1958 model data sets. The SD card can also be employed by the user to update the transmitter's software. The program data for this is also available in the Download area of the robbe website.
- See page 72 for information on updating the software.

### NOTES ON HANDLING SD CARDS

- Do not remove the SD card during the data writing process.
- Do not subject the SD card to powerful magnetic or electrical fields, as this can cause data loss and permanent damage to the card.
- Do not subject the card to direct sunlight or conditions of high aerial humidity.
- Do not allow the card to contact dirt, water or other fluids.
- Always hold the card by the edges when inserting or removing it.
- Take care always to insert the SD card the correct way round.
- Always switch off the transmitter before inserting or removing the SD card.

## 4.7 TRAINER MODE

The FX-30 is fitted with additional sockets on the left-hand side. One of them is a Trainer socket, which can also be used to control a flight simulator, and doubles up as a DSC socket.



Trainer (teacher / pupil) mode operations make it possible for newcomers to learn the art of model flying with the help of a tutor. The Teacher and Pupil transmitters must be inter-connected using the appropriate Trainer lead, which is available separately.

Teacher	Pupil	Trainer lead
FX-30	Skyport T4VY, T4EX, T6EX, T7C, T9C, T10C	Special trainer lead No. F 1314
FX-30	T12Z, T12FG, T14MZ, FX-30, FX-40	Trainer lead No. F 1591
FX-30	FC28, FC 18, F-14, FC-16	With Trainer Module 4 and lead No. F 1592

The FX-30 transmitter can be used either as the Teacher or the Pupil transmitter.

Please note the following points:

Selecting the modulation on Pupil transmitters with G3 modulation (PCM 2048).

For Pupil transmitters which feature G3 modulation, it is possible to switch to 8-channel or 12-channel modulation.

- In the case of other Pupil transmitters (with PCM 1024 or FM (PP8) modulation) it is essential to set 8-channel PPM (FM) modulation.
- If the transmitters are not set up with the same stick mode (throttle left / throttle right), you must change the mode on the Pupil transmitter (MODE 1 - 4).
- Connect the Teacher transmitter to the Pupil transmitter using the Trainer lead.
- Switch the Teacher transmitter on.
- The Pupil transmitter is usually switched on automatically when you connect the Trainer cable; to avoid the Pupil transmitter radiating an RF signal we recommend that you remove the crystal or the RF module from the transmitter, as well as the aerial.
- Pupil transmitters with a six-pin micro Trainer socket and a transmitter power supply consisting of a 2S LiPo or 6 NiMH pack are powered directly via the Trainer lead, No. F 1591 (e.g. T12FG, T12Z, T14MZ, FX-30, FX-40). Other transmitters with a six-pin micro Trainer socket and an eight-cell NC / NiMH power supply require the special Trainer lead, No. F 1314. This lead features an integral voltage converter (from 6 NC to 8 NC), which avoids constantly triggering the low-voltage alarm (T4EX, T6EXP, T7C, T9CP, T10C).
- Check the control functions carefully on the Teacher transmitter, then operate the Trainer switch and check the control functions from the Pupil transmitter.
- Switch back to Teacher mode: control must revert to the Teacher transmitter.

The transmitter software allows you to select whether the Pupil transmitter has its own mixer functions for controlling the model, or whether the system should always use the Teacher transmitter's mixer functions. Alternatively 'mix mode' operation is possible; in this case both transmitters are permitted to control the model.

For more information on the settings required for these arrangements please refer to the "Trainer" set-up menu. This is described as part of the "System menu" section.

The FX-30 transmitter can be operated either as the Teacher transmitter or as the Pupil transmitter in combination with a huge variety of transmitters from the robbe / Futaba range. The following combinations are possible; the list below also states the Trainer leads required:

FX-30 transmitter as Teacher transmitter in conjunction with the following Pupil transmitters:

- T12FG, T12Z, T14MZ, FX-30, FX-40 transmitters = Trainer lead No. F 1591
- T10C, FF-9 (T9CP), FF-7 (T7CP), T4EX, Skysport T4YF transmitters = special Trainer lead No. F 1314

FX-30 transmitter as Pupil transmitter in conjunction with the following Teacher transmitters (transmitter battery required in Pupil transmitter):

- Skysport T4YF, T4EX, FF-7 (T7CP), FF-9 (T9CP), T10C, T12FG, T12Z, T14MZ, FX-30, FX-40 transmitters = Trainer lead No. F 1591

## 4.8 DSC MODE, USE WITH FLIGHT SIMULATOR

It is not possible to use DSC function with 2.4 GHz receivers.

To operate a flight simulator program using the FX-30 transmitter you will need to use the adaptor lead, No. 8239, which is available as an optional accessory.



If you wish to use the transmitter with a flight simulator, you need to set the following parameters:

- Set the transmitter to Pupil in the "Trainer" menu, and switch it "On".
- Set "8Ch".
- Change the modulation to "PPM".

Connecting the adapter lead to the transmitter automatically switches off the RF output.

## 4.9 INPUT ELEMENTS

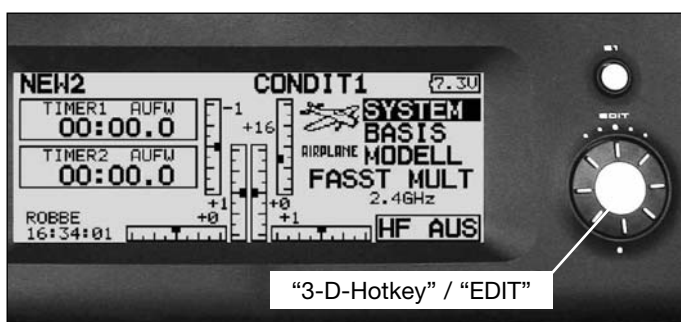
The FX-30 is programmed using the '3-D hotkey' with EDIT function and the S1 button, in conjunction with the large, clearly arranged LCD screen.

### LCD MONITOR CONTROL AREA

The large, clearly arranged, high-contrast LCD graphic monitor, with a resolution of 255 x 96 dots, provides the user with all the essential information during the programming procedure and when using the system to control a model.

### 3-D HOT-KEY / EDIT BUTTON

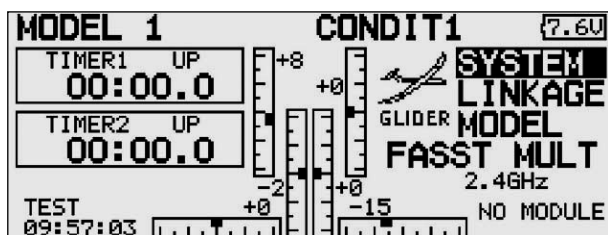
During the programming procedure data is entered primarily using the '3-D hotkey': rotating it increases or decreases a marked value, while - pressing it confirms the newly set values (EDIT function).



### S1 input button

The S1 button can be used to leaf through in either direction within the individual sub-menus even when you are not directly at the special settings level. A brief press on the button takes the cursor straight back to the starting point. To return to the home display you must hold the button pressed in for at least one second. The S1 button also acts as a Key Lock, to ensure that settings are not changed accidentally while you are flying a model. To lock and unlock the buttons first return to the Home display, then hold the S1 button pressed in for at least one second.

The screen-shot shows the Start screen. See Section 9 for a description of the individual displays.



## 4.10 LED STATUS

On the front panel you will find two status LEDs that indicate the transmitter status by means of flashing sequences and colours.



- When you switch the transmitter on, the red LED lights up.
- A green LED flashing slowly indicates that the spot frequency is being transmitted to the receiver.
- The LED monitor colour changes to green when the DSC lead is connected, and when the transmitter is active as a Pupil transmitter for Trainer mode operations.
- If the LED monitor flashes red slowly, this indicates that an RF module is NOT present, or that the RF module in the transmitter does not match the transmitter or the selected frequency band.

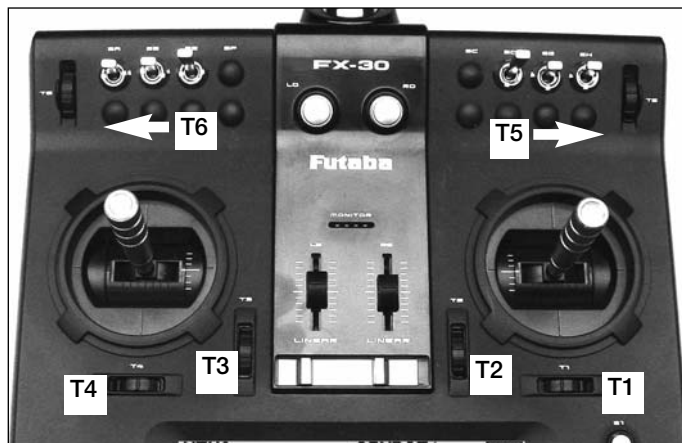
### SUMMARY OF THE MOST IMPORTANT COLOUR INDICATORS:

LED glows red:	RF module installed, No RF signal radiated
LED glows red / green:	Transmitter radiating RF signal
LED flashes red:	No RF module fitted
LED flashes green:	DSC or Trainer (Pupil) mode

## 4.11 ROTARY TRIMS

The four trim controls arranged around the primary sticks (T1 ... T4) take the form of rotary trims, as do the two trimmers arranged at top right and top left (T5 + T6) of the transmitter. The transmitter software allows you to select any of them to act as trims for the stick channels or for any other controls. They can also be set to act as mixer function controls. Every time you move a rotary trim, the trim value changes by one increment (the increment size is user-variable). The transmitter emits an audible signal when the trim position reaches the neutral point (centre position), or passes the neutral point. The current trim position is displayed in bar-graph form in the Start display and also in the "Trim value" menu. The trim rate and increment can be selected individually for each trim button; this is carried out in the "Function" menu.

The rotary trims can be assigned to act as trim functions for the individual transmitter controls; this is carried out in the "Function" sub-menu of the Base menu. The trim travel and the type of trim (ATL, Centre, Normal) can be set in the same menu.



In the Trim display sub-menu the trim increment "Step" can be set individually for each rotary trim. In the same menu you can assign the Global or Separate function as required. The display can also be changed from steps (increments) to %.

## 4.12 ROTARY KNOBS

The rotary knobs LD and RD are analogue controls that can be assigned freely to any function. They feature a fine centre detent, and the transmitter emits an audible signal when they are moved to the centre position.

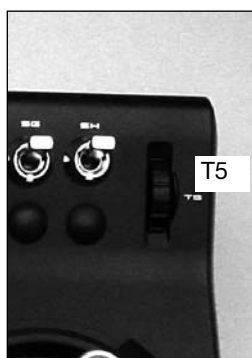
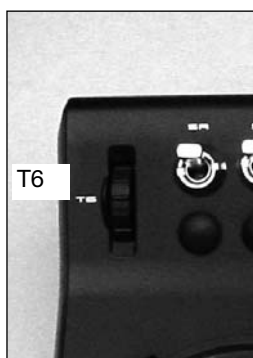
The markers indicate the set position.



## 4.13 UPPER ROTARY TRIMMERS

The two upper rotary trimmers can be set up to act as supplementary trims, or assigned as transmitter controls for any function you like. They feature a fine centre detent, and the transmitter emits an audible signal when they are moved to the centre position.

The trimmer on the left-hand side of the transmitter is designated T6, that on the right-hand side T5. Both controls can be reached conveniently using the index fingers, without forcing the pilot to let go of the primary sticks.



## 4.14 AERIAL

The movable transmitter aerial should be rotated to a horizontal position (see Photo) to achieve the best RF radiation pattern.

Never point the aerial directly at the model, because the RF radiation is at its minimum along the aerial axis



Do not touch the aerial during flight as this dramatically reduces the radiation!

## 5. CONNECTING THE SERVOS

Servo output sequence with 7 channel 2,4 GHz modulation

Channel	Power model	Glider	Helicopter
1	Aileron	Aileron	Roll-axis (aileron)
2	Elevator	Elevator	Pitch-axis (elevator)
3	Throttle	Throttle	Throttle
4	Rudder	Rudder	Tail rotor
5	Retracts	Flaperon	Gyro
6	Aileron 2	Flaperon 2	Collective pitch
7	Free	Aileron 2	Free

The FX-30 radio control system allows the user to select the sequence of servo outputs freely, without restriction.

If you wish to maintain compatibility with previous PCM 1024 systems with fixed servo output assignment, you should change the sequence to that shown in this table.

## 5.1 CONNECTING SERVOS

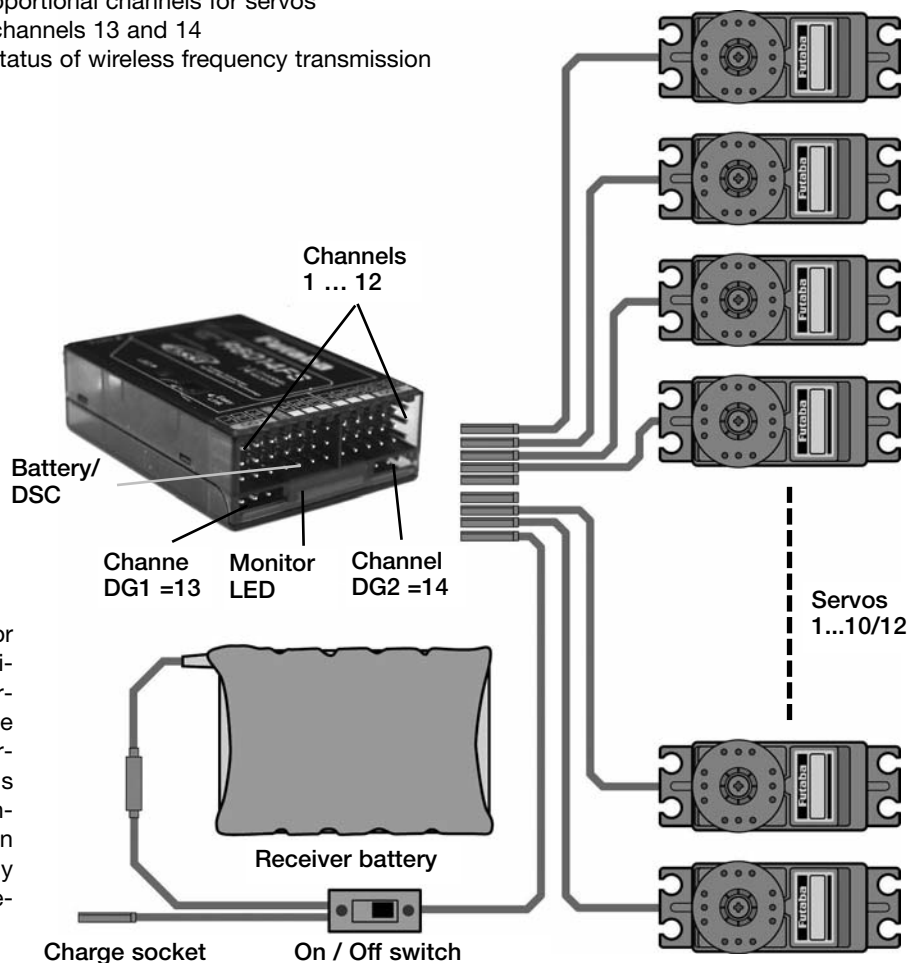
### Connecting servos and power supply:

#### R 6014HS receiver

Socket:	B/C = receiver battery or DSC cable
Outputs 1 ... 12:	1 ... 12 proportional channels for servos
Outputs DG1 and DG2	Switched channels 13 and 14
Monitor LED	Indicates status of wireless frequency transmission

#### Note:

If the number of powerful analogue or digital servos connected to the receiver is high, the standard switch harness supplied in the set will not be capable of handling the heavy currents which will flow. In such systems it is necessary to use a suitable high-current power supply (usually known as a Power battery backer) to supply the servos and receiver. Ask at a specialist model shop for details.



### NEW SYSTEM FOR FUNCTION SEQUENCE

To remain compatible with small 5/6 receivers, the second aileron output has been shifted to output 5 for the PCM-G3/FASST systems. The increased number of channels has also necessitated this change. This means that the receiver channel sequence is not the same as that of the PCM 1024 system.

To maintain compatibility with the PCM-1024 system it is possible to select any function sequence you like; this is accomplished in the "Function" menu.

#### Note:

If you need to change the function sequence when using the PCM-G3/ FASST systems, please ensure that associated functions are allocated together within the channel groups 1 ... 6 or 7 ... 12. Do not assign paired functions to channels 6 and 7, as this could result in different servo transit times.

The transmitter employs a new, graphical method of selecting the model type as basis for the mixer functions and transmitter control arrangement (stick mode), and this automatically generates a suggested configuration for the selected model type. We recommend that you keep to this set-up if possible, so that you are always using a standard configuration.

The "Function" menu clearly shows the output to which the corresponding servo is connected, and which transmitter control is used to operate it. Where a single function operates two or more servos, the corresponding transmitter controls are configured accordingly.

Within an individual model type the configuration varies little, although the number of channels in use may increase if the number of wing flaps and other control surfaces is higher than usual.

The situation is different when you switch from one model type to another. For example, if you change the model type from a normal tail to a tail layout with two elevator servos (Ailvator), the sequence of functions is necessarily different.

The same also applies, of course, to model gliders (powered and unpowered), and for flying wing models with and without winglets.

The following pages contain comprehensive tables and sketches that clearly show the servo connection sequence, arranged according to the different model types that are managed by the software.

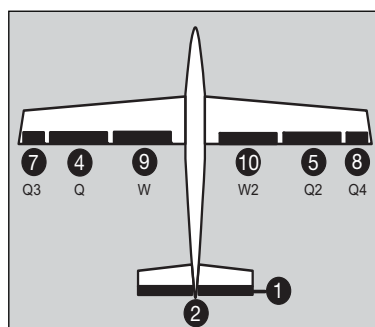
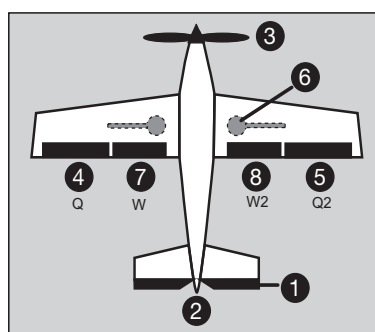
## 5.2 FIXED-WING MODEL AIRCRAFT, NORMAL ELEVATOR

### 1). Airplanes, Motorglider and Glider with standard T-, Cross- and V-tail

CH	1 Aileron			2 Aileron			2 Aileron+1 Flap		
	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
2	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
3	Throttle	Motor	AUX 1	Throttle	Motor	AUX 1	Throttle	Motor	AUX 7
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Gear	AUX 7	AUX 8	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Airbrake	Airbrake	Airbrake	Gear	AUX 7	AUX 7	Flap	Flap	Flap
7	AUX 6	AUX 6	AUX 6	AUX 6	AUX 6	AUX 6	Gear	AUX 6	AUX 6
8	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5
9	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4
10	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3
11	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC1	AUX 1	AUX 1	AUX 1	Camber	Camber	Camber	Camber	Camber	Camber
VC2	AUX 1	AUX 1	AUX 1	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1

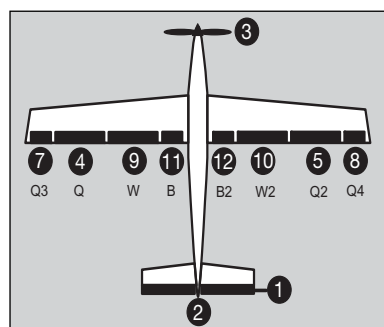
CH	2 Aileron+2 Flap			2 Aileron+4 Flap			4 Aileron+2 Flap		
	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
2	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
3	Throttle	Motor	AUX 6	Throttle	Motor	AUX 4	Throttle	Motor	AUX 4
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Gear	AUX 5	AUX 5	Gear	AUX 3	AUX 3	Gear	AUX 3	AUX 3
7	Flap	Flap	Flap	Flap	Flap	Flap	Aileron 3	Aileron 3	Aileron 3
8	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2	Aileron 4	Aileron 4	Aileron 4
9	AUX 4	AUX 4	AUX 4	Flap 3	Flap 3	Flap 3	Flap	Flap	Flap
10	AUX 3	AUX 3	AUX 3	Flap 4	Flap 4	Flap 4	Flap 2	Flap 2	Flap 2
11	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC1	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber
VC2	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1

CH	4 Aileron+4 Flap		
	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator
2	Rudder	Rudder	Rudder
3	Throttle	Motor	AUX 2
4	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2
6	Gear	AUX 1	AUX 1
7	Aileron 3	Aileron 3	Aileron 3
8	Aileron 4	Aileron 4	Aileron 4
9	Flap	Flap	Flap
10	Flap 2	Flap 2	Flap 2
11	Flap 3	Flap 3	Flap 3
12	Flap 4	Flap 4	Flap 4
VC1	Camber	Camber	Camber
VC2	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1



#### Note:

All model types are available when twelve-channel PCM-G3/FASST mode is selected. If you select FM 8-channel or PCM 1024, the number of available model types is reduced. In this case only the model types shown with a grey background are available. VC 1 ... 4 are virtual functions without physical receiver outputs; however, these functions affect multiple servos, e.g. the Crow (Butterfly) function.



The numbers in circles indicate the receiver output

## 5.3 FIXED-WING MODEL AIRCRAFT, SEPARATE (2) ELEVATORS

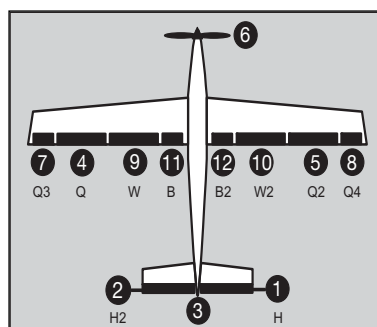
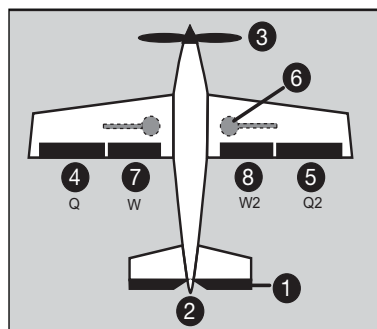
### 2). Modeltype with 2 separate Elevator flaps, usable also as Aileron (Ailvator)

CH	1 Aileron			2 Aileron			2 Aileron + 1 Flap		
	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2
3	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Throttle	Motor	AUX 7	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Airbrake	Airbrake	Airbrake	Throttle	Motor	AUX 7	Throttle	Motor	AUX 6
7	Gear	AUX 6	AUX 6	Gear	AUX 6	AUX 6	Flap	Flap	Flap
8	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	Gear	AUX 5	AUX 5
9	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4
10	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3
11	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC1	AUX 1	AUX 1	AUX 1	Camber	Camber	Camber	Camber	Camber	Camber
VC2	AUX 1	AUX 1	AUX 1	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1

CH	2 Aileron + 2 Flap			2 Aileron + 4 Flap			4 Aileron + 2 Flap		
	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2	Elevator 2
3	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Throttle	Motor	AUX 5	Throttle	Motor	AUX 3	Throttle	Motor	AUX 3
7	Flap	Flap	Flap	Flap	Flap	Flap	Aileron 3	Aileron 3	Aileron 3
8	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2	Aileron 4	Aileron 4	Aileron 4
9	Gear	AUX 4	AUX 4	Flap 3	Flap 3	Flap 3	Flap	Flap	Flap
10	AUX 3	AUX 3	AUX 3	Flap 4	Flap 4	Flap 4	Flap 2	Flap 2	Flap 2
11	AUX 2	AUX 2	AUX 2	Gear	AUX 2	AUX 2	Gear	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC1	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber
VC2	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1

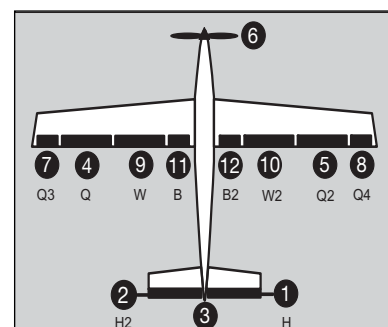
CH	4 Aileron + 4 Flap		
	Airplane	EP-Glider	Glider
1	Elevator	Elevator	Elevator
2	Elevator 2	Elevator 2	Elevator 2
3	Rudder	Rudder	Rudder
4	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2
6	Throttle	Motor	AUX 1
7	Aileron 3	Aileron 3	Aileron 3
8	Aileron 4	Aileron 4	Aileron 4
9	Flap	Flap	Flap
10	Flap 2	Flap 2	Flap 2
11	Flap 3	Flap 3	Flap 3
12	Flap 4	Flap 4	Flap 4
VC1	Camber	Camber	Camber
VC2	AUX 1	Butterfly	Butterfly
VC3	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1

The numbers in circles indicate the receiver output



#### Note:

All model types are available when twelve-channel PCM-G3/FASST mode is selected. If you select FM 8-channel or PCM 1024, the number of available model types is reduced. In this case only the model types shown with a grey background are available. VC 1 ... 4 are virtual functions without physical receiver outputs; however, these functions affect multiple servos, e.g. the Crow (Butterfly) function.

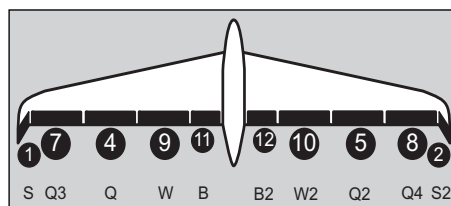
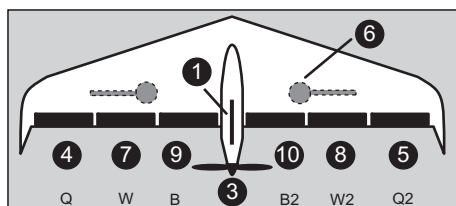
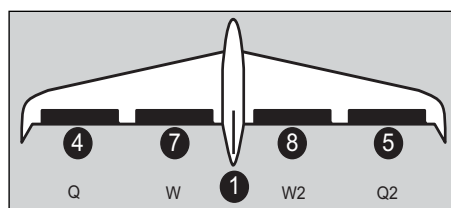
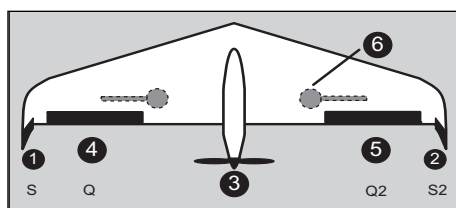


## 5.4 FLYING WING MODEL AIRCRAFT

### 3). Flying wing models as motorplane, EP-Glider ore Glider, standard rudder or winglet rudder

	2 Aileron			2 Aileron + 1 Flap			2 Aileron + 2 Flap		
CH	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2
3	Throttle	Motor	AUX 1	Throttle	Motor	AUX 7	Throttle	Motor	AUX 6
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Gear	AUX 7	AUX 7	Flap	Flap	Flap	Gear	AUX 5	AUX 5
7	AUX 6	AUX 6	AUX 6	Gear	AUX 6	AUX 6	Flap	Flap	Flap
8	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	AUX 5	Flap 2	Flap 2	Flap 2
9	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4	AUX 4
10	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3	AUX 3
11	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1
VC1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
VC2	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber
VC3	AUX 1	AUX 1	AUX 1	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1

	2 Aileron + 4 Flap			4 Aileron + 2 Flap			4 Aileron + 4 Flap		
CH	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider	Airplane	EP-Glider	Glider
1	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder	Rudder
2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2	Rudder 2
3	Throttle	Motor	AUX 4	Throttle	Motor	AUX 4	Throttle	Motor	AUX 2
4	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron	Aileron
5	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2	Aileron 2
6	Gear	AUX 3	AUX 3	Gear	AUX 3	AUX 3	Gear	AUX 1	AUX 1
7	Flap	Flap	Flap	Aileron 3	Aileron 3	Aileron 3	Aileron 3	Aileron 3	Aileron 3
8	Flap 2	Flap 2	Flap 2	Aileron 4	Aileron 4	Aileron 4	Aileron 4	Aileron 4	Aileron 4
9	Flap 3	Flap 3	Flap 3	Flap	Flap	Flap	Flap	Flap	Flap
10	Flap 4	Flap 4	Flap 4	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2	Flap 2
11	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	AUX 2	Flap 3	Flap 3	Flap 3
12	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	Flap 4	Flap 4	Flap 4
VC1	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator	Elevator
VC2	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber	Camber
VC3	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly	AUX 1	Butterfly	Butterfly
VC4	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1	AUX 1



The numbers in circles indicate the receiver output

#### Note:

All model types are available when twelve-channel PCM-G3 mode is selected. If you select FM 8-channel or PCM 1024, the number of available model types is reduced. In this case only the model types shown with a grey background are available.

VC 1 ... 4 are virtual functions without physical receiver outputs; however, these functions affect multiple servos, e.g. the Crow (Butterfly) function.

In the case of flying wings the elevator is also a virtual function.

## 5.5 MODEL HELICOPTERS

### 4. Function sequence for Helicopter use

CH	H1 + 2, HE3 90°, HR3 120° HN3 120°, H3 140°	Heli 4
1	Throttle	Throttle
2	Rudder	Rudder
3	Gyro	Aileron
4	Aileron	Elevator
5	Elevator	Pitch
6	Pitch	Elevator 2
7	Governor	Gyro
8	Governor 2	Governor
9	Needle	Governor 2
10	AUX 3	Needle
11	AUX 2	AUX 2
12	AUX 1	AUX 1
VC1	AUX 1	AUX 1
VC2	AUX 1	AUX 1
VC3	AUX 1	AUX 1
VC4	AUX 1	AUX 1

**Note:**

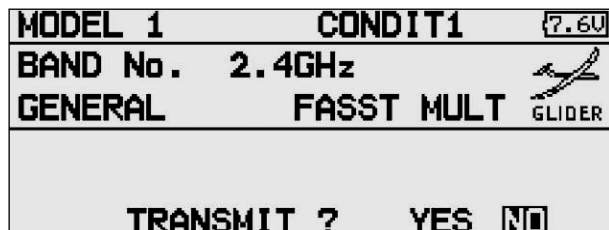
More functions are available when twelve-channel PCM-G3 mode is selected.

If you select FASST Multi or 7 channel, the number of available model types is reduced. In this case only the model types shown with a grey background are available.

VC 1 ... 4 are virtual functions without physical receiver outputs but with their own control curves such as Butterfly and Flaperon. The control curve is individually adjustable; however, these functions affect multiple aileron an/or flap servos.

## 6. SWITCHING THE TRANSMITTER ON / OFF

- Locate the switch on the transmitter marked “Power”, and slide it to the right.
- After the loading and initialisation phase (monitor LED flashes red) the screen displays the spot frequency confirmation field.



- This request to check the spot frequency is displayed every time you switch the transmitter on.
- If the transmitter is set to the correct channel, and you wish to transmit an RF signal, select the appropriate answer with the 3-D hotkey and press the rotary knob (EDIT) to confirm your choice.
- The green status LED now lights up, indicating that an RF signal is being broadcast.
- If you select “No” with the 3-D hotkey and confirm your choice with ‘EDIT’, the display switches to the Start menu, and no RF signal is transmitted; the green LED goes out. You can now carry out adjustments without radiating an RF signal, or change the spot frequency so that the transmitter starts on the correct channel next time you switch it on.

### Note:

If an SD card is fitted, this will also prolong the start phase slightly, as the transmitter must first read all the files on the card.

### Caution:

Never switch the transmitter off during the initialisation phase (monitor LED flashes red), as this could corrupt the settings.

## SWITCHING THE TRANSMITTER OFF

- Move the “Power” switch on the transmitter to the left.
- This action cuts off RF transmission, and causes the data in the working memory to be written to the transmitter’s internal memory or the SD card.

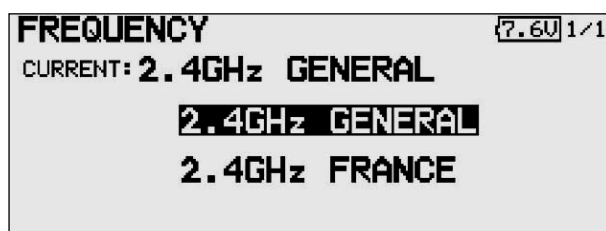
Switching the transmitter on again during the power-off / data storing process could also corrupt the saved data, so the transmitter ignores your action if you try to do this.

## 7. CHANGING THE FREQUENCY BAND

To change the frequency band, choose “FREQUENCY” in basic menu.



Thereafter, you will be asked which 2,4 GHz band is to be used...General or France.



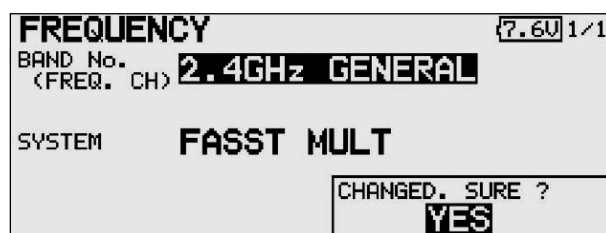
Advice on choosing the frequency in 2,4 GHz band EU countries, Switzerland, Norway, Iceland and Russia. The 2,4 GHz band offers two frequency ranges to be used:

### 1.2400...2483,5 MHz, “GENERAL”

This frequency range is not harmonised in all EU countries, e.g. France. Due to “CE” marking reasons, the manufacturer needs to notify the relevant national agency. On this frequency band Can and due to the missing frequency harmonisation, different national regulations for the use of 2.4 GHz or the radiated power output may apply.

### 2.2400...2454 MHz, switch setting “FRANCE”

This frequency range is harmonised throughout all EU countries and “CE” marked. It requires no notification to national authorities and no national limitations apply.




### Recommendation:

For countries such as Austria, France, Russia, Italy and Belgium, choose the setting “FRANCE” (frequency range 2400...2454 MHz). It is necessary to obtain an additional general permission for use in Romania and Bulgaria. Contact your local Telecommunications Office. It is forbidden to use it in a 20 km radius of the research station Ny Aeslund in Norway.

Important: Following the change of frequency range from “GENERAL” to “FRANCE”, the receiver must be rebound. Following the selection, confirm the frequency change.

With "No" the transmission remains switched off but can be turned on later.

TIP: Make a thorough range check before the first flight!!

<b>MODEL 1</b>	<b>CONDIT1</b>	<b>[7.60]</b>
<b>BAND No. 2.4GHz</b>		
<b>GENERAL</b>	<b>FASST 7CH</b>	<b>GLIDER</b>
<b>TRANSMIT ? YES NO</b>		

Channel sequence (FASST Multi/ 7 channel)  
Servo Connections

If the channel assignment is automatically re-arranged in order to optimise the swashplate control system, you must re-connect the corresponding servo outputs at the receiver in accordance with the following table, as the stated channel sequence differs from that used with G3 modulation. Carrying out a Reset automatically configures the following sequence. The automatic channel sequence assignment only takes effect in the **Helicopter** menu, and only with **G3/FASST Multi modulation**. Models with PCM 1024 or PPM (FM) modulation are not affected by this.

Channel	Multi channel		7 channel	
	except H-4, H4X	H-4, H4X	except H-4, H4X	H-4, H4X
1	Aileron	Aileron	Aileron	Aileron
2	Elevator	Elevator	Elevator	Elevator
3	Pitch	Pitch	Throttle	Throttle
4	Rudder	Elevator 2	Pitch	Pitch
5	Gyro	Rudder	Gyro	Gyro
6	Throttle	Throttle	Rudder	Rudder
7	Governor	Gyro	Governor	Elevator 2
8	Governor 2	Governor	AUX 5	AUX 5
9	Needle	Governor 2	AUX 4	AUX 4
10	AUX 3	Needle	AUX 3	AUX 3
11	AUX 2	AUX 2	AUX 2	AUX 2
12	AUX 1	AUX 1	AUX 1	AUX 1
VC1	AUX 1	AUX 1	AUX 1	AUX 1
VC2	AUX 1	AUX 1	AUX 1	AUX 1
VC3	AUX 1	AUX 1	AUX 1	AUX 1
VC4	AUX 1	AUX 1	AUX 1	AUX 1

## 8. CHANGING THE MODULATION FASST 7CH/MULT.

The TM-14 module can be used in 2 different modulation types- FASST MULT (8-14 channel) and FASST 7CH (6-7 channels).

The modulation in operation is shown in the lower right hand corner of the start display.

- 1 to change the modulation type, select "FREQUENCY" in the Basic menu or press the lower left hand in Start display.
2. Move the cursor to the required modulation type and make the desired selection. The modulation type will be stored in the respective model memory.

<b>FREQUENCY</b>	<b>[7.60] 1/1</b>
<b>BAND No. 2.4GHz</b>	<b>GENERAL</b>
<b>(FREQ. CH)</b>	
<b>SYSTEM</b>	<b>FASST MULT</b>

Choose the following modulation types for the different FASST receivers:

FASST MULT: 14 channel mode, R608FS and R 6014FS receivers.

