

Tips

We have received many ideas for new features from users, and we have incorporated these in Version 2.0 of the software in so far as they are possible and sensible.

The feature summary on the right shows the functions which are new, changed or discontinued, and the summary also serves as Contents for the detailed explanations on the following pages. In the discussions we give the reasons why we have made any particular modification.

If you use the P4000.PC program:

When the new transmitter software was introduced we also issued Version 2.0 of the P4000.PC program.

Note that Version 1.0 of this program cannot communicate with a transmitter running Version 2.0.

For a nominal fee of DM 10.00 you can obtain a diskette containing the new program from our Customer Service Dept.

If you use the UNIVERSAL base type:



TIP: for fixed-wing flyers

The basic (default) setting for the mixers in the UNIVERSAL base type:

- main input(s) switched ON and set to „sensible“ values,
- all other inputs switched ON and set to 0%.



TIP: for helicopter pilots

The basic (default) setting for the mixers in the UNIVERSAL base type is:

- main input(s) switched ON and set to „sensible“ values,
- other inputs switched on or off automatically depending on the flight mode you choose.

In practice this means that the mixer inputs do not become effective automatically; they must first be set to the values you want to use.

The advantage is that the mixers do not exhibit unexpected „side-effects“ because you have overlooked one of the mixer inputs at the setting-up stage.

The final page shows a list of the mixers, their inputs and values.

What is	q	new
	↔	changed
	–	discontinued?

for all models:

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1. Copying flight modes

This is how it used to work:

All switch assignments and adjustments for the controls had to be entered afresh for each flight mode.

You would be pleased to have programmed a model correctly for one flight mode and adjusted all the settings to your satisfaction. You then found that the business had to be repeated for the next flight mode.

This is how it works now:

You set up a flight mode in which everything works as you want it, then copy the data into another flight mode to form the „basic settings“. The settings can then be modified in the new location as you wish.

This is how it's done:

We have placed the new Copy function point in Menu 3, next to the FLIGHT MODE menu point. The menu points Operating Time and Base Type have been removed. The new menu now looks like this:

```
Menu 3:
┌COMBISW.
└COPY FLIGHTMODE┘
```

The following menu appears when you select the Copy function by pressing the **G** button:

```
Copy flight mode
confirm with R
from :Norm. flight
to :Mode 2
```

The function works in the same way as when copying whole model memories: you are asked which flight mode you want to copy from, and the flight mode into which you want to place the copy.

- x** opens the „from“ (source) select field
- w** opens the „to“ (destination) select field
- y** starts the „copy“ and returns you to Menu 3

The following data **is copied**: all the servo and control settings.

The following data **is not copied**: the name of the flight mode and the switch which selects the flight mode.

The name of the flight mode to which you have copied the data (to: ...) is therefore **retained** along with the associated switch.

If you have not assigned a name to the flight mode, the word „Mode“ is always displayed followed by the mode number.

If you have not assigned a switch, the default setting is „OFF“.

TIP:

If you find that you cannot alter the destination when you press the **w** button, you have selected a base type which only includes **one flight mode**. In this case the Copy function has no purpose and does not work.

2. Servo travels as graphic CURVES

This is how it used to work:

Servo travel could be altered in two ways:

1. In the TRAVEL+SW menu
2. In the CURVE menu

If you were using a curve with 5 or more points it was quite easy to „overlook“ individual points, and this would cause a „kink“ in the curve which would result in the servo jumping about unexpectedly.

This is how it works now:

The new TRAVEL/CURVE menu shows the servo travel settings in graphic form as well as in percentage values. Thus you can see „everything at a glance“ and can immediately detect and correct unwanted kinks in the shape of a curve.

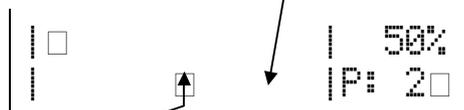
```
┌SERVO 1: BUTTERFLY
└3: SPOILER 50%
|  | 50%
|  | IP: 2 
```

This menu brings together the settings for servo travel and curve.

The term „servo travel“ really just means a curve with the three points end-point left, centre and end-point right. If you select a curve with more than three points the principle stays the same, but the curve gains a number of adjustment points.

The illustration above shows a 13-point curve for the SPOILER input of servo 1.

- Each of the horizontal lines represents a range of travel of about 15%.



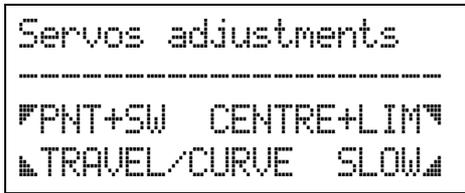
- The centre (approx. -7% to +7%) is marked by a double line.

As has always been the case, the first step in adjusting a curve is to select the relevant servo and then the appropriate input. If the servo only has one input which you can process, the second line on the left does not include the select button and the number of the input.

On the right of the second line you can assign a switch to the input you have selected. The asterisk shows whether the switch is ON (asterisk displayed) or OFF (no asterisk).. Press the R button to reverse the direction of effect of the switch (ON position forward or back).

This is how it's done:

First select the servos by pressing the **b** button in „Menu 1: Adjustments“, then this menu appears:



The following points have changed:

previously:	in Version 2.0:
PNT+SW	PNT+SW Select No. of curve points (3, 5, 7, 9 or 13) and assign mixer input switches (can also be done in the TRAVEL/CURVE menu).
CURVE	TRAVEL/CURVE Adjust travel <u>and</u> curves for mixer inputs. Assign mixer input switches.
SOFT-SW	SLOW Set servo-SLOW times

a. Switches, number of curve points

You reach the „PNT+SW“ menu by pressing the **b** button from the „Servo adjustments“ menu. Here you can assign switches („SW“) for mixer inputs or define the number of curve points („PNT“) for a mixer input.



Pressing the b button opens the field for selecting a servo. Use the **q/n** buttons or the Digi-adjustor to leaf through the options.

Pressing the x button opens the field for selecting the input you wish to process - assuming that more than one input influences the servo. If only one input is available, the symbol for the **x** button does not appear on the screen.

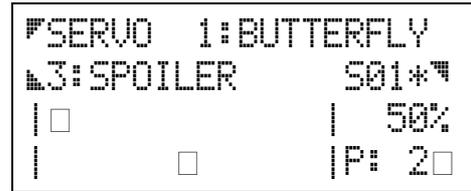
Pressing the w button opens the field for selecting a switch. Here you can select any switch type which is available on your *PROFI mc 4000*.

