

Kyosho's Caliber 30

Whatever you think, it certainly catches the eye... let's see if flying the Caliber 30 is as imaginative!

The Kyosho Caliber 30 has been launched into the competitive 30-size marketplace as the clear successor to the popular Concept 32 VR series of model helicopter. Kyosho make no secret of the fact that the Caliber 30 is aimed at advanced pilots, but have also thoughtfully incorporated a selectable 'rotor head option' so the model can be tamed to suit any training application. In providing both these control options, the model is said to be capable of providing a very stable platform for a complete novice... all the way through to advanced 3-D aerobatics. So my mission was to assemble the Caliber 30, assess the structural qualities and discover if the model is truly versatile enough to meet the manufacturers claims?

An Overview

The overall design is based on a much-simplified format of the FAI competition proven Kyosho Caliber 60 model helicopter. The engine is front facing, the tank is rear mounted and a two-stage belt driven gear reduction drive train is utilised. Add to this, a belt driven tail rotor that retains full drive for auto-rotations and a single front mounted servo/radio pod and we have an incredibly simple, but high spec. 30-size model helicopter! Indeed... simplicity appears to be the main theme of the Caliber 30, with it having a very low parts count and the most uncluttered mechanics that I have come across in this size of model. The main frame module is based on just two GRP mouldings, which also incorporate an integral cooling-duct. The only real additions to the frames, are two bearing blocks, seven frame spacers and a pair of L-section aluminium engine mounts. All but the rear-mounted tail rotor servo is then housed in a completely separate module at the front of the helicopter. This module is also home to the receiver, batteries, switch harness and gyro, thus both installation and maintenance is a very easy affair with the Caliber 30!

QUICK SPEC

AUTHOR: Russ Deakin
PHOTOGRAPHER: Jon Tanner
WE USED: OS 32 SX-H with kit muffler, Model Technics 16% Bekra fuel, Futaba GY-401 Gyro with Futaba S-9253 tail servo, 3 Futaba S-9202 eCCPM servos, Futaba S-3001 throttle servo.

*'Kyosho
make life
very easy'*



This is what greets you when you open the box to reveal the ARTF Caliber 30. Nicely packaged and best of all is that most of the assembly work has been done for you!

To enhance flexibility of operation, Kyosho have also included options on overall control of the pitch and cyclic functions. Thus conventional 'one for one' control of pitch and each direction of cyclic is accomplished via a sliding servo tray arrangement. However, should you wish to use the popular 120° eCCPM type of control, the servo tray is then fixed in place permanently and eCCPM is activated in your transmitter. Regardless of

which option you choose, three 90° bellcranks convert control from the servos up to a conventional swashplate/washout arm assembly. However, Kyosho have been very innovative at this point and deviated away from the norm slightly. The bell-Hiller mixer arms locate on the flybar seesaw, but at 90° to the assembly. Then, via the standard bell-Hiller mixer arm option, leading edge control over the main blade holders is intended to provide an enhanced aerobatic response. This set up works out at about 7° of blade input for



A rather leisurely couple of hours was all that was needed to complete the basic assembly seen here. The Caliber 30 design layout certainly produces a remarkably uncluttered simple model helicopter that is well within the realms of the complete novice.



The two-stage belt driven gear reduction system results in a very smooth running gear train and the model also features a constant driven tail rotor for full directional control in auto-rotations.



Here we see the engine mount with the pre-installed OS 32. It performed flawlessly, with the correct engine settings being easy to achieve and retained all the way down to the very last drop of fuel!



The rear chamber of the kit muffler is sealed with an 'O' ring. The muffler certainly helped the Caliber 30 to retain its whisper like qualities regardless of main rotor speed.

10° of flybar tilt, with 5° of direct input to the main blades. For those who seek the full stability option, a change in ball link positions allows for trailing edge control with a substantially softened cyclic response set-up. Here, flybar authority works out at a full 1:1 ratio, with about 4° of direct input to the blades. As we move up to the main rotor-head yoke, we find that it is of GRP construction, but the supporting centre hub is a substantial aluminium item, thus promoting accuracy and a long service life. Support to the main blades is via a solid one-piece blade spindle and damping is of a conventional rubber 'O'-ring arrangement.

Basic Assembly

The Caliber 30 was supplied in ARTF format which included a factory-installed OS 32 SX-H Ring engine, so the final assembly was a very swift process! You are guided through the assembly by the accompanying instruction manual and here you will find the format concentrates on clear diagrams with short advisory text. This begins by informing you of any additional engine/radio/starting equipment that will be required to complete and fly the model. Then advice concerning the actual channel dedication and set-up values for both Futaba and JR radio is clearly given. Next in line is an example of how the assembly drawings are set out, a glossary of terms used throughout the manual and advice that whilst many parts are pre-assembled, it is advisable to check that all the screws/bolts are tight.