FASST 7 CH: 7 channel mode, R606FS, R 607FS, R 617FS and R6004FF receivers.

### Note:

In FASST 7 CH mode, the failsafe function will only operate on channel 3 and cannot be changed!

If the Throttle failsafe is active, then the battery failsafe is also active.

This is different to FASST MULTI, where both failsafes can be activated individually.

<b>FREQUENCY</b>	<b>[7.60] 1/1</b>
<b>CURRENT: FASST MULT</b>	
<b>FASST MULT</b>	
<b>FASST 7CH</b>	

With the selection of FASST 7 CH, 8 or more channels may be displayed in various menus (servo centring, servo reverse etc.), but only settings for channels 1-7 may be adjusted.

<b>FAIL SAFE</b>	<b>[7.50] 1/3</b>
<b>CHFUNCTION F/S</b>	<b>F/S-PDS</b>
1 AIL	
2 ELE	
3 MOT <b>F/S</b>	<b>+100%</b>
4 RUD	<b>RELEASE BATTERY F/S J2</b>

## 8.1 BINDING THE RECEIVER

General advice for 2,4 GHz equipment

The 2,4 GHz system differs from the traditional 27-40 MHz radio equipment.

- 2,4 GHz signals radiate from the transmitter virtually in a straight line, for which reason it is essential to maintain visual contact with the model at all times.
- Large obstacles between the transmitter and the receiver can have a damping or blocking effect on the signal.
- Close to the ground the transmitter signal is damped more severely than is the case with 27-40 MHz systems.
- On foggy days and / or when the ground is wet the range may be reduced at very low altitudes.
- If a model is close to the ground, and if an obstacle (person, vehicle, object etc.) moves between the transmitter and the receiver, then effective range may be significantly reduced.

Teacher-Pupil System:

When the TM-14 module is being used as the teacher transmitter, please take care that the RF radiation is taking place (green LED "ON" or flashing, red LED off) before switching on the pupil transmitter. Otherwise, possible functional error may occur.

### MODULE LED STATUS MONITOR

Receiver binding (Easy-Link)

When the "Link/Mode" button is pressed, the receiver automatically stores the transmitter's individual code number (130 million codes). This result of this "binding" process is that the receiver only responds to signals generated by the bound transmitter.

LED green	LED red	Function/Status	F/S
ON	ON	Initialisation after switching on	---
alternately flashing		Checking the RF environment	---
ON	OFF	RF radiation - "transmit" without F/S	OFF
ON	flashing	RF radiation in "Power-Down mode" for range-checking	OFF
flashing	OFF	RF radiation - "transmit" with F/S	ON
flashing	flashing	RF radiation in "Power-Down mode" for range-checking with F/S	ON

When the "Link/Mode" button is pressed, the receiver automatically stores the transmitter's individual code number (130 million codes). This result of this "binding" process is that the receiver only responds to signals generated by the bound transmitter.



- Place the transmitter close to the receiver (approx. 1 m)
- Switch the transmitter on
- Switch the receiver power supply on
- Hold the Link/Mode button on the receiver pressed in for at least one second, and then release it again: this "binds" the receiver to the transmitter.
- If the binding process is successful, the LED on the receiver glows green.

This permanent assignment between transmitter and receiver provides a superb basis for suppression of interference signals. Suppression is even better than that of conventional systems, since a digital filter is used to allow through only those control signals that emanate from the receiver's bound transmitter. The net result is extremely effective suppression of interference and signals from other transmitters. Multiple receivers can be "bound" to the same module. If you subsequently wish to bind a receiver to a different module, simply press the Link/Mode button again after switching on.

### Switching from analogue to digital servos

The receiver is pre-programmed to "Normal" mode by default; this means that it is set up for use with normal analogue servos. However, channels 1 to 6 can be set to generate faster output signals, and this results in an even faster response if digital servos are used.

This is the procedure:

### Setting Digital mode:

1. Switch the receiver off after completing the binding process.
2. Hold the Link/Mode button pressed in for about 2 to 3 seconds while you switch the receiver on; the red and green LEDs will now flash.
3. Release the Link/Mode button again: the monitor LED glows green.
4. Switch the receiver off to store the new value.

The method of switching from Digital to Analogue mode is the same.

While you are changing the setting, the monitor LED flashes red to indicate

Analogue mode when the button is held pressed in.

The green LED glows when you release the button.

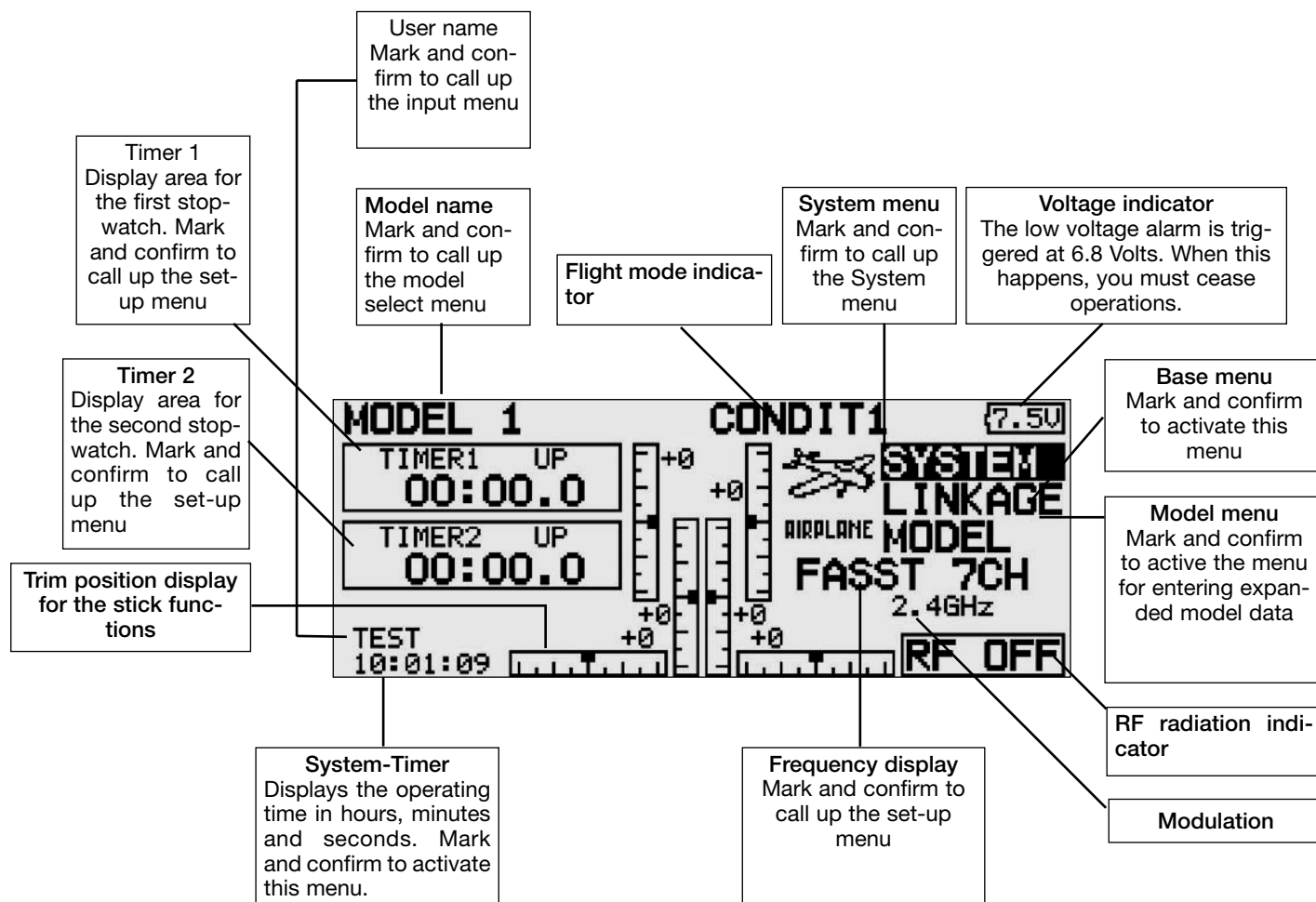
### Note:

Digital mode is only available for channels 1 - 6! Caution: do not connect analogue servos to these channels if you have selected Digital mode, as the high pulse frequency may ruin the servos. Check each new setting on your receiver! Ensure that no FASST transmitters are switched on in the vicinity when you carry out the process.

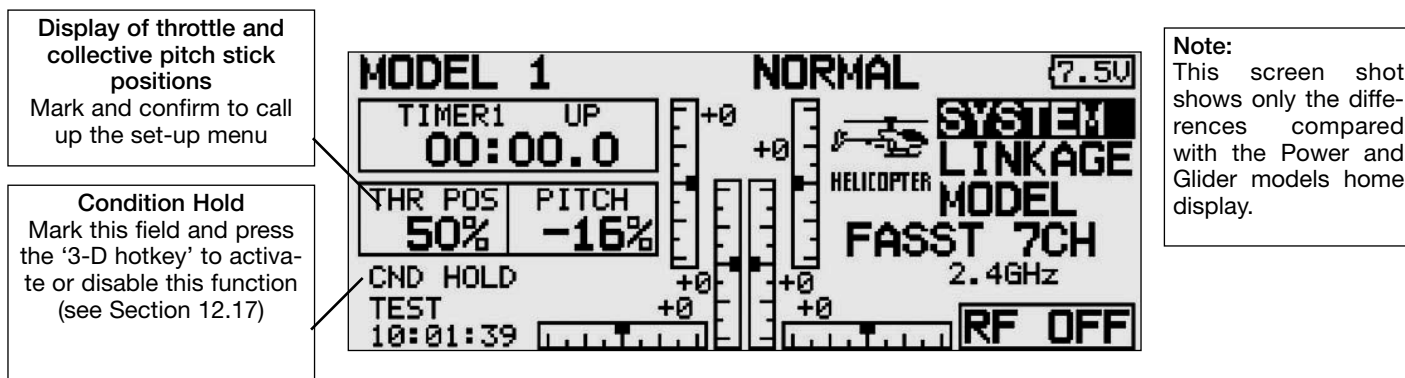
## 9. DESCRIPTION OF THE START SCREEN

The most important information relating to the transmitter programming is displayed on the Start screen. At the same time most of the display fields also constitute the starting point for the individual programming procedures. Use the 3-D hot key to mark the field you wish to change, and press it to confirm your choice: this takes you to the desired set-up menu.

### 9.1 START SCREEN FOR FIXED-WING MODEL AIRCRAFT



### 9.2 START SCREEN FOR MODEL HELICOPTERS



#### CAUTION: IMPORTANT!

Please make it a routine matter to check the residual battery capacity as often as possible, and recharge the transmitter pack in good time. If the low-voltage alarm (6.8 V) should be

triggered during a flight, land the model without delay, switch off the transmitter and recharge the battery. Please check before you launch your model that you have selected the appropriate model memory!

## 10. MENU STRUCTURE, METHOD OF NAVIGATING

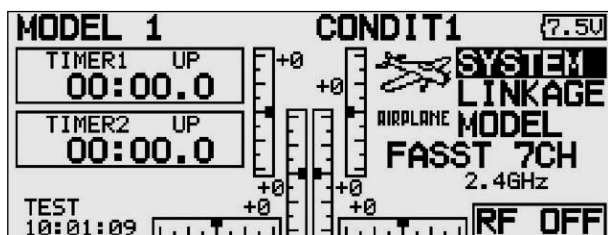
The menu structure is divided up into three distinct Select menus: System, Base and Model. From each Select menu you can then move on to the various Set-up menus. Some Select menus and Set-up menus have a second page or sub-level.

Set-up menus that are frequently needed, e.g. the Frequency Select menu, can be accessed directly from the Start screen (see also the description of the Start screen on the previous page).



The process of finding your way around the menu system is simple and logically arranged. The '3-D hot key' and the Select button S1 are used to control the menu system.

- The S1 button is used to leaf through within the Select menu level; it is also used to lock and unlock the '3-D hot-key'.
- When you stop using the '3-D hotkey', after an interval of five seconds the control is automatically blocked, in order to prevent you changing values accidentally whilst flying a model.

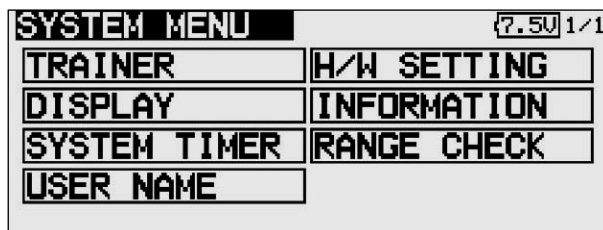


- Hold the S1 button pressed in for at least 0.6 second to unlock the 3-D hot key again.
- Holding the S1 button pressed in for one-second returns you directly to the Start screen.
- The 3-D hotkey features two operating functions:
- To confirm a selection it must be pressed in; this equates to an 'EDIT' function.
- Rotating the hot-key changes the data values.
- For example, turning the 3-D hotkey to the right increases the % value in a sub-menu, whereas turning it to the left reduces the value.

## 11. SYSTEM MENU

This menu is used to adjust basic transmitter settings that apply to all models, i.e. they are not specific to any model memory. Settings entered in this menu apply to all model memories. It is not possible to change or influence the data stored in any model memory whilst you are using this menu. Exception: Trainer mode; this data is stored individually with each model memory.

Use the 3-D hotkey to mark the 'SYSTEM' field in the HOME menu, and confirm your selection with 'EDIT'. This action calls up the overview of the System menu on the screen:



Rotating the '3-D hotkey' selects one of the available functions. These are as follows:

- **Trainer:** Trainer mode settings
- **Display:** Screen contrast
- **System timer:** Operating hours timer, alternatively model memory timer
- **User name:** User name
- **H/W control setting:** Hardware transmitter control reverse
- **Information:** Software version, SD card capacity

### 11.1 TRAINER MODE

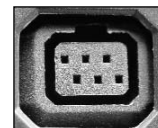
Trainer (teacher - pupil, buddy-box) operations make it possible for newcomers to learn the art of model flying with the help of an experienced pilot (Teacher).

The FX-30 transmitter is equipped as standard with a socket to which a Trainer cable can be connected. The socket is located at the bottom of the transmitter on the left-hand side. Section 4.7 on page 10 of these instructions lists the other transmitters from the robbe / Futaba range which can be used in combination with the FX-30 transmitter, acting either as the Teacher or as the Pupil transmitter. These lists also contain information on the Trainer leads and modules that have to be used for particular combinations, together with safety notes relating to Trainer mode operations.

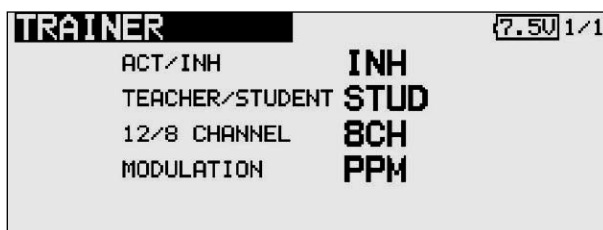
#### Important note:

If you intend to use the FX-30 transmitter as the Teacher unit, then it is absolutely essential to set the modulation on the Pupil transmitter to PPM.

**Exception: systems with PCM 2048 (G3) modulation: in this case you can select eight-channel or twelve-channel mode.**



Use the '3-D hotkey' to mark the 'TRAINER' option in the System menu, and press EDIT to confirm your choice.



In this menu you can enter all the basic settings for Trainer mode operations. After marking the desired option using the 3-D hotkey, any changes to the settings are carried out by turning the '3-D hotkey'.

## TRAINER MODE: TEACHER TRANSMITTER

The following options are available (see pages 1 / 4):

- **ACT / INA:**  
'ACT' mode setting = Trainer function switched on; 'INH' = Trainer function switched off
- **Trainer:**  
This setting determines whether the transmitter is to be used as the Teacher or Pupil transmitter.  
It is essential to note that the FX-30, like all other systems with PCM 2048 (G3)/FASST modulation, features a different function sequence compared with earlier Futaba and robbe / Futaba transmitters.  
If you are using a PCM 2048 (G3)/FASST system, it is possible to select eight-channel or twelve-channel mode.  
For all other systems (PCM 1024, PPM8) you must select FASST.  
The eight-channel setting should also be selected if you wish to use the transmitter to control a flight simulator.
- **Switch:**  
This point selects the switch you wish to use to transfer control between the Teacher and the Pupil transmitters. Mark and confirm this option: this action calls up a sub-menu in which you can determine the switch you wish to use, and its direction of operation. It is also possible to determine the function of the switch. 'NORM' means that the switch has defined 'ON' and 'OFF' positions.

After entering this basic Trainer information, you can decide for each channel separately whether it is to be controlled by the Pupil alone, or in conjunction with the Teacher (Mix mode), when the transfer switch has been operated.

Move to the 'MODE' field for the appropriate channel, then rotate the '3-D hotkey' to select the mode from the following options:

TRAINER				(7.50) 2/3
CH	FUNCTION	MODE	SW	RATE
1	AILERON	<b>FUNC</b>	--	<b>+100</b>
2	ELEVATOR	<b>NORM</b>	--	
3	THROTTLE	<b>MIX</b>	--	<b>+100</b>
4	PITCH	<b>OFF</b>	--	

- **Off:**  
This channel is not transferred to the Pupil transmitter; it is controlled exclusively by the Teacher.
- **FUNC:**  
In this mode the corresponding channel is transferred to the Pupil transmitter. In this case the Pupil transmitter uses the mixer settings of the Teacher transmitter, and therefore does not require its own mixer functions to control the model. The position of the Trainer switch determines whether the Teacher or Pupil has control of the model.

### • NORM:

In this mode, the corresponding channel is also transferred to the Pupil transmitter, but the Pupil transmitter uses its own mixer settings, and therefore requires appropriate mixer functions to control the model. When control is passed to the Teacher transmitter, its own mixer functions are used to control the model. As in FUNC mode, the position of the Trainer switch determines whether the Teacher or Pupil has control of the model.

### • MIX:

If this mode is selected, and the Trainer switch is set to "ON", then the Teacher and Pupil both have access to the model's control system, i.e. they control the model in parallel. In this mode both the Teacher and the Pupil control the model using the settings and mixers selected on the Teacher transmitter.

The various modes can be selected separately for each function, i.e. a combination of modes is possible for the various channels.

The software of the FX-30 allows the user to define a separate switch for each channel. If you wish to do this, you should mark and activate the corresponding field. This action calls up the following screen display, where the switches can be selected.

HARDWARE SEL. NORMAL		(7.50) 1/1
HARDWARE LIST		
SA SE SI		--
SB SF SJ		
SC SG		
SD SH		

The following options are available:

- **NONE:**  
The selected mode is always active for this channel
- **ON / OFF:** Switch Direction sub-menu

ON/OFF NORMAL		(7.50) 1/1
SB	OFF	
	OFF	
	▶ ON	

## TRAINER MODE: PUPIL TRANSMITTER

If the FX-30 is to be used as the Pupil transmitter, the appropriate settings have to be entered as described above. The settings correspond to those required when programming the transmitter as the Teacher transmitter, but the number of available options is much smaller, since a Pupil transmitter only requires a few functions.

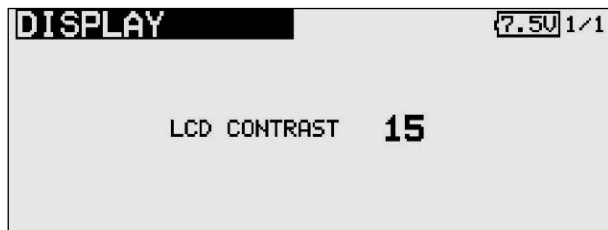
It is important to set the correct number of channels: the channel count must be selected according to the Teacher transmitter to be used:

- Twelve channels if the Teacher transmitter is a T12Z, T12FG, T14MZ, FX-30 or FX-40.
- Eight channels for any other type of Futaba or robbe / Futaba transmitter.

## 11.2 SCREEN (DISPLAY) SETTINGS

In the 'DISPLAY' set-up menu you can alter the contrast settings for the LCD screen.

### ADJUSTING SCREEN CONTRAST



Activate the 'LCD CONTRAST' field and rotate the '3-D hotkey' to adjust the screen contrast. Turning the control to the left makes the screen lighter; turning it to the right makes it darker.

To return the screen contrast to the default setting, select and mark the line in the usual way, then hold the 'EDIT' button pressed in for at least one second: this restores the original default setting.

## 11.3 SYSTEM TIME

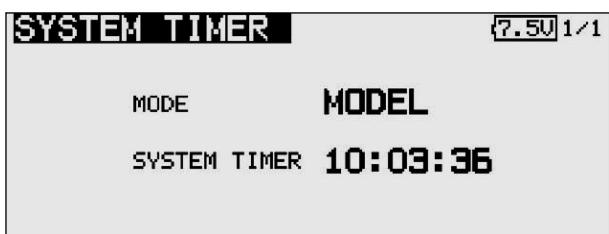
In this menu you can select either of two different timers:

1) TOTAL: this timer displays the overall elapsed operating time since the last reset. As an option this function can be used to record the transmitter's total operating time, or to display the battery operating time; in the latter case the timer should be reset to 'ZERO' every time you recharge the transmitter battery.

The system time is displayed at bottom left of the 'Start' screen.



2) MODEL: this is a model memory timer that records the operating times for each model memory separately.



RESET: this function is used to reset each timer to zero. Move to the System Time menu, and then to the 'System Time' line. Hold the 'EDIT' button pressed in for about one second to reset the timer.

## 11.4 USER NAME

This function is used to program your own name.

### USER NAME

Mark the User Name field and confirm with EDIT; a Character Select menu now appears on the screen, which you can use to enter your name.

The name can be entered using capital letters and numerals.



The user name can be up to twelve characters long (including spaces). First use the '3-D hotkey' to mark the letter in the name line which you wish to alter, then select the appropriate letter in the character field using the '3-D hotkey', and confirm your choice with the 'EDIT' button: this action adopts the new letter. To erase the name move to the 'DELETE' field with the 3-D hotkey and press the 'EDIT' button.

If you wish to modify an existing name, select the appropriate arrow button: now you can move the cursor in the appropriate direction by pressing the 'EDIT' button. To erase the letter, click the cursor in front of the appropriate letter, then switch to the 'DELETE' field with the '3-D hotkey', and confirm with 'EDIT'.

To accept the name use the 3-D hotkey to move to the 'EDIT' field and confirm your choice.

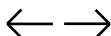
Description of function:

BACK:

Use the 'BACK' button to erase names you have already entered.

EDIT:

The 'EDIT' button is used to confirm and accept data you have entered.



The arrow buttons are used to control the cursor.

DELETE:

The 'DELETE' button is used to erase individual letters.

CANCEL:

To interrupt the procedure or function and return to the menu, use the '3-D hotkey' to move to the 'USER NAME' field and press the Enter button.

## 11.5 TRANSMITTER CONTROL SETTINGS

### Hardware transmitter control reverse

This menu provides a means of reversing any of the transmitter controls, including the primary sticks and switches (hardware reverse). If you carry out a hardware reverse, the effect of the corresponding transmitter control is reversed. This setting does not affect the screen display (percentage value / prefix). We recommend leaving these settings at NORM unless you have very special requirements. The facility is really intended only for very unusual cases where pilots have become accustomed to operating particular functions "the wrong way round", because it suits their individual flying style. Use the 3-D hotkey to mark the 'H/W REVERSE' option in the System menu, and confirm your selection with EDIT.

H/W REVERSE						(7.50) 1/2
H/W	MODE	H/W	MODE	H/W	MODE	
J1	NORM	SA	NORM	SE	NORM	
J2	NORM	SB	NORM	SF	NORM	
J3	NORM	SC	NORM	SG	NORM	
J4	NORM	SD	NORM	SH	NORM	

Use the '3-D hotkey' to make your choice within the menu, and use it again to mark the 'MODE' field for the transmitter control which you wish to reverse.

Turn the '3-D hotkey' to reverse the mode. Key to the display:

- **NORM:**  
The transmitter control operates in the default direction
- **REV:**  
The transmitter control operates in the reverse direction

### • STICK MODE

STICK MODE		(7.50) 1/1
STICK MODE	MODE2	

We have already seen that the throttle stick can be converted mechanically to use a ratchet or brake, but the transmitter also enables the user to re-assign the function of the primary sticks. In addition to the default 'Mode 2' setting, the transmitter software offers three additional stick modes. This makes it a straightforward matter to set up the system to match your personal preferences. Since the assignment of the control functions to the corresponding receiver servo outputs remains the same for all stick modes, all you have to do is decide which stick mode you wish to use to control your models. Pressing the Enter button and turning the hot-key allows you to set any of the stick modes (1 ... 4).

Mode 1: Throttle right, aileron right, rudder left, elevator left  
 Mode 2: Throttle left, aileron right, rudder left, elevator right  
 Mode 3: Throttle right, aileron left, rudder right, elevator left  
 Mode 4: Throttle left, aileron left, rudder right, elevator right

### Switches (switch type assignment)

The external mixer switches of the FX-30 system are equipped with plug-in connectors, and each is clamped in the case using a central nut. This arrangement makes it possible to re-position the switches to suit the user's wishes.

It is also possible to swap over the two-position and three-position switches.

SWITCH						(7.50) 1/1
H/W	SETTING	H/W	SETTING	H/W	SETTING	
SA	3Pos	SE	2Pos	SI	3Pos	
SB	3Pos	SF	3Pos	SJ	3Pos	
SC	3Pos	SG	3Pos			
SD	3Pos	SH	3Pos			

If you wish to interchange the switches (e.g. two-position for three-position), it is also necessary to change the software switch configuration; otherwise the switch position display will be incorrect.

## 11.6 INFORMATION

This menu provides information relating to the currently installed version of the software. It also displays the memory capacity of the SD card and the transmitter's code number (ID). The screen also displays the menu language currently selected.

In the first line of the Information screen you will see the transmitter's ID number displayed after 'PRODUCT ID'. The second line shows the language currently set for the menu system.

The version number of the application software is displayed in the 'Version' field.

INFORMATION				(7.50) 1/1
PRODUCT ID	:	00402309		
LANGUAGE	:	ENGLISH		
VERSION	:	90127	C1 AREA	EUROPE
MEMORY CARD SIZE	:	3862	MODEL	
CARD FREE SIZE	:	3836	MODEL	

If the transmitter is currently fitted with an SD card, the screen also displays the free memory capacity in terms of the number of model memories (model data) available. The transmitter can manage SD cards with capacities of up to 1 GB = 1958 models.

If the transmitter is not currently fitted with an SD card, the display shows no memory card.

## 12. BASE MENU

The functions of the Base Menu are described in detail in the following section. Their purpose is to record the basic settings for a model or model memory. These individual items of data are stored under a model name in a separate memory.

Use the '3-D hotkey' to mark the Base Settings field in the HOME menu, and confirm your selection with 'EDIT'. This action calls up the overview of the Base menu, as shown below:

LINKAGE MENU		(7.50) 1/2
SERVO MONITOR	FUNCTION	
MODEL SELECT	SUB-TRIM	
MODEL TYPE	SERVO REVERSE	
FREQUENCY	FAIL SAFE	

It is not possible to display on a single screen all the functions which are available in the Base menu, so this menu features a second level or page in which the remaining functions can be selected: the S1 button is used to toggle between screen displays 1/2 and 2/2. Turning the '3-D hotkey' beyond the last position also switches automatically to the next page of the display. Move the '3-D hotkey' in the appropriate direction to make your selection. The second page of the Base menu looks like this:

LINKAGE MENU		(7.50) 2/2
END POINT	T1-T6 SETTING	
THROTTLE CUT	MULTIPROP	
IDLE DOWN	FUNCTION NAME	
TIMER	DATA RESET	

The following individual options are available:

- Servo monitor: Servo travel display
- Model select: Model memory select
- Model type: Model type select
- Frequency: Frequency and modulation select
- Function: Transmitter control and sequence select
- Servo centre: Servo centre offset
- Servo reverse: Reverse of direction of servo rotation
- Fail-Safe: Fail-safe settings
- End-point ATV: Servo travel settings
- Motor off: Motor cut function
- Idle 2: Second throttle idle position
- Swashplate: Swashplate type select  
(Helicopter model type only)
- Stopwatch: Stopwatch settings
- Trim display: Trim increment (step) select
- Data reset: Reset data to default values
- Idle-up: Idle up (Helicopter model type only)

### Note:

The display of the individual options in the Power, Glider or Helicopter base menus are different.

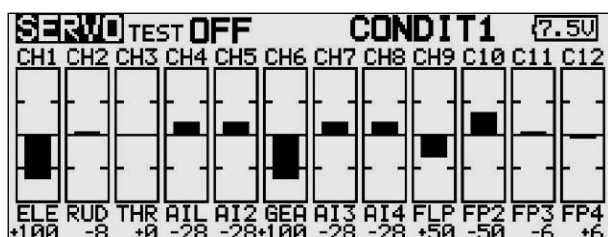
## 12.1 SERVO MONITOR

The Servo Monitor menu displays all servo travels in a clear form using a bar graph and percentage values. The travels are those that are generated by all the adjustments and mixer functions that you have set up. This constitutes an ideal test program for checking control surface travels manually, or for testing all servos automatically.

### Note:

The servo monitor takes into account all the adjustments you may have made, including Limit, transmitter control travel etc.

Use the '3-D hotkey' to mark this option in the Base menu, and confirm your choice with EDIT.



There are three different modes available in the servo monitor:

- Servo test 'Off'

In this mode the screen displays the servo travels / positions corresponding to the current transmitter control positions. A useful tool for manually checking mixer functions and travel settings for individual servo channels.

Move the desired transmitter control. The Test mode must be switched off for this (Test Off). The screen displays the servo deflection for the corresponding channels in bar-graph form and as percentage values.

- Neutral positions 'Neutral'

All channels move to the neutral position dictated by the transmitter. This is an excellent means of checking that servos and servo output arms are set to accurate neutral positions. It is also ideal for establishing the neutral position when installing servos in a model.

Move the '3-D hotkey' to change the test mode in the right-hand field from 'Off' to 'Neutral'.

- Automatic servo test 'Move'

This mode activates an automatic servo test: all channels are slowly moved from one end-point of the transmitter control to the other. Ideal for testing servos and checking maximum control surface travels.

This mode is accessed by switching the Test mode (Move) on. Select the button using the '3-D hotkey', then switch the mode on and confirm your choice.

## 12.2 SELECTING A MODEL MEMORY

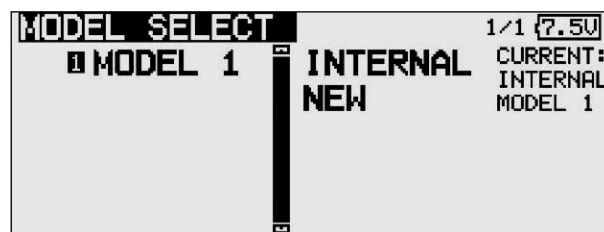
This menu enables you to select the actual model memory file you wish to use. It is also designed for general model data handling tasks, such as creating new memories, copying, erasing and renaming.

Each model memory takes up a space of around 500 kB. Thirty models can be stored internally, while a 32 MB SD card can store approximately 60 models. The transmitter supports SD cards with a maximum capacity of 1 GB = 1958 models.

### Note:

We strongly recommend that you create a back-up copy of your model memory, especially if you wish to experiment with different settings. When you switch off the transmitter, the current data is always written to the model memory.

## CALLING UP A MODEL MEMORY



- The first step must always be to determine the memory location
  - INTERNAL or
  - SD card

Mark the appropriate field, and use the '3-D hotkey' to select the desired memory medium.

- The left-hand field on the screen displays the list of models stored on the selected memory medium. The list includes all the model memories you have created, together with the model names. Use the '3-D hotkey' to mark the desired model, and then press the 'EDIT' button.
- A security query appears which you must also confirm with EDIT: the new model memory is now activated.
- Initially the RF signal is still switched off for reasons of safety. The screen now displays the query 'Transmit?'. You must answer with 'Yes'; only then is the transmitter ready for use with the newly selected model memory.

## SETTING UP A NEW MODEL MEMORY

- The first step must always be to determine the memory location
  - INTERNAL or
  - SD card
 Mark the appropriate field and use the '3-D hotkey' to select the desired memory medium.
- After this you have to re-mark the field and activate it. For safety reasons the radio link is now interrupted.
- Confirm the subsequent security query with the 'EDIT' button once more.
- A display now appears automatically in which you can:
  - select the model type and confirm the change;
  - select the spot frequency and modulation and - if necessary - enter the new receiver No.
- Confirm the frequency change. Switch the transmitter off, then on again, and the radio link is restored.

- At this point a security query appears which you must also confirm with EDIT. The new model memory is now activated.
- For safety reasons the RF signal is still switched off. The screen now displays the query “Transmit?”; you must answer with ‘Yes’; only then is the transmitter ready for use with the newly selected model memory.

The new model is initially saved under the name “New” followed by an incremental number; at the same time it is added to the model list. Your next step should be to assign the model a memorable name.

## ERASING A MODEL MEMORY

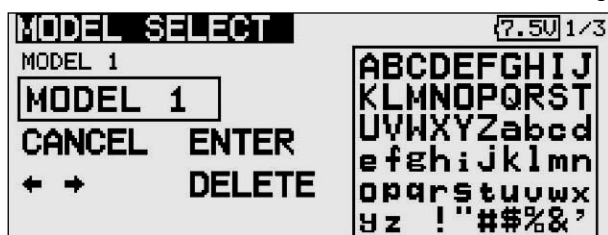
For safety reasons it is not possible to delete an active model.

- From the list in the appropriate memory medium use the ‘3-D hotkey’ to select the model to be erased, and confirm with ‘EDIT’.
- Now mark the DELETE field, and confirm with ‘EDIT’.
- Answering the security query with “Yes” erases the model; if you wish to interrupt the erase process, turn the ‘3-D hotkey’ or operate the S1 button.

## RENAMING A MODEL MEMORY

- From the list in the appropriate memory medium use the 3-D hotkey to select the model which is to be renamed, and confirm with ‘EDIT’.
- Now mark the ‘RENAME’ field and confirm with ‘EDIT’. A new screen appears displaying all the available letters, numbers and symbols.

S1 = leaf  
through



The name is entered in letters and numerals. The model name can be up to eight characters long, including spaces.

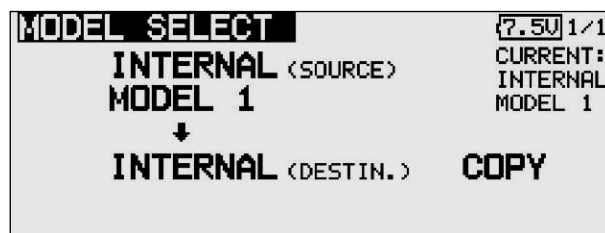
- First use the ‘3-D hotkey’ to mark the letter in the name line which you wish to alter, then select the appropriate letter in the character field using the ‘3-D hotkey’, and confirm your choice with the ‘EDIT’ button. This action adopts the new letter.
- Use the ‘Arrow button’ to jump to the previous letter; ‘Delete’ erases the character after the cursor.
- Repeat this procedure to enter the whole name, letter by letter.
- When you have completed the data input process, confirm with the ‘EDIT’ button.
- To interrupt the procedure and re-activate the old name, move the cursor to MODEL SELECT, and press Enter.

## COPYING A MODEL MEMORY

You can copy a model memory within the same memory medium, and also transfer the data into the alternative memory medium.

- The first step must always be to determine the memory location (source)
  - INTERNAL or
  - SD card
 Mark the appropriate field and use the ‘3-D hotkey’ to select the desired memory medium.

- 1) Select the source from which the copy is to take place, e.g. from the internal memory or from the memory card.



- 2) The next step is to determine the memory location of the destination file using the cursor; confirm your choice with the ‘EDIT’ button.
  - INTERNAL or
  - SD card
- 3) The ‘COPY’ command can now be carried out by marking it with the cursor, and confirming it with the ‘EDIT’ button. You can interrupt the process at any time by turning the ‘3-D hotkey’.

When you make a copy, an incremental number (-1, -2 etc.) is always appended to the existing model name. If the model name is too long for an additional suffix, the last two characters of the name itself are erased.

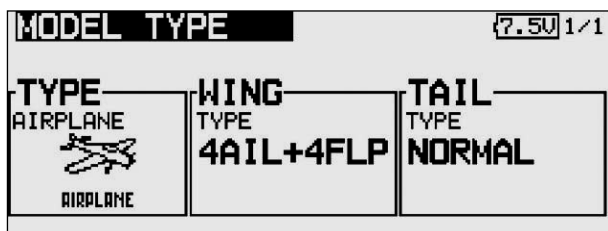
## 12.3 SELECTING THE MODEL TYPE

This is the menu where you select the model type, the wing type and the tail type for fixed-wing model aircraft. For model helicopters this menu determines the type of swashplate mixing.