Pressing the g button opens the field for selecting the number of curve points.

If you select a fixed value in this menu, there are no curve points for you to select or adjust, so the screen shows „OFF“ at bottom left to indicate that there is nothing to process here.

b. Adjusting travel and/or curve

You reach the „Travel/Curve“ menu by pressing the **g** button in the „Servo adjustments“ menu.



Pressing the b button opens the field for selecting a servo. Use the **q/n** buttons or the Digi-adjustor to leaf through the options.

Pressing the g button opens the field for selecting the input you wish to process - assuming that more than one input influences the servo. If only one input is available, the **g** symbol and the name of the input do not appear on the screen. In this case the settings apply directly to the selected servo.

Pressing the x button opens the field for selecting a switch. You can select any type of switch which is available on your *PROFI mc 4000*. If you wish to reverse the direction of operation of any switch in this menu, press the **y** button.

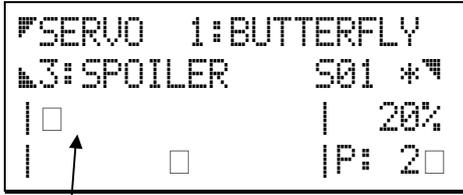
TIP:
In this menu you can also **switch off mixer inputs temporarily**. This is a very useful option, as it allows you to check settings without being confused by other mixer inputs. The principle of temporarily switching inputs off is the key to testing and checking the more complicated mixers which may have many inputs.

The w button has a **special function** in this menu, and its usual symbol is therefore replaced by the special symbol „□“ here. Pressing this button opens the lower half of the menu: the curve area.

Now you can:

- Select a point on the curve by pressing the **g** or **w** button. The selected point flashes.
The button g only resumes its original function, 1.e. selecting the input, when you press one of the two top buttons (b or x).
- use the **q/n** buttons or the Digi-adjustor to alter the set value for the point you have selected.
- You can „reverse“ the whole curve by pressing the **y** button.

The graphic display shows an approximation of any change you make to the selected point. The exact numeric value and the number of the point currently selected are shown on the right-hand edge of the menu.

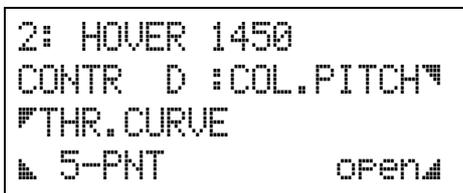


The example above shows a „slip“ (mistake) at point 2 on the curve for the spoiler input of servo 1. If the curve were left in this state, the associated servo would start by moving from its end-point towards the centre, then at point 2 would suddenly deviate before resuming its normal course after point 3.

c. Adjusting curves for helicopters

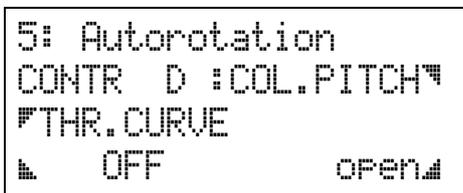
Helicopter pilots can now see the curves for throttle, collective pitch, tail rotor and flare at a glance. Adjustments are made in the same way as for fixed-wing models.

All helicopter curves are grouped together under the COLLECTIVE PITCH control. You reach the controls by pressing the **x** button from „Menu 1: Adjustments“, then press **x** again and select the COLLECTIVE PITCH control. Now press **b** to open the select field for the COLLECTIVE PITCH control options, and leaf through with the **q/n** buttons, for our example to THROTTLE CURVE.



Pressing the **g** button opens the field for selecting the number of curve points.

Pressing the **w** button opens the selected curve. AUTOROTATION is a special case, and the menu looks like this:



In the auto-rotation flight mode the „OFF“ state for the throttle curve cannot be changed, because no throttle curve exists; instead a fixed value is passed to the throttle servo. If you press the **w** button twice for „open“, the bottom line of the screen shows the fixed throttle value when auto-rotation is selected.



The fixed value can be set to any point between 0% and 100%.

TIP:
 The throttle setting can be set to any point between 0% (idle) and 100% (full throttle), i.e. negative % values are not possible (- prefix). The available range equates to full travel of the throttle servo.
 You can reverse the fixed value for THROTTLE during AUTOROTATION and also the entire THROTTLE CURVE by pressing the **y** button.

Advantage: You can leave all the controls where they are!

If you use the keypad to select the curve points, then the associated transmitter control can be left in any position. This makes it possible to adjust, say, the full throttle point without actually having to apply full throttle.

You will only see the effect of a change on the model itself if you move the associated control to the selected point or an adjacent point - either accidentally or deliberately.

Important: the transmitter control has priority!

When the curve range is open (**w** button) and you move the associated transmitter control, then that control assumes priority for selecting the curve points.

3. Logic-coupled switches

The logical switches fulfil a wish which we have heard from many modellers:

„I want my airbrakes to be locked unless and until I select the 'landing' flight mode **AND** the throttle is below 20%“; or

„I want the on-board glow system for my motor to be switched on when I operate a switch, **OR** when the throttle is below 20%, **OR** when I operate the on-board starter.“

These are two good examples of applications for logic-coupled switches.

The new software allows you to define four such switches: LOG1 to LOG4, and each of the four switches can have up to four inputs. The linking possibilities are AND and OR.

AND linking means:

2, 3 or 4 conditions must be fulfilled simultaneously if an effect is to take place.

Example:

The airbrakes can only be extended if you have selected the 'landing' flight mode (e.g. using the transfer switch T1-1) **AND** the throttle is below 1/4 (e.g. with control switch C4-D).

OR linking means:

At least one condition must be fulfilled before an effect can take place.

Example:

The „on-board glow system“ is to be switched on when the throttle signal is below 20% (e.g. with control switch C-D),

OR when you operate switch S06,

OR automatically when the on-board starter is operated.

This is how it's done:

To implement the first example (airbrakes) you use the following procedure:

1. Servo 12 controls the airbrakes.

Assign the servo:

SERVO 12 is SERVOMIX

Assign Mixer for Servo 12:SERVOMIX

1st input: FIXED VALUE (-100% = brake closed)

2nd input: FIXED VALUE (+100% = brake open)

2. Define transmitter control switch

```
Assign switches
CONTROL SW: C4
FROM CONTROL D
1-POINT: MAX - 50%
```

We set the control switch to -50%, as we assume that -100% is idle and +100% is full throttle.

