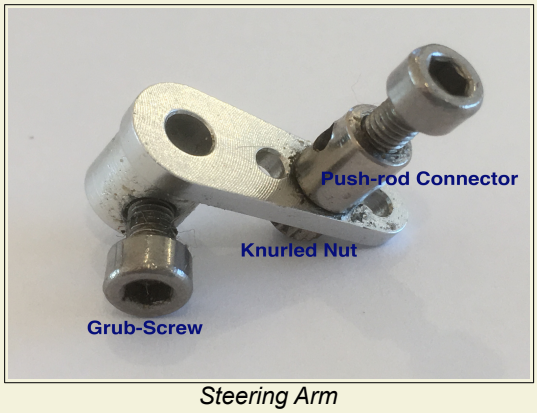
FatSparrowRacing

Adjusting Servos

Removing Slop in the Steering Linkage

Before making any adjustment to the rudder travel, check for any mechanical slop in linkage back to the steering servo. If there is slop, the rudder will not be able to centre accurately and the boat will not reliably track in a straight line.

If there is slop at the steering arm assembly, remove the steering arm and tighten the knurled nut until the connector is firm, but not binding. Ideally the knurled nut should not rotate too freely on the thread. If it does rotate freely, it will easily loosen over time with rotation of the steering arm. Give the threads a squeeze with large pliers to introduce a little bit of bind.



Steering Arm

Insert the rudder stock up through the boat and push it in as far as it will go. Note the flat section on the aft side of the rudder stock. Slide the rudder arm over the stock and align the grub screw with the flat. With the stock pressed up and the rudder arm pressed down, there should be no vertical play in the rudder. Tighten the hex head grub screw – the arm will self-align as the screw is tightened down on the flat. The arm should be pointing to starboard on a DF65; port on a DF95.

If slop was detected at the steering servo arm on a DF65 V5 hull, it's because the hole through the plastic servo arm was made too large or has worn. Replace the servo arm for one with a snug fit around the z-bend in the end of the push-rod.

Slop at the servo arm of a DF65 V6, or DF95 hull, is removed in similar fashion to slop at the top of the rudder. Remove the servo arm and tighten the holding nut until it is firm, but not binding. The push-rod connector must be able to rotate freely. You can put a small dab of CA glue on the thread to prevent the nut working loose. Loctite is not recommended here as any drips falling onto the servo case will dissolve it.

Centring the Rudder Servo

The transmitters that come standard with these boats give no indication of when the rudder is centred. One option is to use a servo tester to give you a definite centre position. There are a range of these devices on the market. You can purchase for about US$10 plus shipping from your favourite online hobby store.

Servo testers

To centre the servo with one of these tools, disconnect it from the receiver and connect it to the signal port on the tester. Follow the tester instructions to centre.

With the servo electrically centred, find the spline alignment that allows the servo arm to sit as square to the centreline as possible and secure the arm with the retaining screw. Secure the pushrod to the pushrod connector with the grub screw.

With the servo still connected to the servo tester, go back to the rudder and check for centre. If adjustment is needed, loosen the grub screw on the push-rod connector and move the rudder as close to centre as possible. Tighten the grub screw.

Reconnect the servo to the receiver, power up the boat and transmitter and check servo operation. You can now use the rudder trim control on the transmitter to re-centre the rudder if required. Programmable transmitters will usually offer some form of “sub-trim” which will allow fine adjustment of the rudder centring.

The Final Centring Check

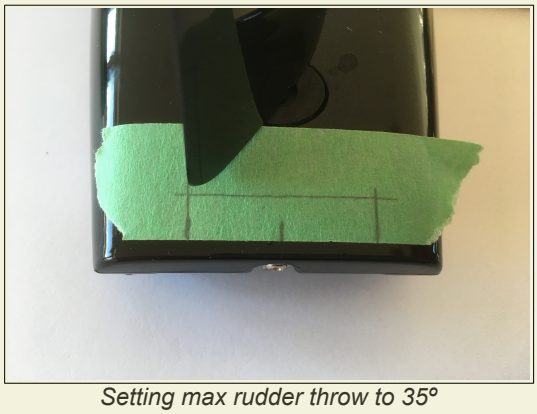
The final adjustment of you rudder centre needs to be done on the water. Sail the boat square to the wind (gull-wing if possible), either away from you or towards you. The boat should travel straight with no deviation to port of starboard. You will quickly see if the boat is making even a small deviation from a straight course. Make any necessary corrections with the trim control to get the boat tracking absolutely straight. You should also check the boat on the other gybe.