Using your information as a basis, the software then suggests the appropriate mixer functions in accordance with the selected model type. This reduces the screen display to the minimum required, and helps to avoid unwanted complexity and confusion.

### Note:

The model type must always be selected before you adjust any model settings, because a change of model type always erases all previously stored values.



Use the '3-D hotkey' to mark the 'Model Type' field in the Base menu, and confirm your choice with EDIT. The following screen display appears; note that it will vary according to the model type you have selected.



Use the cursor to mark the TYPE field, and then press EDIT.

Mark the desired model type from the three categories on offer, and confirm with EDIT.

Confirm the subsequent security query.

When you have made your choice, the associated wing, tail or swashplate types will automatically be available for you to select.

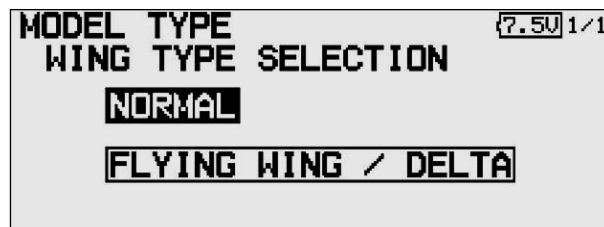
The following basic selections are available:

- Model type: Airplane (power model) - Helicopter - Glider
- Wing type (seven types for power models and gliders)
- Tail type (three types for power models and gliders)
- Swashplate type (eight types for model helicopters)

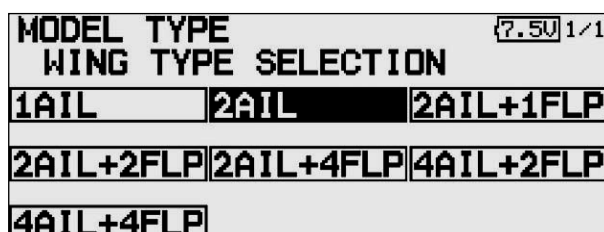
## SELECTING THE WING AND TAIL TYPE

If you have selected the Fixed-wing model type (power model or glider), then the next step is to determine the appropriate wing and tail types. This menu contains three screen pages arranged in series; this is necessary in order to display all the wing types in a comprehensible manner. The page number is indicated at top right on the screen.

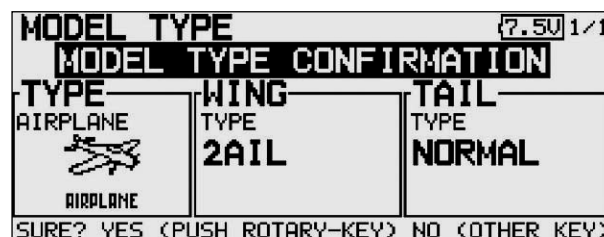
Selecting the wing type



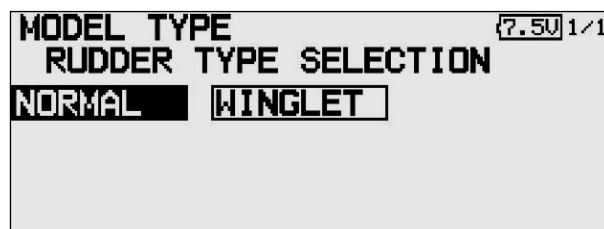
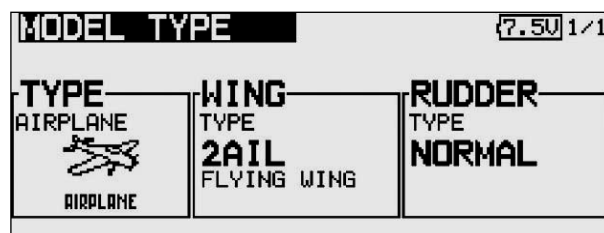
Selecting the control surface count



Display of selected type, confirmation query



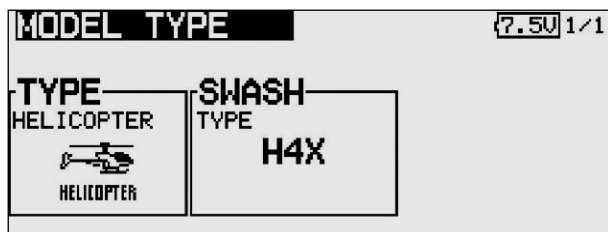
Alternatively for flying wings the type of rudder(s)



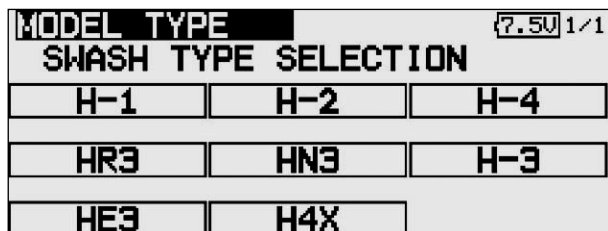
## SELECTING THE SWASHPLATE TYPE

If you have selected a model helicopter as model type, the next step is to define the method of actuating the swashplate.

Use the familiar method for activating the Swashplate Select field; the display now changes to the following:



The swashplate types now available to you are listed below:



- H1: Actuation using one servo
- H2: Actuation using two servos (Heim system)
- H3 140°: CCPM linkage with three servos, with extended linkage points for the two roll-axis servos
- HR3 120°: Actuation using three servos (one each pitch-axis, roll-axis and collective pitch servo), arranged at an angle of 120°
- HE3 90°: Actuation using three servos, arranged at an angle of 90°
- HN3 120°: Actuation using three servos (two pitch-axis, one roll-axis), arranged at an angle of 120°
- H4: Actuation using two pitch-axis and two roll-axis servos
- H4X: Actuation using two pitch-axis and two roll-axis servos +45° virtual rotation

The method of activating a particular swashplate type is the same as that for calling up the various wing types (see previous page).

Sections 5.1 to 5.4 (see pages 14 to 17 in these instructions) contain clearly arranged tabular lists of the servo sequences for all the available wing and swashplate types, relating to the transmitter controls.

## 12.5 FUNCTION

The transmitter employs a new method of selecting the model type as basis for the mixer functions and transmitter control arrangement (stick mode), and this process automatically generates the optimum configuration for the model type you select. We recommend that you keep to this set-up if possible, so that you are always using a standard configuration.

The "Function" menu clearly shows the output to which the corresponding servo is connected, and which transmitter control is used to operate it. Where a single function operates two or more servos, the corresponding transmitter controls are configured accordingly. Within an individual model type the configuration varies little, although the number of channels in use may increase if the number of wing flaps and other control surfaces is higher than normal.

The situation is different when you switch from one model type to another. For example, if the model type changes from a normal tail to a tail layout with two elevator servos (Ailvator), the sequence of functions is necessarily different. The same also applies to model gliders (powered and unpowered), and for flying wing models with and without winglets.

For the PCM-G3/FASST MULTI system the second aileron output has been shifted to output 5, in order to maintain compatibility with small five-channel and six-channel receivers; the higher number of channels has also necessitated this change. This means that the receiver channel sequence is not the same as that of the PCM 1024 / PPM 8 system. However, you can select any function sequence you like in this menu, in order to maintain compatibility with the PCM 1024 and PPM 8 system.

### Note:

If you need to change the function sequence when using the PCM-G3/FASST MULTI system, please ensure that associated functions are allocated together within the channel groups 1 ... 6 or 7 ... 12. Do not assign paired functions to channels 6 and 7, as this could result in different servo transit times.

The servo sequence tables are to be found in Sections 5.1 to 5.4 (Servo sockets); see pages 14 to 17 in these instructions.

### ASSIGNING TRANSMITTER CONTROLS

Use the '3-D hotkey' to mark the 'Function' set-up menu in the Linkage menu, and confirm your choice with EDIT. The following screen display now appears:

FUNCTION		CONDIT1	[7.50]	1/5
CH	FUNCTION	CONTROL	---	TRIM
1	ELEVATOR	J2	T2	COMB.
2	RUDDER	J4	T4	COMB.
3	THROTTLE	J3	T3	COMB.
4	AILERON	J1	T1	COMB.

There are additional screen pages of this kind; the page indicator on the right-hand side indicates this. In this menu you can assign your preferred transmitter controls and trims for all functions, and determine the sequence of functions.

Any transmitter control can be assigned to any control function:

- First mark the 'FUNCTION' field using the 3-D hotkey, then confirms it with EDIT.
- Then mark the appropriate function field, e.g. 'ELEVATOR' for elevator, and confirm it.
- Now select the transmitter control you wish to use for this function: mark the 'HARDWARE SEL.' field and activate it. The display changes, and a Select menu appears which lists the transmitter's controls in symbolic form:

HARDWARE SEL.		CONDIT1	[7.50]	1/1
HARDWARE LIST				
J1	SA	SE	SI	LD T3 --
J2	SB	SF	SJ	RD T4
J3	SC	SG	LS	T1 T5
J4	SD	SH	RS	T2 T6

- At this point you can now assign your choice of transmitter control to the selected function by moving the flashing cursor using the '3-D hotkey' and confirming with the 'EDIT' button.
- The 'Global' and 'Separate' fields determine whether the transmitter control is to be the same for this function in all flight modes (Global). If you set the function to 'Separate', the transmitter control for this function can be different for each flight mode (condition). This point is selected by turning the '3-D hotkey' to left or right; the display changes when you operate the selected flight mode changeover switch. A combination of 'Global' and 'Separate' transmitter controls is also possible.

### SELECTING THE TRIM CONTROLS

The trim controls are also freely selectable; the procedure is identical to that for selecting the transmitter controls. Mark the 'TRIM' field for the corresponding function and confirm your choice; the Trim set-up menu now appears.

In this menu you can select the trim controls from the symbolic depictions on the left-hand side of the screen, and assign them in any way you wish.

### TRIM SETTINGS

Additional adjustments can be carried out in this menu:

HARDWARE SEL.		CONDIT1	[7.50]	1/1
HARDWARE LIST				
J1	SA	SE	SI	LD T3 --
J2	SB	SF	SJ	RD T4
J3	SC	SG	LS	T1 T5
J4	SD	SH	RS	T2 T6

- **Trim Rate**  
The trim travel is infinitely variable within the range -150 to +150% of the travel of the transmitter control; the default setting is +30%. Once you have marked and activated this option, you can set the desired % value by turning the '3-D hotkey'. You can revert to the default setting (30%) by holding the 'EDIT' button pressed in for at least one second.
- **Trim Mode**  
Once you have marked and confirmed this field, you can set any of the following trim modes by turning the '3-D hotkey'. Normal = Normal trim type; the trim range is symmetrical around the servo centre-point. The selected (fixed) trim

range is offset around the centre, which causes changes to the end-point values.

ATL = Asymmetrical trim type; the trim value alters only at one end of the transmitter control range. This is usually employed for the throttle function, so that you can fine trim the idle without affecting the full-throttle position.

CTRM = Centre trim; this trim function also affects the centre range of the transmitter control, but has no effect on the end-points. Since the end-points are fixed, the trim travels change (i.e. become asymmetrical) if you alter the trim value.

## • Global or Separate mode

The 'Global' and 'Separate' fields determine whether the trim controls are to be the same for this function in all flight modes (Global). If you change this function to 'Separate', the trim control for this function can be different for each flight mode. Turn the '3-D hotkey' to left or right to change this setting. The display changes when you operate the selected flight mode changeover switch.

## Note:

Changing the trim from Global to Separate makes it possible to alter the configuration of various trim controls to suit each flight mode; it also enables the user to set and store different trim values for each flight mode.

## Typical applications:

### 1. Different trim controls for each flight mode

In the Normal flight mode the trim controls T1 + T4 are assigned to control functions J1 + J4. In the 'Aerobatics' flight mode the trim controls T1 + T4 are assigned in reverse (cross-trims). This makes it possible to control the function with the one hand, and adjust the trim for the same function with the other hand.

### 2. Different trim values for each flight mode

Model helicopters: it can be highly advantageous if the different trim values for the static flight mode 'Hover' and the dynamic flight mode 'Aerobatics' can be set and stored separately.

**VIRTUAL CHANNELS:** this set-up menu is used to configure the virtual functions VC-1 ... VC-4. The term 'virtual function' is used to describe functions that use other channels as 'double functions', i.e. they do not have their own servo channels. A virtual channel is a separate second control curve with which a transmitter control affects the servo output.

Examples of this are the Crow (Butterfly) function, which controls the aileron and flap servos, or the elevator function of a flying wing model, where the ailerons have a dual function, 'doubling up' as elevators.

The servo sequence tables (Sections 5.1 to 5.4) on pages 14 to 17 include the virtual functions.

## SWITCHED CHANNELS 9 + 10 AND 13 + 14

The switched channels 13 + 14 in PCM G3/FASST mode, are operated using the transmitter controls DG1 + DG2.

## 12.6 SERVO CENTRE OFFSET

When you install the servos in a model, it is always best to position them in such a way that the servo output arm is in the neutral position when the associated trim control on the transmitter is also at centre.

Sometimes the design of the model makes this impossible, and in other cases the neutral position is non-standard due to the use of different makes of servo. In such instances this function can be used to bring the servos of all channels to the exact neutral position.

This option should only be used to correct minor discrepancies, as it inevitably affects servo travel, which may become restricted and asymmetrical.

We recommend this procedure:

After establishing the correct trim positions through test-flying, the first step should be to adjust the position of the servo output arms as accurately as possible, and adjust the control surface linkages to the correct mechanical trim settings. At this stage the trim memory and the settings in this menu should be left at 0%. Once you have made these adjustments as accurately as possible, you should use this menu to fine-tune the servo neutral positions to exact centre.

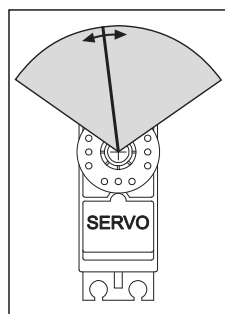
## Note:

Always determine the correct direction of servo rotation (servo reverse) before adjusting the servo centre offset; see page 33.

Use the '3-D hotkey' to mark the 'Servo centre' function in the Base menu, and confirm your choice using EDIT.

SUB-TRIM				7.50 1/2
CH	FUNCTION		CH	FUNCTION
1	ELEVATOR	+0	5	AILERON2
2	RUDDER	+0	6	GEAR
3	THROTTLE	+0	7	AILERON3
4	AILERON	+0	8	AILERON4

This menu has a second level (page) for channels 9 to 12; the page number on the right-hand side indicates this. The servo positions are always displayed as a value and as a %-value.



To change a setting the appropriate channel must first be marked with the cursor. Select the correct channel, then adjust the trim increments by rotating the '3-D hotkey'. The adjustment range is -240 increments to +240 increments, corresponding to around +/- 20° of servo travel. The default setting is 0 increments.

You can change any active setting back to the default value (0 increments) by holding the '3-D hotkey' pressed in for at least one second.

## 12.7 SERVO REVERSE

This function is used to reverse the direction of servo rotation electronically; it is available separately for all servos. This means that you do not have to consider the direction of rotation when installing the servos in a model. It is important to set the correct direction of servo rotation using this function before you start programming additional model data.

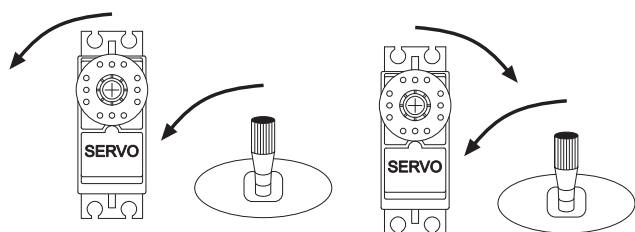
Use the 3-D hotkey to mark the 'Servo reverse' option in the Base menu, and confirm your choice with EDIT.

SERVO REVERSE			7.50 1/2		
CH	FUNCTION	MODE	CH	FUNCTION	MODE
1	ELEVATOR	NORM	5	AILERON2	NORM
2	RUDDER	NORM	6	GEAR	NORM
3	THROTTLE	NORM	7	AILERON3	NORM
4	AILERON	NORM	8	AILERON4	NORM

This menu has a second level (page) for channels 9 to 12; the page number on the right-hand side indicates this. The direction of rotation of the servos is shown in each display field as either 'NORMAL' or 'REVERSE'.

To change a setting you must first use the cursor to mark the appropriate channel. Once you have selected the correct channel, you can change the direction of servo rotation from 'NORMAL' to 'REVERSE' or vice versa by turning the '3-D hotkey'. Pressing the 'EDIT' button concludes the servo reverse procedure.

This drawing shows the normal and reversed directions of rotation of one servo.



## 12.8 FAIL-SAFE SETTINGS

This function is only available in PCM-G3 and PCM-1024 mode. This means that the corresponding modulation process must be set at the transmitter, and a matching PCM receiver must be installed in the model.

In the Fail-Safe menu you can set the following parameters for channels 1 ... 8:

1. 'HOLD' mode: the last fault-free signals are stored temporarily in the receiver, and are passed on to the servos if interference should occur. These servo positions are maintained ('held') until such time as valid signals are picked up from the transmitter again. This is the default mode.
2. (F/S) Fail-Safe position: when interference strikes, the servos run to pre-programmed positions which are set at the transmitter; these settings are also stored temporarily in the receiver.
3. An additional feature - the 'Battery Fail-Safe' function: as soon as the voltage of the receiver battery falls below a value of about 3.8 V, the servos for which B/F/S has been selected run to pre-selected positions in order to warn the pilot that the airborne battery is almost flat. If this should happen, you must land immediately.

**Recommended setting:** for power models set the motor to the idle position and a gentle turn; for gliders: flaps to launch position or airbrakes extended.

FAIL SAFE				7.50 1/3	
CH	FUNCTION	F/S	BAT.F/S	F/S-POS	
1	ELE	HOLD	OFF		
2	RUD	HOLD	OFF		
3	THR	F/S	B.F/S	+85%	RELEASE BATTERY F/S J3
4	AIL	HOLD	OFF		

Helicopter mode: throttle to around 80%.

Use the 3-D hotkey to mark the 'FAIL-SAFE' option in the Base menu, and confirm your choice with EDIT.

This menu has a second level (page) for channels 5 to 12; the page number on the right-hand side indicates this. Use the 3-D hotkey to mark the 'F/S' field of the channel for which the Fail-Safe settings are to be altered. Turn the '3-D hotkey' to the left to change the mode from 'HOLD' to 'F/S'. You must press the 'EDIT' button to confirm your choice.

If you opt for 'Fail-Safe', it is then necessary to enter the correct settings for the servo positions. This is carried out by using the 3-D hotkey to mark the F/S-POS field at the far right end of the corresponding channel. Now move the associated transmitter control to the desired position, and press the 'EDIT' button. The servo position you enter is now displayed as a percentage figure. This process has to be repeated for all the channels that you have set to 'F/S' mode.

To change the setting from 'F/S' back to 'HOLD', mark the left-hand field of the corresponding channel before turning the '3-D hotkey' to the right; press the 'EDIT' button to confirm.

## 12.9 SERVO TRAVEL SETTINGS (ENDP. ATV)

You can use exactly the same procedure to program the Battery Fail-safe feature, separately for each channel. To accomplish this you have to select 'BAT-F/S' in the right-hand field by turning the '3-D hotkey': the display now changes from 'OFF' to 'B.F/S'. The warning position for the selected servo is entered using the method already described; the value is displayed on-screen in the form of a percentage. We recommend that you set up the throttle or airbrake / spoiler servo for this warning function.

It is possible to reset the Battery Fail-Safe function; this is achieved by assigning a transmitter control to the function: mark the appropriate field at bottom right of the screen using the '3-D hotkey', and confirm with the 'EDIT' button. When you do this, the Switch Select menu appears. Use the 3-D hotkey to mark the transmitter control or switch you wish to use for this function, and then confirm your choice with 'EDIT'. The set control is displayed in the appropriate field.

The F/S settings necessarily vary according to the model type you have selected. For example, sensible settings for a model helicopter would cause it to settle in a stable hover, whereas a fixed-wing model aircraft should take up a broad turning pattern. The basic requirement is that brief interference should trigger a set of fail-safe settings that would automatically enable the model to adopt an inherently stable flight pattern even when not under the pilot's control, until contact with the transmitter is restored. If you select the throttle function, don't set the throttle value too low, otherwise there is a danger that the motor will cut out.

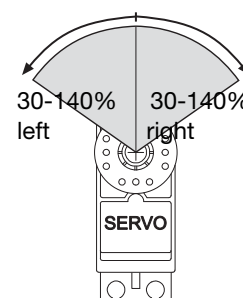
### Important note:

If you wish to check the Fail-Safe settings for the throttle channel, first remove the propeller or disconnect the rotor blades (from the motor), to avoid the risk of injury if the motor should start accidentally. Alternatively the function can be tested in complete safety by connecting a servo to the throttle channel. The Fail-Safe settings can be checked by switching the transmitter off - but only after carrying out the safety precautions.

### Note:

If you select a powered fixed-wing model or helicopter, the software automatically selects a Fail-Safe setting of 20% for the throttle function at the model select stage. Please check that this is correct for your application; change the value if necessary, or alter the function to HOLD. Reversing the direction of the transmitter control has the effect of changing a low value into a high one (80%). Fail-Safe settings must always be checked carefully before flying the model!

This function provides a means of adjusting servo travel separately for each side of centre, individually for all twelve channels. It is often necessary to reduce servo travel in order to prevent the servo output shaft moving through an angle greater than that permitted by its mechanical limits. However, servo travel can also be increased for particular applications. This function always acts upon the individual servo channel you select, and all mixed functions involving this channel. In the same menu you can also enter a servo travel limit point and the desired servo transit speed for each channel separately.



Please note that any changes you make to this setting also have a proportional effect on the trim travel, as well as on any Dual Rate settings you have programmed.

Use the '3-D hotkey' to mark the 'Limit' option in the Base menu, and confirm your choice with EDIT. The screen now looks like this:

END POINT					7.50 1/3
CH	FUNCTION	LIMIT	TRAV.	TRAV.	LIMIT SPEED
1	ELEVATOR	135%	100%	100%	135% 0
2	RUDDER	135%	100%	100%	135% 0
3	THROTTLE	135%	100%	100%	135% 0
4	AILERON	135%	100%	100%	135% 0

### • Servo travel settings

In the "Travel" column mark the appropriate field for right or left travel of the servo; this field is now highlighted (dark background). At this point you can change the servo travel using the '3-D hotkey' as a % value, corresponding to the requirements of your model. If you wish to alter the travel setting for both directions, you have to remember to change the value in the 'Travel' column. The default setting is 100%, and the travel can be adjusted within the range 30% to 140%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

### • Entering limit points

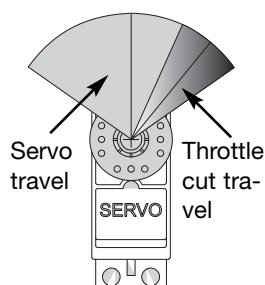
The same procedure is used for determining the servo limit point: mark the appropriate field with the cursor, and set the value using the '3-D hotkey'. The limit points can also be entered individually for each side of servo travel. The default value is 135%, but the limit point can be varied within the range 0 to 155%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

### • Entering servo transit speeds

If you wish to adjust the servo transit speed to meet particular requirements, mark the appropriate field in the right-hand column using the '3-D hotkey'. You can now adjust the servo speed in single increments within the range 0 to 27 increments, again using the '3-D hotkey'. The default value is 0 increments. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

## 12.10 MOTOR CUT FUNCTION

This function enables you to cut the motor using a switch, without changing the idle trim. For fixed-wing models and helicopters alike this is an elegant method of reliably stopping the motor. Mark the 'Throttle Cut' option in the base menu. The screen now looks like this:



Use the '3-D hotkey' to mark the 'Motor cut' option in the Base menu, and then confirm your choice with EDIT. The screen display now looks like this:



- Activate the function by marking the field of the ACT / INA line. Use the '3-D hotkey' to change the mode from 'INA' to 'ACT' or 'ON', according to the current position of the trigger switch, then confirm your action with the 'EDIT' button.
- You should now select the switch which you wish to use to cut the motor: mark the 'Switch' field and press the 'EDIT' button to call up the Switch Select menu. Choose your preferred switch, and activate the state corresponding to 'switched on'.
- Use the 3-D hotkey to mark the 'Motor off' (CUT) field, and set the desired cut-off point as a percentage of the servo travel. The adjustment range is 0 to 50%; the default setting is 17%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

The motor can now be stopped simply by operating the selected cut-off switch - but only if the throttle stick is at the idle position.

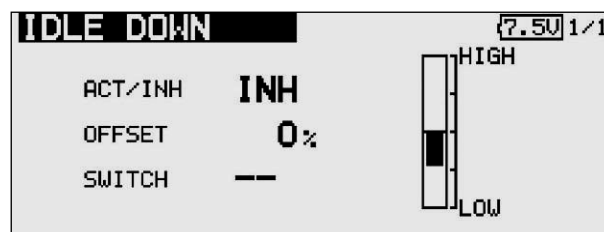
**Please note the following points when setting up this function:**

- It is impossible to start the motor unless the motor-cut switch is at the 'OFF' position.
- Set the percentage value in such a way that the carburettor is completely closed, but the pushrod does not strike its end-stops.
- If the motor cut-off is still switched on (i.e. motor stopped) when you switch the transmitter on, the software activates an alarm. The alarm can be switched off by operating the external mixer switch.
- The purpose of this alarm function is to remind the user that the carburettor is still completely closed, and that it is therefore impossible to start the motor.

## 12.11 THROTTLE PRE-SELECT (IDLE 2)

The 'Idle 2' function enables the pilot to use a physical switch as a rapid method of selecting a pre-set throttle position in the low-speed range, e.g. for the landing approach. The function can only be triggered if the throttle stick is already positioned in the bottom half of its travel, so that the motor is already running in the 'lower speed range'.

Use the '3-D hotkey' to mark the 'Idle 2' option in the Base menu, and confirm your choice with EDIT. The screen now looks like this:



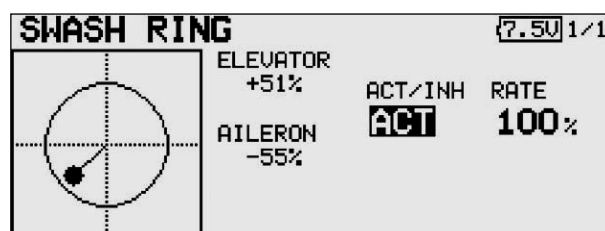
- Activate the function by marking the field in the ACT / INA line. Use the '3-D hotkey' to change the mode from 'INA' to 'ACT' or 'ON', according to the current position of the trigger switch, and confirm your actions with the 'EDIT' button.
- You should now select the switch which you wish to use to set the motor to the idle position: mark the 'SWITCH' field and call up the Switch Select menu using the 'EDIT' button. Choose your preferred switch and activate the state corresponding to 'switched on'.
- Use the '3-D hotkey' to mark the 'OFFSET' position, and set the desired idle point as a percentage of total servo travel. The adjustment range is 0 to 100%; the default setting is 0%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

If you now operate the switch you have selected, the throttle servo adjusts the carburettor opening so that the motor takes up the desired high idle speed.

## 12.12 SWASHPLATE RING

The new swashplate ring mixer limits the travels of the swashplate functions roll-axis (aileron), pitch-axis (elevator) and collective pitch to a pre-set value, in order to prevent the servos being stalled at extremes of travel. It acts as an automatic limiter on the maximum servo travel when two functions (roll-axis and pitch-axis) are operated simultaneously.

This is particularly useful for model helicopters intended for 3-D flying, as this style of flying requires extreme servo travels.

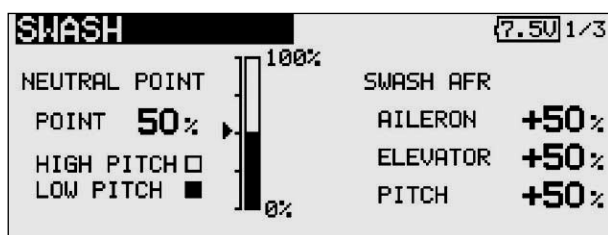


## 12.13 SWASHPLATE SETTINGS

This function is used to program the mixer functions required to actuate the swashplate of a model helicopter. It is not available if you select the swashplate type SWH1, as no mixers are required for the collective pitch function with this configuration.

If you activate a model helicopter with any of the other swashplate types, you can access this menu to set and reverse the stick travels of the roll-axis (aileron), pitch-axis (elevator) and collective pitch (PIT) functions. The essential mixer functions can also be programmed at this point.

Use the '3-D hotkey' to mark the 'Swashplate' option in the Base menu, and confirm your choice with EDIT. The screen now looks like this:



### • Neutral point adjustment

The first step is to optimise the neutral point setting, which is entered as a percentage value. First adjust the servo output arms mechanically, so that the neutral point is close to 50%. Now mark the 'Point' field and adjust the position of the collective pitch stick until the servo output arms are exactly at 90° to the pushrods. Press the 'Enter' button, and read off the displayed percentage value; this figure is also displayed in bar-graph form.

### • Adjusting stick travel

The swashplate travel settings can be optimised for the roll-axis, pitch-axis and collective pitch functions: mark the corresponding field, and enter the required percentage value using the '3-D hotkey'. The adjustment range is -100% to +100%; the default setting is 50%. Holding the rotary knob pressed in for about one second restores the default setting.

You should now use the servo reverse function to correct the direction of servo rotation where necessary, so that all the servos move in the same direction when you operate the collective pitch stick. With these settings correct, set the appropriate direction of rotation for the pitch-axis and roll-axis functions by changing the + / - prefix where necessary.

It is important to set the control travels to the largest possible value without the pushrods or servos striking their end-stops. Check the maximum control travels carefully when the collective pitch, roll-axis and pitch-axis functions are at their extremes of travel. Remember that the swashplate may bind if you set excessive travels, although this varies according to the method of actuation and the design of the rotor head.

The swashplate menu has several display levels (pages); the page indicator at top right indicates this. You can access the other levels by pressing the S1 button. The screen changes, and the display for adjusting the mixer rates looks like this:



### • Setting the mixer rates

The mixer rate set-up procedure is explained using an HR-3 swashplate as an example. The procedure for the other swashplate types is identical, but the actual settings will need to be slightly different.

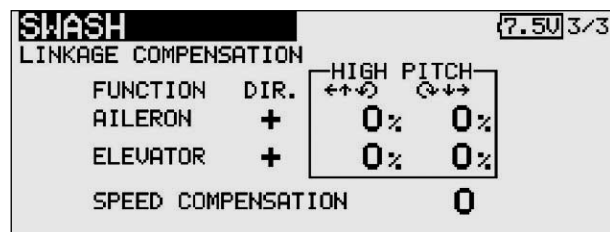
First move the throttle stick to the neutral position, and adjust the pushrod lengths so that the swashplate is exactly horizontal. Fine-tuning can be carried out using the 'Servo centre offset' option.

The mixer rate for the roll-axis function (AIL -> PIT) is optimised first. Mixer values can be set as percentages separately for the left and right side of travel. Set the values in such a way that there are no adverse effects on the pitch-axis and collective pitch functions when the roll-axis function is operated over its full travel.

The next step is to optimise the mixer rate for the pitch-axis functions (ELE -> ROL and ELE -> PIT). Mixer values can be set as percentages separately for the left and right side of travel. Set the values in such a way that there are no adverse effects on the roll-axis and collective pitch functions when the pitch-axis function is operated over its full travel.

The final step is to optimise the mixer rate for the collective pitch functions (PIT -> ROL and PIT -> ELE / ELE2). Mixer values can be set as percentages separately for the left and right side of travel. Set the values in such a way that the swashplate remains horizontal even when the throttle stick is moved over its full travel.

Activate the last display page, and the following screen appears:



In this sub-menu you can compensate for the unwanted effects of pushrod non-linearity.

First move the throttle stick to a position where the rotational speed is as low as possible. Now move the roll-axis stick (aileron) over its full travel from left to right. Set the compensation value for that function in such a way that there is no adverse effect on the collective pitch and pitch-axis functions. The values can be entered individually for each side of centre, and are entered using the '3-D hotkey'.

## 12.14 TIMER SETTINGS (stopwatch)

The next step is to set up compensation for the pitch-axis function. Set the compensation value for that function in such a way that there is no adverse effect on the collective pitch and roll functions at full travel of the pitch-axis stick.

Repeat both these steps for the situation in which the throttle stick is in a position corresponding to maximum motor torque.

The Swashplate set-up menu also provides a means of setting 'servo speed compensation'. Set the throttle stick to the neutral position, then move the pitch-axis stick as fast as you can. Adjust the 'speed' settings as a percentage value so that this action has no adverse effect on the collective pitch function.

The values are entered by turning the '3-D hotkey' after marking the appropriate field.

The Timer menu is used to set up and adjust the electronic timers provided by the FX-30 transmitter. The timers are displayed in two on-screen windows, which means that you have constant access to two crucial times, for example: the overall flight time and the motor run time of an electric-powered model. The timers can be set up individually for each model. The selected configuration is automatically loaded when you switch from one model to another.

For each timer you can select either of two operating modes - count-down and count-up. If you choose a count-down timer, you will need to enter a maximum flight time for each model, e.g. according to the volume of the fuel tank or the capacity of the flight battery. As soon as you start the timer, the time begins counting down, starting from the initial value you have entered. The residual time is constantly displayed.

In contrast, the count-up timer starts at '0' and displays the time that has elapsed since you operated the switch. For the last twenty seconds of the period the transmitter emits an audible signal every two seconds. Over the last ten seconds of the programmed time a signal sounds every second. When the set time is reached, a continuous tone sounds for several seconds. The timer then continues running, but the display shows the time with a negative prefix.

Use the '3-D hotkey' to mark the 'TIMER' option in the Base menu, and confirm your choice with EDIT. The screen display now looks like this:



In this main Timer menu the first step is to select the stopwatch for which the settings are to be entered. Mark the desired function and confirm with the 'EDIT' button. For Timer 1 the screen then looks like this:

- Select mode of operation (count-up / count-down)



First you have to determine whether the activated timer is to operate as a count-down or count-up stopwatch. To change this setting, mark the appropriate field and change it using the '3-D hotkey'.

- Setting the count-down time

Mark the '10' and '00' fields in turn in order to set the minutes and seconds values. The settings are entered using the '3-D hotkey'.

## • Selecting the switch

With the timer configured in this way, you can move on to defining the switches which are to be used to control the timers. In each case a switch can be assigned for:

- Resetting the timer ('Reset'),
- Starting the timer,
- Stopping the timer, and
- Recording lap times (split time).

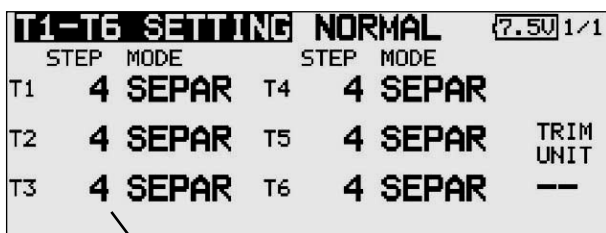
The same switch can also be assigned to individual timer function options. In each case mark the field adjacent to the switch list, operate the 'EDIT' button and determine the desired switch and direction of operation in the Switch Select menu.



A timer can be reset by operating the switch defined for that purpose. However, an alternative method is to activate the 'Reset' field of the corresponding timer function, and then press the 'EDIT' button.

## 12.15 TRIM DISPLAY

Use the '3-D hotkey' in the Base menu to mark the "Trim display" function, and then confirm your choice with EDIT. The screen display now looks like this:



Trim increment indicator

The current settings are now displayed in the form of an increment (step) value for the trim buttons T1 ... T6. You can also select the 'Global' or 'Separate' mode for the trim buttons.

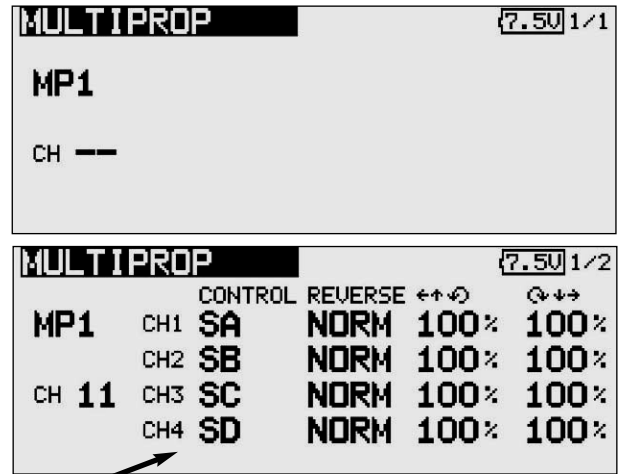
The Step setting provides a means of adjusting the resolution of the trims. The resolution is variable within the range 1 ... 200; at the finest resolution even the most minute of inaccuracies can be trimmed out. The default increment value is 4, which gives a resolution of -50 and +50 increments. Changing the increment value to 8 produces a resolution of -25 and +25 increments.