3. Defining logic-coupled switches

```
Assign switches
LOGICAL SW: LOG1
INPUT 1
AND C4-D+*
```

You now have to press the **w** button to open the field for the control switch and then reverse the control switch with the **R** button. This is necessary because the control switches normally switch ON when the signal exceeds the switching threshold (MAX). However, in our example the airbrakes are required **NOT** to extend if the throttle is open more than ¼ of full travel.

The second input to the logic-coupled switch is the transfer switch T1-1, which simultaneously activates the 'landing' flight mode.

```
Assign switches
LOGICAL SW: LOG1
INPUT 2
AND W1-1+*
```

In this case no reversing is required.

4. The first step here is to assign SERVOMIX to each airbrake servo (Menu 2: Assigning/SERVOS).

In Menu 2 „Assigning MIXERS“ we assign FIXED VALUE to input 1 **and** input 2. This has to be done separately for the SERVOMIXers of all the airbrake servos in your model. The two fixed values correspond to the airbrake settings „extended“ and „retracted“.

 **TIP:**
When assigning the inputs for Servomix you will find **FIXED VALUE** directly after „AUX. 4“.

In the menu point TRAVEL/CURVE, under MENU 1: SERVO adjustments, you can now set the fixed value and assign the switches. You select the same logic-coupled switch (e.g. L1) for both fixed values. However, note that you have to reverse the effect of the switch for input 2 by pressing the **y** button.

This ensures that one of the two inputs is always switched on and the other switched off.

1. Fixed value (brake open) = +100%

```

SERVO 1:SERVOMIX
1:FIXED VAL LOG1*
|   |   | 100%
|   |   |P: 1
    
```

2. Fixed value (brake closed) = -100%

```

SERVO 1:SERVOMIX
2:FIXED VAL LOG1
|   |   | -100%
|   |   |P: 1
    
```

When you are dealing with fixed values, pressing the **w** button (now represented on the screen by „□“) always makes the far-right point flash, so that it is accessible for adjustment. From this moment on the **g** button cannot be used to select other curve points. It has no effect as long as the right-hand point is flashing.

If you alter a fixed value you will see that all three graph points shown on the screen move up or down simultaneously.

4. Selecting the trim method

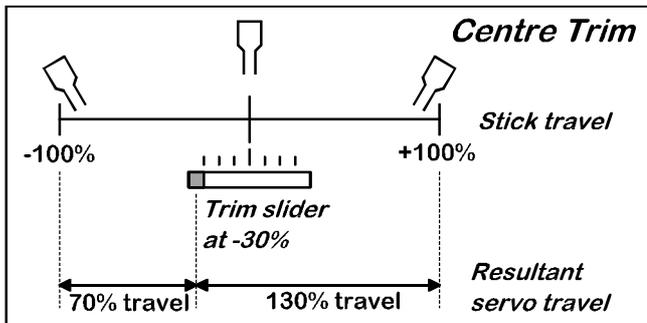
This is how it used to work:

All trims worked on the „Centre Trim“ principle. Centre Trim means that the end-points of the servo’s travel are unchanged when you offset the centre of the transmitter control’s travel (whether you move the trim slider or offset the control centre through the menu system).

Advantages of this method of trimming:

- The end-point of the servo’s travel does not change
- The transmitter controls have no „dead band“

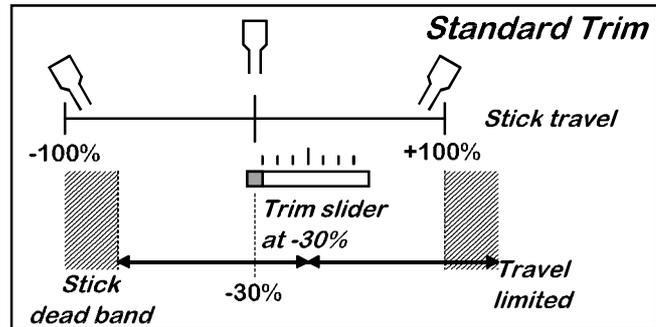
A side-effect of this method of trimming is that the associated servo behaves differently on either side of centre if the trim is not central, i.e. depending on the direction of movement of the stick. The diagram below makes this clear:



If the stick is moved 10° away from centre, the result is travel of about 23% to the left, and about 43% to the right.

This is how Standard Trim works:

The second method of trimming - Standard Trims - offsets the entire working range, i.e. the behaviour of the stick stays the same in both directions. If the stick is now moved 10° away from centre, servo travel to either side is the same, namely approximately 33%.



This diagram also shows clearly the drawbacks to this method of trimming:

On the left-hand side the stick has a dead band, i.e. the associated servo reaches its end-stop (-100%) before the stick reaches its end-point. The last third of the stick’s travel therefore produces no servo movement.

On the right-hand side the servo only moves 70% of its possible travel, because the stick cannot be moved far enough in that direction.

This is how it works now:

You can select your preferred trim method. The default setting is Centre Trim, so if you wish to use Standard Trims you must expressly make the change. This is done in the Adjustment menus for the transmitter control options.

Starting from the operating screen you reach the transmitter control options by pressing **x x**. Pressing **x** again opens the select field for the transmitter controls. You can now use **q/n** or the Digi-adjustor to select the control which you want to process. Finally you open the options with the **b** button and select the method of trimming. The menu will look like this:

```

CONTR D :COL.PITCH
TRIM TRAV
CENTRE + 10%
    
```

What you select here applies to all flight modes. The top line would normally show the flight mode, and the fact that it is blank is intended to remind you of this.

The g button opens the select field for the trim method. You can select STANDARD or CENTRE using the **q/n** or **y** buttons.

The w button opens the trim travel adjust field.

Trim travel is independent of the travel of the transmitter control which you have set; it always refers to **maximum possible travel** of the control. The default

value is +30% (with the exception of collective pitch trim for helicopters).

TIP:

If you **reverse a transmitter control**, you must also reverse the direction of the trim. Open the trim travel adjust field and reverse the direction of effect by pressing the **y** button. You will see that the prefix symbol for trim travel changes. „-10%“ means that the trim has been reversed.

5. Second independent memory block (optional)

This is how it used to work:

The *PROFI mc 4000*'s model memory could store data for 25 to 100 models depending on their complexity. Many users exhausted even this capacity and were obliged to store settings for rarely used models on their PC. This is a good idea in any case, as it allows the experimentally minded modeller to fall back on the „last properly working version“ of a particular model when a new variant turns out to be a bad choice.

This is how it works now:

If you have this option installed in your transmitter, two independent model memory blocks of equal size are available to you. Memory capacity now rises to

50 to 200 models.