As mentioned the review model is the ARF version where the engine is already installed, however we thought a short description of how the assembly goes together would be of interest... The engine mount module uses three spacers to connect two substantial L shape engine mounts together. The OS 32 SX-H engine simply bolts to the mount, whilst the clutch and reverse threaded clutch shaft are added shortly afterwards. The starter coupling is added to allow the hex start adapter to be fully tightened, before being removed in preparation of the engine installation into the frame module. Here the fan is pushed up into place first, then the clutch drum and engine on its mount, before the



At the tail end, each tail blade grip is supported by two ball races, with a substantial metal tail rotor hub to ensure accurate control and a long service life.



Accurate tail pitch control is achieved via this well thought out 'dual control support system'. Also note how the tail fin in centre mounted and the pitch lever runs through the centre of the boom.

'the Caliber is noticeably un-intimidating and simply purred on the supplied kit muffler'

starter coupling is re-fixed in place permanently. Once aligned correctly, all of the engine mount bolts are tightened which locks the fore/aft sections of the frame modules together, before the supplied muffler is fitted.

Now we'll go to the assembly we actually undertook to have the Caliber 30 ready for flight... The tail blades are fitted into the holders, before the boom is installed into the frames with the correct twist on the tail drive belt and hooked over the tail drive pulley. The tail belt is then tensioned before the boom clamp bolts were fully tightened. Once this was achieved, the boom supports were added, the canopy trimmed and the colourful stickers applied. A leisurely couple of hours took the Caliber 30 from a boxed set of components to a complete basic assembly, with very little in the way of effort or additional attention to detail!

Radio Installation and Set-Up

Installing the radio control into the Caliber 30 begins by mounting the receiver, switch, gyro and Rx battery into the front radio module. You are then directed towards the tail rotor servo, which via a two part moulded GRP mount, is sited at the front end of the tail boom. Then a control ball-link is added to the wire pushrod and the linkage rod is supported with two plastic guide-



No need for upgrades here, as the 'rear tail rotor servo mount' is supplied with the Caliber 30, thus ensuring accurate friction free control to the tail end. The 'Z' bend may be replaced with a ball link if wear develops.



Here we see the heart of the Caliber's sweet and very progressive cyclic response. The rotor head consists of a GRP rotor head yoke with substantial aluminium supporting centre hub. In 'training mode' blade grip is flipped over to trailing edge input and the pitch ball on the lever is relocated to the other side of the pivot point.

clamps that wrap around the tail boom. The throttle servo is added and linked up as advised, before you are guided through both available control options. The first is for the aforementioned 'one for one' control system and this is achieved via a ball-raced sliding servo tray. The other option is for 120° eCCPM control that Kyosho describe as 'EMS' (Electronic Mixing System), where the radio tray is permanently fixed in place. I opted for the EMS option and fitted the servos with the advised length of servo horn and control ball. From here, the remaining two 90° bellcranks are fitted onto the correct choice of location and the control balls were then fitted as clearly advised for this option. Once completed, all the servos are linked up to the bellcranks and swashplate right up to the rotor head. Kyosho make life very easy here and 'fixed length' rods with pre-fitted ball links are used throughout, apart from the link

'the model is equally at home either way up'

between the bell/Hiller arms and blade holders. Here, two 'adjustable' pitch control rods are required to allow for minor adjustments to the overall pitch range and for tracking the main rotor blades. My only deviance away from the manual in the whole process was to make the additional effort of checking the control paddle alignment. In fairness, this was found to be very close, but both paddles did require a slight adjustment to be in perfect alignment to the paddle control arms. Once adjusted, I then pre-empted aggressive testing of the Caliber 30 and wicked a small amount of thin cyano glue around the flybar to paddle joint.

To adjust the radio, I initially followed the setup advice and values found in the front of the instruction manual. However, as I have installed three Futaba 9202 servos for the 120° eCCPM control system, but combined these with JR Radio control, the servos did not move in the correct direction. Thus whilst the direction of travel in 'swash mix' was perfect, the servos reversing function in my transmitter ended up being in opposition to the advice given. I also found that to achieve a symmetrical 3-D collective pitch set-up, I ended up screwing the adjustable pitch linkage rods nearly all the way in. I then set the initial pitch travel in JR 'swash mix' to 75% to achieve about plus and minus 9° of collective pitch. After this, I checked the GY 401 gyro sensing direction and adjusted the rudder and throttle servo travel to suit. From here, I set up the normal flight condition for hovering, Idle-up 1 for conventional flight and Idle-up 2 for full blown 3-D aerobatics. Cyclic to throttle mixing was activated for both roll and elevator with about 20% initial activation for both Idle-up flight conditions.

