

# ***Twinstar***

# ***ARF Helicopter***

## *Detail Manual*



### ***Specifications***

- HIGH QUALITY FIBERGLASS	
- MAIN ROTOR DIAMETER	49.5 in
- TAIL ROTOR DIAMETER	9.7 in
- HEIGHT	15.2 in
- BLADES	550mm
- ENGINE	32 ~ 38

## ***Century Helicopter Products***

Designed and Developed in USA

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# **Building Instructions for:**

**CN1075 Twinstar Scale Helicopter Kit**

**CN1075A Twinstar Painted Scale Helicopter w/ ARF Mechanics**

## **Introduction**

Congratulations on your purchase of Century Helicopters Product's Twinstar scale helicopter kit. The ARF helicopter is the beginning of a new breed of **Almost Ready to Fly** pre-painted scale helicopters that are simpler to build, easier to see and look fantastic. For those that have the complete kit version, you have great flexibility to make choices when installing the mechanics and apply an awesome paint design of your own. Whether you are just beginning in helicopters, wanting to start in scale or an accomplished pilot, Century offers a helicopter to fulfill your dreams in scale. Century has combined their world class helicopter mechanics with awesome ARF fiberglass fuselages designed to mount directly inside without modifications.

## **Warning**

The Twinstar scale helicopter kit must be assembled and installed in accordance with these instructions. Failure to do so could cause failures in the fuselage or the helicopter mechanics. Such failures could result in serious injuries. It is strongly recommended that if you are in doubt of your abilities, you should seek the assistance from experienced radio control modelers and associations. As manufacturer, we assume no liability for the use of this product.

## **Pre-assembly Information**

Upon opening the Twinstar scale helicopter, you will find the major fiberglass and clear component parts and hardware bags. Hardware is identified by the size of the fastener or part. This is done for ease of assembly. Be careful when opening bags as not to lose any hardware, whenever possible, keep all screws in a container until you use them up through the assembly process. Care has been taken in the filling and packaging of each bag. However, mistakes do happen. If there is a shortage or missing hardware, please contact us at:

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# Twinstar Detail Construction Manual

## Detail Instructions:

This manual has been written to cover the assembly of the Twinstar scale helicopter kit and the ARF Painted version. This is the detail construction of the Twinstar fuselage components that work in cooperation with the scale mechanics instruction manual. For modelers building the kit version, all mechanics fitting (landing gear, muffler exhaust, tail gearbox, fuel system components and radio mounting) must be completed before the fuselage is painted as this will reveal any addition access holes that need to be cut-out. This is much simpler before painting is complete.

## Building Level:

**Level 1.** Beginners will follow all steps and sections in order as they are laid out, this is a longer process that involves building the mechanics completely, running-in the engine and then disassembling the helicopter to install into the completed fuselage.

**Level 2.** Intermediate to expert modelers can complete the fuselage and build & install the helicopter simultaneously using a previously run-in engine.

## Instructional Information

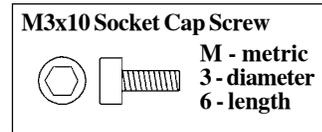
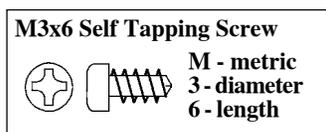
Every attempt has been made to ease the assembly of your helicopter, at each step where there are complex assemblies, there are detailed drawings, photos and written instructions to walk you through each step. Remember to take a few minutes before each step to carefully examine the instructions in order to become familiar with the parts and assembly sequence before beginning that step.

Symbols used to help assist you in building:

	Apply "Goop"		Repeat Step as Specified		Partially Tighten		Helpful Tip
	Special Attention		Apply Threadlock		Purchased Separately		Cut away Shaded Portion

Hardware Description and Identification:

M3x6 = 3 x 6mm and can refer to screws or fasteners:



Required Items to complete the Twinstar Fuselage kit:

Recommended Tools & Accessories:

Pencil & Ruler  
Slow CA Glue  
1/16", 1/8" Drill Bit  
Regular Hand Tools  
Masking Tape  
Lead Weight  
Foam Rubber  
Permanent Marker  
Rubbing Alcohol  
Clear Fuel Proof Paint  
1/4" Paintbrush  
Scissors  
Paint, primer and filler\*  
320 Grit Sandpaper  
30 Minute Epoxy  
Sanding Blocks\*  
Locktite (liquid thread lock)  
Disposable epoxy brushes

Moto Tool w/ sanding accessories  
Remote Glow Plug Connector (CN2222)  
Remote Fueling Valve (CNT4444)  
5.0mm Open End Wrench  
5.5mm Open End Wrench  
7.0mm Open End Wrench

\* For unassembled fuselage kit version.