This is how it's done:

You select which of the two memory ranges you wish to use in Power-on menu 3.

Assuming that the memory expansion module has been installed in your transmitter, this is the procedure:

- Switch the transmitter on with the **k** button pressed in
- Press the **q** button twice

This menu should now appear:



If the bottom line does not appear on your screen, then the second memory module is not present.

- Open the select field with the **w** button.
- Select the module you wish to use with the **q/n** buttons or the Digi-adjustor.
- Press **k**, **k** to return to the operating screen. The selected module is now active.

TIP:

Don't be alarmed if your transmitter now switches itself off briefly. Switching to the other memory module initiates a complete „re-boot“ (re-start). This includes saving the data, so you will also see the message „Saving data!“ on the screen.

Interrogating the active memory module:

If you want to know which module is currently active in your transmitter, simply move to the Memory menu. From the operating screen you reach this with **w w**. The top line of the screen displays the number of the currently active memory module.



6.1 SLOW for mixer inputs (formerly SOFT-SW)

This is how it used to work:

Mixer inputs could be switched „gradually“, but the delay time was only effective during the switching process itself. If you only switched on the input in question once, then the set delay had no effect, i.e. the transmitter control signal was passed to the servo without any delay.

This is how it works now:

This facility has been expanded into a genuine SERVO SLOW function. The actual switching process still works „SLOWly“, but the function's response to commands from the associated transmitter control is also affected, and works at the SLOW rate which you have set.

In the new software the SLOW time you have set always applies, i.e. the response to the transmitter control is delayed when switching on, switching off and when the transmitter control is operated. It is in fact a proper SERVO-SLOW function. The set delay time therefore only affects the selected mixer input on the selected servo.

This new method of operation clearly required a new designation, and that is why we have changed the menu point's label from Soft-SW to SLOW.

```
Slow for mi er input
#SERVO 5:ELEV.+
INPUT 2:ELEVATOR ↵
┌02.0sec↑  ↓01.0sec└
```

The maximum delay time is 25 seconds, and the value can be set separately for both directions.. The time statement always refers to full servo travel, -100% to +100% (=200%). For example, if you have set 20% elevator trim compensation for the SPOILER mixer input, then the elevator moves to the new setting in 2.5 seconds.

Example:

Compensating for an unwanted pitching moment due to incorrect motor downthrust (model climbs when the throttle is opened).

The mixer ELEVATOR+ has been set up with THROTTLE as one of the inputs. This provides a means of correcting the model's unwanted tendency to climb when the throttle is opened. Nothing new there.

What is new is that the „slow“ mixer can now be added. Naturally the model's unwanted pitching moment builds up gradually, i.e. it follows the model's rate of acceleration. Even if you use a switch to open the throttle (electric motor), it can take several seconds before the pitching moment takes full effect.

The same applies when you close the throttle (or switch off the electric motor), but this time in reverse.

In the next section you will see how to adjust the times for „running up“ (┌0.00 sec↑) and „running down“ (↓0.00 sec└) for the input.

To correct the power moment we wish to add and subtract the THROTTLE input slowly relative to the ELEVATOR+ mixer. At the same time the application of up- or down-elevator is slowed due to the set SLOW delay, and this allows you to adjust the response speed of the THROTTLE input to ELEVATOR+ exactly to match the model's behaviour.

This is how it's done:

Button	Effect
b b	Hot keys to reach the „Servo adjustments“ menu
w	On to the „SLOW“ menu

```
Slow for mi er input
#SERVO 5:ELEV.+
INPUT :THROTTLE ↵
┌02.0sec↑  ↓03.5sec└
```

| -100% to +100% | +100% to -100% |

b	Open „Servo“ select field and select the servo
(x)	Open the „Input“ adjust field and select the input to be adjusted <i>The input line only appears if more than one input is present!</i>
g or w	Select adjust field for the desired direction, set time using q/n or the Digi-adjustor, range 0,1 sec to 25,0 sec

6.2 Transmitter control options varying with flight mode

This is how it used to work:

If you moved to „Menu 1: Adjustments“ and select the CONTROLS point, the top line of the screen **always** displayed the name of the current flight mode.

This is how it works now:

The name of the flight mode is only displayed if the selected option can be set differently in the various flight modes.

If the setting applies to all flight modes (SLOW, trim travel, trim method, AUTO-TRIM) then the top line is left blank. This gives you a visual reminder that the settings apply to all modes.

6.3 Control switch status displayed on the screen

This is how it used to work:

When adjusting the switching threshold you could previously only see the % value on the screen. You could only check where the switching point lay with reference to the transmitter control travel if the control switch was also assigned to a function.

This is how it works now:

In „Menu 2: Assigning SWITCHES“ an asterisk („*“) appears next to the control's code letter if the associated control is in the „ON“ range.

```
Assign switches
CONTROL SW.: C1 ↵
#FROM CONTROL: A *
┌1-POINT: MAX + 0%└
```

The same applies if you define the switch as a 2-position switch.

6.4 Servos as input for analogue switches and control switches

This is how it used to work:

Control switches could only be operated from transmitter controls. It was impossible, for example, to evaluate the setting of the throttle servo and use that information to operate a timer.

Helicopters are a good example for this application. In this case the throttle servo is influenced by the Direct Throttle switch, the idle-up control, the collective pitch control and (optionally) even the roll-axis and pitch-axis functions.. So where do we derive the information for the control switch?

This is how it works now:

Quite simply the throttle servo itself (in the case of helicopters this is usually servo 1) acts as the transmitter switch which operates the timer. It therefore makes no difference which transmitter control is affecting the servo at any one time.

This is how it's done:

First move to the „Assign switches“ menu and select one of the six control switches, then press the **b** button to open the field for selecting the transmitter control. Leaf through the transmitter controls with the **q/n** buttons or the Digi-adjustor. First you will see the controls A to M, then the trim sliders TA to TD. After these come the twelve servos 01 to 12, any of which you can select to act as „control“ for the selected switch.

We will assume that you want to use servo 7 to operate the control switch C3, in which case the screen looks like this:

```

Assigning switches
CONTROL SW: C1
FROM SERVO : 01
1-POINT: MAX - 80%
    
```

6.5 Analogue switches with V-characteristic

This is how it used to work:

The analogue switches could be used to adjust a value (e.g. a mixer input at the servo) in only one way. Moving the associated transmitter control from one end-point to the other either increased or reduced the value.