Training Mode

The first area of flight-testing was with the aforementioned 'training mode' option. The Caliber 30 was lifted into the hover and once the carb mixture and throttle rpm was adjusted to give about 1500 rpm



The single-servo control system uses a sliding tray system where the collective servo slides the tray back and forth. The tray is ball raced and may need some shimming and bracing to eliminate play.



Single servo arrangement with the swashplate rods at 90°.



Here, 120° eCCPM is used, note that the bellcranks have been relocated and the input ball is moved to compensate for the reduced servo movement with eCCPM.



eCCPM servo use a fixed mount in the servo compartment.

in the hover, it became very apparent just how quiet the model is! In this mode, the Caliber is noticeably un-intimidating and simply purrs on the supplied kit muffler. Cyclic control in each direction was equally suitable for this mode and was soft and progressive at all times. In gusty winds, the model faired brilliantly and was remarkably unaffected by the turbulent test conditions for its low all up weight. Moving the model around from left to right showed a similar level of stability and predictable control response. I must confess that I felt remarkably at home playing around with the Caliber 30 in this hovering mode of flight and spent at least half a tankful of fuel remembering that model helicopters do not have to be twitchy beasts waiting to jump into aggressive 3-D action.

Pushing in a little more engine power/collective pitch took the model off into some very sweet low speed circuits and control over the model was very predictable and progressive at all times. Returning the model back into the hover form a circuit was also very easy going and the pitch response from the 120° EMS control method was found to be surprisingly accurate and powerful. Overall, the Caliber 30 was so very sweet and forgiving in this training mode option. The engine was easy to adjust, ran very smooth and fuel consumption was low. The model is amazingly quiet for this class of model helicopter and the general feel of the model was superb for learning purposes. Thus the Caliber 30 would certainly suit anyone attempting their first tentative moments at the sticks and would no doubt make learning to fly a model helicopter a much swifter and more enjoyable experience!

'the Caliber swirled around smoothly in a nicely controlled sphere'

Conventional Flight

Before I entered any high-speed conventional flight, I de-selected the 'trainer mode' control option and returned the blade holders to leading edge control, before readjusting the pitch links to suit. Returning the model to the previous 1500 rotor speed in normal, showed a slight decrease in stability with a healthy increase in the cyclic control response. Entering forward flight showed a good steady turn of speed and no instability could be sensed at any point in the Caliber 30's flight path. Bringing the model back down to earth and engaging Idle-up 1 showed no need to deviate away from the previous carb settings and with a raise in rotor speed to about 1700, the Caliber now felt more alive. Pushing the collective stick to the max. produced a steady rate of climb and in forward flight; the model now trucked along very nicely at a good rate of knots. Pulling the Caliber up into stall turns showed a respectable vertical climb, with a positive tail response through the 180° turn. Levelling out the model at the bottom of the descent was smooth and perfectly controllable, allowing for an accurate return to the chosen forward flight path.

Entering conventional aerobatics showed a safe roll rate and I was surprised at how axially the model tracked throughout the manoeuvre. Pulling into a conventional loop showed excellent fore/aft cyclic control and the Caliber 30 went round superbly on every example of this manoeuvre. From here, I climbed to height and engaged 'throttle-hold' in preparation of an auto-rotation. With the fully driven tail rotor, very precise directional control over the descent was enjoyed all the way down to the final flare. Once here, I did find enough inertia in the blades to land safely, but due to the energy required to drive the tail rotor, there was not an abundance of lift. However, I personally felt that the ability to retain full directional control was a good trade off and after several autos, I did become used to the models auto characteristics and the situation became more comfortable.

3-D Aerobatics

Engaging Idle-up 2 and adjusting the rotor speed to around 1900 still showed no need to adjust the carb from the previous settings. Here, the Caliber was now really humming, but it was still found to be remarkably quiet! Once fine-tuned, this set-up certainly gave the Caliber 30 a sharp increase in vitality, but there was an expected reduction in vertical climb-out at the reduced max. pitch values.

Entering stationary manoeuvres like flips and rolls expressed a slightly slower cyclic response than I would have liked, but the model retained a remarkable level of stability. The feel of the cyclic/collective control through these manoeuvres was very pleasant, being both progressive and predictable. Swinging the model over into an inverted hovering mode of flight showed an almost identical level of stability to upright and the model is equally at home either way up. Inverted circuits were also very predictable and control was found to be



The completed Caliber 30 fully adorned with its sleek futuristic canopy. The canopy is not going to be to everyone's taste... but it has grown on me throughout the review.