The higher the value, the 'coarser' the trim resolution.

The settings can either be adopted for all flight modes (Global), or just for the selected flight mode (Separate).

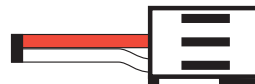
## 12.16 MULTIPROP FUNCTION

The Multiprop function enables the user to expand proportional channels 11 + 12 by eight proportional channels each. One MPDX-1 Multi-Prop decoder, No. F1400, is required per channel at the receiver end to decode the signals. In this configuration the total channel count is increased to ten proportional channels, two switched channels and sixteen multi-prop channels.

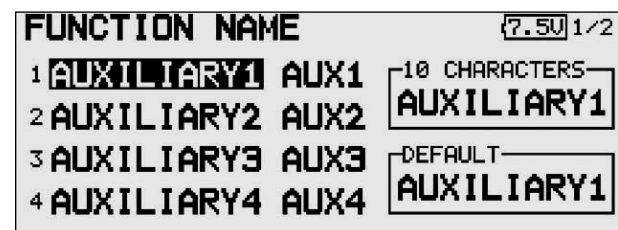


### Note:

Multiprop is not possible with "normal" FASST receivers! In future this function will only be possible with the R6014 HS receiver, No. F1059. Inserting a jumper in the receiver's DATA input socket sets up channels 11 + 12 for Multiprop use. The adapter plug can be made from a servo plug by connecting the red and white wires together.



## 12.17 FUNCTION NAME



Using the "Function Name" adjustment in base display, the first preset name can be changed to your own needs. A maximum of 10 characters are available. The 4-character abbreviation for the servo monitor display may also be changed. After the deletion of the previous and entry of the new name, the selection must be confirmed with "ENTER".

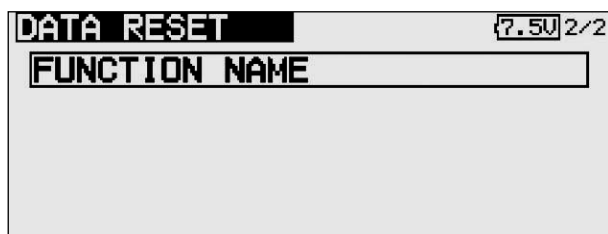
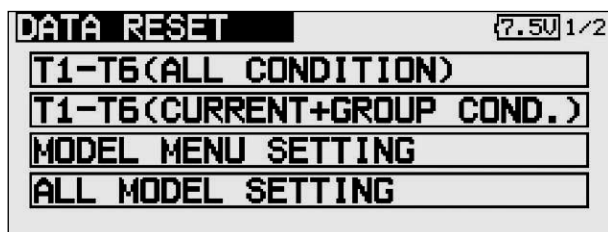


## 12.18 DATA RESET

When you wish to enter the essential data for a new model, you will often need to start by erasing the contents of a model memory which you no longer need, or just certain areas of that memory. The reset process is carried out in this menu, which provides four options:

- **Trim settings (T1 - T6, all flight modes - Global)**  
All the trim settings for all flight modes can be reset using this sub-menu.
- **Trim settings (T1 - T6, ACT flight mode - Separate / Global)**  
This sub-menu is used to reset the trim settings of the current flight mode, and all 'Global / Separate' settings.
- **Reset model menu settings**  
This sub-menu is used to reset all the functions of the Model menu apart from the 'Condition Select' function (for selecting flight modes).
- **Reset all model data**  
This sub-menu is used to reset all model data in the Base menu, with the exception of the frequency settings; the model type and the model select data.

Start by marking the 'DATA RESET' function in the Base menu using the '3-D hotkey', then confirm your choice with EDIT. The screen now looks like this:



Select one of the four options on offer, and use the '3-D hotkey' to mark the field which corresponds to the process you wish to use. Operate the 'EDIT' button to confirm your choice. The actual erasure process is only carried out when you press this button a second time. Pressing any other button interrupts the process.

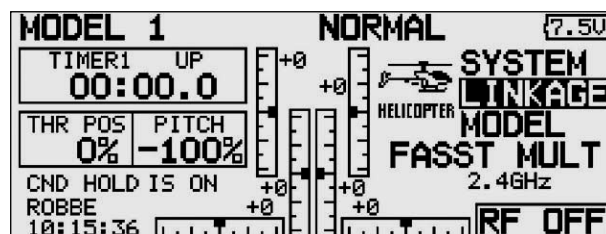
## 12.19 FLIGHT MODE HOLD

The purpose of this function is to enable you to change the settings in a flight mode other than the current one. The motor is held at the 'idle' setting, to prevent it being switched on accidentally.

CND HOLD (Condition Hold) can only be activated when the "Normal" flight mode is selected, and only if the throttle stick is at the idle position.

As soon as you activate CND HOLD, the transmitter sounds a warning signal, alerting you to the fact that the throttle servo or speed controller will not respond if you move the throttle stick. You can now switch to the flight mode you wish to adjust by operating the appropriate flight mode changeover switch, and alter any settings you wish in safety.

Activating this function sets the throttle servo to a fixed, preset position. This means that you must disable the 'CND HOLD' function if you actually wish to carry out adjustments to the channel that operates the throttle servo.



Note that CND HOLD cannot be activated or disabled if:

- A flight mode switch has already been switched on, or
- The throttle stick is at a value higher than 1/3 of full stick travel.

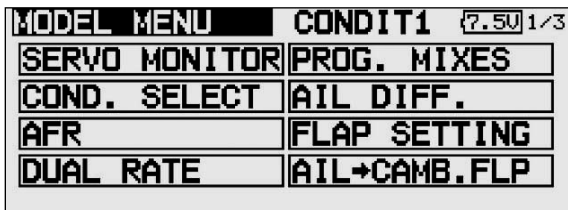
To select the throttle setting you must first mark the field with the cursor button, and then move the throttle stick to the desired position. Note that the selected stick position must be lower than 1/3 of stick travel. Pressing the 'EDIT' button now activates the CND HOLD function.

The status of this option is shown in the Base display. This is the meaning of the display:

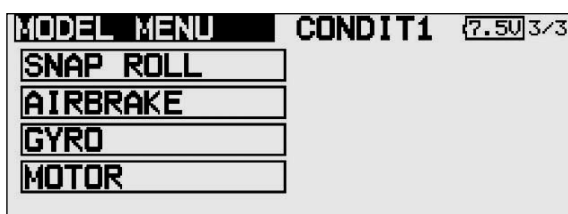
- **CND HOLD IS ON:** flight mode hold switched on
- **CND HOLD:** flight mode hold switched off

## 13. MODEL MENU

The Model menu, which is described in detail in this section, provides functions that enable you to enter wide-ranging settings for a specific model memory. The data is then stored under the programmed model name in the appropriate model memory.



Since a single display cannot encompass all the functions that are available in the Model menu, there are two additional display pages in which the remaining functions can be selected. The page indicator on the right-hand side of the screen indicates that more data is available on additional pages. Individual menu points are selected by operating the S1 button. The sub-menus are listed below. The following options - amongst others - are available according to the selected model type:



- SERVO MONITOR: Servo travel display
- FLIGHT MODE: Flight mode select
- CONTROL AFR: Transmitter control travel settings
- DUAL RATE: Switchable second control curve
- PROG. MIXER: Programmable mixers
- AIL DIFF: Aileron differential
- FLAP SETTING: Flap travel setting
- AIL TO FLAP: Aileron -> flap mixer
- AIL TO RUD: Aileron -> rudder mixer
- Airbrake to elevator: Airbrake -> elevator mixer
- AILERON -> spoiler: Aileron -> spoiler mixer
- AILERON -> brake flap: Aileron -> brake flap mixer
- Flap -> elevator: Flap -> elevator mixer
- Rudder -> aileron: Rudder-> aileron mixer
- Rudder -> elevator: Rudder -> elevator mixer
- SNAP ROLL: Snap roll function
- Spoiler: Brake flap mixer
- Mixture adjustment: Carburettor mixture adjust
- Gyro: Gyro adjustments
- V-tail: V-tail mixer

### Note:

The following section does not describe every possible option, as some of them have already been discussed in previous menus, or are described in the next section that covers the model type menus; these menus can also be activated at that point. The displays for the individual options may vary slightly according to the model type you have selected.

## 13.1 FLIGHT MODE

The software of the FX-30 provides up to eight flight modes for each individual model memory. This feature ensures that you can always store the optimum settings for the various phases of a typical flight, and call them up as and when required simply by operating a switch.

For example, this option can be used to program the settings for a model glider so that the control surfaces are set correctly for the winch launch phase, i.e. both ailerons and both flaps lowered in order to gain maximum possible lift for the launch. To guarantee a stable flight attitude you could also select the option for setting an elevator offset to provide pitch trim compensation (around the lateral axis). These values can be called up prior to launching the model, using a switch or a particular position of one transmitter control.

If you program several flight modes in a particular model memory, it is possible to define the priority of the modes in any way you like. Flight modes can be copied, named and renamed individually, and also erased individually. You can program a delay time for each channel, so that there is a smooth transition when you switch modes, rather than an abrupt change.

Use the '3-D hotkey' to mark the 'Flight mode' option in the Model menu, and confirm your choice with EDIT. The screen display now looks like this:

The basic programming procedure consists of the following steps:

- Adding a new flight mode



Use the '3-D hotkey' to mark the 'New' field, and confirm your choice with the 'EDIT' button. The screen now shows the next available number that can be allocated for the new flight mode. Pressing the 'EDIT' button again calls up the new flight mode on the screen.



Mark the field for selecting the flight mode switch (--), and press the 'EDIT' button to call up the Switch Select menu. In this sub-menu you can define the flight mode activation switch, and its mode of operation, i.e. the direction for activating and disabling the new flight mode.

Note that it is possible to select an individual switch (SINGLE) or a logically linked pair of switches (LOGIC).

## • Erasing flight modes

Use the '3-D hotkey' to mark the flight mode in the list which you wish to erase; the number of the marked flight mode now flashes. Move the cursor to the 'Erase' field, and press the 'EDIT' button to initiate the erase process. A warning now appears: if you press the 'EDIT' button again, the selected flight mode is deleted. Pressing any other button interrupts the process.

## • Renaming flight modes

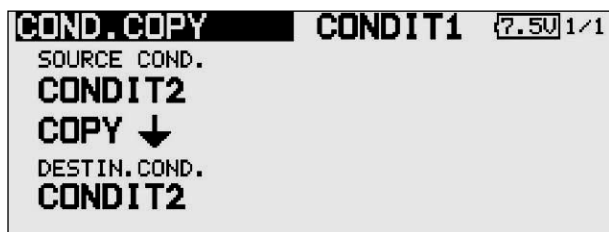
Use the '3-D hotkey' to mark the flight mode in the list whose name you would like to change; the number of the marked flight mode now flashes. Move the 3-D hotkey to the 'New Name' field, and press the 'EDIT' button to initiate the renaming process.

The menu for selecting letters, numerals and characters now appears (see also page 29). Use the '3-D hotkey' to mark the letter to be changed. Select the desired new letter, numeral or symbol from the on-screen list, again using the 3-D hotkey, then press the 'EDIT' button; this action adopts the new letter etc. Repeat this procedure for all eight characters in the name.

Once the full name has been entered, the 'EDIT' field must be marked, and the 'EDIT' button pressed; this concludes the renaming of the flight mode.

## • Copying flight modes

Use the '3-D hotkey' to mark the 'Copy' field, then press the 'EDIT' button. This brings up the menu for copying individual flight modes.



The first step is to determine the source flight mode, i.e. the mode to be copied, by marking the appropriate field with the 3-D hotkey and pressing the 'EDIT' button. The flight mode to be copied is now displayed in this field. Mark the destination field, and press the 'EDIT' button again.

You can now choose the flight mode, which is to be overwritten.

The flight mode which is to be copied, and the flight mode to be overwritten, are selected by turning the '3-D hotkey'. When everything has been set correctly, mark the 'Copy' field and operate the 'EDIT' button to initiate the copy process. This action starts the copy process, but it is only carried out when you confirm the security query with 'Yes'. The data content of the source flight mode is then copied to the specified location.

## • Changing priorities

Use the 3-D hotkey in the list to mark the flight mode whose priority you wish to change. The '3-D hotkey' can again be used to shift the marked line (flight mode) up or down; this action shifts its priority accordingly. Please note that the last line has the highest priority. Pressing the 'EDIT' button concludes the procedure.

## • Setting the delay time

In the list of flight modes, mark the one whose transition time you wish to alter, then activate the 'DELAY' field, and press the 'EDIT' button. The screen changes, and now looks like this:

COND.DELAY		CONDIT1		7.50	1/4
CH	FUNCTION	DELAY	GROUP		
1	ELEVATOR	0	GROUP		
2	RUDDER	0	GROUP		
3	THROTTLE	0	GROUP		
4	AILERON	0	GROUP		

Use the '3-D hotkey' and mark the channel in the 'DELAY' column for which you wish to alter the transition time. The setting is entered by turning the '3-D hotkey'. The adjustment range is 0 to 27 increments. The default setting is always '0', i.e. there is no programmed delay time as standard.

Finally you can select the separate / global mode, i.e. whether the delay time for that channel is to apply only to the currently active flight mode (Separate) or to all flight modes (Global). If you select Separate, the set transition time only applies to the mode in which the setting was selected.

### Note:

If you have set up and activated multiple flight modes, the corresponding transmitter control curves (AFR) must also be changed from Global to Separate, to ensure that a different setting takes effect in each flight mode. If the setting is left at Global, the transmitter control has the same effect in all flight modes.

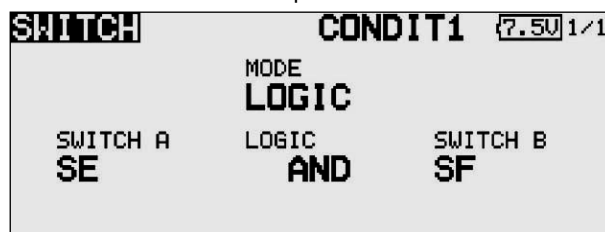
## • Switch function SINGLE / LOGIC



It is possible to select either an individual switch (Single) or a logically linked switched function (Logic) involving two switches.

In the latter case the following functions are available:

- AND: links switches in series
- OR: links switches in parallel
- Ex-OR: links and connects particular switches



## 13.2 TRANSMITTER CONTROL TRAVEL SETTINGS

The transmitter control travel (AFR) settings are used to adjust the travel characteristics (Expo1, Expo2, Curve), which a transmitter control employs when it affects the associated receiver output (servo) or mixed functions. Sixteen AFR curves are available in total: twelve transmitter controls for the twelve servo channels and four VC transmitter control curves for the virtual channels, whose transmitter controls have no direct servo output; instead they control servos using a supplementary curve, according to a mixed function.

### Summary:

Eight flight modes, with up to twelve transmitter control curves, four VC curves and six switchable (D/R) curves. It is difficult to imagine a more convenient system. Each curve can have two to seventeen curve points, plus a variable speed, which is set separately. All the adjustments can be carried out for each function individually.

### Note:

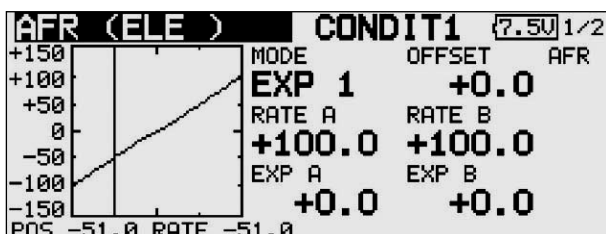
It is essential to complete the following settings before carrying out adjustments to the transmitter control curves:

- 1) Model type select
- 2) Servo and function sequence
- 3) Direction of servo rotation
- 4) Servo travel (ATV)
- 5) Servo centre

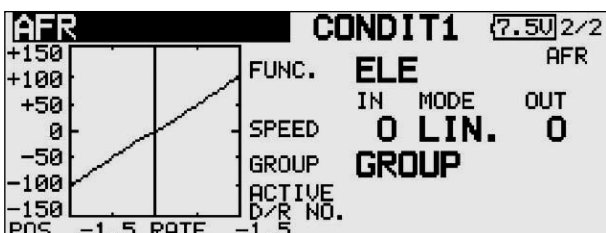
The reason for this requirement is that any change to the function sequence, for example, erases any curve, which has already been set.

Use the '3-D hotkey' to mark the transmitter control travel (AFR) function in the Model menu, and confirm your choice with EDIT.

The screen display now looks like this:



This display has two levels (pages); the page indicator on the right-hand side indicates this. The second page looks like this:



### Operation:

#### • Entering pre-set values

First use the '3-D hotkey' to mark the set-up field on the second page (FUNCT). Turn the '3-D hotkey' to select the transmitter control whose settings you wish to adjust. At this point you can also define whether the settings you are about to enter apply to all flight modes (Global) or only to one specific mode (Separate). Turn the '3-D hotkey' to change this setting, and confirm with the 'EDIT' button.

In this menu the servo speed can also be adjusted in the 'Speed' field. The first facility at this point is to program a mode (linear or non-symmetrical). The linear mode is used to control the throttle servo and for switches; this mode is not self-neutralising. This characteristic applies to the other, non-symmetrical mode, which for this reason is the default setting for all control surfaces.

If you wish, you can enter a separate speed for both directions ('there' and 'back'). The adjustment range is 0 to 27 increments. Please note: the higher the number, the more slowly the servo moves. The maximum value (27 increments) corresponds to a duration of nine seconds. The '3-D hotkey' is used to alter the setting. The default setting is always '0'. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

#### • Programming curves

- The first step in this process is to determine the curve type. Starting from the main display, mark the 'MODE' field and use the '3-D hotkey' to make your selection. The following curve types are available:

EXP1: Exponential curve (curve 1)

EXP2: Exponential curve (curve 2)

CURVE: 9-point curve (2- ... 17-point) curve with turn-points

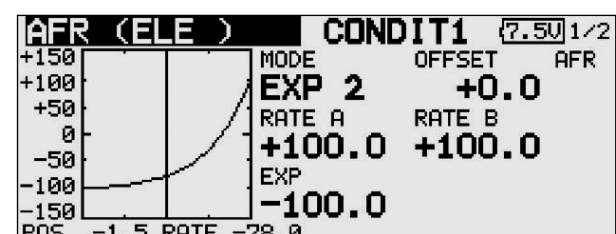
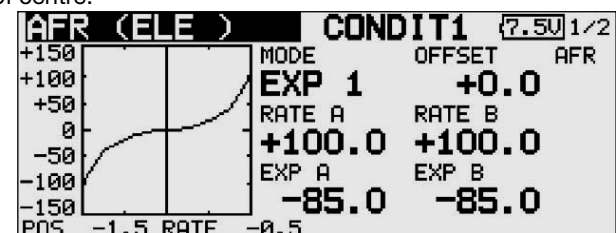
Press the 'EDIT' button to activate the selected curve type and display it in graphic form.

- The settings can be defined separately for the right side (RATE A) and the left side (RATE B) of the curve: mark the appropriate field and use the '3-D hotkey' to alter the value in it. The adjustment range is -200% to +200%; the default setting is +100%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

- The curve can be shifted vertically (OFFSET). This is accomplished by marking it with the '3-D hotkey' and confirming with EDIT. Positive values move the curve up; negative values down.

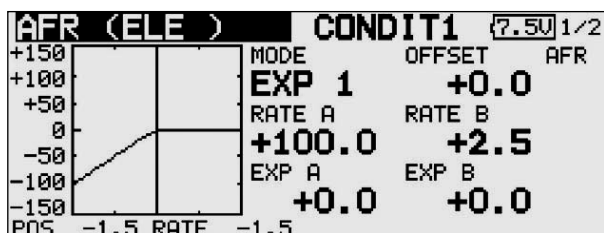
The same procedure is employed for setting up the two available exponential curves. The illustrations show two typical examples of these curve types. The EXP function affects the characteristics of the primary sticks: the linear connection between the transmitter control travel and the servo travel is altered to an exponential characteristic, which generally provides finer control of the model.

As an additional feature, the fields 'Rate A + B' can be marked to adjust the transmitter control travel separately for each side of centre.

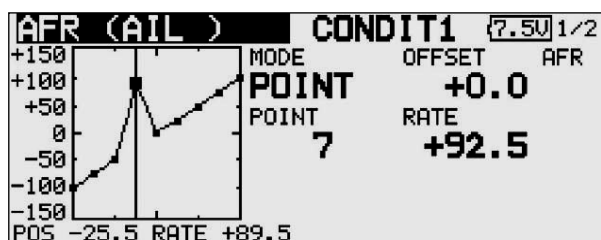
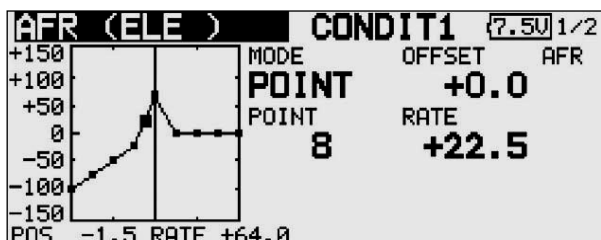


To set up a freely variable curve you have to define curve points. The two screen shots show sections of the display as examples of these curves.

- Use the cursor to mark the field in which the associated curve point is displayed (POINT).
- The point which is to be modified is selected using the '3-D hotkey'. Once you have activated the appropriate point, the value in the 'RATE' field can be defined by turning the '3-D hotkey'.
- The default set-up contains nine different points, which can be varied, but for special purposes the number of points can be varied within the range two to seventeen.



- The position of the curve point can now be defined: mark the appropriate field, and set the value by turning the '3-D hotkey'. You must now hold the 'EDIT' button pressed in for at least one second in order to adopt the new point.
- This is the procedure for erasing a curve point: mark the point adjust field (POINT), select the point to be erased using the '3-D hotkey', and hold the 'EDIT' button pressed in for at least one second.
- It is also possible to shift these two curve types vertically using 'Offset'.



## 13.3 DUAL RATE SETTINGS

- Up to six different Dual Rate settings can be entered. Select by marking the Dual Rate field and pressing the 'EDIT' button. The display changes, and you can enter the appropriate settings in the sub-menu when then appears.
- The first step here is to activate the D/R settings you wish to use, by marking the first field in the appropriate line. Turn the '3-D hotkey' to activate the setting (changes from INA to ACT). This change must be confirmed with EDIT.

DUAL RATE		CONDIT1 [7.50] 1/2	
D/R NAME	STATUS	FUNCTION	SWITCH
1 D/R 1	INH	AILERON	SD
2 D/R 2	INH	ELEVATOR	SA
3 D/R 3	INH	RUDDER	SB
4 D/R 4	INH	AILERON	--

- Move to the 'Function' field and use the same procedure to select the channel to which the D/R setting is to apply. You now have to select an actuating switch. Use the '3-D hotkey' to mark the appropriate field, and then press the 'EDIT' button. This calls up the Switch Select menu, where you can define the desired switch and its direction of operation.
- The Dual Rate function provides a second control curve, which can be called up by operating a switch. You can decide whether the function is to be linear with reduced travels (classic D/R), Expo1, Expo2 or a curve with two to seventeen points.

The D/R (Dual Rate) function can be used to set a second control curve for up to six transmitter controls, which is selected by means of a switch. It makes no difference whether you assign six switchable curves to one transmitter control, or two curves to three transmitter controls, or a single curve to six controls.

This function can be used in order to adjust the control travels to the model for particular phases of flight (launch, landing). In addition to this convenient facility, it is also possible to set up the sixteen AFR curves as mentioned earlier; once again these can be assigned to each flight mode individually by setting up a maximum of eight flight modes.

## 13.4 PROGRAMMABLE MIXERS

The FX-30 features ten freely programmable mixers, which are available for every model memory, in addition to the fixed pre-programmed mixer functions. The programmable mixers feature user-selectable transmitter control settings which can be called up, ranging from a linear characteristic to a nine-point curve; the latter can be expanded to seventeen points for special purposes.

The primary use of these mixers is to compensate for interactions between the individual functions of fixed-wing model aircraft, e.g. for precision aerobatic flying. When the corrective mixers are properly set up, the model becomes generally simpler and more pleasant to fly. Programmable mixers can be set up to link any functions and channels (Master and Slave channels).

Three curve types are available for the transmitter control settings: two exponential and one linear. All these mixers can be assigned a separately variable delay, in order to avoid abrupt transitions when a mixer is switched on in flight. Another option is to set group mode (effective in all flight modes) or single mode (effective only in a specific flight mode).

The trim select function determines whether the trim of the Master channel is also to affect the Slave channel. The Offset option allows you to adjust the mixed (slave) channel to match the main function, so that there is no control surface movement at the neutral position. The switches or other transmitter controls, which are used to activate the various mixers, can be selected individually. Finally, it is even possible to define a transmitter control, which is used to fine-tune the settings.

Use the '3-D hotkey' to mark the 'PROG. MIX' option in the Model menu, and confirm your choice with EDIT. The screen now typically looks like this:

PROG. MIXES		CONDIT1	{7.50}	1/3
MIXING	MODE	GROUP		
1	INHIBIT	MIXING	GROUP	
2	INHIBIT	MIXING	GROUP	
3	INHIBIT	MIXING	GROUP	
4	INHIBIT	MIXING	GROUP	

The individual mixers are listed line by line: the first four mixers are listed on the first page. The display has additional levels (pages); the page indicator on the right-hand side indicates this. The programming procedure is described here using the first mixer as an example, but mixers 2 to 10 are set up in exactly the same way.

This menu is used to enter your preferred settings for the mixer in question. In the last column 'Global' you can define whether the mixer is only to apply to one flight mode (Separate) or to all flight modes globally (Global); 'global' mode is the default setting. To change this setting, use the '3-D hotkey' to mark the field for the mixer you wish to program. The field is now highlighted (dark background), and you can turn the '3-D hotkey' to the left to change the setting to 'Separate'. Activate the change by pressing the 'EDIT' button.

You move to the actual programming masks by marking the appropriate field in the 'Mixer' column on the left, and confir-

ming with the 'EDIT' button. The display changes, and the first mixer program menu appears. This display has three levels; the page number on the right-hand side indicates this.

The programming procedure involves the following steps:

PROG. MIX 1		CONDIT1	{7.50}	1/3
+150		MODE	OFFSET	INH
+100		EXP 1	+0.0	
+50		RATE A	RATE B	
0		+0.0	+0.0	
-50		EXP A	EXP B	
-100		+0.0	+0.0	
-150				
POS	-3.0	RATE	+0.0	

PROG. MIX 1		CONDIT1	{7.50}	2/3
	FUNCTION, H/W	LINK	MODE	
MASTER	AILERON	OFF	TRIM OFF	
SLAVE	ELEVATOR	OFF	STK OFF	
	CTRL		RATE(%)	
FINE TUNING	--		+0 (< +0)	

PROG. MIX 1		CONDIT1	{7.50}	3/3
		IN	MODE	OUT
STATUS	INH	SPEED	0 LIN.	0
SWITCH	--	MASTER	SLAVE	
		START	STOP	
DELAY	0.0s	0.0s		

### • Activating the mixer

Move the '3-D hotkey' to the 'STATUS' field; the default setting here is 'INA' (inactive). Turn the '3-D hotkey' to the left to activate the mixer; 'ACT' now flashes on the screen. Press EDIT to conclude this procedure.

### • Defining the mixer switch

Move the '3-D hotkey' to the field in the 'SWITCH' line, and confirm your action with the 'EDIT' button: the Switch Select menu is now superimposed. Select the operating switch and the direction of operation at that point. If you want the mixer to be switched on constantly, leave this setting at the default of 'NONE'.

### • Setting up the Master channel

If you are setting up a normal mixer, the settings should be entered as described in the following section:

First mark the 'Master' field. Using the '3-D hotkey' you can select the function which is to be the Master channel. You must confirm your choice with EDIT.

If you wish to connect or link this mixer with another mixer, then you must enter suitable settings in the 'Link' column. The 'Link' function is required in order to connect one programmable mixer to other mixer functions. For example, if you do not use the Link function and set up a model with two aileron servos - each connected to a separate receiver output - coupling rudder to aileron will have the effect that only one aileron servo will move when you give a rudder command.

- If the 'Link' function is switched on, the second mixer will affect the existing mixer, with the result that both aileron channels will be affected.
- The Link mode can be switched from 'OFF' (default) to '+' or '-'; the prefix indicates the direction of effect. Changes are made by turning the '3-D hotkey'.
- Finally you can set up the trim function. Here you have to determine how the trims of the two mixed channels are to work. In the corresponding 'TRIM' window you can set 'OFF' or 'ON'. If set to 'ON', the trim of the Master channel also affects the Slave channel. Otherwise both channels are de-coupled. The mode change is carried out using the '3-D hotkey' once the field has been marked; confirm your choice with the 'EDIT' button.
- **Setting up the Slave channel**  
The settings are entered using exactly the same procedure: mark the 'Slave' field, use the '3-D hotkey' to determine the Slave function, then confirm your choice with EDIT. Activate the 'Link' mode if required, as described above.
- Now you have to determine whether AFR mode is to apply to the Slave channel, i.e. what is known as 'Stick to stick mode'.
- **'STK - STK' = OFF**  
The Master function affects the Slave channel directly, without taking into account any special settings you may have applied to the Master transmitter control, i.e. it only affects the selected Slave channel.
- **'STK - STK' = ON**  
In this mode any special settings applied to the Master transmitter control - such as D/R, AFR, EXPO etc. - also affect the Slave channel. In this mode the mixer functions also affect any other mixers involving the Slave channel.

Example: Model type - two ailerons

Mixing elevator to aileron in 'Stk - Stk' mode affects both ailerons.

Select the mode accordingly, and - if necessary - switch the mode from 'OFF' to 'ON' by turning the '3-D hotkey'. Pressing the 'EDIT' button concludes the procedure.

### • Carrying out 'fine-tuning' adjustments

It is possible to program a transmitter control, which is used to carry out fine adjustments (fine-tuning) of the mixer settings. Changes are carried out in the 'TRIM' line, but first you have to define the transmitter control you wish to use for this purpose: mark the appropriate field to call up the menu, then select your preferred transmitter control using the '3-D hotkey'. Any of the auxiliary transmitter controls can be used. Next you have to define the operating mode for the transmitter control you have chosen; the mode is selected using the standard procedure: mark the 'Mode' field using the '3-D hotkey', and make your selection using the '3-D hotkey' once more. Four modes are available in total, and their method of working is displayed on-screen in schematic form. This is the key to the symbols:



The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left increases and reduces the value respectively.



The mixer rate is 0% at the left end-point of the transmitter control. Moving the transmitter control to the right increases the value.



The mixer rate is 0% at the right end-point of the transmitter control. Moving the transmitter control to the left increases the value.



The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left always increases the value.

### • Setting the servo transit speed and delay

In the 'SPEED' line you can enter a speed for both directions of servo travel, i.e. the 'there' direction and the 'back' direction. The adjustment range is 0 to 27 increments. Please note: the higher the number, the more slowly the servo moves. The maximum value (27 increments) corresponds to a duration of nine seconds. The value is changed using the '3-D hotkey'. The default setting is '0'. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

In the 'Delay' line you can enter a delay time in the range 0.0 to 4.0 seconds for the POWER ON and POWER OFF phases. This value means the time, which elapses between operating the switch (in the 'ON' direction), and the mixer taking full effect. In the 'STOP' field you can program a delay that occurs when the mixer is switched off again.

To program this setting you must first mark the appropriate field and enter the setting using the '3-D hotkey'. The default value is '0'. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

### • Master / Slave function

The Master / Slave function is used to control pre-set and programmed curves using a switch.

In Slave mode you can define a target point that is reached after a user-defined time. This function only takes the end-point into account - not any intermediate points. In Master mode the situation is different: in this case you can set up a curve with seventeen intermediate points, all of which are taken into account when the function is switched on. This means that you can give your model aircraft a completely new set-up within a few seconds, or change its characteristics to suit particular circumstances.

### • Programming an Offset mixer

This type of mixer is typically used to pass a fixed value to a particular function when operating a switch triggers the mixer. This means that Offset mixers do not require a Master channel.

To activate this function simply change the mode from MIXER to OFFSET.

PROG. MIXES		CONDIT1		7.50	1/3
MIXING	MODE	GROUP			
1 INHIBIT	MIXING	GROUP			
2 INHIBIT	MIXING	GROUP			
3 INHIBIT	MIXING	GROUP			
4 INHIBIT	MIXING	GROUP			

PROG. MIX 1		CONDIT1		7.50	1/5
OFFSET 1/4		MODE	NORM	SPEED	MIX
FUNCTION AIL		FINE TUNING		IN	OUT
OFFSET		CTRL	--	0	0
ON	+0.0%			DELAY	START
OFF	+0.0%			STOP	0.0
		RATE	+0%		

First determine the 'Slave' channel or channels, i.e. the channel into which a fixed value is to be mixed. Up to four functions can be operated in this way. The functions can be selected once you have marked the corresponding field in the Function Select menu, which now appears. Mark the desired function, and leave the sub-menu by selecting 'End'.

Your selection is displayed in the 'Slave' column.

After this the mode of the Offset mixer can be changed if required. Two modes are available:

### Manual control:

When you operate the switch, the servo runs to the Offset position selected under 'ON', at the set speed and with the set delay, and remains there as long as the switch is in the 'On' position. The servo only moves again when the switch is moved back to the 'Off' position; it then returns to the starting point - as set under 'OFF' - using the selected speed and delay.

### Timer control:

In this mode the servo runs to the prescribed 'On' position, as described for manual control, when the switch is operated. However - in contrast to manual control - it does not stay in this position, but automatically returns to the starting point when the pre-set dwell time (duration) has elapsed.

This Offset mixer is very convenient, and can be used to implement sequences involving up to four functions, either under manual or automatic control. Typical practical applications include the sequential retraction and extension of a scale retractable undercarriage; whose functions can be controlled very accurately using an Offset mixer. By setting the times carefully, you can arrange for various wheel doors to open in turn, after which the wheels then extend.

The Offset value can be entered as a percentage figure in the 'Offset' fields, separately for the 'On' and 'Off' states: mark the appropriate field, and adjust the settings in the familiar way using the arrow buttons. The adjustment range is +300% to -300%. The default setting is 0%; marking the 'Reset' button restores the defaults.

Fine-tuning is also available for the Offset mixers. The first step is to define a transmitter control in the appropriate column, using the Transmitter Control Select menu as previously described. After this you must set the effect range in the 'Rate' field using the arrow buttons; the adjustment range is +100% to -100%. The default setting is 0%; marking the 'Reset' button restores the defaults.

The transmitter control you select for fine-tuning an Offset mixer also has four operating modes; they are absolutely identical to those of a normal mixer.

You may also wish to optimise the servo transit speed for the task in hand: the speed of the servo can be adjusted in small increments, separately for the 'there' and 'back' directions. The adjustment range is 0 to 27 increments. Please note: the higher the number, the more slowly the servo moves. The maximum value (27 increments) corresponds to a duration of nine seconds. The default setting is always '0'. When you mark one of the fields 'THERE' or 'BACK', the button fields for the arrows appear at the right margin. It is possible to make adjustments in steps of one increment or ten increments. Pressing the 'Reset' button restores the default setting.

A delay time can be programmed using virtually the same procedure.

Delays in the range 0.0 to 9.0 seconds can be set, separately for the 'Start' and 'Stop' phases. Pressing the double-arrow buttons increases or reduces the delay by one second; operating the single-arrow buttons produces increments of 0.1 second.

The programming of an Offset mixer is concluded by activating a switch using the standard procedure: mark the corresponding button field in the bottom line, and define the switch in the Switch Select menu which then appears. The direction of effect of the switch can also be set in the usual way. The status of the mixer is displayed as 'On' or 'Off' - according to the position of the switch - in the left field in the bottom line.

### OFFSET MIXER AS MOTOR-CUT SWITCH

Offset mixers also offer the possibility of mixing a fixed value into the primary channel. This value can be up to 300%, as shown in the screen shot.

PROG. MIX 1		CONDIT1		7.50 1/5	
OFFSET 1/4	MODE	NORM	SPEED	MIX	INH
FUNCTION THR	FINE TUNING		IN	OUT	SW
OFFSET	CTRL	--	0	0	--
ON +300.0%			DELAY	START	0.0
OFF +0.0%	RATE	+0%	STOP		0.0

This facility can be used, for example, to make absolutely certain that the motor of an electric-powered model cannot burst into life unexpectedly, even if you move the throttle stick by mistake; this is a very useful safety feature.

If you program an Offset mixer, and set the Offset value to -300%, the throttle stick can be moved to any position without the motor starting, because it is impossible for the stick travel to override the value set by the Offset mixer.

The motor can then only be controlled in the normal way if you first disable the Offset mixer by operating the associated switch. This switch is not interrogated during the safety switch query when the transmitter is switched on.