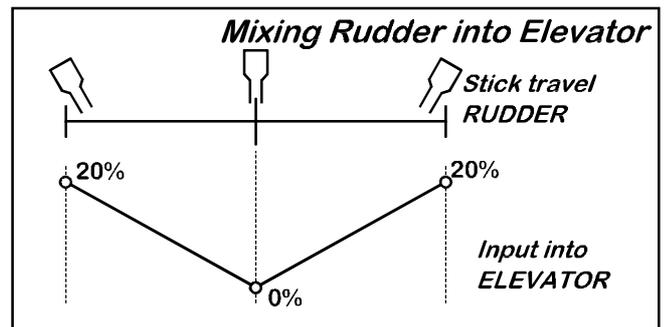
This is how it works now:

Starting from the centre point of a transmitter control a value can now be changed **equally** for both directions of travel.

A rudder - elevator mixer may be of debatable usefulness in practice, but it makes a good example to show how this works in **fixed-wing applications**.

When the model is turning the pilot has to apply up-elevator to prevent the model diving. The same correction - up-elevator - is required whether you are turning right or left.

A movement of the rudder stick must therefore produce the same effect on the elevator (i.e. „up“), regardless of whether the stick is moved left or right.



The diagram shows clearly why we have selected the description „**V-characteristic**“ for this method of operating the analogue switches.

For the **helicopter pilot** gyro suppression is the obvious application.

The gyro counteracts unwanted movements of a helicopter around the vertical axis, but it also tends to damp out intentional commands when the pilot operates the yaw (tail rotor) stick.

For this reason it is necessary to reduce the effect of the gyro when you apply a tail rotor command. This applies regardless of whether the helicopter is required to rotate right or left.

This is how it's done:

1. Define the analogue switch

The selection is made as previously in Menu 2: Assigning/SWITCHES

```

Assigning switches
ANALOGUE SW.: A1
FROM CONTROL: A
EFFECT : MAX +100%
    
```

To define the V-characteristic you first have to open the select field for the switch type (**x** button). Pressing the **y** button changes the mode of operation of the analogue switch from „normal“ to „V“.

The V-characteristic is indicated by the letter V instead of A. The second line on the screen then looks like this:

```
ANALOGUE SW.: V1 ▾
```

The parameters „Effect“ and „Window“ for the analogue switches are adjusted in the usual way, but the maximum now applies to **both end-points** of the transmitter control.

2. Using analogue switches

Let us assume that you have „created“ a mixer using SERVOMIX which has ELEVATOR as input 1 and FIXED VALUE as input 2.

In the „SERVO adjustment/TRAVEL/CURVE“ menu you can now define the analogue switch as the FIXED VALUE input.

```

▸SERVO 1:SERVOMIX
▸2:FIXED VAL. V1-A ▾
|                | 20%
|                | P: 3▢
    
```

V1-A means that analogue switch 1 has the V-characteristic and is operated by transmitter control A.

If you set up this example in your *PROFI mc 4000* to try it out, you can check its effect very simply by running the servo monitor in Menu 5.

6.6 Running time for the current lap displayed on the screen

This is how it used to work:

The time for the current lap was nowhere to be seen. You had to wait until the next lap started before you could see the time for the lap which had just finished.

This is how it works now:

The time for the current lap is displayed in the „Counter“ menu.

```

▸COUNTER : 50 ▸*▾
LAP : 12
▸START: 0
LAP13: 00:01:12.25▸
    
```

Key to this display:

LAP : 12 12 laps have been completed
 START: 0 Lap counter begins at 0
 LAP13: 1 minute 12.25 seconds have already elapsed in the 13th lap

When the 13th lap is finished, LAP jumps to 13, and the current time for lap 14 is shown in the bottom line.

6.7 Battery operating time moved to Power-on menu 2

This is how it used to work:

The operating period for the transmitter and the alarm threshold for the battery monitor were part of Menu 4.

This is how it works now:

We have moved the operating time and the alarm threshold for the transmitter battery into the second Power-on menu. These seldom needed functions are out of harm's way there.

Just to remind you: you reach the second Power-on menu by pressing the **q** button after switching on the transmitter with the **k** button held pressed in.

We have also moved the menu point DISCHARGE to the same location so that all the items to do with the transmitter battery are kept together.

```

Power-ON menu 2
-----
▸ALARM THRESHOLD
▸DISCHARGE OP.TIME▸
    
```

6.8 Changing base type discontinued

This is how it used to work:

You could check the base type of a model and change it at any time. However, changing the base type loses all the settings you have already made, and as this is not helpful we have now made it impossible.

This is how it works now:

The Base Type menu point has disappeared. If you want to see the base type which applies to your model, you can do this in the MEMORY/NAME menu (Typ: ...).

```

Change model name
-----
Typ:Glider utterfl
Condor 1. lue ▢
    
```

You will now find new symbols in the form of double arrows „ **▢** „ in all menus in which it is possible to enter and change names. If space permits, the double arrows are set to left and right of the editable characters (see above: „Changing model name“), otherwise only to the right of them (flight mode names and free mixer names).

These symbols „ □, indicate that the associated select button is used to open a name field so that you can make changes, and that the associated pairs of buttons „b x“ and „g w“ are used to move the flashing cursor.

TIP: Changing any base type into UNIVERSAL
Any model's base type can now be changed into UNIVERSAL at any time. To do this the model's data must be transferred to a PC from the transmitter, converted into UNIVERSAL in the PC, and then transferred back to the transmitter. If you do not personally possess the PC program for the *PROFI mc 4000*, your local specialist MPX dealer may be able to help you.

Of special interest for fixed-wing models

7. Centre offset and trim for the ELEVATOR control

This is how it used to work:

Changes to the centre point or trim of the ELEVATOR control affected all mixers which included elevator as an input. This is certainly desirable, for example, for the elevator input in a V-tail mixer. However, used in relation to BUTTERFLY, SNAPFLAP or QUADRO mixers this characteristic results in incorrect camber-changing flap settings.

This is how it works now:

For the reason explained above the ELEVATOR control is processed by the mixers BUTTERFLY, SNAPFLAP and QUADRO without regard to the trim setting, and ignoring any centre offset. In other words only the actual position of the elevator stick is passed to these mixers as the elevator input.

With the earlier arrangement a common problem was that a change to elevator trim (via the ELEVATOR input in the BUTTERFLY mixer) used to lead to an unwanted change in the camber-changing flap setting, and this is now corrected.

8. Suppressing aileron differential when spoilers are used

This is how it used to work:

If you had set up differential ailerons for a particular model, the spoiler control **always** suppressed the differential effect when the spoilers were extended.