Adjusting for Maximum Rudder Throw

The full range of steering servo rotation can produce quite large rudder deflections. While this will spin a DF65 quickly, it also produces a lot of drag which slows the

boat considerably. A maximum deflection of 35º seems to work for both hulls.

To adjust maximum the rudder throw, power up the boat and turn it upside-down on the bench. Place a piece of masking tape on the hull underneath the trailing edge of the rudder. Mark the tape at the centreline and make two further marks 18mm either side. Adjust Channel 1 gain on the transmitter so that maximum deflection sits inside these two marks. This will give a maximum rudder throw of around 35º.



Setting max rudder throw to 35º

Servos are not always linear and you could find you have different maximum throws either side of centre. If your transmitter is programmable, it might give you independent control over the range of servo rotation in each direction. The transmitter that comes with the boat isn't that clever and you may need to find a compromise adjustment.

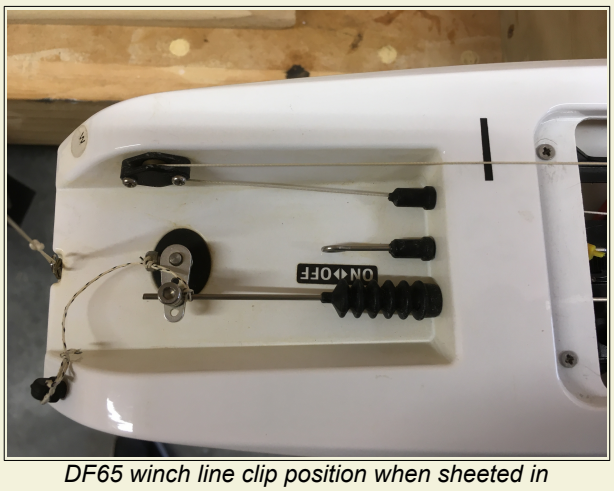
Sheet Winch

To check that the winch is producing the required range of travel, start with the clip position for sheeted in.

Power up the boat and move the transmitter sheet control to fully sheeted in. The positions of the winch line clip should be as shown in the images below. Measure the start position from the centre of the transom to the forward end of the clip.

Boat	Clip position, sheeted in
DF65	115mm
DF95	165mm

Start position of winch line clip (measured from transom)



DF65 winch line clip position when sheeted in

DF95 winch line clip position when sheeted in

If you need to alter the start position of the clip, remove the retaining screw and lift the drum off the winch spline. With the drum held in place above, but not on the winch spline, rotate the drum until the winch line clip is at the desired position. Find the nearest spline alignment that matches this position and press the drum back home, securing with the retaining screw.

The ideal distance the winch line should travel between fully sheeted in and fully sheeted out is specified in the instruction manual for each boat.

Boat	Travel
DF65	115mm
DF95	128mm

Ideal winch line travel sheeted in to sheeted out

Lay a rule on the deck and with the boat powered up, check the distance the clip moves between sheeted right in and sheeted out.

You may have to increase the Channel 3 gain on the transmitter to get the required range of travel. Check your transmitter manual for how to do this. If you can't get the required amount of travel, set it to maximum.

Sheet Guide Eye Positions

Instruction manuals for each boat specify the angles of booms when sheeted fully out.

Boat	Jib Boom	Main Boom
DF65	85º	80º
DF95	80º	80º

Maximum sheeted out boom angle

In practice these angles seem to work pretty well when sailing downwind. However, if you follow the assembly instructions, you will only achieve these angles if the sheet winch gives you the full sheet travel and many of them don't. You can compensate to some extent for less than ideal sheet winch travel by moving sheet guide eyes forward on each of the booms. You will need to experiment to find the right position then record them on your baseline setup sheet.

The cause of less than optimal sheet travel most likely lies with the transmitter, not the winch. You can confirm the range of operation of the winch with a servo tester. If the transmitter is programmable, you will have a lot more control over servo end-point limits, but models of transmitter sold with the boats give only rudimentary control over servo range and you may have to live with what you get (or upgrade your transmitter).