## 14. MODEL MENU (FIXED-WING MODEL AIRCRAFT)

In this Section we analyse the settings which are specific to fixed-wing model aircraft. The options covered here are those that have not already been discussed in Section 13 (see page 41). The model must be marked in the HOME menu, and confirmed with 'EDIT'. This calls up an overview of the Model menus for fixed-wing model aircraft.

<b>MODEL MENU</b>	<b>CONDIT1</b> [7.50] 1/3
<b>SERVO MONITOR</b>	<b>PROG. MIXES</b>
<b>COND. SELECT</b>	<b>AIL DIFF.</b>
<b>AFR</b>	<b>FLAP SETTING</b>
<b>DUAL RATE</b>	<b>AIL+CAMB.FLP</b>

<b>MODEL MENU</b>	<b>CONDIT1</b> [7.50] 2/3
<b>AIL+BRAKEFLP</b>	<b>ELE+CAMBER</b>
<b>AIL+RUD</b>	<b>CAMB.FLP+ELE</b>
<b>AIRBRAKE+ELE</b>	<b>RUD+AIL</b>
<b>CAMBER MIX</b>	<b>BUTTERFLY</b>

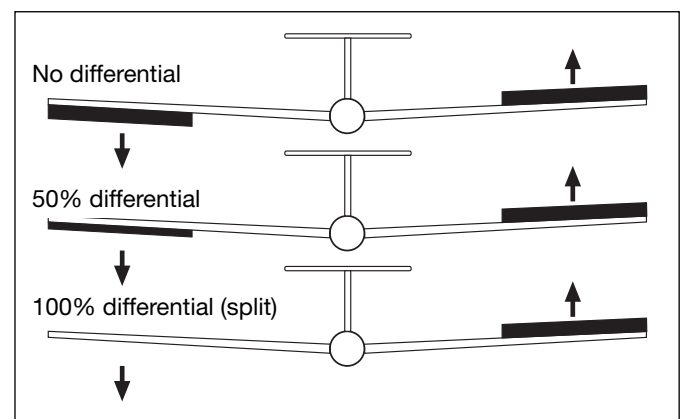
<b>MODEL MENU</b>	<b>CONDIT1</b> [7.50] 3/3
<b>TRIM MIX 1</b>	
<b>TRIM MIX 2</b>	
<b>GYRO</b>	
<b>MOTOR</b>	

- AIL. DIFF: Aileron differential
- FLAP SETTINGS: Flap settings
- SPOILER: Aileron -> spoiler mixer
- AIL->BRAKEFL: Aileron -> brake flap mixer
- AIL->RUD: Aileron -> rudder mixer
- AIRBRAKE->ELE: Airbrake -> elevator mixer
- RUDDER->AIL: Rudder -> aileron mixer
- CAMBER MIX: Flap mixer
- ELE->FLAP: Elevator -> flap mixer
- FLAP->ELE: Flap -> elevator mixer
- BUTTERFLY: Crow (butterfly) mixer
- TRIM MIX 1/2: Trim mixer 1 and 2
- AIRBRAKE: Brake flap mixer
- GYRO: Gyro settings
- V-TAIL: V-tail settings
- AILVATOR: Elevator with aileron function
- WINGLET: Winglet rudder settings
- MOTOR: Settings for electric motors
- RUDDER->ELE: Rudder -> elevator mixer
- SNAP ROLL: Snap-roll function

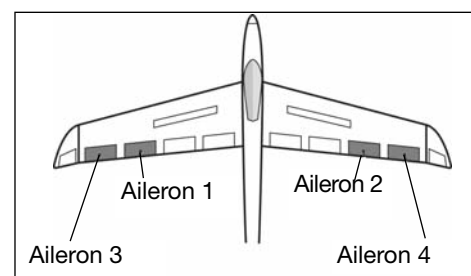
## 14.1 AILERON DIFFERENTIAL

Differential aileron travel is often required on fixed-wing model aircraft in order to compensate for the phenomenon known as adverse yaw. When an aeroplane is turning, the outboard wing moves through the air more quickly, which means that the drag generated by the down-going aileron (on the outside of the turn) is greater than that of the up-going aileron. The result is a yawing moment that tends to turn the model's nose away from the turn, swinging the aeroplane around its vertical axis.

The effect of aileron differential is to reduce the travel of the down-going aileron relative to that of the up-going aileron, with the aim of generating equal amounts of drag on both wing panels. This eliminates the adverse yaw problem.



This function acts as a mixer for two separate aileron servos, enabling you to adjust travels for 'aileron up' and 'aileron down' individually for each aileron. One of the auxiliary transmitter controls can be set up as a means of fine-tuning the degree of differential.



A separate servo must be used for each control surface. The FX-30 software allows you to assign transmitter controls in any way you like. The diagram above shows a typical fixed-wing model with two ailerons on each wing panel.

Use the '3-D hotkey' to mark the 'AIL DIFF.' option in the Model menu and confirm your choice with 'EDIT'. The screen now looks like this:

<b>AIL DIFF.</b>	<b>CONDIT1</b> [7.50] 1/1
	LEFT RIGHT
AILERON	100% 100%
AILERON2	100% 100%
AILERON3	100% 100%
AILERON4	100% 100%
	GROUP GROUP
	FINE TUNING --
	CURVE
	AIL-AFR

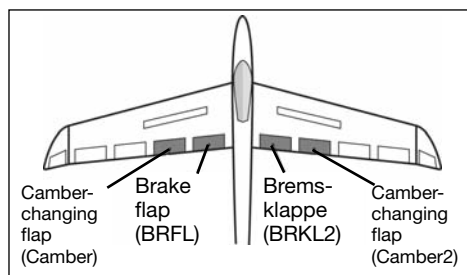
## 14.2 FLAP SETTINGS

These are the individual steps for programming aileron differential:

- Enter the differential travels  
Mark the appropriate adjustment field for the left and right side of the aileron servos (max. four). The '3-D hotkey' is used to enter the settings, followed by confirmation with the 'EDIT' button; note that you have to move the stick to the right or left end-point in each case.
- Set up a curve  
On this page of the menu it is possible to program a curve for the effect of the aileron differential function. A percentage value can be entered in addition to your preferred curve type for each side (Rate A and Rate B). The exact procedure for programming a curve has already been described in full in Section 13.2 on page 44.
- Select the 'fine-tuning' settings  
It is possible to program a switch or transmitter control that can be used for fine adjustments to the aileron differential settings (fine-tuning); changes are carried out in the 'Fine-tuning' line. Mark the appropriate field and confirm with the 'EDIT' button. Select your preferred transmitter control in the Transmitter Control / Switch Select menu which then appears. A curve can also be set up for the fine-tuning option.
- Define the basic settings  
In the 'Global' field you can select 'Separate' or 'Global' mode using the procedure already described, with the results previously explained.

Selecting the 'Ail-AFR' field takes you directly to the AFR settings for the ailerons.

All the aileron mixer functions are shown in graphic form in the centre of the second page of this menu.



This menu is used for entering the settings for all the inboard wing flaps. If your model features two pairs of inboard flaps (the most complex available - see diagram above) this menu applies to the inboard brake flaps and camber changing flaps, which are located adjacent to each other. The 'up' and 'down' travel of each control surface can be set individually at this point, while the Offset function allows you to fine-tune the travels. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). If you wish, you can program a mixer that causes the camber-changing flaps to be deployed when the brake flaps are operated. Use the '3-D hotkey' to mark the 'Flap settings' option in the Model menu, and confirm your choice with 'EDIT'. This menu has three levels (pages) that look like this:

FLAP SETTING		CONDIT1		[7.50] 1/3	
CAMBER FLAP		INH			
	FLAP	FLP2			
UP	+100%	+100%			
DOWN	+100%	+100%	GROUP	GROUP	
OFFSET	+0%	+0%			

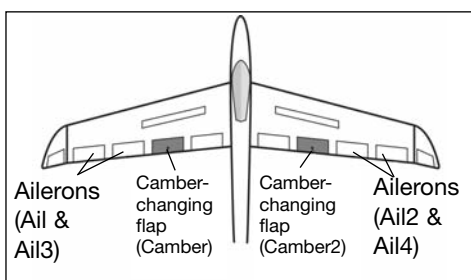
FLAP SETTING		CONDIT1		[7.50] 2/3	
BRAKE FLAP		INH			
	FLP3	FLP4			
UP	+100%	+100%			
DOWN	+100%	+100%	GROUP	GROUP	
OFFSET	+0%	+0%			

FLAP SETTING		CONDIT1		[7.50] 3/3	
BRAKE FLAP + CAMBER FLAP					
UP	+100%	ACT/INH	INH		
DOWN	+100%	GROUP	GROUP		
OFFSET	+0%	SWITCH	--		

You can adjust the travel individually for each control surface and each direction of movement, using the method already described repeatedly in this manual. The same applies to the Offset function; the value is simply entered as a percentage using the '3-D hotkey'.

The effects and methods of setting the 'Global' and 'Separate' modes have already been described several times. The brake flap mixer (BrFl -> flap) causes the camber-changing flaps to follow the movement when the brake flaps are deployed. You can also set the degree of following for each direction of travel separately, program an Offset, set the flight mode and program a switch.

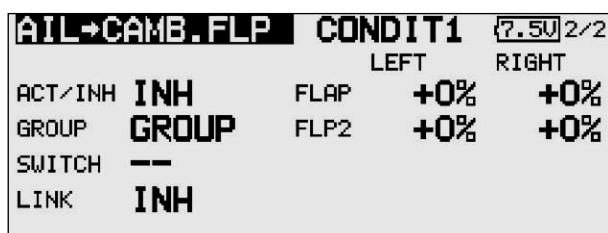
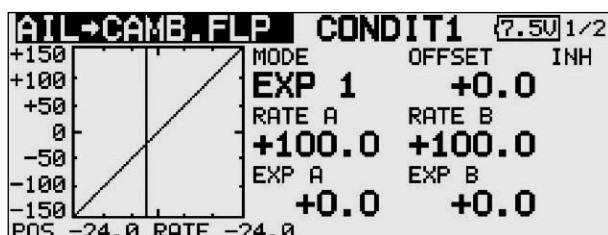
## 14.3 AILERON -> FLAP MIXER



This menu is used to set the values for a mixer that causes the inboard flaps to move in the same direction as the ailerons when an aileron command is given. This mixer improves the roll rate of a model glider, because the flaps deflect to support the ailerons, thereby generating a greater roll moment. At the same time the induced drag of the wing is reduced when the model is turning.

The mixer rate can be adjusted in the usual way, but it is also possible to set up a curve in order to obtain the exact control surface travel you require. The function can be activated using a switch that is user-selectable; it can also be connected to other mixers via a Link.

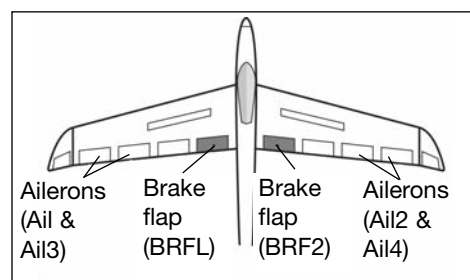
Use the '3-D hotkey' to mark the 'Aileron -> flap' mixer in the Model menu, and confirm your choice with EDIT. The menu has two levels (pages) that look like this:



Start by activating this function in the 'ACT / INA' line using the familiar method, then enter the mixer values for both flaps as percentages using the '3-D hotkey' in the standard way, in each case for left and right aileron deflections. If you need to reverse the direction of travel, this is achieved by changing the prefix.

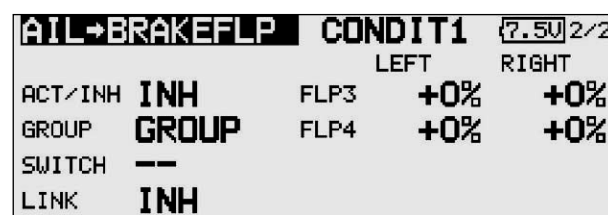
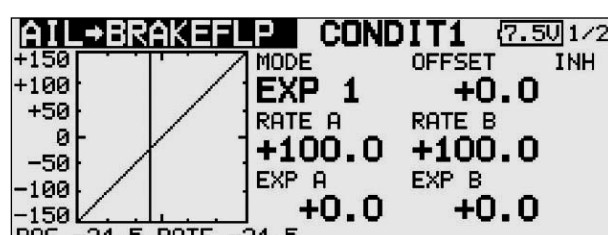
The effects and method of setting the 'Global' or 'Separate' mode have already been described. If you wish to link this mixer to the aileron -> brake flap mixer, the appropriate settings should be entered in the 'LINK' line. You must first activate this option, and then select a switch to be able to switch this function on and off. A mixer curve can also be defined and programmed on the first screen page.

## 14.4 AILERON -> BRAKE FLAP MIXER



This menu is used for setting up a mixer that causes the brake flaps to move in the same direction as the ailerons when an aileron command is given. This mixer helps to improve the manoeuvrability of a model aircraft around the longitudinal (roll) axis, because the flaps deflect to support the ailerons, thereby generating a greater roll moment. At the same time the induced drag of the wing is reduced when the model is turning.

The mixer rate can be adjusted in the usual way, but it is also possible to set up a curve in order to obtain the exact control surface travel you require. The function can be activated using a switch that you can select; it can also be connected to other mixers via a Link. Use the '3-D hotkey' to mark the 'Aileron -> brake flap' option in the Model menu, and confirm your choice with EDIT. The menu has two levels (pages) that look like this:

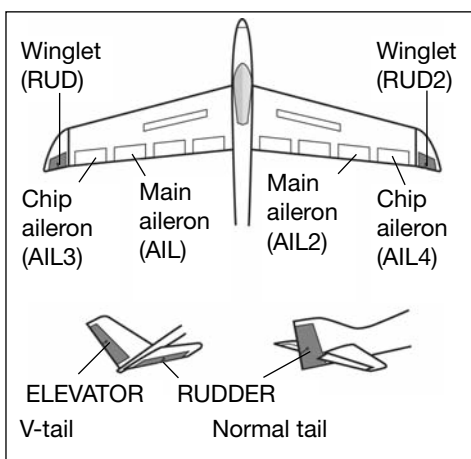


Start by activating this function in the 'ACT / INA' line using the familiar method, then enter the mixer values for both brake flaps as percentages using the '3-D hotkey' in the standard way, in each case for left and right aileron deflections. If you need to reverse the direction of travel, this is achieved by changing the prefix. The effects and method of setting the 'Global' or 'Separate' mode have already been described. A switch can be selected to trigger the mixer, using the standard procedure; define its direction of operation in the usual way.

If you wish to link this mixer to another mixer, the appropriate settings should be entered in the 'LINK' line. You must first activate this option, and then define the mixer to which a link is to be created.

A mixer curve can also be defined and programmed on the first screen page.

## 14.5 AILERON -> RUDDER MIXER

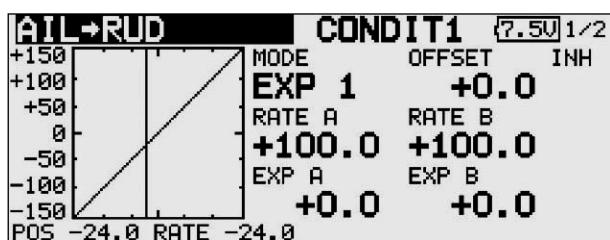


This menu is used for setting up a mixer that causes the rudder (and the winglet rudders, if present) to move in the same direction when an aileron command is given.

When this function is activated, the ailerons and rudder(s) are coupled, so that only one stick has to be operated in order to turn the model effectively. This function is particularly useful for controlling large-scale model aeroplanes, as it eliminates adverse yaw completely when set up correctly.

It is possible to set up a curve in order to obtain the exact mixer rates required for a particular model. The function can be activated using a switch that you can select. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). An auxiliary transmitter control can be assigned to the function for fine-tuning.

Use the '3-D hotkey' to mark the 'Aileron -> rudder' mixer in the Model menu, and confirm your choice with 'EDIT'. The menu has two levels (pages), which look like this:



The function must first be activated in the 'ACT / INA' line, as previously described: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with 'EDIT'. You will now see 'ON' or 'OFF' in the field, according to the position of the switch.

The effects and settings for the programming of 'Global' or 'Separate' mode have already been described repeatedly; they are altered in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

A mixer curve can be set up and programmed on the first page of the menu using the usual procedure.

This mixer curve determines the rate of following, i.e. the extent to which the rudder moves (in the same direction) when an aileron command is given.

On the second page of the menu the fine-tuning settings can be carried out in the separate frame marked 'Fine Trim'. It is possible to assign a transmitter control to the task of fine-tuning the mixer setting. First select the transmitter control you wish to use for this purpose; this is carried out in the 'Transmitter control' field: mark the corresponding field and use the '3-D hotkey' to make your selection in the Switch / Transmitter Control Select menu. Any of the auxiliary transmitter controls can be selected for this purpose.

The next step is to define the operating mode for the transmitter control you have chosen; this is carried out using the now familiar procedure: use the '3-D hotkey' to mark the 'Mode' field, then make your selection. Four modes are available in total, and their method of working is displayed in schematic form on the screen. This is the key to the symbols:



The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left increases and reduces the value respectively.



The mixer rate is 0% at the left end-point of the transmitter control. Moving the transmitter control to the right increases the value.

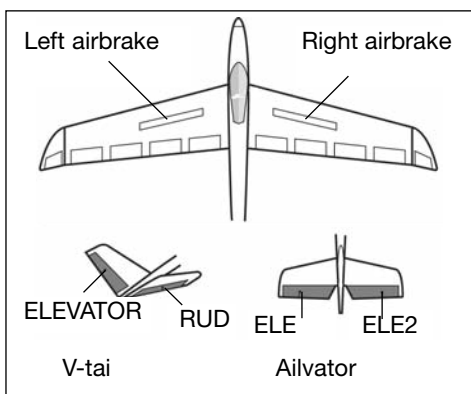


The mixer rate is 0% at the right end-point of the transmitter control. Moving the transmitter control to the left increases the value.



The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left always increases the value.

## 14.6 AIRBRAKE -> ELEVATOR MIXER



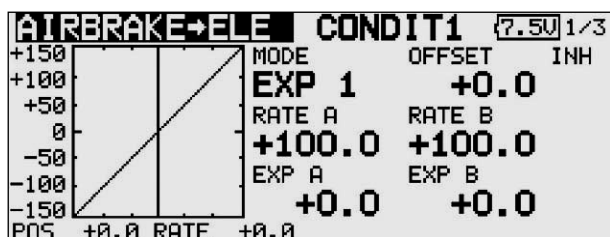
This menu is used to set up a mixer that causes the elevator to deflect when the airbrakes are extended.

When airbrakes are deployed, a pitch trim change often occurs - this applies to many models. Without a suitable mixer, the pilot then has to compensate for this by applying down-elevator manually. The FX-30 includes a mixer which carries out this pitch trim correction automatically.

The exact mixer values for the elevator servo(s) can be adjusted separately. The function can be activated using a switch that is user-selectable. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). It is possible to assign an auxiliary control for fine-tuning the function.

This mixer is only available if you have already programmed a wing type that features airbrakes; this is carried out in the Model Type Select section of the Base menu.

Use the 3-D hotkey to mark the 'Airbrake -> elevator' mixer in the Model menu, and confirm your choice with EDIT. The menu has three levels (pages), which look like this:



As ever, this mixer function must first be activated in the 'ACT / INA' line: first mark the field, enter the setting using the '3-D hotkey', and conclude the activation with EDIT. The screen will now display 'On' or 'OFF', according to the current position of the switch.

The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

On the second page of the menu the fine-tuning settings can be carried out in the separate frame marked 'Fine Trim'. It is possible to assign a transmitter control to the task of fine-tuning the mixer setting. First select the transmitter control you wish to use for this purpose; this is accomplished in the 'Transmitter control' field: mark the corresponding field and use the '3-D hotkey' to make your selection in the Switch / Transmitter Control Select menu. Any of the auxiliary transmitter controls can be selected for the task.

The next step is to define the operating mode for the transmitter control you have chosen; this is carried out using the now familiar procedure: use the 3-D hotkey to mark the 'Mode' field, then make your selection. Four modes are available in total, and their method of working is displayed on-screen in schematic form. This is the key to the symbols:

The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left increases and reduces the value respectively.



The mixer rate is 0% at the left end-point of the transmitter control. Moving the transmitter control to the right increases the value.



The mixer rate is 0% at the right end-point of the transmitter control. Moving the transmitter control to the left increases the value.

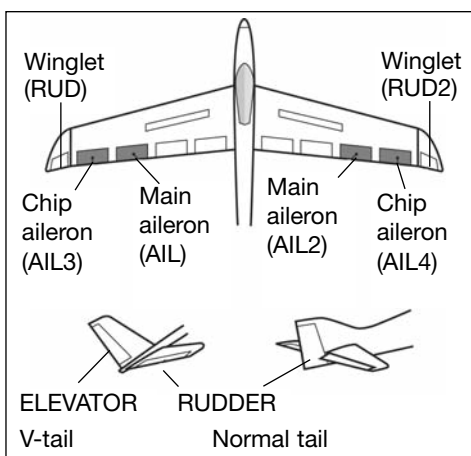


The mixer rate is 0% when the transmitter control is in the centre position. Moving the transmitter control to right or left always increases the value.



A mixer curve can be programmed using the by now familiar method, separately for each side of travel. The actual mixer rates for the elevators are entered on the third page of the menu: for each control surface the mixer rate can be entered as a % value. The method is exactly the same as previously described.

## 14.7 RUDDER -> AILERON MIXER



This menu is used for setting up a mixer that causes the ailerons to move in the direction of the turn when a rudder command is given.

This function is employed primarily with large-scale model aircraft where a scale

control system is required, i.e. emulating a full-size aircraft. However, the same mixer can also be useful when flying particular manoeuvres in a 3-D aerobatic schedule.

Use the '3-D hotkey' to mark the 'Rudder -> aileron' mixer in the Model menu, and confirm your choice with 'EDIT'. The menu has two levels (pages), which look like this:

RUD->AIL		CONDIT1		[7.50] 1/2	
+150		MODE	OFFSET	INH	
+100		EXP 1	+0.0		
+50		RATE A	RATE B		
0		+0.0	+0.0		
-50		EXP A	EXP B		
-100		+0.0	+0.0		
-150					
POS -8.0		RATE +0.0			

RUD->AIL		CONDIT1		[7.50] 2/2	
ACT/INH	INH	FINE TUNING			
GROUP	GROUP	CONTROL --			
SWITCH	--	RATE +0%			
LINK	INH	( +0%)			

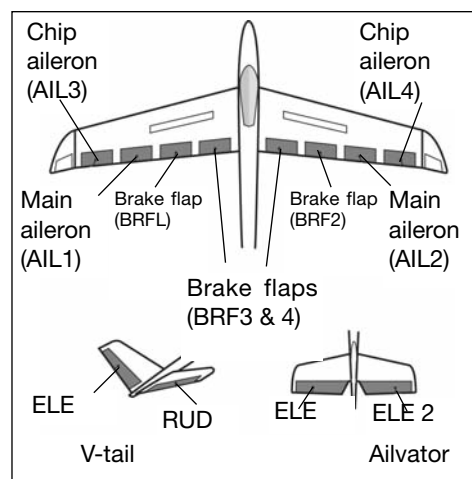
The function must first be activated in the 'ACT / INA' line, as previously described: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with EDIT. In the field you will see 'ON' or 'OFF' according to the position of the switch.

The effects and settings for the programming of 'Global' or 'Separate' mode have already been described repeatedly; they are altered in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

A mixer curve can be set up and programmed on the first page of the menu in the usual manner. This mixer curve determines the rate of following, i.e. the extent to which the ailerons move when a rudder command is given.

On the second page of the menu the fine-tuning settings can be carried out in the separate frame marked 'Fine Trim'. The fine-tuning settings are entered using the method described for the aileron - rudder mixer on page 49.

## 14.8 SPOILER



The purpose of this menu is to set up a mixer that causes all the wing flaps to be lowered to increase wing camber and thereby maximise lift.

The travels for all the control surfaces can be set in the 'up' or 'down' direction as required, to

ensure that the mixer can generate the optimum wing geometry for all flight tasks. The servo travels and directions of rotation can be set accurately using a mixer curve. It is also possible to program a delay time, define the servo transit speed and select a mixer trigger switch.

Use the '3-D hotkey' to mark the 'Spoiler' option in the Model menu, and confirm your choice with 'EDIT'. The menu has four levels (pages), which look like this:

CAMBER MIX		CONDIT1		[7.50] 1/1	
ACT/INH	INH	CAMBER AFR			
GROUP	GROUP	CURVE AND RATE			
SWITCH	--	AILERON			
COND.DELAY	0	FLAP			
CUT-SW	--	ELEVATOR			

CAMBER(AIL)		CONDIT1		[7.50] 1/2	
+150		MODE	OFFSET	INH	
+100		EXP 1	+0.0		
+50		RATE A	RATE B		
0		+100.0	+100.0		
-50		EXP A	EXP B		
-100		+0.0	+0.0		
-150					
POS +6.5		RATE +6.5			

CAMBER(FLP)		CONDIT1		[7.50] 1/2	
+150		MODE	OFFSET	INH	
+100		EXP 1	+0.0		
+50		RATE A	RATE B		
0		+100.0	+100.0		
-50		EXP A	EXP B		
-100		+0.0	+0.0		
-150					
POS +6.5		RATE +6.5			

CAMBER(ELE)		CONDIT1		[7.50] 1/2	
+150		MODE	OFFSET	INH	
+100		EXP 1	+0.0		
+50		RATE A	RATE B		
0		+100.0	+100.0		
-50		EXP A	EXP B		
-100		+0.0	+0.0		
-150					
POS +6.5		RATE +6.5			

The adjustment facilities are extremely comprehensive, but they are arranged in just as logical a manner as all the other menus described up to this point.

## 14.9 CAMBER-CHANGING FLAP -> ELEVATOR MIXER

The function must first be activated in the 'ACT / INA' line, as previously described: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with EDIT. The field will now display 'ON' or 'OFF' according to the position of the switch.

The effects and settings for the programming of 'Global' or 'Separate' mode have already been described repeatedly; they are altered in the 'Mode' line. In the 'Switch' line a switch can be selected in the accustomed manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on. You can program a delay time for each channel, so that there is a smooth transition when you switch modes, rather than an abrupt change. The first step here is to mark the 'DELAY' line. You can now enter a setting using the '3-D hotkey', and confirm your choice with 'EDIT'.

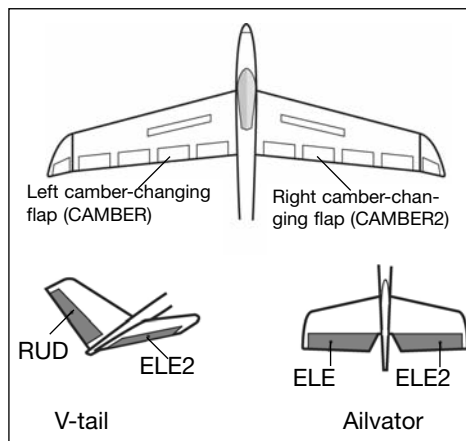
On the second page of the menu the AFR settings are entered for the camber-changing flap mixer. Marking the 'Flap AFR' field, and pressing the 'EDIT' button access this sub-menu. The AFR curve is programmed exactly as described in Section 14.2 on page 47.

The mixer curves can be set up and the servo travels entered individually for the ailerons, the inner and outer brake flaps and also for the elevators. In the separate 'Curve and Rate' field the appropriate line must be marked and confirmed with 'EDIT'. On the next screen the mixer curve can be set up in the usual manner, working separately for the left and right sides of the curve. A vertical shift of the curve (Offset) is also possible.

The servo travels can be entered individually as percentage values in a separate frame, e.g. for all four aileron servos separately. In the same display the servo transit speed can also be programmed; you can enter a speed separately for the 'there' and 'back' directions. The adjustment range is 0 to 27 increments. Please note: the higher the number, the more slowly the servo moves. The maximum value (27 increments) corresponds to a duration of nine seconds. The '3-D hotkey' is used to make any adjustments. The default value is always '0'. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

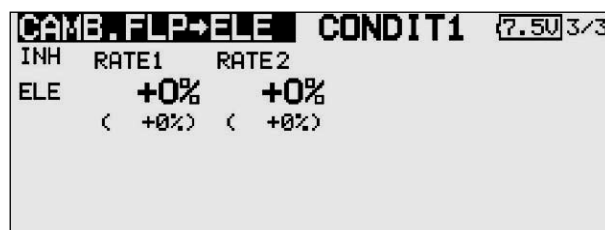
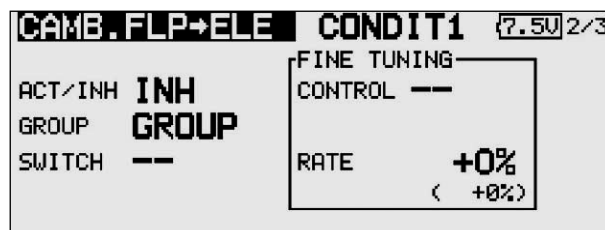
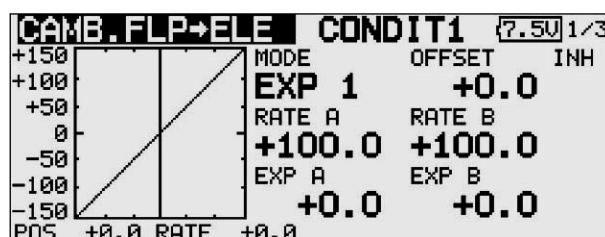
Please note that the programming options and the actual appearance of the screen display may vary slightly according to the model type and wing type you have selected.

This menu is used for setting up a mixer that causes all the wing flaps to be lowered or raised to change the wing camber when an elevator command is given. This amplifies the elevator effect, and enables the aircraft to turn more tightly and perform "square" manoeuvres.



A mixer curve can be programmed for this function, and it can be activated using a switch that is user-selectable. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). You can define an auxiliary transmitter control that is used to fine-tune the function.

Use the '3-D hotkey' to mark the 'Flap -> Ele' option in the Model menu, and confirm your choice with 'EDIT'. The menu has three levels (pages), which look as shown below. The function must first be activated in the 'ACT / INA' line, as previously described: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now display 'ON' or 'OFF' according to the position of the switch.



## 14.11 CROW (BUTTERFLY) MIXER

The effects and settings for the programming of 'Global' or 'Separate' mode have already been described repeatedly; they are altered in the 'Mode' line.

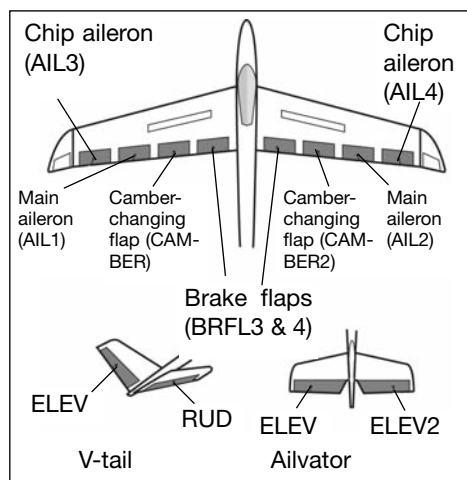
In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

On the fourth page of the menu the fine-tuning settings can be carried out. A transmitter control can be defined which is used to fine-tune the mixer setting. The first step is to define the desired transmitter control in the 'Transmitter control' field: mark the appropriate field and make your choice in the Switch / Transmitter Control Select menu using the '3-D hotkey'. Any of the auxiliary transmitter controls can be used for this purpose. Your selected control and its direction of effect are displayed on-screen.

A mixer curve can be set up using the conventional technique, separately for each side of travel. The actual mixer rates for the elevators are entered on the third page of the menu display. For each control surface the mixer rate can be entered as a % value; the method has already been described many times.

The actual settings for the travels of the (max.) four aileron servos and four flap servos are entered in separate sub-menus. For each servo the servo travels can be entered separately for each side of centre in the form of percentage values. The values are entered using the familiar method: mark the field, confirm it, then set the percentage value using the '3-D hotkey'.

Please note that the programming options and the actual appearance of the screen display may vary slightly according to the model type and wing type you have selected.

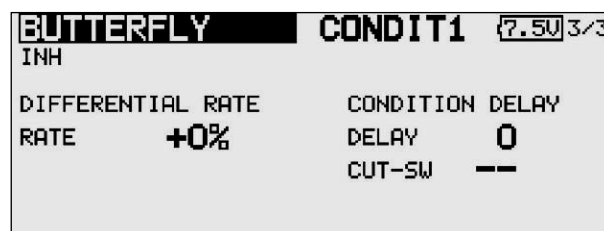
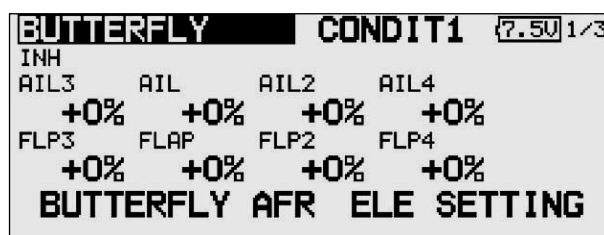


The purpose of this menu is to set up a mixer which produces a very powerful braking effect on the model by deflecting the ailerons up and the camber-changing / brake flaps down. The function is particularly useful for landing

high-speed models at restricted flying sites. If your model features a four-flap wing, it is a straightforward matter to program this mixer in such a way that all the wing control surfaces contribute to the braking effect.

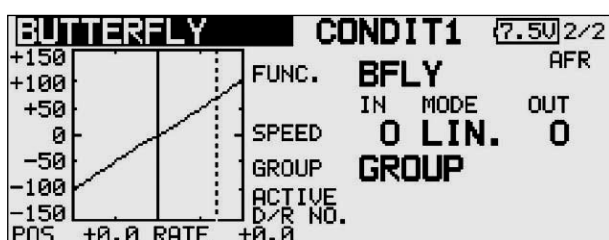
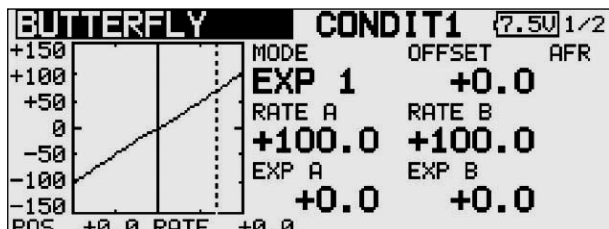
A mixer curve can be programmed for the Crow function, and a switch that you can select triggers it. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). The transit speed of the aileron and flap servos can be adjusted individually. A delay time can be selected, and an Offset point programmed. It is also possible to adjust the degree of aileron differential in this menu.

Use the '3-D hotkey' to mark the button field for the 'BUTTERFLY' mixer in the Model menu, and confirm your choice with 'EDIT'. The menu has five displays (pages), which look like this:



## 14.12 TRIM MIXER 1 AND 2

The mixer rates are set in the main Crow menu for the (max.) four aileron and flap servos, according to the selected model or wing type, using the familiar method. Starting from this main menu, you can use the switch fields at the bottom of the screen to move to the set-up menu for Butterfly AFR (D/R) curve for this mixer (screen 4) and to the programming menu for the associated elevator travels (screen 5). Pressing the S1 button takes you to the two sub-menus (screens 2 and 3).



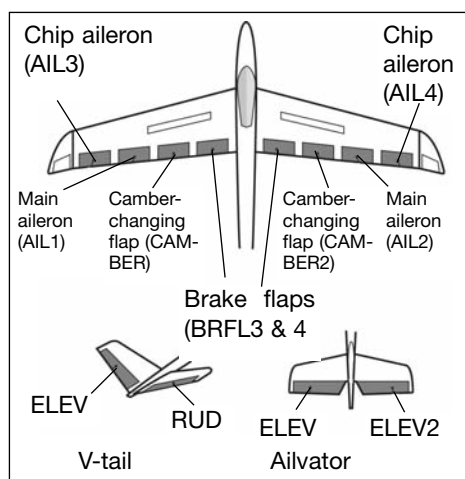
The Crow mixer must first be activated in the 'ACT / INA' line on the second screen: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now display 'ON' or 'OFF' according to the position of the switch.

The effects and settings for the programming of 'Global' or 'Separate' mode have already been described repeatedly; they are entered in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on. In the 'Offset' line a reference point can be entered as a % value. Select the reference point for this mixer, and confirm your choice with the 'EDIT' button.

On this second page you can also set the servo speed individually for the aileron and flap servos, using the now familiar method, in each case separately for the 'there' and 'back' directions. On the third menu screen you can set the % value for aileron differential, and program a delay time.

The AFR or D/R mixer curve can be selected in the usual manner, and the mixer rates entered separately for both sides (see screen 4). The last menu page includes a point for programming a suitable elevator travel; this is intended for pitch trim compensation. The servo speed can also be entered for up to two elevator servos.