Naturally this only makes sense if the ailerons are actually used as „spoilers“. If they are not, then suppressing the differential just caused an unwanted change in aileron response.

This is how it works now:

Differential is only suppressed „upon request“, i.e. if you want it, you must program it. This means that you must assign an analogue switch for aileron differential which is operated by the transmitter spoiler control.

This is how it's done:

For our example we will assume that control D is to be the SPOILER control at the transmitter. Servos 1 and 2 are assigned to BUTTERFLY. For example, the „Glider Butterfly“ base type is a good starting point. The default setting for this base type is that aileron differential is switched on and set to 50% in all flight modes.

If you now wish the spoilers to suppress aileron differential for normal flight, you need to do the following:

1. Define an analogue switch

If you are using the „Glider Butterfly“ base type there is nothing to do, as all values are already prepared as you need them to be. We will look at the set values briefly just to make things clearer.

To do this move to

„Menu 2: Assign SWITCHES“.

There you select the analogue switch A4, to which the spoiler control D is already assigned as the physical control.

The minimum value for „EFFECT“ is 0%, i.e. aileron differential is completely suppressed. The maximum value of 100% means that the differential value set as the control option becomes fully effective.

The „WINDOW“ from -100% to +100% shows that the spoiler control will influence the suppression over its full travel.

```
Assigning switches
ANALOGUE-SW.: A4
FROM CONTROL: D
WIRKUNG: MAX +100%
```

2. Assign differential to the analogue switch:

This is done in

„Menu 1: Adjustments/CONTROLS“.

There you select control C (AILERON), open the control options select field by pressing the **b** button and leaf through using the **q/n** buttons or the Digi-adjustor until you find DIFFERENTIAL. Open the field for selecting the switch by pressing **g** and look for the analogue switch A4. The result should look like this:

```
1: Norm.flight
CONTR C :AILERON ▾
▸DIFFER.
▾A4-D+* + 50%▾
```

The „up“ arrow next to the analogue switch means that aileron differential is fully effective when the spoiler control is set to its forward end-point. The suppression takes effect when you move the stick back (towards you).

If you are used to „reversed“ controls (stick forwards - spoilers extended) you must open the switch field by pressing the **g** button and reverse the direction of operation by pressing the **y** button. The arrow will then point the other way.

Of special interest for helicopters

9. Idle-up with idle adjustment and SLOW

This is how it used to work:

The only selectable option for the IDLE-UP transmitter control was MAXIMUM FORWARD or BACK. The end-points were always 0% (= motor stopped) and 100% (= full throttle).

This is how it works now:

The IDLE-UP control has the following new options:

- TRAVEL adjustable separately for each side
- CENTRE variable
- SLOW variable separately for each direction

The „MAXIMUM FORWARD/BACK“ option has been removed, hence the following tip:

TIP:
 The **MAXIMUM FORWARD/BACK option no longer exists**. If you want to alter the full-throttle setting for the idle-up transmitter control, you must reverse the travel for the idle-up control.

With these new options the *PROFI mc 4000* can now:

- slowly advance the throttle if the throttle has been released using idle-up;
- limit throttle to an idle value when idle-up is „pulled right back“;
- „expand“ the bottom end of idle-up, so that you have finer control over the throttle setting for starting the motor.

However, first we would like to show you how the throttle control for helicopters works in the *PROFI mc 4000* based on diagrams and explanations.

In the next-but-one section we will deal with how the individual adjustments are made.

This is how the throttle works in a helicopter for the AUTO-ROTATION mode

The flight mode AUTO-ROTATION has top priority. All other settings are over-ridden by the values which are set here.

The throttle servo receives a fixed value when AUTO-ROTATION is selected. This fixed value is set as follows:

1. Switch on AUTO-ROTATION

This is done in the base types with the switch S04.

2. Select the THROTTLE CURVE control option for COLLECTIVE PITCH.

Starting from the operating screen you press the button sequence **x x x**. A control name should now be flashing, and you can select the COLLECTIVE PITCH transmitter control using the **q/n** buttons or the Digi-adjustor.

Open the options field by pressing the **b** button and search for THROTTLE CURVE.

The menu should now look like this:

```
5: Autorotation
CONTR D :COL.PITCH▾
▸THR.CURVE
▾ OFF open▾
```

Press the **w** button twice, and the last line changes to:

```
FIXED VAL.+ 15%▾
```

The % value is already flashing, so you can immediately set your chosen value using **q/n** or the Digi-adjustor.

k k takes you back to the operating screen from this menu point.

This is how DIRECT THROTTLE works:

Direct throttle has second-highest priority after AUTO-ROTATION.

If the direct throttle switch is at the ON position, then the throttle servo is controlled directly and exclusively by the IDLE-UP control. The position of the collective pitch stick has no effect on the throttle servo.

In the base types this function is assigned to slider F.

Please note:
AUTO-ROTATION must not be switched on!

You will find the switch for DIRECT THROTTLE under the options for the COLLECTIVE PITCH control.

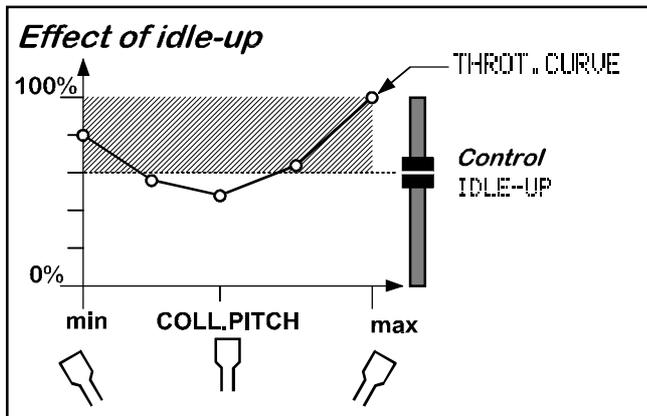


In the base types the switch S06 is assigned here as standard. If you assign ON instead of a switch, then throttle is **always** controlled via the transmitter control IDLE-UP - except during AUTO-ROTATION.

TIP:
For electric-powered helicopters DIRECT THROTTLE ON is the most suitable mode of operation. If you use THROTTLE as the transmitter control and servo, then the link with AUTO-ROTATION is not automatically present, and must be programmed separately.

This is how IDLE-UP works:

The IDLE-UP transmitter control limits the travel of the throttle servo. The COLLECTIVE PITCH stick affects the throttle curve only if the associated value is below the limit set by idle-up. The following diagram shows the connection.