## Section One: Completing the helicopter mechanics.

The mechanics (completely built helicopter without body) should be flight ready. At this point the helicopter should essentially be together without the fuselage, this can be accomplished with the scale mechanics instruction manual that comes with the kit and ARF versions. For the kit version, complete all the fitting before painting.

The final items that need to be finished are:

1. The battery pack and the receiver (wrapped in foam) are installed in front or below the battery tray. If mounting in front for balance, suitable anchoring need to be fabricated to securely hold the items.
2. The antenna needs to be routed to the tail gearbox with out contacting any metal or wiring. Optional short whip antennas are great but either method needs to be routed correctly.
3. Remote glow plug adapter and fueling system needs to be installed (purchased separately).
4. The engine Run-in will require 2-4 tanks of fuel to get the engine running smoothly (with main blades).
5. Rudder pushrod length needs to be shortened and adjusted based on the rudder setup instructions.
6. During the Run-in, cycle the throttle to lift-off and trim the rudder while setting up the gyro.

Do not fly the helicopter at this stage, the mechanics are designed for the scale fuselage and is not balanced for extended hovering or forward flight. Also note that there is no tail support strut or tail fins (apart of the fuselage) for stability.

## Section Two: Fuselage Preparation

### STEP 1 Muffler Cutout & Clearance

If you are installing the optional CN3058 Scale 30 size muffler the cutout in the fuselage is already completed. The fuselage is designed to use the scale muffler from Century, either the CN3058 (30 size) or the CN3059 (46-50 size) that can be purchased separately. These mufflers are box like and fit very close to the scale mechanics making them an ideal choice. Standard torpedo style mufflers simply will not work because they require cutting out the side of the fuselage. It is common and recommended to use an optional exhaust diverter that extends the muffler exhaust out past the edge of the fiberglass, however it may be necessary to enlarge the hole in the fuselage depending on the type used, Century offers CN3014, CN3015 & CN3016 that can be trimmed to fit.



### Kit Version

No further work is necessary if mounting the optional CN3058 Scale muffler. For all other mufflers, trace the template in the back of the scale mechanics manual, install the preferred muffler and mark the hole for the exhaust. Using a sharp pencil, pierce the holes for the side frame and the appropriate exhaust center mark that corresponds to your muffler. While holding the rear fuselage upside down, align the pierced “side frame” holes. Using a marker, mark the center and draw the circle for the exhaust hole. Using a moto-tool and a grinding stone, make the hole in the bottom of the fuselage and the bottom hatch. Alternately, the hole can be drilled inside the final diameter and filed or hand sanded to the final size.

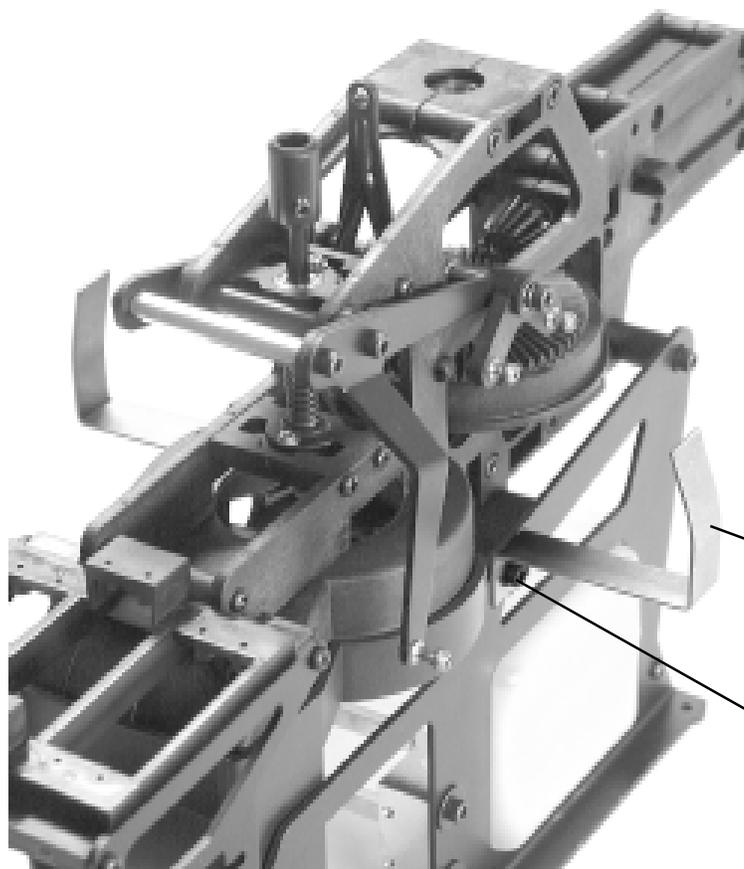
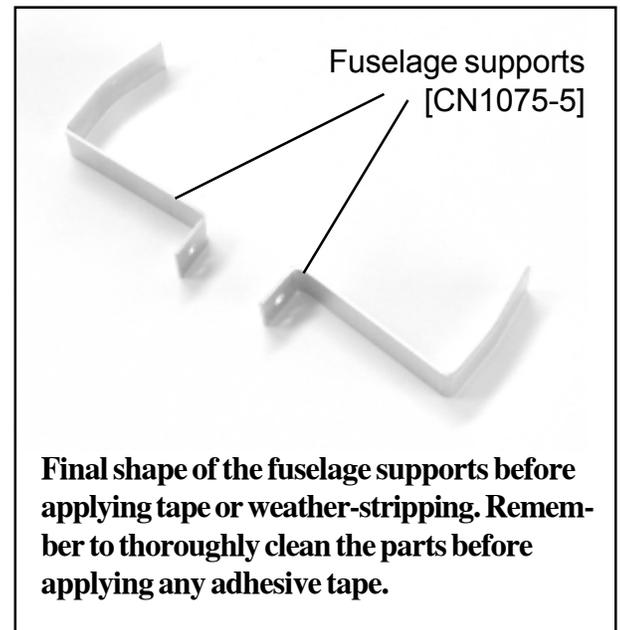
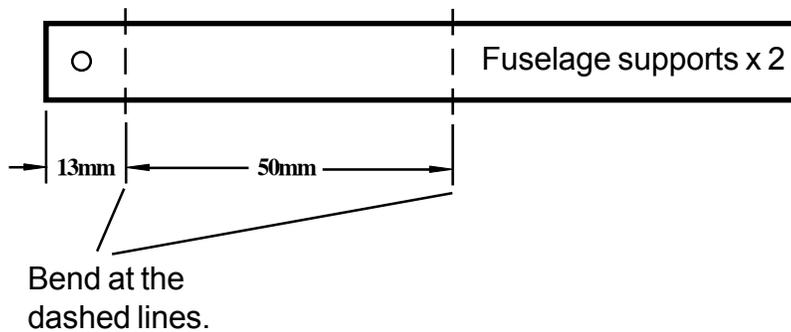
### ARF Version