Please note that the programming options and the actual appearance of the screen displays may vary slightly according to the model type and wing type you have selected.



This menu is used to set up mixers, which apply to all the wing control surfaces and the elevators, separately for particular flight phases. The software of the FX-30 provides two flight phase mixers (TRIM MIX 1 and 2); both mixers are programmed in

exactly the same way, so this section only describes the set-up procedure for the first mixer.

A typical application would be for a model glider, with TRIM MIX 1 set up to provide the optimum control surface settings for the winch launch phase of the flight. These settings would lower the ailerons and the flaps in order to maximise the model's lift on the winch line. To ensure a stable pitch attitude on tow, the mixer includes an option for entering an elevator Offset to provide pitch trim compensation (i.e. around the lateral axis).

In our example the second mixer (TRIM MIX 2) might be used to set up the optimum control surface settings for the speed phase of the flight, with ailerons and flaps raised slightly in order to minimise the aircraft's drag.

These options are designed to ensure that reliable, reproducible control surface travels can be recalled again and again when you select these flight phases. You can assign any switch you like for calling up the settings.

An Offset can be entered for each of the wing control surfaces - up to four ailerons and four flaps - in order to fine-tune the individual wing flap neutral positions (screens 1 to 3). You can also assign one of the auxiliary transmitter controls for fine-tuning the system. This allows you to select pre-set positions for all the control surfaces prior to fine-tuning in flight. As with all mixers, you can select 'Global' or 'Separate' mode as required.

You can also define a trigger switch, which activates the settings for the flight phase. At the same time you can determine whether the function is triggered by a switch (manual mode) or by the position of a transmitter stick (automatic mode).

It is possible to set the required transit speed individually for the aileron servos, flap servos and elevator servos, with separate settings for the 'there' and 'back' directions. If you wish, you can program a delay time for this mixer function, so that the transition is smooth rather than abrupt.

Start by using the 3-D hotkey to mark the desired 'TRIM MIX 1' or 'TRIM MIX 2' option in the Model menu, and confirm your choice with 'EDIT'. The menu has five levels (pages), which look like this:

<b>TRIM MIX 1</b>		<b>CONDIT1</b>		7.50 1/5	
INH	AIL3	AIL	AIL2	AIL4	
OFFSET	+0%	+0%	+0%	+0%	
TUNING	+0%	+0%	+0%	+0%	
	( +0%)	( +0%)	( +0%)	( +0%)	

<b>TRIM MIX 1</b>		<b>CONDIT1</b>		7.50 2/5	
INH	FLP3	FLAP	FLP2	FLP4	
OFFSET	+0%	+0%	+0%	+0%	
TUNING	+0%	+0%	+0%	+0%	
	( +0%)	( +0%)	( +0%)	( +0%)	

<b>TRIM MIX 1</b>		<b>CONDIT1</b>		7.50 3/5	
INH	ELE				
OFFSET	+0%				
TUNING	+0%				
	( +0%)				

<b>TRIM MIX 1</b>		<b>CONDIT1</b>		7.50 4/5	
ACT/INH	INH	SPEED	IN	OUT	
GROUP	GROUP	AIL	0	0	
SWITCH	--	FLAP	0	0	
MODE	MANUAL	ELE	0	0	

<b>TRIM MIX 1</b>		<b>CONDIT1</b>		7.50 5/5	
INH					
FINE TUNING		CONDITION DELAY			
CONTROL	--	DELAY	0		
		CUT-SW	--		

The page indicator on the right-hand side indicates that there are additional menu levels. In the first three menus the settings are virtually identical; the difference between them is that the topmost level contains the settings for the ailerons, the second page those for the camber-changing and brake flaps, and the third screen the settings for the elevators.

An Offset value can be entered separately for each control surface, by marking the appropriate field and then entering the required value using the '3-D hotkey', and confirming your choice with 'EDIT'. The same technique is employed to set the fine-tuning values.

The mixer must be activated in the 'ACT / INA' line on the fourth screen: first mark the field, enter the settings using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now display 'ON' or 'OFF' according to the position of the switch.

The effects and settings for the programming of 'Global' or 'Separate' mode are entered in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its

direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

You can also determine whether the 'TRIM' mixer is to be activated using the selected switch, or automatically by the position of one of the sticks. If you prefer the latter automatic mode, first mark the field and confirm with 'EDIT'. This calls up a menu in which you can set the desired stick and trigger point, using the familiar methods.

The servo transit speed for all three control surface types (ailerons, flaps and elevator) can be programmed on the fourth page of the menu, in each case separately for the servo directions 'there' and 'back'.

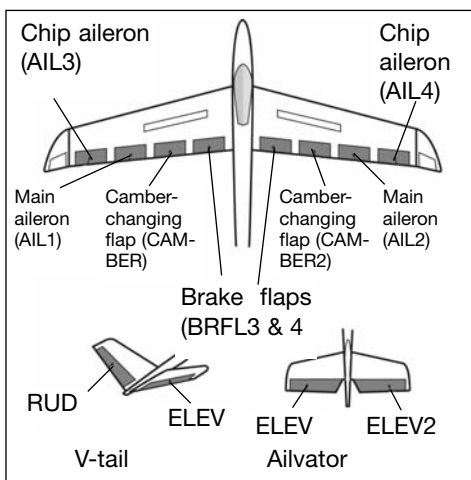
In the final menu display you can select a transmitter control or switch for fine-tuning the function: mark the field and confirm with 'EDIT' to call up the Switch Select menu. You can now define your preferred transmitter control in the time-honoured fashion.

Finally it is possible to program a delay time using the technique, which has already been described repeatedly. One new feature here is that a switch can be defined which is used to switch the delay from active to disabled. This means that both types of transition between flight modes are available according to switch position, i.e. abrupt or smooth. The method of selecting the switch is identical to the usual switch select method.

Please note that the programming options and the actual appearance of the screen displays may vary slightly according to the model type and the wing type you have selected.

## 14.13 BRAKE FLAP MIXER

(Only available if suitable model type is selected)

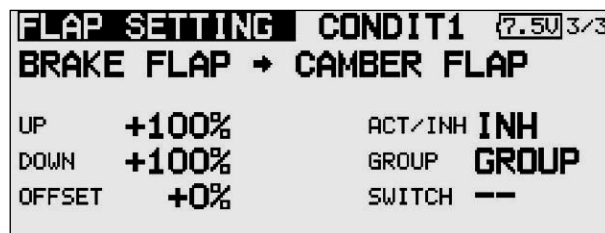
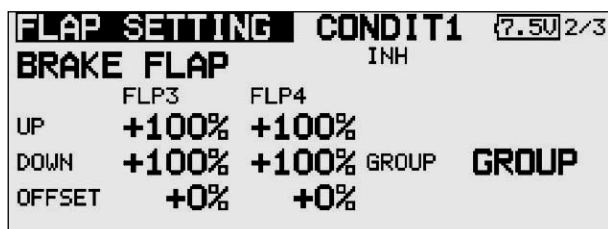
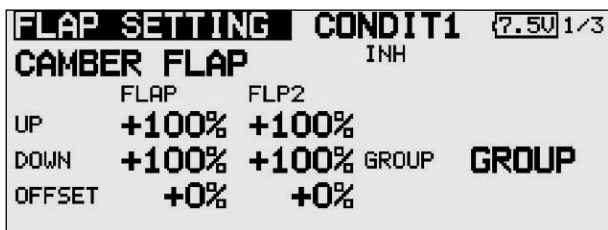


The purpose of this menu is to set the travels for all wing and tail control surfaces in such a way that the model's airspeed is reduced, but at the same time the wing geometry generates the required high lift for slow flying. In basic terms all the wing control surfaces deflect down, while a corresponding elevator travel compensates for the pitch trim change (around the lateral axis), which generally accompanies such a configuration.

An Offset value can be entered separately for all the wing-mounted control surfaces, i.e. up to four ailerons and four flaps (screens 1 to 3). You can also assign one of the auxiliary transmitter controls for fine-tuning the system. This allows you to set up a pre-set position for all the control surfaces prior to fine-tuning in flight. As with all mixers, you can select 'Global' or 'Separate' mode as desired.

A trigger switch can be defined which is used to activate the settings for the flight phase. You can also determine whether the mixer is to be activated using the selected switch, or automatically by the position of one of the sticks.

It is possible to set the required transit speed individually for the aileron servos, flap servos and elevator servos, with separate settings for the 'there' and 'back' directions. If you wish, you can program a delay time for this mixer function, so that the transition is smooth rather than abrupt. Start by marking the 'Brake flap' option in the Model menu using the 3-D hot-key, and confirm your choice with 'EDIT'. The menu has several levels (pages), which look like this:



The page indicator on the right-hand side indicates the menu level in which you are currently working. In the first three menus the settings are virtually identical; the difference between them is that the topmost level contains the settings for the ailerons, the second page those for the camber-changing and brake flaps, and the third screen the settings for the elevators.

The brake flap mixer must first be activated in the 'ACT / INA' line on the fourth screen. The effects and settings for the programming of 'Global' or 'Separate' mode are entered in the 'Mode' line. In the 'Switch' line a switch can be selected in the familiar manner, and its direction of operation determined. The default setting here is 'NONE', i.e. the mixer is always switched on.

You can also determine whether the 'Brake flap' mixer is to be activated using the selected switch, or by the position of a stick. The servo transit speed for all three control surface types (ailerons, flaps and elevator) can be programmed on the fourth page of the menu, in each case separately for the servo directions 'there' and 'back'.

In the last menu display you can select a transmitter control for fine-tuning the function. It is also possible to program a delay time. For the brake flap mixer a switch can be defined which, like the two Trim mixers, is used to switch the delay from active to disabled. The complete procedure for programming this mixer is almost identical to that for setting the two Trim mixers, so please read about this menu for a fully detailed description: see Section 14.12 on page 54.

Please note that the programming options and the actual appearance of the screen displays may vary slightly according to the model type and the wing type you have selected.

## 14.14 GYRO SETTINGS

Gyros are often used in modern fixed-wing model aircraft in order to stabilise one flight axis, and this is the menu to use for entering the settings for the gyro. The basic purpose of this facility is to allow the pilot to set three different modes (Normal - AVCS) and the corresponding gyro gain (sensitivity) for a maximum of three gyros, which can then be called up simply by operating a switch at the transmitter.

Gyro gain can be programmed as a percentage value, and it is also possible to select the gyro type. You can assign a switch, which is used to set the gain to any of three values from the transmitter.

It is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate).

Use the '3-D hotkey' to mark the 'Gyro' option in the Model menu, and confirm your choice with 'EDIT'. The screen now looks like this:

GYRO		RATE123		CONDIT1		[7.50] 1/3	
ACT/INH	INH		MODE		RATE		
TYPE	GY	GYRO	AVCS		0%		
SWITCH	--	GYRO2	AVCS		0%		
GROUP	GRP	GYRO3	AVCS		0%		

The menu features three identical levels (pages), which can be used for three different settings per flight mode, which can be called up when required.

Start by activating this function in the 'ACT / INA' line by marking the field, then set the values using the '3-D hotkey'. Conclude the activation process with 'EDIT'. The field will then switch to 'ON' or 'OFF', according to the position of the switch.

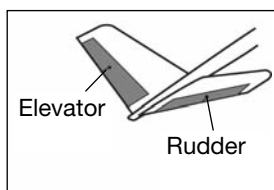
In the 'Type' column you should enter the type of gyro installed in the model. For AVCS or 'heading hold' gyros enter 'GY' as the type; for others select the 'NORMAL' type. In the 'Switch' column you can select a switch and its direction of operation using the familiar procedure. The default setting is 'NONE', i.e. the function is constantly switched on. The effects and method of setting the 'Global' or 'Separate' mode have already been described; the setting is adjusted in the 'Mode' line.

In the 'MODE' column you have the option of choosing whether the gyro is to work in 'AVCS' mode (heading hold) or normal mode. For more information on this, please refer to the instructions supplied with the gyro you have installed in the model. The gain for the three (possible) gyros is entered in the usual way as a percentage value.

### Note:

If you wish to be able to use a transmitter control to adjust gyro gain from the transmitter, Gyro 2 or Gyro 3 mode must be activated under 'Functions' in the Base menu.

## 14.15 V-TAIL MIXER



This menu presents the entire mixer functions required for controlling a V-tail, which involves superimposing the signals from the rudder and elevator controls at the transmitter. The travels of the elevator function (same-sense movement) and of the rudder function (opposite-sense movement) can be adjusted independently of each other. The sketch shows the arrangement of the functions for a typical V-tail.

Use the '3-D hotkey' to mark the 'V-tail' option in the Model menu, and then confirm your choice with 'EDIT'. The screen display now looks like this:

V-TAIL		CONDIT1		[7.50] 1/1	
GROUP	GROUP				
FUNCTION	ELEVATOR		RUDDER		
	DOWN	UP	LEFT	RIGHT	
ELE <RUD2>	+50%	+50%	+50%	+50%	
RUD <ELE2>	+50%	+50%	+50%	+50%	

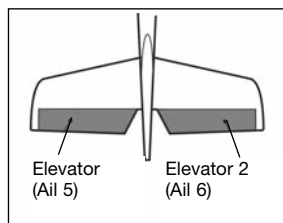
The first step is to define the mode ('Global' or 'Separate') in the 'Mode' line in the usual way.

The servo travels for both control surfaces of the V-tail can now be set separately for the elevator and rudder functions in the form of percentage figures. The same applies to the directions of movement; this procedure has already been described in full many times in these instructions: first mark and confirm the appropriate field, then enter the percentage value using the '3-D hotkey', and conclude the procedure with 'EDIT'.

The default setting in each case is 50%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

Once you have entered the data, it is essential to carry out a check using the model itself, to ensure that the V-tail mixer is operating correctly, and that all the settings are as required. Check also that the total travel is not excessive, i.e. that the system is not restricted or obstructed mechanically in any way.

## 14.16 ELEVATORS WITH AILERON FUNCTION



This menu presents all the mixer functions required for controlling a pair of elevators which are also used to generate a rolling moment (around the longitudinal axis) to amplify the effect of the wing-mounted ailerons, i.e. both elevator panels deflect in parallel with the ailerons.

The purpose of this option is to provide an effective increase in the roll rate of a fixed-wing model aircraft. The mixer can only be used if the model is fitted with two elevator servos, each connected to a separate receiver output. The function is sometimes called an 'Ailvator' system. It can be used with normal tails and also for models with a V-tail (ruddervator). The drawing shows the arrangement of the functions in the case of a conventional tail.

Use the '3-D hotkey' to mark the 'Aileron differential' option in the Model menu, and confirm your choice with 'EDIT'. The screen now looks like this:

AILEVATOR CONDIT1 {7.50} 1/1				
GROUP	GROUP			
FUNCTION	ELEVATOR		AILERON	
	DOWN	UP	LEFT	RIGHT
ELE (AIL5)	+100%	+100%	+0%	+0%
ELE2 (AIL6)	+100%	+100%	+0%	+0%

The first step is to define the mode ('Global' or 'Separate') in the usual way

The servo travels for both control surfaces of the V-tail can be set separately for the elevator and aileron functions in the form of percentage figures. The same applies to the directions of movement; this procedure has been described in full many times: first mark and confirm the appropriate field, then enter the percentage values using the '3-D hotkey' before concluding the procedure with 'EDIT'.

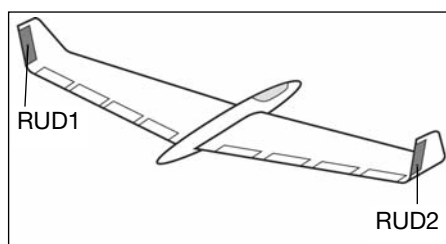
The default setting in each case is 100%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

Once you have entered the data, it is essential to carry out a check using the model itself, to ensure that the AILVATOR mixer is operating correctly, and that all the settings are as required. Check also that the total travel of the aileron and elevator functions is not excessive, i.e. that the system is not restricted or binds mechanically at any point.

### Note:

If the second elevator function is only required to work as a simple elevator, i.e. without superimposed aileron travel, we recommend that you set the aileron value to 0%.

## 14.17 WINGLET RUDDER SETTINGS



This menu presents the entire mixer functions required for controlling rudder panels in the winglets of a fixed-wing model aircraft. These control surfaces have the same effect as a conventional rudder, but tend to be more effective since they are not located in the turbulent airflow from the propeller. This reduces drag, and therefore helps to improve flight performance.

The function is primarily employed on flying wing models with tip-mounted winglets. The sketch shows the arrangement of the functions.

Use the '3-D hotkey' to mark the 'Winglet' option in the Model menu, and confirm your choice with 'EDIT'. The screen display now looks like this:

WINGLET CONDIT1 {7.50} 1/1		
GROUP	GROUP	
FUNCTION	RUDDER	
	LEFT	RIGHT
RUDDER	+100%	+100%
RUDDER2	+100%	+100%

The first step is to define the mode ('Global' or 'Separate') in the usual way.

The servo travels for both winglet rudders can now be set separately for Rudder and Rudder 2, in the form of percentage figures. The same applies to the directions of movement; this procedure has already been described in full several times: first mark and confirm the appropriate field, then enter the percentage value using the '3-D hotkey'; conclude the procedure with 'EDIT'.

The default setting in each case is 100%. Holding the 'EDIT' button pressed in for at least one second restores the default setting.

Please note that this function is only available if you have already selected the appropriate model type (flying wing / delta).

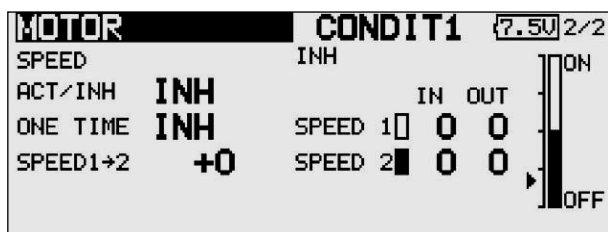
## 14.18 ELECTRIC MOTOR SETTINGS

The purpose of this menu is to enter the settings for switching an electric motor on and off; it is of particular interest if you wish to control the electric motor of a hot-line model using a simple switch. It is possible to program two different motor speeds for slow and fast flight (Speed1 / Speed2). In this case you will need to assign a three-position switch to the function.

It is important to check that the propeller fitted to the motor is capable of absorbing the loads, especially for the 'Speed2' setting. A 'Once mode' is provided; when this option is selected, the settings can only be changed within the menu.

Use the 3-D hotkey to mark the 'MOTOR' option in the Model menu, and then confirm your choice with EDIT. The menu has two levels (pages), which are shown below.

The function first has to be activated in the usual manner in the 'ACT / INA' line.

The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed in the 'Mode' line.

A switch can be defined to trigger the mixer, using the standard procedure. The default setting is switch 'G'. Move to the 'Motor off' line, where you can define the switch position at which the motor is to be switched off. Mark the field and move the switch to the 'OFF' position, then confirm the security query by pressing the 'EDIT' button. The setting is now stored, and is displayed in the field in graphic form.

The speed settings are entered on the second page of the menu; this sub-menu must first be activated in the 'ACT / INA' line. You can then decide whether to activate 'once mode': the setting is selected using exactly the same procedure as for activating a mixer.

The next step is to define the settings for 'SPEED1' and 'SPEED2'. Mark the appropriate field, and use the '3-D hotkey' to enter the percentage value.

Finally you should ensure that the 'Motor stopped' settings coincide with the Fail-Safe settings for the motor control function.

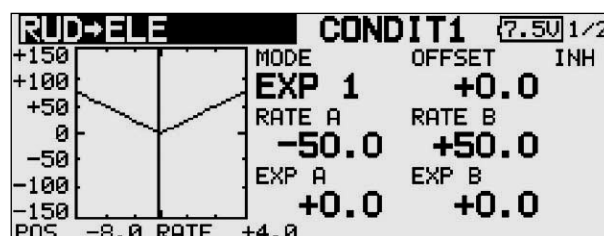
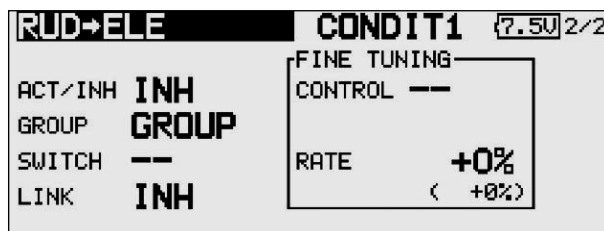
## 14.19 RUDDER -> ELEVATOR MIXER

(For power models only)

The purpose of this mixer is to cause the elevator to deflect up when a rudder command is given. This option is required in order to counter the tendency of many models to dive slightly when a rudder command is given. This function may also be of interest to pilots who enjoy extreme 3-D aerobatics.

The mixer rate can be set up accurately using a curve. The function can be activated by a switch, which you can select, and can be connected to other mixers by setting up a Link. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently activated flight mode (Separate). An auxiliary transmitter control can be assigned for fine-tuning the settings.

Use the '3-D hotkey' to mark the 'Rudder -> elevator' option in the Model menu, and confirm your choice with 'EDIT'. The screen display has two levels (pages), which look like this:

The function first has to be activated in the usual manner in the 'ACT / INA' line. You can now set the 'Global' or 'Separate' mode. In the 'Switch' line a switch can be selected in the customary manner, and its direction of operation determined. The default setting here is 'NONE'.

On the first page of the menu you can define and program a mixer curve. This mixer curve determines the rate of following, i.e. the extent to which the elevator moves when a rudder command is given.

In contrast to all the other compensation mixers, this mixer requires a V-shaped curve; i.e. regardless of the direction of the rudder command, the elevator compensation is always in the same direction, i.e. 'up'.

On the second page of the menu the fine-tuning settings can be carried out in a separate frame. It is possible to assign a transmitter control to the task of fine-tuning the mixer setting. The direction of effect of this control can also be defined (see page 54 for an example).

Finally it is possible to define a Link in order to connect the mixer to other mixers. Select by marking the 'Link' field and setting it to 'ON'.

## 14.20 SNAP ROLL FUNCTION

The snap roll function enables you to define transmitter control positions, which cause the aeroplane to carry out a particular flight manoeuvre. The model then flies this manoeuvre when you operate a switch. The servo settings cannot be overridden while the switch is in the 'ON' position.

For each flight manoeuvre it is possible to define four settings (right / up; right / down; left / up; left / down) for each of the three primary control surfaces (aileron, elevator and rudder). A mode (Master or Single) can also be defined, which determines whether a Master switch or any other switch is to be used to initiate and conclude the manoeuvre. If you select Master mode, a safety switch must be defined in addition to the trigger switch (Master switch). The Master switch is then only active when the 'safety switch' is in the 'ON' position. The purpose of this precaution is to ensure that you never trigger the snap roll manoeuvre accidentally.

The servo speed of all three control surfaces can be set individually, separately for the 'there' and 'back' directions.

Use the '3-D hotkey' to mark the 'SNAP ROLL' option in the Model menu, and confirm your choice with 'EDIT'. The screen display has four levels (pages), which look like this:

SNAP ROLL		CONDIT1		(7.50) 1/4
RATE	AIL	ELE	RUD	
RIGHT/UP	+100%	+100%	+100%	
RIGHT/DOWN	+100%	-100%	-100%	
LEFT/UP	-100%	+100%	-100%	
LEFT/DOWN	-100%	-100%	+100%	

SNAP ROLL		CONDIT1	(7.50) 2/4
MODE	MASTER		
MASTER-SW	---		
SAFETY-SW	---		
GROUP	GROUP		

SNAP ROLL		CONDIT1		(7.50) 3/4
	ACT	SWITCH		
RIGHT/UP	OFF	---		
RIGHT/DOWN	OFF	---		
LEFT/UP	OFF	---		
LEFT/DOWN	OFF	---		

SNAP ROLL			CONDIT1			(7.50)	4/4
SPEED	AIL IN	OUT	ELE IN	OUT	RUD IN	OUT	
RIGHT/UP	0	0	0	0	0	0	
RIGHT/DOWN	0	0	0	0	0	0	
LEFT/UP	0	0	0	0	0	0	
LEFT/DOWN	0	0	0	0	0	0	

The servo travel can be entered as a percentage value for all three control surfaces (aileron, elevator and rudder); this is carried out in the first menu level, and is available for each direction of travel separately.

The familiar method is employed: first mark the field, then change the value using the '3-D hotkey' before concluding the process with 'EDIT'.

On the second display page you can define the mode - 'Master' or 'Single' - for the trigger process. As already mentioned, selecting 'Master' mode requires you to define a safety switch in addition to the main trigger switch. Both switches can be programmed on this page of the menu using the normal procedure. In the bottom line of the second page you can also set the 'Global' or 'Separate' mode as already described, i.e. whether the function is to be available in all flight modes or only one flight mode.

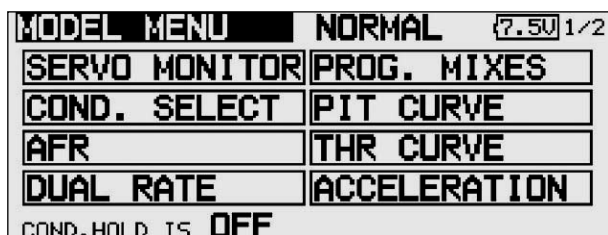
At the third menu level you can define a switch for each of the four directions, again using the normal method: mark the appropriate field and select the values using the '3-D hotkey'. The activation state in the 'ACT' column will now display 'ON' or 'OFF' and be dependent on the switch position.

In the final menu level you can set the servo speed for each direction of movement, separately for the 'there' and 'back' direction of the servos. As with all servo speed adjustment facilities, the available range of values is from 0 to 27.

Please be particularly careful when programming this function, and take care not to enter any settings, which could lead to uncontrollable flight situations. Check everything very carefully!

## 15. MODEL MENU (MODEL HELICOPTER)

This Section analyses the settings, which are specific to model helicopters, i.e. it only covers, those options that have not already been described in Section 13. All the options of the Model menu can be activated in the top-level menu screens illustrated below, but some options have already been described in the earlier Model menu; see pages 41 to 47. Activate the menu by selecting the 'Heli' model type in the Base menu using the 3-D hotkey, and confirm your choice with 'EDIT'. This action calls up the overview of Model menus for helicopters.



The following section describes the options, which have not already been analysed in these instructions:

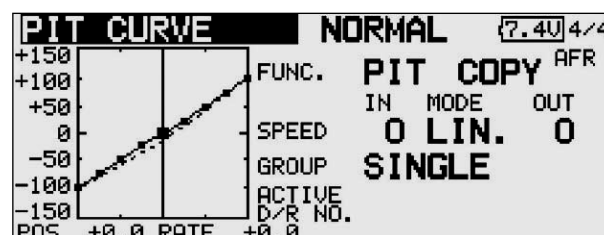
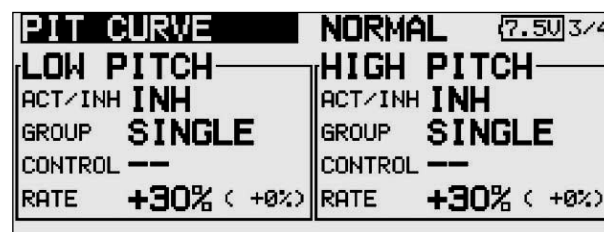
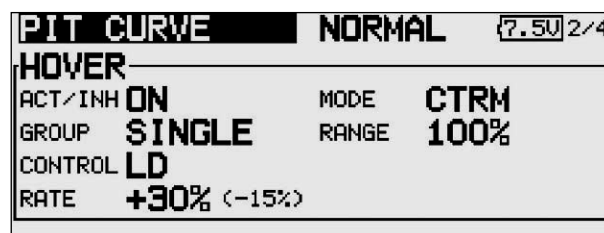
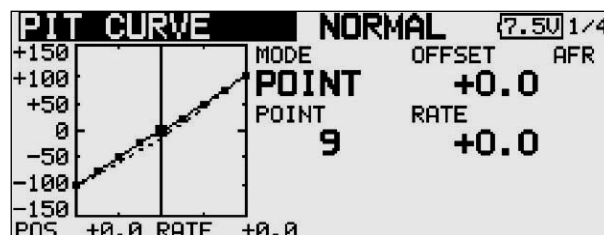
- PIT CURVE: Collective pitch curve settings
- THR CURVE: Throttle curve settings
- ACCELERATION: Acceleration function
- AUTO-ROTATION: Auto-rotation settings
- SWASH MIX: Swashplate mixer
- THROTTLE MIX: Swashplate -> throttle mixer
- PIT -> NEEDLE: Collective pitch -> needle valve mixer
- PIT -> RUD: Collective pitch -> tail rotor mixer
- GYRO: Gyro settings
- SPEED GOVERNOR: Speed governor settings
- COND. HOLD: Flight mode hold; see description on page 39

## 15.1 COLLECTIVE PITCH CURVE SETTINGS

Operating the collective pitch stick moves the collective pitch servo or servos, but also automatically operates the throttle servo. The interaction between collective pitch and throttle is very important, and for this purpose the collective pitch function can be assigned one of three possible curve types, each of which can be allocated a maximum of seventeen variable points. The FX-30 also offers switchable flight modes, which enable the pilot to set up the optimum collective pitch curve for each flight mode individually.

Use the '3-D hotkey' to select the 'COLLECTIVE PITCH CURVE' in the Helicopter model menu, and confirm your choice with 'EDIT'.

This menu has four levels (pages), which look like this:



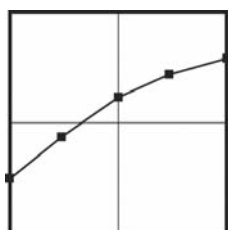
In this menu you can set up collective pitch curves for the following flight modes:

- Normal: = For starting and stopping the motor
- Idle up1 = Throttle pre-select 1: for hovering
- Idle up2 = Throttle pre-select 2: for cruising
- Idle up3 = Throttle pre-select 3: for aerobatics
- HOLD = Auto-rotation: auto-rotation landing
- Condit 6-8 = Flight modes 6 to 8: freely selectable

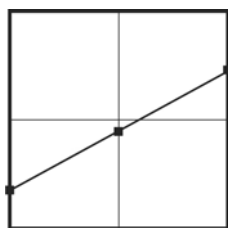
To be able to set different collective pitch curves it is essential to switch each flight mode from group mode (GLOBAL) to single mode (SEPARATE).

Switching between these curves (flight modes) is carried out using the (flight mode-) switch assigned to the flight mode in question (see Section 13.1, page 40). When you switch the system on, the 'Normal' flight mode must be selected, otherwise you will hear an audible mixer alarm. It is only possible to switch RF transmission on when the transmitter is set to 'Normal' mode.

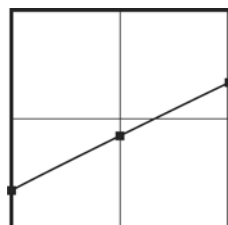
Here is an example of a collective pitch curve for the 'NORMAL' flight mode. The base curve is a straight line. The curve should be programmed in such a way that the motor speed remains as nearly constant as possible over the full range of travel. For most purposes five-point curves are perfectly adequate for this.



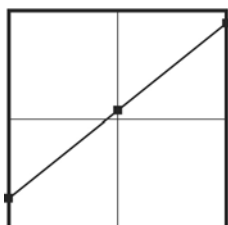
Example of a curve for the flight mode 'Idle up 1': the base curve is linear, but the values have been optimised for the hover, so that the motor maintains the correct rotational speed (rpm) at all collective pitch settings. For most purposes three-point curves are adequate for this.



Example of a curve for the flight mode 'Idle up 2': the base curve is linear, but the values have been optimised for cruising (cruising), so that the motor maintains the correct rotational speed (rpm) at all collective pitch settings. For most purposes three-point curves are adequate for this.



Example of a curve for the flight mode 'Auto-rotation': the base curve is linear. For a 'HOLD' curve the motor is switched off, or set to idle; see the 'THR-HOLD' menu (Section 15.4).



The bottom collective pitch value has been reduced in order to maintain as high a rotor head speed as possible as the helicopter falls. The minimum value has been increased in order to flare and land the model as smoothly as possible at a high pitch angle.

The curves shown above are just examples. It is essential to optimise them to suit your specific model by carrying out a test-flight programme.

The programming procedure is as follows for all flight modes:

- Programming collective pitch curves
- The curve is programmed in the usual way in the first menu level: first you have to determine the curve type. Mark the 'MODE' field in the topmost display, and make your selection using the '3-D hotkey'. The settings are entered in exactly the same way as for programming the Dual Rate curves; please read Section 15.1 on page 62 for more details.
- Trimming the collective pitch function

The collective pitch trim can be optimised in the two screen levels 2 and 3. On the second page just the trims for hovering (HOVER) are adjusted. The first step as always is to mark this option and activate it: mark the field with the cursor, activate the function with the '3-D hotkey', and conclude the procedure with 'EDIT'. You can now define whether the settings are to apply to all flight modes (Global) or only to individual flight modes (Separate).

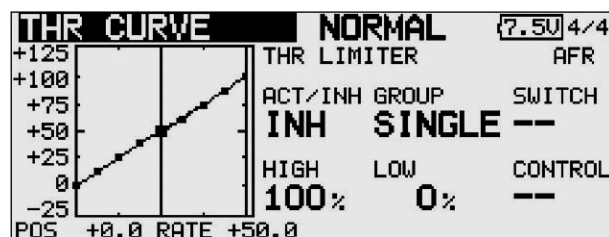
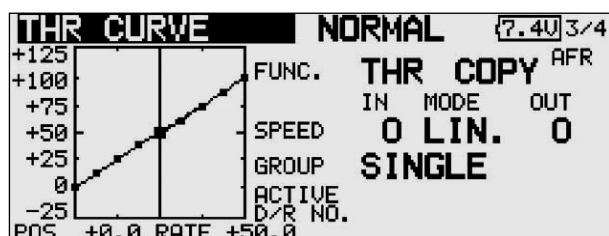
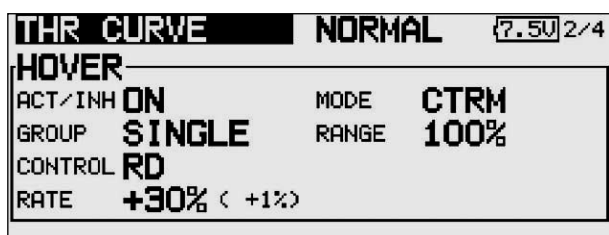
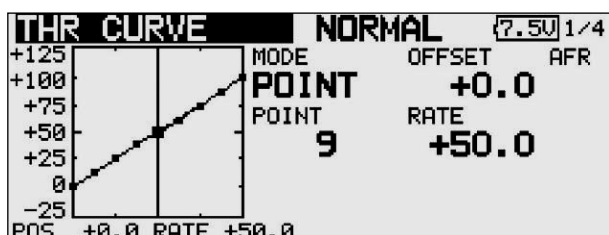
- At this point you should define a transmitter control for varying the trim. Mark the 'Transmitter control' field using the '3-D hotkey' and activate it with 'EDIT'; this action calls up the Transmitter Control Select menu; you can now choose your preferred transmitter control using the procedure already described many times.
- Next you define the collective pitch trim mode in the 'MODE' field. The options here are 'NORM' and 'CTRM'. If you select the Normal trim type, the trim range lies symmetrically around the centre position, and the servo end-points are affected when the trim value is changed. The Centre trim type also works around the centre position of the transmitter control, but does not affect the end-points, i.e. the trim travels become asymmetrical when you offset the trim.
- It is also possible to adjust the trim range (Range). If you select a small range, the trim only affects the area around the centre of the stick travel. The final point to adjust is the trim rate (RATE) or trim travel: the adjustment range is infinitely variable between -30% and +30% of transmitter control travel; the default setting is +30%. Mark and activate this option, then turn the '3-D hotkey' to set your preferred percentage value. Holding the 'EDIT' button pressed in for at least one second restores the default setting (+30%).
- On the third page of the menu the trims for 'Collective pitch minimum' and 'Collective pitch maximum' can be set, i.e. the end-points of the collective pitch servo travel. The programming procedure is exactly the same as that for defining the hover trims settings, although in this case the trim mode and trim range are not variable.
- Collective pitch servo settings
- In the fourth level of the menu the most important point to note is that you can determine the speed and mode of the collective pitch servo, as well as define whether the curve is to apply only to the current flight mode (Separate) or to all flight modes (Global).
- The first facility is for programming a mode: linear mode is used for controlling non-self-neutralising functions, whereas symmetrical mode is employed for self-neutralising functions. A transit speed can be entered separately for both directions of running, i.e. 'there' and 'back'. The adjustment range is 0 to 27 increments: the higher the number, the more slowly the servo moves. The maximum delay time (27 increments) corresponds to a servo transit time of nine seconds. The settings are changed using the '3-D hotkey'. The default setting is always '0'; holding the 'EDIT' button pressed in for at least one second restores the default setting.