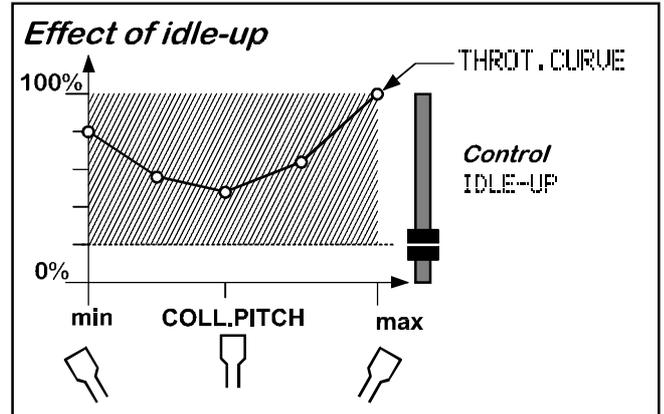


When the idle-up slider is in the position shown, the shaded area in the diagram is **blocked** for the throttle servo.

Where the throttle curve runs into the shaded area, throttle is limited to the value set by the IDLE-UP control. In our diagram that is about 60%.

In the middle range the throttle curve dips below the limit. Here the throttle servo will react to movements of the COLLECTIVE PITCH stick.

If IDLE-UP is pulled right back (e.g. for starting the motor) the throttle servo no longer responds to the COLLECTIVE PITCH stick.



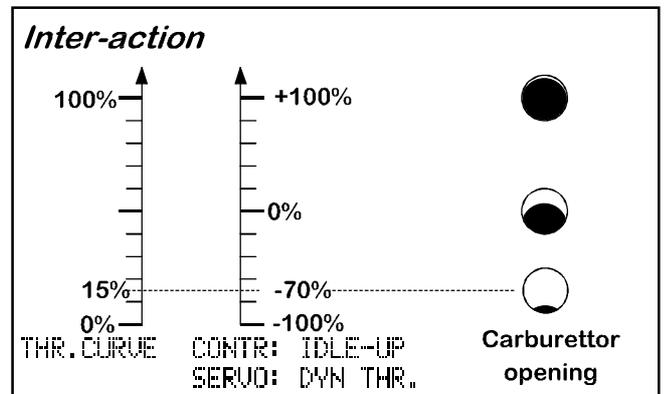
In this example throttle is set to about 20%.

In this diagram you can also see that throttle can be reduced down to 0% using the IDLE-UP control, i.e. you could stop the motor in this way. In version 1.0 of the software this was the **only** possibility. The ability to define a value for idle is only possible in Version 2.0 and later.

This is how to adjust the idle speed:

Adjust the IDLE-UP transmitter control so that the motor idles smoothly and stably at the rear end-point. We will assume that the throttle servo is at -70% when this is the case.

The next diagram is intended to show how the size of the carburettor opening varies in relation to the values for the throttle servo, the IDLE-UP control and the THROTTLE CURVE.



The **THROTTLE CURVE** is set to a range of values between 0% and 100%.

IDLE-UP works between -100% and +100%.

The **DYNAMIC THROTTLE** servo also works over the range -100% to +100%, which corresponds to the full angular travel of the servo from one end-point to the other.

The three „holes“ on the right-hand side of the diagram show how the carburettor opening corresponds to these settings.

For example, if you want to set the idle value to 15% (with reference to the throttle curve), this corresponds to a value of -70% at the servo.

The same applies if you want to **limit the travel of the transmitter control for idle-up**.

This is how to set an idle value of 15%:

1. Select the IDLE-UP control, then the TRAVEL option

Starting from the operating screen press **x x x** to move to the menu for the transmitter control options. Select the IDLE-UP control using **q/n** or the Digi-adjustor.

Now open the Options field by pressing **b** and search for TRAVEL.

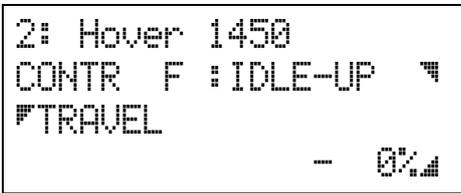
2. Open the TRAVEL adjust field

Pressing the **w** button opens the field.

3. Select the correct end

Assuming that you want the motor to idle when the idle-up slider is at the rear end-stop (towards you), then you must move the slider to this position in order to adjust travel.

The screen should now look like this:



The  symbol indicates that you have selected the rear half of the control's travel for travel adjustment.

You can now set your chosen idle value using the **q/n** buttons or the Digi-adjustor.

Press **k k** to return to the operating screen and store the new setting.

 **TIP:**
The flight mode display „2: Hover1450“ in the top line is intended to remind you that the setting in this menu **only applies to this one flight mode!**

This is the procedure for setting the throttle to „run up slowly“:

This is no problem with the new SLOW option for the IDLE-UP transmitter control.

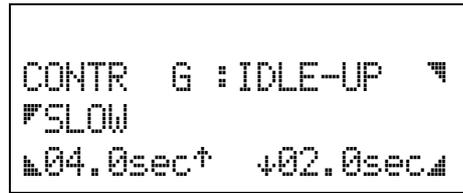
1. Select the IDLE-UP transmitter control and the SLOW option.

Starting from the operating screen move to the transmitter control options menu by pressing **x x x**. Select the control IDLE-UP using the **q/n** buttons or the Digi-adjustor.

Now open the Options field with the **b** button and look for SLOW.

2. Open the adjust fields for SLOW (g or w)

The times for the motor running up and running down can be adjusted separately.

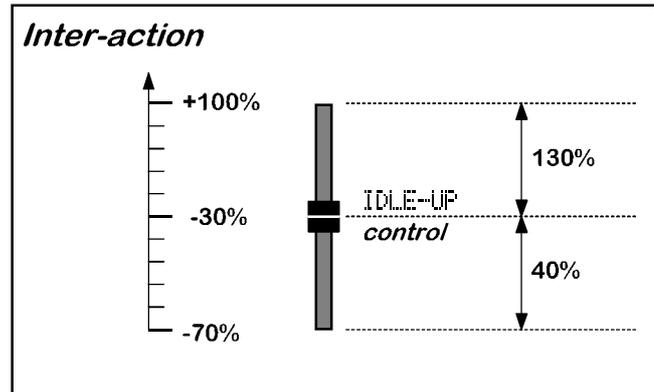


 **TIP:**
The top line of the screen is blank. This indicates that the adjustment **applies to all flight modes.**

How to „expand“ the low-speed range for idle-up:

You can use the CENTRE option for the IDLE-UP control to effect this improvement. Offset the centre to, say, -30%, then the first half of the control's travel affects the range from -70% (that is the control travel which we have already set - see above) and -30%.