Here you can see the belt primary drive with secondary gear reduction. The auto unit is on the lay shaft providing constant tail drive. Note the neat servo lead clips.



Throttle servo is perfectly sited, note the neat radio installation. The spartan cooling duct has proved perfectly adequate with no signs of overheating.

excellent from slow to high speed. In medium speed backward flight, the Caliber performed well and accurate backward rolls were easily performed. When pushed up into medium size backward loops the model also performed flawlessly, but when shoving the model into oversize examples where the engine was working very hard, the tail end did show signs of running out of tail-power.

Entering pirouetting flips expressed a very predictable performance and the Caliber swirled around smoothly in a nicely controlled sphere. However, when powered around pirouetting loops, the rotation rate of the tail does falter on the uphill section, thus confirming that longer tail blades would help improve overall tail efficiency. However, the model worked very well for all medium level 3-D aerobatics and this was with the stock set-up. Those looking to learn 3-D aerobatics, would find the model a very sweet platform indeed. The engine purrs and is extremely hassle free and I felt no need to resort to a header tank to smooth the mixture out as the tank ran low. The performance

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In training mode, the Caliber 30 is so smooth, stable and very quiet, that it would make the ideal learning platform for any novice.



In forward flight, the Caliber retained impeccable manners and cruises around smoothly, with a nice progressive control response being enjoyed at all times.

and cyclic response is softer than I have become accustomed to lately with larger machines, but high engine power can certainly get you into more trouble... than help you out of it! Thus I feel the Caliber 30 would provide a sound platform for learning 3-D aerobatics and once the stock set-up has been exhausted, some higher Nitro fuel or a tuned pipe exhaust system would certainly spruce up the performance! Add to the above, some longer tail rotor blades, lighter control paddles, stiffer rotor head damping and the Caliber 30 would be more than capable of taking you on to plenty of new challenges.

The Final Summary

The Caliber 30 represents an amazingly simple design concept that should be well within the realms of any novice! 100% out of the box, the model performs brilliantly across a very wide spectrum of roles. In training mode, the model is so very quiet that raw beginners would find the model incredibly un-intimidating! The stability in this training mode is also extremely commendable and the easy handling of the supplied OS 32 would enhance those settling in with model helicopters for the first time.

In conventional forward flight and aerobatics, the model retains its whisper like qualities and has impeccable table manners. Thanks to a well thought out eCCPM control system, the Caliber tracks superbly through the air and loops and rolls are very accurate.

At medium level 3-D aerobatics, the Caliber 30 is a real bundle of low hassle fun! On just 16% Nitro and kit muffler, the combination is not overly powerful, but is so sweet and smooth that the complete package gives an aura of solid dependability! When unfairly pushed into manoeuvres that are only really destined for 60 plus model helicopters, more tail power and cyclic response would help take this model onto a higher level of ability. However, for those chasing the higher end of 3-D aerobatics, the need for a change in control paddles/rotor head damping, a little more power and some longer tail blades would be taken for granted.



Through conventional aerobatics, the eCCPM control system showed almost zero interaction and as a result, the model tracks superbly through loops and rolls.



A fully driven tail rotor ensures total control over the tail end in power off Autorotations scenarios like this one.



Entering inverted flight, showed superb inverted stability with the model locking in very nicely.



The action never stopped and the OS 32/Kit muffler provided flawless engine runs down to the very last drop of fuel.

Overall, reviewing the Caliber 30 has been a surprisingly hassle free, successful and thoroughly enjoyable experience. The model certainly slots in superbly with Kyosho's claim of distinct versatility. I personally feel that the Caliber is an extremely commendable introduction to the competitive 30-size model helicopter arena.



SPEC CHECK

Product:	Caliber 30 ARF
Manufacturer:	Kyosho Corporation, Japan
Market Place:	Sports 30 Size Model
UK Distributor:	Ripmax plc Ripmax Corner, Green Street, Enfield, EN3 7SJ. Tel. 0181 282 7500
Main Rotor Diameter:	1230 mm (48.43")
Tail Rotor Diameter:	240 mm (9.45")
Overall length:	1095 mm (43.1")
All-up weight with blades:	3014 g (6 lb 10.4 oz)
Main Gear ratio:	9.62:1
Main to tail gear Ratio:	1:5
Control requirements:	Heli radio with 5 servos and gyro
Power requirements:	'30' size helicopter engine
Current UK RRP:	Caliber 30 ARF incl. OS 32SX-H: £379.99