## 15.2 THROTTLE CURVE SETTINGS

Operating the throttle stick moves the throttle servo, but also automatically operates the collective pitch servos. The interaction between collective pitch and throttle is very important, and for this purpose the throttle function can be assigned one of six possible curve types, each of which can be allocated a maximum of seventeen variable points. The FX-30 also offers switchable flight modes, which enable the pilot to set up the optimum throttle curve for each individual flight mode.

Use the '3-D hotkey' to mark the 'THROTTLE CURVE' function in the Helicopter Model menu, and confirm your choice with 'EDIT'.

The screen has three levels (pages), which look like this:

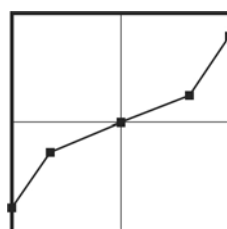


In this menu you can set up collective pitch curves for the following flight modes:

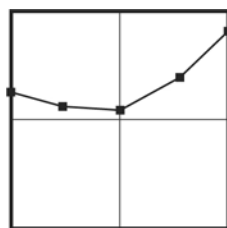
- Normal: = For starting and stopping the motor
- Idle up1 = Throttle pre-select 1: for hovering
- Idle up2 = Throttle pre-select 2: for cruising
- Idle up3 = Throttle pre-select 3: for aerobatics
- HOLD = Auto-rotation: auto-rotation landing
- Condit 6-8 = Flight modes 6 to 8: freely selectable

To be able to set different throttle curves it is essential to switch each flight mode from group mode (GLOBAL) to single mode (SEPARATE).

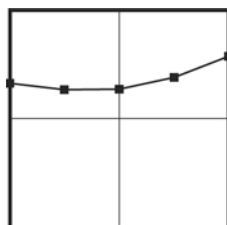
Switching between these curves (flight modes) is carried out using the (flight mode-) switch assigned to the flight mode in question (see Section 13.1, page 40). When you switch the system on, the 'Normal' flight mode must be selected, otherwise you will hear an audible mixer alarm. It is only possible to switch RF transmission on when the transmitter is set to 'Normal' mode.



Here is an example of a throttle curve for the 'NORMAL' flight mode. The curve should be programmed in such a way that motor speed remains as nearly constant as possible over the full range of travel when the collective pitch stick is operated. For most purposes five-point curves are perfectly adequate for this.



Example of a curve for the flight mode 'Idle up 1': the values have been optimised for the hover, so that the motor maintains the correct rotational speed (rpm) at all collective pitch settings. For most purposes five-point curves are adequate for this.



Example of a curve for the flight mode 'Idle up 2': the base curve is linear, but the values have been optimised for cruising (cruising), so that the motor maintains the correct rotational speed (rpm) at all collective pitch settings. For most purposes five-point curves are adequate for this.

The curves shown above are just examples. It is essential to optimise them to suit your specific model by carrying out a test-flight programme.

The procedure for programming a throttle curve for the individual flight modes is absolutely identical to that for setting up the collective pitch curves. Please read the previous section on page 62 for a full description.

The same applies to programming the settings for throttle servo trim in hover mode on the second display page.

The settings for the throttle servo in the third display level are also completely identical; full details are to be found on page 62.

## 15.3 ACCELERATION FUNCTION

The purpose of this function is to prevent unwanted changes in the helicopter's attitude when you alter the throttle setting or the collective pitch function. The action of the Acceleration function is as follows: when you alter the throttle setting, the software superimposes a temporary compensatory effect. The result is that rotor speed does not collapse if you suddenly increase the blade pitch angle, and rotor speed does not increase if you suddenly reduce collective pitch. This option has proved to be extremely useful for general flying, and for 3-D aerobatic flying in particular.

Use the '3-D hotkey' to mark the 'ACCELERATION' option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The screen has two levels (pages), which look like this:

ACCELERATION

NORMAL

7.50 1/2

PITCH

ACT/INH INH

RATE

LOW 0%

HIGH 0%

GROUP SNGL

DUMPING

ACT POS 25% 75%

0%

ACCELERATION

NORMAL

7.50 2/2

THROTTLE

ACT/INH INH

RATE

CLOSE 0%

OPEN 0%

GROUP SNGL

DUMPING

ACT POS 25% 75%

0%

You will now find two strictly separated pages for the collective pitch and throttle settings. On the first page you enter a setting for the collective pitch function, and on the second page a setting for the throttle function. Both settings are entered using the identical procedure, with the exception that the terms 'Min.' and 'Max.' on the collective pitch settings page are replaced by 'END' (idle) and 'OPEN' (carburettor open) on the throttle page, referring to the state of the carburettor. The following description therefore covers both menu pages, but we will concentrate on the collective pitch settings in our example.

The first step is to activate this option in the 'ACT / INA' line in the standard fashion. After this you can select 'Global' or 'Separate' mode. You can now enter separate percentage values (Rate) for the positions 'Min.' and 'Max.', and 'END' and 'OPEN'. Mark the field and enter the setting using the '3-D hotkey', then conclude the procedure with 'EDIT'. The selected setting is displayed as a percentage value in the field, and also in graphic bar-form. You can enter a percentage value (actually a time period) in the 'Damping' field; this determines how long the function is to remain active once the change in setting has been carried out. In the bottom line 'ACT-POS' you can define a point for both sides, which represents the position from which the function is to take effect.

If you decide to make use of this facility, please ensure that the throttle and collective pitch linkages have sufficient freedom of movement, i.e. that they are not mechanically restricted or obstructed at any point. If necessary, adjust the mechanical linkages until this is the case.

## 15.4 AUTO-ROTATION SETTINGS

This option is used for entering the settings for auto-rotation, so that the motor either stops or idles when the 'Auto-rotation' flight mode (HOLD) is selected, regardless of the position of the throttle stick. Two independent settings - idle (IDLE mode) and motor off (OFF mode) - can be entered. It is advisable to use the 'Idle' mode for practising auto-rotation landings. Either of the auto-rotation modes can be activated using switches, which you can select without restriction.

Use the '3-D hotkey' to mark the 'AUTO-ROTATION' option in the Helicopter Model menu, and confirm your choice with 'EDIT'.

The screen has two levels (pages), which look like this:

THR HOLD

NORMAL

7.50 1/2

CUT MODE

MODE

MANUAL

ACT/INH INH

GROUP SINGLE

HOLD POS. 17%

SWITCH --

SPEED 0

0%

THR HOLD

NORMAL

7.50 2/2

IDLE MODE

MODE

MANUAL

ACT/INH INH

GROUP SINGLE

IDLE OFS +0

SWITCH --

SPEED 0

You will now find two separate pages for the auto-rotation settings, i.e. 'motor stopped' and 'idle'. On the first page you can enter the settings for a cut (stopped) motor, while the second page contains those for the motor at idle. Both sets of values are entered in exactly the same way. The only item which differs is the term 'Auro POS.' for motor cut, which changes to 'Idle OFS.' for the idle option; the first screen also displays the Offset point for automatic mode in graphic bar-form. The following description therefore covers both menu levels, but we will concentrate on the 'Motor off' mode in the following example.

The first step is to activate this option in the familiar fashion in the 'ACT / INA' line. After this you can select 'Global' or 'Separate' mode.

You can now enter the Auto-rotation mode in the second line. Two different modes are available:

- Manual: Manual mode
- Auto: Automatic mode

In manual mode the auto-rotation flight mode is only triggered when you operate a (freely selectable) switch. In automatic mode, the auto-rotation flight mode is triggered by the position of the throttle stick. In the latter case it is necessary to define the trigger point: move the throttle stick to the desired position, then press the 'EDIT' button. The trigger position is displayed in bar-form on the right of the screen.

## 15.5 SWASHPLATE MIXER

The next step is to set the carburettor position for auto-rotation, in the form of a percentage figure in the bottom line. In 'Motor off' mode the motor must be stopped completely; a corresponding servo travel must be set in order to ensure this. In 'Idle' mode the carburettor setting should be selected to move the motor to idle at a reliable but not excessively high speed. In either case you must first mark the field, and enter the required setting using the '3-D hotkey'; conclude the procedure with 'EDIT'.

In the 'Switch' line you can set your preferred switch: mark the field and confirm with 'EDIT'. This action calls up the Switch Select menu, where you can define your preferred switch and set the correct direction of operation.

Finally you should mark the 'Speed' field in order to define the speed at which the throttle servo is to move to its auto-rotation position. Use the '3-D hotkey' to enter the setting as a numerical value. Please note: the higher the figure, the slower the servo takes up the selected position.

Please ensure that the Auto-rotation function is switched off before you attempt to start the motor.

This function is used to set up the swashplate accurately over its full travel. All the basic functions (roll-axis (aileron), pitch-axis (elevator) and collective pitch) can be superimposed on each other. Four mixers are required for this, and for each one a mixer curve can be activated and a trigger switch defined. Use the '3-D hotkey' to mark the 'SWASH MIX' option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The screen has a single level (page), but for each mixer it includes a graphic display for programming the mixer curve.

The screen looks like this:

SWASH MIX		NORMAL		(7.40) 1/1
MIXING	ACT	SWITCH	TRIM	GROUP
AIL→ELE	INH	--	OFF	SINGLE
ELE→AIL	INH	--	OFF	SINGLE
PIT→AIL	INH	--		SINGLE
PIT→ELE	INH	--		SINGLE

AIL→ELE		NORMAL		(7.50) 1/1
+150		MODE	OFFSET	INH
+100		EXP 1	+0.0	
+50		RATE A	RATE B	
0		+0.0	+0.0	
-50		EXP A	EXP B	
-100		+0.0	+0.0	
-150				
POS -24.5 RATE +0.0				

The first requirement is to activate each mixer you wish to use in the 'ACT' column: mark the field, then enter your settings using the '3-D hotkey', and conclude the activation with 'EDIT'. The same field then displays 'On' or 'Off' according to the position of the switch.

The effects and method of setting the 'Global' or 'Separate' mode have already been described; select your preference in the 'Mode' column. Move to the 'Switch' column and select a switch and its direction of operation in the usual way.

The mixer function itself is actually set up with the help of the associated curve in the sub-menu: mark the appropriate line in the 'MIXER' column and confirm with EDIT; the curve display now appears, and can be programmed using the familiar procedure: the first step is to select the curve type: mark the 'MODE' field in the topmost display and use the '3-D hotkey' to make your selection. The method of programming the mixer curve is exactly as described in Section 15.5 on page 64; please refer back to that section if you are not sure.

Virtual swashplate rotation (range 0 - 90°)

Virtual swashplate rotation of 45° is required, and for this we need to activate the first two mixers 'Roll -> pitch-axis' and 'Pitch-axis -> roll' with trim 'On', in each case with a mixer rate of 100%.

If you find there are minor discrepancies in the swashplate linkage, preventing the helicopter from flying in a straight line, it is possible to correct this by setting up slightly different settings in the individual mixer functions.

A fixed virtual swashplate rotation of 45° is available if you select the model type H4X.

## 15.6 THROTTLE / MOTOR MIXER

This function is used to program a mixer, which affects the position of the throttle servo when a 'pitch-axis' (elevator), 'roll-axis' (aileron) or 'tail rotor' command is applied at the transmitter. The settings are adjusted separately. Once set up correctly, this mixer ensures that motor speed is not affected when you operate any of the three functions mentioned above. In addition to the mixer it is possible to program an acceleration function for the throttle servo to obtain the optimum corrective setting.

Use the '3-D hotkey' to mark the 'THROTTLE MIX' option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The screen display has one level (page), but two sub-menus are present for each mixer: in each case a separate graphic display for programming the mixer curve, and one for setting the acceleration function. The two lower screen shots are typical displays for the 'Roll -> throttle' mixer.

THROTTLE MIX NORMAL (7.40) 1/1				
MIXING	ACT	SWITCH	MODE	GROUP
AIL→THR	INH	--	CTRM	SINGLE
ELE→THR	INH	--	CTRM	SINGLE
RUD→THR	INH	--	CTRM	SINGLE

AIL→THR NORMAL (7.40) 1/2				
+150			MODE	OFFSET INH
+100			EXP 1	+0.0
+50			RATE A	RATE B
0			+0.0	+0.0
-50			EXP A	EXP B
-100			+0.0	+0.0
-150				
POS -25.0 RATE +0.0				

AIL→THR NORMAL (7.50) 2/2				
INH				
	LEFT	RIGHT		
RATE	0%	0%		
DUMPING		0%		
ACT POS	-50%	+50%		

The mixer function itself is actually set up in the sub-menu, with the help of the associated curve: mark the appropriate line in the 'MIXER' column, confirm with 'EDIT', and the curve display appears. The curve can then be programmed using the familiar procedure: first select the curve type: mark the 'MODE' field in the topmost display, and select the settings using the '3-D hotkey'. The method of programming a mixer curve is exactly as described in Section 15.2 on page 63; please refer back to that section if you are not sure.

The acceleration function is set up on the third menu page; please refer to Section 15.3 on page 64 for details. For each mixer a percentage value (Rate) can be entered separately for both maximum travels of the stick (Left and Right): mark the field, enter the setting using the '3-D hotkey', and conclude the programming with 'EDIT'. The setting is displayed in the field as a % value. You can also enter a percentage value (actually a time period) in the 'Damping' field; this determines how long the function is to remain active once the change in setting has been carried out.

In the bottom line - 'ACT-POS' - you can define a point for both sides which represents the position from which the function is to take effect: mark the appropriate field, enter the setting using the '3-D hotkey', then conclude the procedure with 'EDIT'. The default settings are 50% for left, and +50% for right. Holding the 'EDIT' button pressed in for at least one second restores the defaults.

The first step is to move to the second column and follow the standard procedure to activate each mixer which is to be used: mark the field, enter the setting using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now display 'ON' or 'OFF', according to the position of the switch.

The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed using the 'Mode' column. Define a switch and its direction of operation in the usual way, using the 'SWITCH' column. The default setting is '--', i.e. the mixer is permanently switched on.

## 15.7 COLLECTIVE PITCH -> NEEDLE VALVE MIXER

This function is used to program an automatic needle valve adjustment, which follows the movement of the collective pitch stick. It enables you to set the optimum fuel mixture at the carburettor (by adjusting the needle valve) whenever the load on the motor alters due to changes in the pitch angle of the rotor blades. An acceleration option can also be programmed to optimise this function.

Use the '3-D hotkey' to mark the 'COLLECTIVE PITCH -> NEEDLE VALVE' option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The screen display has two levels (pages), which look like this:

PIT→NEEDLE		NORMAL		[7.50] 1/2	
+150		MODE	EXP 1	OFFSET	INH
+100		RATE A	+0.0	RATE B	
+50		EXP A	+0.0	EXP B	
0					
-50					
-100					
-150					
POS +0.0 RATE +0.0					

PIT→NEEDLE		NORMAL		[7.40] 2/2	
ACT/INH	INH	RATE	LOW 0%	HIGH 0%	
GROUP	SNGL	DUMPING	0%		
SWITCH	--	ACT POS	25%	75%	

The mixer must first be activated in the second display in the standard manner: mark the field, enter the setting using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now show 'ON' or 'OFF', according to the switch position.

The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed in the 'MODE' line. A switch and its direction of operation can be defined in the 'SWITCH' column. The default setting is 'NONE', i.e. the mixer is always switched on.

The mixer function itself is actually set up with the help of the associated curve, which is set up in the familiar way: the first step is to define the curve type: mark the 'MODE' field in the topmost display, and make your selection using the '3-D hotkey'. The method of programming the mixer curve is exactly as described in Section 15.7 on page 67; please refer back to that section if you are not sure.

An acceleration function can be programmed on the second page of the menu (see also Section 15.3 on page 64). You can enter a separate percentage value (Rate) for both maximum travels of the collective pitch stick (Min. and Max.): mark the field, enter the values required using the '3-D hotkey', and conclude the programming with 'EDIT'. The setting is displayed in the field as a percentage value. It is also possible to enter a percentage value in the 'Damping' field; this determines how long the function is to remain active once the change in setting has been carried out. In the bottom line - 'ACT-POS' - you can define a point for both sides which represents the position from which the function is to take effect: mark the appropriate field, enter the setting using the '3-D hotkey', then conclude the procedure with 'EDIT'.

## 15.8 COLLECTIVE PITCH -> TAIL ROTOR (REVOLUTION) MIXER

The purpose of this function is to detect torque fluctuations at the main rotor, caused by changes to the throttle or collective pitch settings, and pass that information to a mixer which controls the tail rotor servo, so that the tail rotor always generates the appropriate corrective torque, thereby more or less eliminating unwanted moments around the vertical (yaw) axis. If this mixer is set up accurately, it greatly eases the task of the tail rotor gyro system. However, an incorrectly set mixer of this type (also known as a Revo mixer) will interfere with the gyro's proper function. For this reason it is particularly important to set up this mixer as accurately as possible. An acceleration function can be programmed to optimise the function.

If a modern gyro is installed, and operated in heading-hold / AVCS mode, the revolution mixer must always be switched off.

Use the '3-D hotkey' to mark the COLLECTIVE PITCH -> TAIL ROTOR option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The menu has two levels (pages), which look like this:

PIT→RUD		NORMAL		[7.40] 1/2	
+150		MODE	EXP 1	OFFSET	INH
+100		RATE A	+0.0	RATE B	
+50		EXP A	+0.0	EXP B	
0					
-50					
-100					
-150					
POS +0.0 RATE +0.0					

PIT→RUD		NORMAL		[7.40] 2/2	
ACT/INH	INH	RATE	LOW 0%	HIGH 0%	
GROUP	SNGL	DUMPING	0%		
		ACT POS	25%	75%	

The mixer must first be activated on the second page of the menu: simply mark the field, enter the setting using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will now display 'ON' or 'OFF', according to the position of the switch. The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed in the 'Mode' field.

The mixer function itself is actually set up in the usual way with the help of the associated curve: the first step is to define the curve type: mark the 'MODE' field in the topmost display, and make your selection using the '3-D hotkey'. In most cases a linear curve is ideal for the Revolution mixer. The method of programming the mixer curve is exactly as described in Section 15.2 on page 63; kindly refer back to that section if you are not sure.

Please be extremely cautious when making these adjustments, and carry out any changes in small steps. Check all the settings very carefully before eventually moving on to very careful test-flights. From a stable hover the helicopter should exhibit no tendency to rotate around the vertical (yaw) axis when you open the throttle or increase the collective pitch setting - whether you make the change quickly or slowly. The reverse also applies: the helicopter must not rotate around the vertical (yaw) axis when you reduce motor torque or the collective pitch setting.

An acceleration function can be programmed on the second page of the menu (see also Section 15.3 on page 64). You can enter a separate percentage value (Rate) for both maximum travels of the collective pitch stick (Min. and Max.): mark the field, enter the values required using the '3-D hotkey', and conclude the programming with 'EDIT'. The setting is displayed in the field as a percentage value.

It is also possible to enter a percentage value in the 'Damping' field; this determines how long the function is to remain active once the change in setting has been carried out. In the bottom line at 'ACT-POS' you can define a point for both sides which represents the position from which the function is to take effect: mark the appropriate field, enter the setting using the '3-D hotkey', then conclude the procedure with 'EDIT'.

## 15.9 GYRO SETTINGS

This function is used for adjusting gyro gain (sensitivity) from the transmitter. Gyro gain can be entered as a percentage, and it is also possible to select the gyro type. You can assign a switch for changing gyro gain to any of three settings (Rate 1, 2 or 3) for each flight mode. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes or only to one mode (Global or Separate mode).

Use the '3-D hotkey' to mark the 'Gyro' function in the Helicopter Model menu, and confirm your choice with 'EDIT'. The display looks like this:

<b>GYRO</b>		RATE 1 2 3	<b>NORMAL</b>	{7.40} 1/3
RATE 1 IS ON	MODE	RATE		
ACT/INH <b>ON</b>	<b>AVCS</b>	<b>50%</b>	< +50%	
TYPE	<b>GY</b>	FINE TUNING		
SWITCH	<b>--</b>	CONTROL	<b>--</b>	
GROUP	<b>SNGL</b>	RATE	<b>+0%</b>	< +0%

The menu has three identical levels (pages) for setting three different gyro gain values (Rate 1 to 3). This mixer must first be activated in the 'ACT' line: first mark the field, enter the setting using the '3-D hotkey', and conclude the activation with 'EDIT'. The field will then display 'ON' or 'OFF', according to the position of the switch.

In the 'Type' column you should enter the type of gyro fitted to the model. For AVCS or 'heading hold' gyros enter 'GY' as the type; for others select the 'NORM' type. In the 'SWITCH' column you can select a gyro gain switch and its direction of operation using the familiar procedure.

The default setting is 'NONE', i.e. the function is constantly switched on. The effects and method of setting the 'Global' or 'Separate' mode have already been described; the settings are adjusted in the 'Mode' line.

In the 'MODE' column you have the option of choosing whether the gyro is to work in 'AVCS' mode (heading hold) or normal mode. For more information on this, please refer to the instructions supplied with the gyro you are using.

Under 'FINE Trim' you can enter the fine-tuning settings. A transmitter control can be defined which is used as a means of fine-tuning the mixer settings: first select your preferred trans-

mitter control in the 'Transmitter control' field. Mark the appropriate field, then use the '3-D hotkey' to make your selection in the Switch / Transmitter Control Select menu. Any of the auxiliary transmitter controls can be selected. The current setting and direction of operation are displayed on-screen.

Three different gyro settings can be called up for each flight mode in this menu. If you have assigned a separate transmitter control (linear slider) to the 'Gyro' function in the Functions menu, so that you can override the set values, then this transmitter control has no function; this arrangement avoids the settings in the menu counteracting the transmitter control positions.

However, if you still wish to be able to adjust gyro gain in the usual way using a slider, select the Gyro 2 function. This function allows you to adjust gyro gain using a linear slider.

### Caution:

In this case we recommend that you enter no settings in the Gyro menu, as the functions may interact, either by a cumulative effect or by cancelling each other out.

## 15.10 SPEED GOVERNOR (REGULATOR) SETTINGS

This function enables you to adjust the settings of a speed governor (regulator) from the transmitter, and / or call up pre-set values. The nominal value of the governor can be entered in the form of a percentage value, and a switch can be programmed for selecting any of three values (Rate 1, 2 or 3) as the nominal rotational speed when set to Separate mode. As with many functions, it is also possible to determine whether the settings are to apply to all flight modes (Global) or only to the currently active flight mode (Separate). A transmitter control can be assigned for fine-tuning this function.

Use the '3-D hotkey' to mark the 'GOVERNOR' option in the Helicopter Model menu, and confirm your choice with 'EDIT'. The menu has three levels (pages), which look like this:

<b>GOVERNOR</b>		RATE 123	<b>NORMAL</b>	(7.40) 1/3
ACT/INH	<b>INH</b>	RATE	<b>50.0%</b>	( 50.0%)
UNIT	<b>%</b>	FINE TUNING		
SWITCH	<b>--</b>	CTRL	<b>--</b>	
GROUP	<b>SNGL</b>	RATE	<b>+0%</b>	( +0%)

<b>GOVERNOR</b>		RATE 123	<b>NORMAL</b>	(7.40) 2/3
ACT/INH	<b>INH</b>	RATE	<b>50.0%</b>	( 50.0%)
UNIT	<b>%</b>	FINE TUNING		
SWITCH	<b>--</b>	CTRL	<b>--</b>	
GROUP	<b>SNGL</b>	RATE	<b>+0%</b>	( +0%)

<b>GOVERNOR</b>		RATE 123	<b>NORMAL</b>	(7.40) 3/3
ACT/INH	<b>INH</b>	RATE	<b>50.0%</b>	( 50.0%)
UNIT	<b>%</b>	FINE TUNING		
SWITCH	<b>--</b>	CTRL	<b>--</b>	
GROUP	<b>SNGL</b>	RATE	<b>+0%</b>	( +0%)

The menu features three identical levels, which are used to enter three different gain levels (RATE 1 - 3). This function must first be activated in the 'ACT' line in the usual way by marking the appropriate field, changing the setting with the '3-D hotkey', and concluding the activation with 'EDIT'. The field then displays 'OFF' or 'ON', according to the physical position of the switch. A switch can be defined in the 'SWITCH' column using the standard procedure: mark the appropriate field and define the desired switch and its direction of operation for changing the pre-set rotor speed. The default setting is 'NONE'; at this setting the governor operates at the nominal rotational speed set on the unit itself. The effects and method of setting the 'Global' or 'Separate' mode have already been described; the function is programmed in the 'Mode' line.

In the 'Rate' column you can enter the percentage value for the nominal rotational speeds 1, 2 and 3 by marking the field and entering the setting using the '3-D hotkey'. The default setting is 50%; holding the 'EDIT' button pressed in for at least one second restores the default setting. If you wish, you can change the unit for rotational speed displayed on the screen; this is carried out in the 'UNIT' field. The two options are a percentage value and a direct rotational speed in rpm.

To change this, simply mark the field, carry out the change using the '3-D hotkey', and conclude the procedure with 'EDIT'. In the 'FINE Trim' field you can carry out fine-tuning to the settings. A transmitter control can be defined for fine-tuning the pre-set governor speed. The first step is to select a transmitter control in the 'Transmitter Control' field: mark the appropriate field and define the transmitter control or switch of your choice using the '3-D hotkey' in the Switch / Transmitter Control Select menu which subsequently appears. Any of the auxiliary transmitter controls can be selected; the current setting and the direction of operation are displayed on-screen. In this menu you can call up three different speed settings for each flight mode. If you have assigned a separate transmitter control (linear slider) to the 'Speed governor' function in the Functions menu, so that you can override the set values, then this transmitter control has no function; this arrangement avoids the settings in the menu counteracting the transmitter control positions. However, if you still wish to be able to adjust the pre-set speed in the usual way using a slider, select the Speed 2 function. This function allows you to adjust the speed setting using a separate transmitter control (e.g. linear slider).

### Caution:

In this case we recommend that you enter no settings in the Governor menu, as the functions may interact, either by a cumulative effect or by cancelling each other out.

## 15.11 FLIGHT MODE HOLD (CND HOLD)

The purpose of this function is to enable you to carry out adjustments in another flight mode. The motor is held at idle to prevent the possibility of opening the throttle accidentally. The 'Flight mode hold' function can only be activated in 'Normal' flight mode, and even then only if the throttle stick is at the idle position. A warning signal sounds as soon as you activate 'Flight mode hold'. In this way the transmitter alerts you to the fact that the motor will not respond if you move the throttle stick. You can now change to a different flight mode by operating the appropriate flight mode switch, and make changes to the settings in that flight mode. When you activate this function, the throttle servo is fixed at a pre-set position. If you wish to change the settings for the channel that operates the throttle servo, you must first disable the 'Flight mode hold' function.


Note that the 'Flight mode hold' function cannot be activated or disabled if:

- a flight mode switch is switched on, or
- the throttle stick is at a value higher than 1/3 of full stick travel.

This option is controlled from the Base display for model helicopters. To define the pre-set value, mark the field and move the throttle stick to the desired position. Note that the stick must be positioned at a point lower than 1/3 of full travel. The Base, Model and Main menu displays show the status of this option in the following way:

'ON': Flight mode hold switched on

'INA': Flight mode hold switched off (inactive)

<b>MODEL 1</b>		<b>NORMAL</b>		(7.40)
TIMER1	UP	+0	+0	 <b>SYSTEM LINKAGE</b> <b>MODEL</b> <b>FASST MULT</b> 2.4GHz <b>RF OFF</b>
THR POS	PITCH	+0	+0	
0%	-100%	+0	+0	
CND HOLD IS ON		+0	+0	
ROBBE	10:39:45	+0	+0	

## 16. TRANSMITTER CONTROL / SWITCH SELECT MENU

The software of the FX-30 includes a comprehensive Transmitter Control Select menu, which allows you to select any transmitter control you like for virtually all the functions - whether to act as a control for a switched function, or for a proportional control function. The Select menu always looks the same, and the description presented here relates to both options. As soon as you mark a field for selecting a transmitter control or switch for a particular function, and confirm your choice with 'EDIT', the following Select menu appears. Please note at this point that the menu differs from function to function, i.e. the display and selectable options vary according to the application. Our example shows the Switch Select menu for the 'Programmable Mixer' function. All the transmitter controls, switches and rotary trimmers are listed and named.



- J1 ... J4 = Stick 1 ... 4
- SA ... SH = Switch A ... H
- SI ... SJ = Stick switch, right / left
- LD ... RD = Left / right rotary knob
- LS ... RS = Left / right linear slider
- ON / OFF = Switch position
- T1 ... T6 = Rotary trimmer

Mark the desired switch or control, and confirm your choice with the 'EDIT' button. When you have selected a switch, move the cursor to the ON / OFF field, and define the switch position.



A sub-menu now appears in which you can define the switch position, in our example, is for switch 'G'.

- The arrows indicates the current mechanical position of the switch. Use the 3-D hotkey to change the ON or OFF position in order to set the desired direction of switching.
- In the bottom part of the display the switch type is determined: press-button (Memory) or ratchet switch (NORMAL).
- The upper part of the screen display shows the current flight mode. If the function is to be controlled by different switches or transmitter controls in different flight modes, the mode must be changed to separate. It will then be necessary to switch the flight mode in this menu, and select another switch or control for the current flight mode.

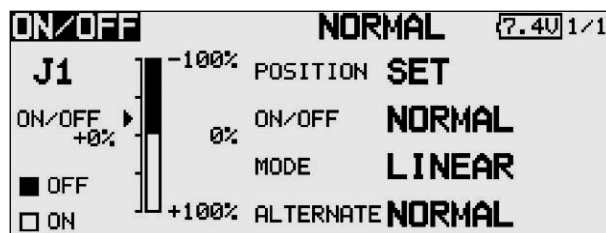
If you choose a primary stick or other proportional control, you can set the switching point in the following screen.

### • SET

To set the trigger point, move the selected transmitter control to the desired switching point, move the cursor to SET, and press the 'EDIT' button. The switching point is displayed as a % value and in bar-graph form.

### • ON / OFF

At this menu point you can define the direction of switching: NORMAL or REVERSE.



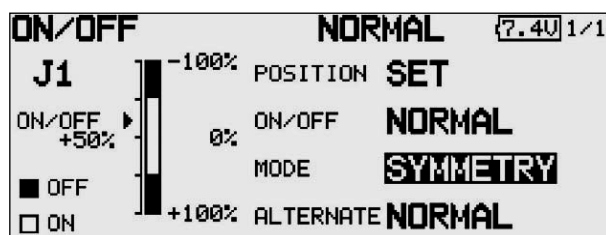
### • MODE

#### LINEAR

At this setting the transmitter control travel is divided up into an ON zone and an OFF zone (see screen shot above). The function is then switched on or off according to the position of the transmitter control.

### SYMMETRICAL

The two switching points at this setting are located symmetrically relative to the stick's neutral position. A switched function is triggered as soon as the value exceeds the switching point at the top or bottom end of the stick travel.



### MEMORY

The switch type - push-button (Memory) or ratchet switch (NORMAL) - is selected in the bottom part of the screen.

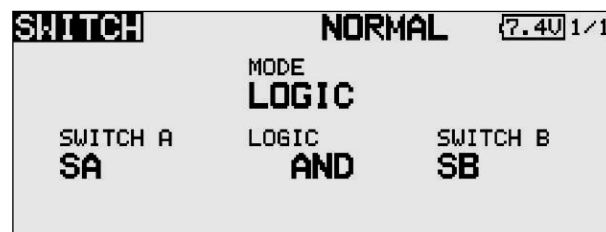
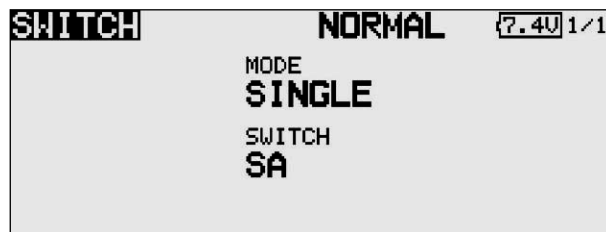
### • Logic functions

Particular functions and flight modes can also be switched on and off using a logical link between two switches; this is known as a logic function.

Select the switch MODE (SINGLE) or a logic link (LOGIC).

The following functions are available:

- AND: Serial link between switches
- OR: Parallel link between switches
- EX-OR: Links and connects particular switches.



## 17. UPDATING THE TRANSMITTER SOFTWARE

The user can replace the FX-30 software with the current version at any time. Update files are stored on the robbe website ready for downloading. We recommend that you register at <http://support.robbe.com>, so that you will be informed by e-mail newsletter of the availability of new updates. You will also have access to the protected Support area of the site. This file must then be copied onto the SD card using a card reader. The procedure for transferring the software to the transmitter's working memory is as follows:

### Software Update:

1) Download the compressed software file from the robbe Support Server.

2) De-compress (unzip) the file.

3) A folder entitled 'T12FG update' is generated.

4) Open the folder, and double-click on the file T12FG update.exe.

5) The 'Futaba File System Utility' opens.

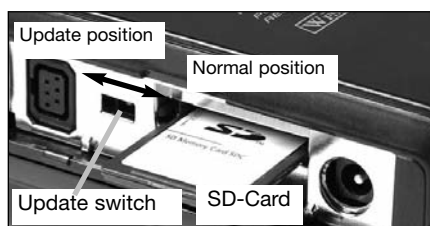
6) Select the drive in which the SD card is located, and click on 'OK'.

7) You will now see a query:  
'Data Copy on the SD-card. OK?'  
Click on OK to confirm this

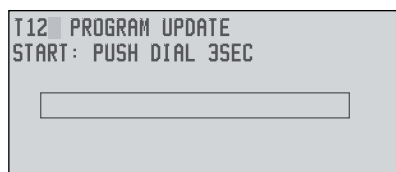
8) The following message then appears:  
'The copy to the SD-card ended normally'

9) Insert the SD card in the transmitter:  
Fit the SD card containing the Update file in the card slot on the left-hand side of the transmitter.

10) Move the 'Update' switch to the 'Update' position using a screwdriver with a very fine tip.

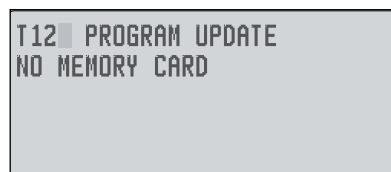


11) Switch the transmitter on. After about ten seconds you will see the following message on the transmitter screen:



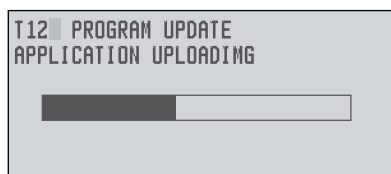
Follow the instructions, and hold the 'EDIT' button pressed in for at least three seconds.

If no card is present, if the card contains no Update file, or if the Update file is corrupt, the following error message will be displayed on-screen:

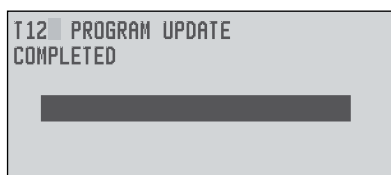


Switch the transmitter off and check the card and / or the file.

12) Press the 'EDIT' button to initiate the data transfer.



13) As soon as the data transfer is completed, the following display appears:



14) Switch the transmitter off, and move the Update switch back to the 'Normal' position.

## 18. TIPS ON INSTALLING 2,4 GHZ RECEIVERS AND ANTENNAE

Over the years, RC users gather their own experience in the installation and use of RC components. 2.4 GHz technology has ushered in a new epoch, which brings enormous advantages. At the same time this new equipment is different in nature from previous technology, and we need to adopt appropriate measures when installing and operating a 2.4 GHz system.

One of the most common mistakes is to wrap the receiver in foam or fit it in a foam tube as we have always done with 35 MHz receivers, in order to protect the unit from vibration. This is not necessary with 2.4 GHz FASST receivers, as they do not contain ceramic filters, and are therefore not vulnerable to vibration in the same way. This "well meant" measure is actually counter-productive, as 2.4 GHz receivers contain high-performance ICs with a fairly high current drain, and this results in heat generation. Wrapping the receiver in foam prevents waste heat being dissipated from the receiver. We recommend that you install 2.4 GHz receivers using double-sided foam tape (or Velcro tape). If possible the tape mounting should not cover the full area of the case; it is better to fit tape "feet", so that air can circulate freely around and under the receiver. Installing the receiver vertically also enhances air circulation. The temperature range for radio control system components is generally stated as -15°C ... +55°C: this is the typical range, which is stated by manufacturers of electronic components. This temperature range applies to virtually all electronic apparatus used in our daily lives.