Here is another diagram to make things clearer:



You can immediately see that the top half of the transmitter control's travel has more than three times as much effect as the bottom half.

This allows you to adjust the low throttle range setting for starting the motor very accurately.

The top range then simply releases the travel for the throttle curve.

10. Gyro suppression

Why suppress the gyro?

We have already discussed this when we dealt with the V-characteristic for analogue switches:

The gyro counteracts unwanted movements of a helicopter around the vertical axis, but it also tends to damp out intentional commands when the pilot operates the yaw (tail rotor) stick.

For this reason it is necessary to reduce the effect of the gyro when you apply a tail rotor command.

This is how it used to work:

In the base types there was only the GYRO servo. There it was possible to control gyro sensitivity. However, it was not possible to include the effect of the yaw control if you had programmed the helicopter using the UNIVERSAL base type.

This is how it works now:

You can set the level of gyro suppression required by setting up the system as follows: control the GYRO servo using an analogue switch which has the V-characteristic and is operated by the YAW (tail rotor) control. This is the procedure:

1. Define an analogue switch

Starting from the operating screen move to the „Assign switches“ menu by pressing **b q g**. Open the select field by pressing **x** and select the analogue switch A1. If your tail rotor control is not on Control A (left-hand stick) select A3. If you choose analogue switch A1 the menu should now look like this:

```
Assigning switches
ANALOGUE SW.: A1 ▾
FROM CONTROL: A
EFFECT : MAX +100%
```

As long as the select field is still open you can press the **y** button to change the characteristic for the analogue switch to „V“. The designation then changes to V1.

2. Changing GYRO with the analogue switch

Return to Menu 2 by pressing **k**, then move on to Menu 1 by pressing the **n** button. Press **b b** to move to the menu for setting the number of points and to assign the switches. Press the **b** button to open the select field for the servos and select GYRO. That is servo 7 in the base types.

Now you can open the switch select field by pressing **w**, and select the analogue switch V1. The analogue switch must now be reversed with the **y** button to ensure that gyro effect is diminished when you move the tail rotor stick away from centre. The menu now looks like this:

```
No. of points+switch
SERVO :GYRO
INPUT :GYRO
3-PNT U1-A ▾
```

V1-A means that the analogue switch A1 has been assigned the V-characteristic and is operated by control A. The down-arrow indicates that the analogue switch has been reversed.

3. Setting the fixed value for the GYRO transmitter control

In the base types control H is assigned to GYRO. No physical control exists for it. We now have to apply a fixed value to this control in order to give the servo a value too. This value then represents the control signal for maximum gyro sensitivity.

Starting from the menu shown above for switch assignment, return to Menu 1 by pressing **k k**, and then move to the Adjust Controls menu with the **x** button.

Press the **x** button to open the select field and search for the GYRO control. Press **b** to move on to select the options, then search for FIXED VALUE. If you now open the adjust field by pressing **w**, you can set the appropriate value using the **q/n** buttons or the Digi-adjustor. The menu should then look something like this:

```
2: Hover 1450
CONTR H :GYRO ▾
FIXED VAL.
ON +100%
```

TIP:

Note that a flight mode is displayed in the top line of the menu; this indicates that the setting **applies only to this one flight mode**. If you wish to use gyro suppression in more than one flight mode, you must assign the fixed value in all the modes separately.

**Pre-set mixer values
in the UNIVERSAL base type**

For fixed-wing models:

Mixer	Inputs	Default input values	
ELEV+	ELEVATOR	ON	-100/ 0 / +100%
	SPOILER	ON	0%
	FLAP	ON	0%
	THROTTLE	ON	0%
	RETRACT	ON	0%
V-TAIL	ELEVATOR	ON	-100/ 0 / +100%
	RUDDER	ON	-100/ 0 / +100%
V-TAIL+	ELEVATOR	ON	-100/ 0 / +100%
	RUDDER	ON	-100/ 0 / +100%
	SPOILER	ON	0%
	FLAP	ON	0%
	THROTTLE	ON	0%
FLAPERON	AILERON	ON	-100/ 0 / +100%
	FLAP	ON	0%
BUTTERFLY	AILERON	ON	-100/ 0 / +100%
	FLAP	ON	0%
	SPOILER	ON	0%
	ELEVATOR	ON	0%
SNAPFLAP	ELEVATOR	ON	-100/ 0 / +100%
	FLAP	ON	-100/ 0 / +100%
UADRO	AILERON	ON	-100/ 0 / +100%
	FLAP	ON	0%
	ELEVATOR	ON	0%
DELTA	AILERON	ON	-100/ 0 / +100%
	ELEVATOR	ON	-100/ 0 / +100%
	FLAP	ON	0%
	SPOILER	ON	0%
WINGLET	RUDDER	ON	-100/ 0 / +100%
	SPOILER	ON	0%
	AILERON	ON	0%

For helicopters:

Mixer	Inputs	Default input values	
TAILROTOR	YAW	ON	-100/ 0 / +100%
	COL.PITCH	OFF	0%
	COL.PITCH	ON	0%
HEAD-MIX	V-ROLL	ON	-100/ 0 / +100%
	V-NOSE	ON	-100/ 0 / +100%
	COLL MIX	ON	-100/ 0 / +100%
HEIM-MIX	ROLL	ON	-100/ 0 / +100%
	COLL MIX	ON	-100/ 0 / +100%
HELI THR	FIXED VAL.	OFF	-100/ 0 / +100%
	IDLE-UP	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	ON	-100/ 0 / +100%
DYN THR	HELI-THR	ON	-100/ 0 / +100%
	ROLL	ON	0%
	NOSE	ON	0%
	YAW	ON	0%
V-ROLL	ROLL	ON	-100/ 0 / +100%
	FLARE	OFF	0%
	FLARE	ON	0%
V-NOSE	FLARE	ON	-100/ 0 / +100%
	ROLL	OFF	0%
	ROLL	ON	0%
COLL-MIX	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	OFF	-100/ 0 / +100%
	COL.PITCH	ON	-100/ 0 / +100%
FLARE	NOSE	ON	-100/ 0 / +100%
	COL.PITCH	OFF	0%
	COL.PITCH	OFF	0%
	COL.PITCH	OFF	0%
	COL.PITCH	ON	0%