The same range (-15 ... +55°C) also applies to RC system receivers, has done for many years, and is equally applicable to the new generation of 2.4 GHz FASST receivers. For other 2.4 GHz systems this temperature range is significant because they employ ICs developed for WLAN applications; these are generally operated under normal conditions, and their temperature limits are therefore the same. Of course, the stated maximum is a theoretical 'safe' limit, and in practice these receivers can cope with considerably higher ambient temperatures (approx. 70 - 75°C). Nevertheless, manufacturing tolerances mean that the component manufacturers cannot guarantee higher values. For these reasons we recommend that you handle your 2.4 GHz equipment with appropriate caution, and in particular observe the following points:

- The use of two LiPo cells without voltage reduction is not recommended.
- Voltage converters used with LiPo cells generate their own waste heat, and should not be positioned in the same compartment as the receiver, or too close to it.
- On hot, sunny days you should not leave models in the car, to avoid the model and electronics becoming too hot.
- Provide effective ventilation, or - even better - take the model out of the car, and park it in the shade of the vehicle.
- If your model is fitted with a clear canopy, or one painted a light colour, the sun shining through the canopy can heat up the fuselage and RC components. You can avoid this problem by removing the canopy to ensure good air circulation in the fuselage, or by covering the area with a light-coloured cloth.
- Cover dark-coloured models with a cloth, or park them in shade.
- Never leave slim / black CFRP / GRP fuselages containing a receiver in the car or in bright sunlight.
- Do not install the receiver close to a motor and / or exhaust system, as the radiated heat may cause the receiver to over-heat.
- Silencers installed inside fuselages should be partitioned off using balsa panels or similar to avoid heat transfer and prevent excessive temperatures in the fuselage.

- Take measures to ensure that air can circulate through the fuselage.
- You may wish to cut ventilation openings in the canopy or fuselage.

### Supplementary notes regarding additional RC components

Although receivers are a special case, most other electronic components will also benefit from the measures suggested above.

- Speed controller heat-sinks, which are already warm or hot, are not so efficient at dissipating heat, and this may result in components overheating in use.
- At temperatures of about 45°C and above, LiPo batteries have a much worse energy yield (approx. 10 - 12%), which in turn will have an adverse effect on your model's performance.
- Servos also lose a proportion of their power when hot: the higher the temperature of the motor winding, the worse its efficiency.

This means that the power of a servo may be reduced by up to 20% at temperatures of 55°C and above compared with cold conditions. This figure is quickly reached, as servo motors generate their own heat.

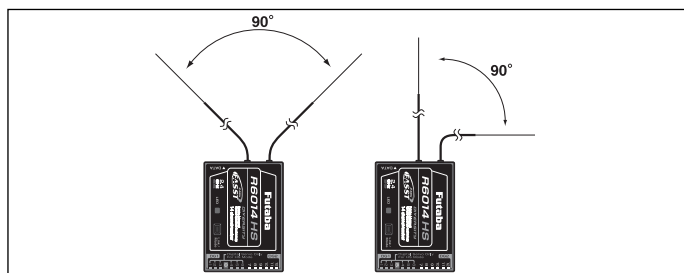
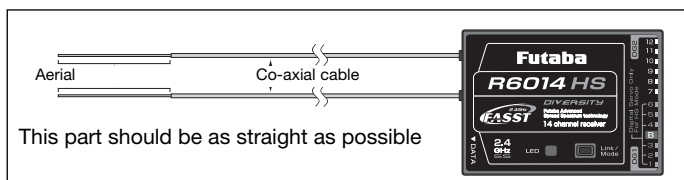
### General information on the subject of 2.4 GHz RC systems

- In general terms the range of 2.4 GHz FASST systems is greater than that of 35 MHz equipment. Close to the ground the range is around 2000 metres, and in the air it is more than 3000 metres. The potential range reductions described in the following section, caused by unfavourable weather conditions and obstacles, have no adverse effect on the system's function; all they do is reduce the safety margin.
  - Large obstacles between the transmitter and the receiver can have a damping or blocking effect on the signal.
  - Close to the ground the transmitter signal is damped more severely than is the case with 35 MHz systems. On foggy days and / or when the ground is wet the range may be reduced at very low altitudes
- If a model is close to the ground, and if an obstacle (person, vehicle, object etc.) moves between the transmitter and the receiver, then effective range may be significantly reduced.
- 2.4 GHz signals radiate from the transmitter virtually in a straight line, for which reason it is essential to maintain visual contact with the model at all times.
  - The FASST R R607, R617, R608, R6008 and R6014 receivers feature a diversity system with dual aerials and corresponding input stages. This system constantly checks the signal level at both aerial inputs, and switches lightning-fast to the stronger signal, without any interruption.
  - Arranging the two aerials at an angle of 90° to each other significantly improves the attitude-dependency, which is usual with a single aerial, and this in turn provides a clear improvement security of reception.
  - The PRE-VISION software constantly scans the input signal, and carries out error-correction as and when necessary.

### 18.1 To obtain optimum reception results

#### Please note the following points regarding aerial deployment:

- The two aerials should be deployed in a straight line.
- The angle between the two aerials should be approximately 90°.
- Large models often contain quite large metal parts, which may have a damping effect on RF reception; in such cases the aerials, should be positioned to left and right of the offending object.



- The aerials should not be deployed parallel with each other, and should always be positioned at least 1.5 to 2 cm away from the following items:
- Anything made of metal or carbon, electrical cables, control 'snakes', control cables, carbon fibre pushrods, carbon roving reinforcements, etc.
- High-current speed controller cables and motor leads;
- Sparkplugs, glowplugs, glowplug heating circuits;
- Locations liable to static charge build-up, e.g. toothed belts, turbines etc.
- Where the fuselage includes materials with a shielding effect (carbon, metal, etc.), route the aerials out of the fuselage by the shortest possible route.
- The aerial ends should never be attached to electrically conductive materials (metal, carbon) either inside or outside the model.
- This applies not only to the co-ax cable but also to the end part of the aerials.
- Avoid bending the co-axial cables through tight radii, and do not kink the leads.
- Protect the receiver from damp at all times.

#### Notes on installing 2.4 GHz FASST receivers:

- Wherever possible, the receiver should be powered by consisting of low-impedance NC or NiMH cells.
- Pulsed BEC systems used as receiver power supplies must be adequately specified; if the voltage under load falls below 3.8 Volts, then the receiver will carry out a reset and restart, which equates to a period of signal loss lasting about two or three seconds. This can be prevented by using so-called RX capacitors at the receiver, which bridge brief voltage collapses (RX capacitor, 1800 ?F, No. F 1621 or 22.000 ?F, No. F 1622).
- FASST 2.4 GHz receivers are relatively immune to 'electro-smog' (such as metal-to-metal noise, stray RF signals, static charge effects, etc.) due to their high intermediate frequency of 800 MHz. At frequencies of about 300 - 400 MHz and higher the amplitude of these effects is quite small. Certain supplementary electronic devices are known to be powerful sources of interference, and under unfavourable circumstances it may be necessary to install a suppressor filter, No. F 1413, in order to keep such interference from the receiver. A range check will show up whether this type of filter is actually required or not.

To prevent the build-up of powerful static charges certain measures are required at the model.

#### Helicopters:

- Use an earthing strap to connect the tail boom to the chassis. Toothed-belt tail rotor drive systems may require a "copper

brush" to dissipate electrical charges from the toothed belt. It may also be necessary to connect the toothed-belt pulleys electrically to the chassis.

- In electric-powered model helicopters it is generally necessary to connect the tail boom to the motor case.
- If the model is fitted with CFRP / GRP blades and a carbon fibre tail boom, massive static charges can be generated at high rotational speeds when air humidity is low. To avoid this an electrically conductive connection should be present between the tail rotor gearbox and the main rotor shaft. The use of anti-static sprays (e.g. Kontakt Chemie) has also proved effective.

#### Turbines:

- Connect an earthing strap to the turbine shielding plate to prevent the build-up of static charges.
- The high airspeeds of fast GRP model jets can result in high static charges (around 40,000 Volts), especially in conditions of low humidity. If this produces a problem, all the model's GRP components with a surface area larger than about 10 cm<sup>2</sup> should be interconnected using an electrically conductive material.
- Turbine connections, (that are routed outside of the fuselage, such as fuel tank connections, etc.), should also be connected to each other electrically in order to avoid static charge problems. Static charges affecting the refueling hose can even have the effect of operating shut-off valves.
- The tyres of the aircraft's undercarriage can also provoke static charge effects, and should therefore be fitted with copper brushes.


#### Range-checking:

- We recommend that a range check should be carried out every time before you fly a new model, or fly a model fitted with a new receiver. Note that the model should not stand on the ground for the check: it should be raised above the ground by about 1 to 1.5 m. Use a plastic or wooden table, box, carton etc. as a support - never a metal object (camping table, etc.). No electrically conductive objects (fences, cars, etc.) should be in the vicinity, and your assistant should not stand too close to the model.
- Start by switching the system on, but leave the motor or engine switched off. Walk slowly away from the model, and operate one control function slowly but continuously.
- While you increase the range, carefully watch the control function on the model, and observe whether it follows the stick movement accurately, or occasionally stops or wavers. You may find it easier to ask a friend to watch the control function from a certain distance.  
Turn the transmitter to left and right as you increase the distance from the model, in order to simulate different aerial positions relative to the model.
- In Power-Down mode (range-check mode) you should achieve a range of about 50 m. In most cases the ground-range will be about 80 to 120 m, which is a very good result. If the value is only about 40 m or less, then you should certainly not fly the model: seek out the cause of the problem and eliminate it before flying.
- If this initial range-check is successful, repeat the whole procedure with the motor running (caution: secure the model well beforehand). The range now achieved should be the same or only slightly less (approx. 20% reduction is acceptable). If the groundrange is substantially reduced, then the power system is causing interference to the receiver. Running through all the measures listed above should enable you to cure the problem.

## RANGE TEST (POWER DOWN MODE)

### Activate the Power-Down Mode:

- Turn on Tx. Select "NO" when asked to transmit

MODEL 1	NORMAL	[7.40]
BAND No.	2.4GHz	
GENERAL	FASST MULT	HELICOPTER
TRANSMIT ? YES NO		

- Select Range Test in system menu

SYSTEM MENU [7.40] 1/1	
TRAINER	H/W SETTING
DISPLAY	INFORMATION
SYSTEM TIMER	RANGE CHECK
USER NAME	

- The Range Test will be displayed. Select "YES" to transmit on reduced power

RANGE CHECK [7.40] 1/1
TRANSMITTER OUTPUTS A WEAKER SIGNAL. PERFORM A RANGE CHECK?
YES

- This menu reduces the transmitted power
- When this mode is activated, the green LED illuminates and the red LED flashes on the RF module and beeps every three seconds.

RANGE CHECK [7.40] 1/1
[EXIT] RETURN TO NORMAL POWER TRANSMITTING
80 RESTART EXIT

- Switch on the model without engine running or connected.
- Slowly move away from the model, operating the controls slowly and continuously
- During this activity, check that the controls follow the stick input with no jerkiness or holding. If necessary, get a helper to observe the controls as you perform the range check.
- Move the Tx from left to right to simulate different aerial positions.
- You should achieve 50 m range in Power-Down-Mode.
- If this first range test is ok, then perform the same test but with the motor running (ENSURE MODEL IS SECURELY RESTRAINED)
- The range may be reduced by a maximum of 20%. If it noticeably less, then the receiver is getting interference from the power unit. Get help to make sure whether all of the above mentioned interference protection measures have been made correctly.
- The Power-Down mode remains active for only 90 seconds and switches automatically back to normal operation. To return to normal mode earlier, press the EXIT key. To extend the Power-Down-Mode during the 90 seconds, select the

"NEW START" field with the '3-D hot key' and press the 'EDIT' button. The time will be extended for a further 90 seconds.

- Should the Power-Down-Mode be required after the time limit, and then the Tx must be switched off and on again. The power-Down-Mode can be switched on as previously described.

RANGE CHECK [7.40] 1/1
CURRENTLY TRANSMITTING (RF ON) RANGE CHECK IS UNAVAILABLE

Attention: Never take off with the Tx in Power-Down- Mode.

For safety reasons a further range test is not possible when the Tx is already transmitting at full power. It is necessary to turn the Tx off and on again. This measure stops an accidental switch to range test power during normal operation.

## 18.2 SWITCH HARNESS

It must be possible to operate the receiving system switch easily, without mechanical restriction, i.e. the cut-out in the fuselage side must be large enough to avoid obstructing the mechanism. In powered models with internal-combustion engines, the switch should be mounted on the opposite side to the exhaust, to avoid the danger of oil penetrating the housing and soiling the contacts. If your model is fitted with a large number of high-power digital servos, we recommend the use of a standard commercial dual-battery power supply system.

## 18.3 SERVO LEADS

When deploying servo leads, please ensure that they are not under any mechanical strain and are not kinked or bent tightly, as this might cause them to fracture over time. Make sure there are no sharp edges, which might damage the cable insulation. All connectors must be firmly fitted and secure. When disconnecting servo plugs, pull on the plastic housings - not on the wires.

Servo leads should not just be left trailing loosely inside the fuselage; it is far better to attach them neatly to, say, the fuselage side or the chassis using adhesive tape or cable ties. It is not permissible for modifications of any nature to be made to the receiving system components. Avoid reversed polarity and short-circuits of all kinds, as the electronics are not protected against such errors.

## 18.4 SERVO SUPPRESSOR FILTERS

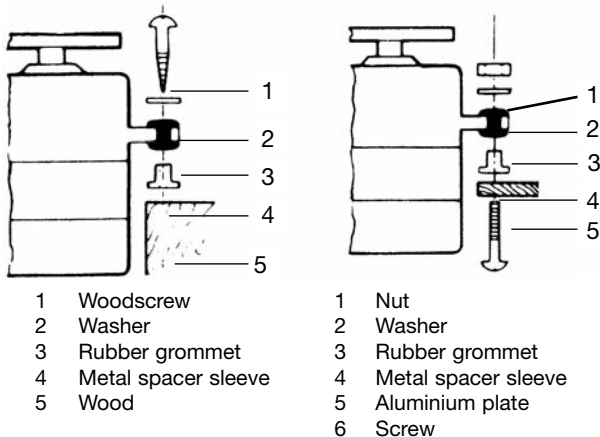
If you wish to use long servo leads or extension leads, please note that interference may be picked up via the over length cables. Where servo cables are longer than two normal leads (approx. 50 cm), you should at least use twisted cables (No. F 1452).

Even better: use suppressor filters, No. F 1413.

## 18.5 INSTALLING SERVOS

When installing servos in a model, always use the rubber grommets and tubular brass spacers (eyelets) supplied. When you fit the servo retaining screws, ensure that they are not tightened beyond the point where the brass eyelets make contact top and bottom; if the rubber grommets are compressed to this point; they are no longer capable of absorbing vibration.

The following diagram shows two typical methods of mounting servos. Diagram "A" shows a wooden servo plate. Diagram "B" shows the use of a plastic or aluminium plate.



In RC model cars the servos are usually fitted in the openings provided for them in the RC installation plate. Robbe quick-release servo mounts are a good choice for model boats. Please take great care over mounting servos, as they are sensitive to vibration.

## 18.6 SERVO TRAVEL / SERVO OUTPUT LEVERS

The crown-gear servo-lever facilitates mechanical adjustment of the neutral position.

### Setting the neutral position

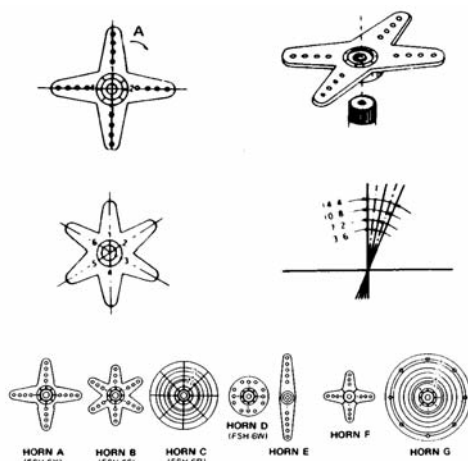
Remove fixing screw of driving lever, lift off lever, refit in required neutral position and retighten screw.

### Effect

For the smallest possible adjustment ( $3.6^\circ$ ) to the RIGHT, ARM 2 of the 4-armed servo-lever has to be placed on the closest possible position of base line A so that arm 3 is adjusted by  $7.2^\circ$  and arm 4 by  $10.8^\circ$ . For the smallest possible adjustment of the LEFT, ARM 4 has to be placed on the next position of base line A.

### Division

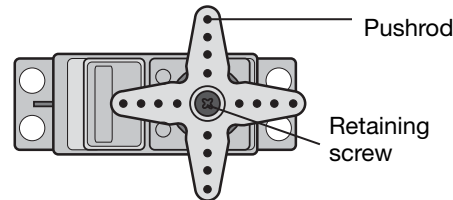
The gear shaft and gear drive lever are divided into 25 segments. Therefore, any change of setting amounts to  $360^\circ : 25 = 14.4^\circ/\text{segment}$ . The minimum adjustment depends on the number of lever arms. For a 4-armed lever, this minimum adjustment amounts to  $360^\circ : (25 \times 4) = 3.6^\circ$ , for a 6-armed lever this equals  $2.4^\circ$ . ARM 2 can be moved by  $2.4^\circ$  to the right, ARM 3 by  $4.8^\circ$  to the right, ARM 6 by  $2.4^\circ$  to the left, ARM 5 by  $4.8^\circ$  to the left, ARM 4 by  $7.2^\circ$  to the left and right.



A range of different servo output arms is available for robbe servos, and they are illustrated in the picture at the bottom of the page. The drawing also shows the angular change per individual spline segment.

## 18.7 INSTALLING LINKAGES

The basic rule when installing mechanical linkages and control surfaces is that they must be extremely free moving, otherwise the servos will draw excessive currents, and the effective operating time per battery charge will be greatly reduced. At the same time the centring accuracy of the control system will be worse, which in turn has a negative influence on the model's flying characteristics.



## 19. THE SYSTEM IN USE

All robbe-Futaba receivers continue to work with full range at reduced voltage, down to the point where the supply voltage falls to 3 V. The advantage of this feature is that the receiving system will normally continue to work even if one cell fails completely (short-circuit), since robbe-Futaba servos still work down to 3.6V, albeit at slightly lower speed and with reduced power. This is very important in winter, when ambient temperatures are very low; otherwise any momentary voltage collapse could cause the loss of a model.

However, there is a drawback: under certain circumstances the user may not even notice the failure of a battery cell. For this reason it is important to check the receiver battery from time to time.

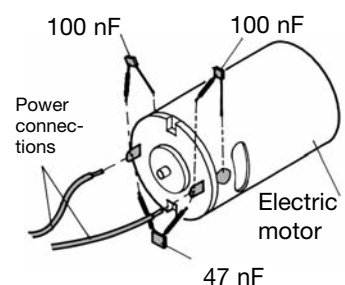
We especially recommend the use of robbe battery monitors, No. 8409, which indicate the condition of the battery by means of a chain of LEDs.

## 19.1 POWER-ON SEQUENCE

Always switch the transmitter on first, and only then the receiver; reverse the sequence when switching off. When you switch the receiver on, the servos run to the neutral position. We recommend that you check each function in turn by operating the associated stick or other transmitter control. Check that each control surface operates in the correct "sense" (direction) relative to the stick movement. If any control surface moves in the wrong direction, that servo must be reversed at the transmitter.

## 19.2 'ELECTRICAL NOISE' INTERFERENCE

If your radio control system is to operate safely and reliably, it is essential to avoid what is known as electrical 'noise' interference. This problem is due to metal parts - such as pushrods - rubbing against each other intermittently as a result of vibration. For this reason the linkage to the engine's carburettor must always terminate in a plastic clevis - never connect a metal linkage directly to the carburettor arm without an insulator between them.



## 19.3 ELECTRIC MOTORS

All conventional electric motors in RC models must be effectively suppressed, otherwise the sparks which are generated between the armature and the carbon brushes when the motor is running will have a serious adverse effect on the radio control system, i.e. they cause interference. We recommend robbe suppressor filters, No. 8306, 8307 or a set of suppressor capacitors, No. 4008. Each electric motor in the model must be suppressed individually as shown in the diagram.

## 19.4 ELECTRONIC IGNITION SYSTEMS

The ignition systems of spark-ignition petrol engines can also generate interference, which has an adverse effect on the radio control system. Never power an ignition system from the receiver battery; a separate battery is essential. Be sure to use properly suppressed spark plugs, plug caps and shielded ignition cables. Keep the receiving system as far away as possible from any ignition system.

## 19.5 RECEIVER BATTERY CAPACITY / OPERATING TIMES

This rule applies to all types of battery: at low temperatures battery capacity is severely reduced, i.e. safe operating times are shorter in cold weather.

The safe operating time varies greatly according to the number of servos connected to the receiver, the stiffness of the linkages, and the frequency of control commands generated by the pilot or operator. A standard servo draws between 150 mA and 600 mA when the motor is running, and about 8 mA at idle. Super-servos and powerful digital units can draw peak currents of up to 1300 mA at full power.

Be sure to select a receiver battery with ample capacity, bearing in mind the likely current drain and the number of servos in the model. Ensure that all mechanical linkages are free moving, and that the servo is not obstructed in its travel. A servo running constantly against a mechanical stop or limit draws a very high current, and will also inevitably suffer damage in the long-term.

You will notice the point where the receiver battery is almost discharged, because the servos will respond much more slowly than normal. The moment you realise this, land the model immediately and recharge the battery. We recommend the use of a battery controller to monitor the receiver pack during a session, as this gives you a useful idea of the state of charge of the battery between flights.

## 20. GUARANTEE

All our products, including this radio control system, are guaranteed for the full statutory period of 24 months. If you wish to make a valid claim under guarantee, please contact your dealer, who is responsible for the guarantee and the processing of any guarantee claim. During the guarantee period we will correct any material defects or faults in operation or manufacture at no cost to you. All other claims, e.g. in the case of consequent damage, are excluded from the guarantee.

The system must be returned to us carriage-paid; we will pay the cost of transport back to you. We will not accept shipments sent C.O.D. We accept no liability for damage in transit or loss of your shipment; we recommend that you take out suitable insurance to cover this.

Send your equipment to the robbe Service Centre for the country in which you live.

To process your guarantee claims the following conditions must be fulfilled:

- The purchase receipt must be included with your shipment.
- The units must have been operated in accordance with the operating instructions.
- Recommended batteries and genuine robbe accessories must have been used exclusively.
- Damage due to damp, tampering, reversed polarity, overloading and mechanical damage are not covered.
- Please be sure to include a succinct description of the problem to help us locate the fault or defect.

## 21. LIABILITY EXCLUSION

We at robbe Modellsport are not in a position to ensure that you observe the operating instructions, and have no influence on the way you install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect use and operation of our products, or which are connected with such operation in any way.

## 22. POST OFFICE REGULATIONS

The R&TTE (Radio Equipment & Telecommunications Terminal Equipment) Directive is the new European regulation, which applies to radio systems and telecommunications apparatus, and is applicable to all such equipment, which has general conformity approval in the EC.

One section of the R&TTE Directive regulates the setting up and operation of radio systems in the European Community. An important change compared with earlier regulations is the abolition of approval procedures. The manufacturer or importer must submit the radio system to a conformity assessment procedure before marketing the equipment, and is obliged to notify the appropriate authority (register) when the process is completed.

The CE symbol is applied to all such equipment, and indicates that it fulfils the currently valid European norms. An exclamation mark is also applied to radio transmitting equipment as an indication that the approved frequencies are not uniform throughout Europe. This symbol is used in all the countries of the European Union.



Other nations such as Switzerland, Norway, Estonia and Sweden have also adopted this directive. Your radio control system is registered (i.e. approved) in all these countries, and can legally be sold and operated in all of them. We are obliged to point out that the responsibility for this, and also for operating a radio system, which fulfils the requirements of the directives, rests with you, the user.

## 23. CONFORMITY DECLARATION

robbe Modellsport GmbH & Co. KG hereby declares that this device conforms to the basic requirements and other relevant regulations of corresponding CE directives. The original Conformity Declaration can be found on the Internet at [www.robbe.com](http://www.robbe.com), by clicking on the "Conform" logo button at the relevant device description.

## 24. GENERAL HOMOLOGATION 2,4 GHz

The frequencies 2400...2483,5 MHz are free from registration and cost. A general homologation has been given by the national radio frequency agency.

2. Geräte, die im Rahmen dieser Frequenznutzung eingesetzt werden, unterliegen den Bestimmungen des "Gesetzes über Funkanlagen und Telekommunikations-einrichtungen" (FTEG) und des "Gesetzes über die Elektromagnetische Verträglichkeit von Geräten" (EMVG).
3. Diese Frequenz-zuteilung berührt nicht rechtliche Verpflichtungen, die sich für die Frequenz-nutzer aus anderen öffentlich-rechtlichen Vorschriften, auch telekommunikationsrechtlicher Art, oder Verpflichtungen privatrechtlicher Art ergeben. Dies gilt insbesondere für Genehmigungs- oder Erlaubnisvorbehalte (z.B. baurechtlicher oder umweltrechtlicher Art).
4. Der Frequenz-nutzer ist für die Einhaltung der Zuteilungsbestimmungen und für die Folgen von Verstößen, z. B. Abhilfemaßnahmen und Ordnungswidrigkeiten verantwortlich.
5. Der Frequenz-nutzer unterliegt hinsichtlich des Schutzes von Personen in den durch den Betrieb von Funkanlagen entstehenden elektromagnetischen Feldern den jeweils gültigen Vorschriften.
6. Beauftragten der Reg TP ist gemäß §§ 7 und 8 EMVG der Zugang zu Grundstücken, Räumlichkeiten und Wohnungen, in denen sich Funkanlagen und Zubehör befinden, zur Prüfung der Anlagen und Einrichtungen zu gestatten bzw. zu ermöglichen.
7. Beim Auftreten von Störungen sowie im Rahmen technischer Überprüfungen werden für WLAN - Funkanwendungen im 2,4 GHz - Frequenzbereich die Parameter der europäisch harmonisierten Norm EN 300 328-2 zu Grunde gelegt. Hinweise zu Messvorschriften und Testmethoden, die zur Überprüfung der o. g. Parameter beachtet werden müssen, sind ebenfalls dieser Norm zu entnehmen.

225-13

### Vfg 89 / 2003

**Allgemeinzuteilung von Frequenzen im Frequenzbereich 2400,0 – 2483,5 MHz für die Nutzung durch die Allgemeinheit in lokalen Netzwerken; Wireless Local Area Networks (WLAN- Funkanwendungen)**

Auf Grund § 47 Abs. 1 und 5 des Telekommunikationsgesetzes ( TKG ) vom 25. Juli 1996 ( BGBl. I S. 1120 ) in Verbindung mit der Frequenz-zuteilungsverordnung (FreqZutV) vom 26. April 2001 ( BGBl. I S. 829) wird hiermit der Frequenzbereich 2400,0 – 2483,5 MHz zur Nutzung durch die Allgemeinheit für WLAN – Funkanwendungen in lokalen Netzwerken zuteilt.

Die Nutzung der Frequenzen ist nicht an einen bestimmten technischen Standard gebunden.

Die Amtsblattverfügung Nr. 154/1999 „Allgemeinzuteilung von Frequenzen für die Benutzung durch die Allgemeinheit für Funkanlagen für die breitbandige Datenübertragung im Frequenzbereich 2400 – 2483,5 MHz (RLAN - Funkanlagen)“, veröffentlicht im Amtsblatt der Regulierungsbehörde für Telekommunikation und Post (Reg TP) Nr. 22/99 vom 01.12.99, S. 3765, wird aufgehoben .

### 1. Frequenznutzungsparameter

Frequenzbereich	Kanalbandbreite /Kanalraster	Maximale äquivalente Strahlungsleistung
2400,0 – 2483,5 MHz	Keine Einschränkung	100 mW (EIRP)

Die äquivalente Strahlungsleistung bezieht sich, unabhängig vom Modulations- bzw. Übertragungsverfahren, auf die Summenleistung mit Bezug auf den Frequenzbereich von 2400,0 bis 2483,5 MHz.

### 2. Nutzungsbestimmungen

Maximale spektrale Leistungsdichte bei Frequenzsprung- Spektrumspreizverfahren (FHSS)	Maximale spektrale Leistungsdichte bei Direktsequenz Spektrumspreizverfahren (DSSS) und anderen Zugriffsverfahren
100 mW/100 kHz	10 mW/1 MHz

### 3. Befristung

Diese Allgemeinzuteilung ist bis zum 31.12.2013 befristet.

### Hinweise:

1. Die oben genannten Frequenzbereiche werden auch für andere Funkanwendungen genutzt. Die Reg TP übernimmt keine Gewähr für eine Mindestqualität oder Störungsfreiheit des Funkverkehrs. Ein Schutz vor Beeinträchtigungen durch andere bestimmungsgemäße Frequenz-nutzungen kann nicht in jedem Fall gewährleistet werden. Insbesondere sind bei gemeinschaftlicher Frequenznutzung gegenseitige Beeinträchtigungen der WLAN - Funkanwendungen nicht auszuschließen und hinzunehmen.

## 25. RECOMMENDED ACCESSORIES



**Trainer lead** No. F 1591  
Skysport T4YF, T4EX, FF9, T12Z, T14MZ, FX-40



**Y-lead** No. F1423  
To connect two servos, in parallel, to one receiver output socket.



**Power Peak 14 EQ-BID** No. 8507  
The ultimate, intelligent fourth generation charging station; incorporating convenient battery management. For charging and discharging NC, NiMH, Lead and LiFe, Lilo, LiPO batteries, with integral equalizer and Cap touch operating system. Cell counts

NC batteries:	1 ... 30 cells
NiMH batteries:	1 ... 30 cells
Lead-acid batteries:	1 ... 6 cells
Lithium batteries:	1 ... 12 cells
Charge / discharge current	0.1 ... 10 A



**Adaptor lead for use with flight simulators** No. 8239

Skysport T4YF, T4EX, FF9, T12Z, T14MZ, FX-40, FX-30



**Switch harness with charge socket** No. F1407  
Required for connecting the battery to the receiver. Features a separate charge socket for recharging the receiver battery.



**Power Peak TRIPLE EQ-BID** No. 8541

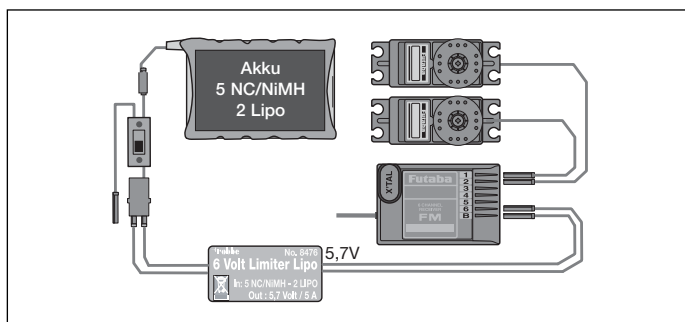
Compact TRIPL3 charger-discharger with battery management for 3 x 1...14 cell NC/NIMH batteries, 3 x 1...6-cell Lilo, LiPo or LiFe batteries as well as 3 x 2...12V lead batteries. With 3 integrated equalizers and 3 BID systems.



**Receiver battery charge lead** No. F 1416



**T12FG transmitter battery charge lead** No. 8260



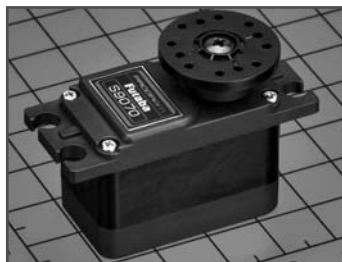
**6-VOLT LIMITER, LITHIUM** NO. 8476  
Stabiliser module, generating a stable voltage of 5.7 V from a 5-cell NC battery. Maximum continuous load: 5 A (NC / NiMH); peak current higher. Continuous current with Lithium batteries: approx. 3 A.



**Switch retaining nut FX-30 3,8 mm** No F1402



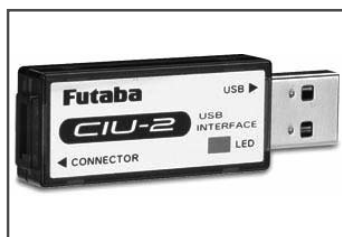
**Momentary Switch 2 position long** No 8232  
Switch 2 position short No 8227  
Switch 2 position long No 8228  
Switch 3 position short No 8229  
Switch 3 position long No 8230



## Servo S 9070-P MG

No. F1623

Powerful, fast universal digital servo, dual ball bearings and metal gears. Compact- only 23,5 mm high. The first of the new generation of programmable digital servos from Futaba. The servo can be connected and programmed via a separate adapter (CIU-2) and USB interface with your PC. Besides the normal adjustments such as servo direction, throw, end point, reverse and centring: the servo acceleration and speed can also be programmed. The new system is perfect for the forthcoming developments, and it will be possible to assign an address (ID) and channel number to the servo.



## USB Adapter CIU 2

No. F1405

USB adapter for adjusting the servo, gyro and speed controller parameters via a PC. Suitable for Windows Vista/XP/2000



## SMM-Kreisel GY520

No. F1244

Ultra small and light AVCS heli gyro with the latest MEMS sensor technology.



## Rx Capacitor 1800 ?F

No. F1621

Minimises voltage breaks to the receiver. Which can lead to short breaks in power supply. Capacitance 1800 ?F



## Rx Capacitor 22.000 ?F

No. F1622

Minimises voltage breaks to the receiver. Which can lead to short breaks in power supply. Capacitance 22,000 ?F

## 26. DISPOSAL



Disposal of equipment: this symbol attached to an item of electrical and electronic equipment means that you are required to dispose of it separately from the general household waste when it reaches the end of its useful life. Take your unwanted equipment to your local specialist waste collection point or recycling centre. This applies to all countries of the European Union, and to other European countries with a separate waste collection system.

**Note: (applies to Germany only)**

On 1 October 1998 a new Battery Regulation came into force, which regulates the return and disposal of exhausted batteries. This regulation creates an obligation to return, recycle and dispose of all types of battery. We comply with this regulation by participating in the Common Battery Return System (GRS - Batteries), which provides for the return and disposal of every type of battery. You, dear customer, can return your batteries to the following collection points for disposal at no charge to you.

- Communal collection points
- Your dealer
- Any battery retail outlet (regardless of where the battery was originally purchased)

When the Lithium battery in your radio control transmitter reaches the end of its useful life, please return it to any of the collection points listed above.

## 27. SERVICE CENTRE ADDRESSES

Country	Company	Street	Town	Telephone	Fax	E-Mail
Andorra	Sorteney	Santa Anna, 13	AND-00130 Les escalades-Princip. D'Andorre	00376-862 865	00376-825 476	sorteney@sorteney.com
Denmark	Nordic Hobby A/S	Bogensevej 13	DK-8940 Randers SV	0045-86-43 61 00	0045-86-43 77 44	hobby@nordichobby.com
Germany	robbe-Service	Metzloser Str. 38	D-36355 Grebenhain	0049-6644-87-777	0049-6644-87-779	hotline@robbe.com
England	robbe-Schlüter UK	LE10-UB	GB-LE10 3DS Leicestershire	0044-1455-637151	0044-1455-635151	keith@robbeuk.co.uk
France	S.A.V Messe	6, Rue Usson du Poitou, BP 12	F-57730 Folschviller	0033 3 87 94 62 58	0033-3-87 94 62 58	sav-robbe@wanadoo.fr
Greece	TAG Models Hellas	18,Vriullon Str.	GR-14341 New Philadelphia/Athen	0030-2-102584380	0030-2-102533533	info@tagmodels.gr
Italy	MC-Electronic	Via del Progresso, 25	I-36010 Cavazzale di Monticello C.Otto (Vi)	0039 0444 945992	0039 0444 945991	mcelec@libero.it
Netherl./Belgium	Jan van Mouwerik	Slot de Houvelaan 30	NL-3155 Maasland	0031-10-59 13 594	0031-10-59 13 594	van_Mouwerik@versatel.nl
Norway	Norwegian Modellers	Box 2140	N-3103 Toensberg	0047-333 78 000	0047-333 78 001	per@modellers.com
Austria	robbe-Service	Puchgasse 1	A-1220 Wien	0043-1259-66-52	0043-1258-11-79	office@robbe.at
Sweden	Minicars Hobby A.B.	Bergsbrunnagatan 18	S-75323 Uppsala	0046-186 06 571	0046-186 06 579	info@minicars.se
Switzerland	Spahr Elektronik	Gothelfstr. 12	CH-2543 Lengau	0041-32-652 23 68	0041-32 653 73 64	spahrelektro-nik@bluewin.ch
Slovak Rep.	Ivo Marhoun	Horova 9	CZ-35201 AS	00420 351 120 162		ivm2000@seznam.cz
Spain	robbe-Service	Metzloser Str. 36	D-36355 Grebenhain	0049-6644-87-777	0049-6644-87-779	hotline@robbe.com
Czech Rep.	Ivo Marhoun	Horova 9	CZ-35201 AS	00420 351 120 162		ivm2000@seznam.cz

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