For the CN3059 Scale 46-50 size muffler, the cutout will need to be slotted as the position of the exhaust outlet is slightly offset. If another exhaust system is going to be installed, make the cutout for the exhaust at this time.

## STEP 2 Fuselage Side Supports

During flight the fuselage will vibrate and depending on the rotor speed, this vibration can be strong enough to have the some part of the fiberglass contact the mechanics. The common result can range from a mild abrasion to actual cracking of the fuselage. To eliminate this problem, there are two aluminum strips included with a 3mm hole pre-drilled in one end. Measuring from the end with the hole, make a mark at 13mm and 63mm where the strip will be bent to match the photo. Using a set of pliers that have a smooth, straight jaw (or possibly a table vise) bend the first 13mm mark at 90° degrees downward, bend the second 63mm mark 90° degrees upward. The last portion of the support should be curved to match the vertical side wall the the fuselage. At a minimum apply vinyl tape (not included) to the vertical support where it will contact the fuselage, using a thin foam weather-stripping would be better to dampen all vibration. Attach the support to the forward M3x16 Socket Cap Screw on the lower side frames. After the mechanics are in the

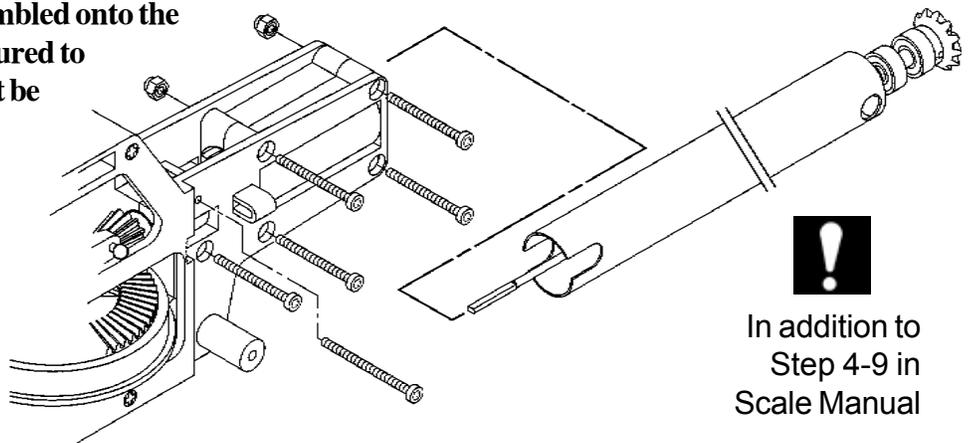
final position, some slight adjustment is possible by bending the last segment to fit.



**Tip** An alternate to using tape is to apply “Goop” or “Zap-a-Dap-a-Doo” type of adhesive to the seams of the supports, effectively bonding them to the fuselage sides. These types of adhesives can be removed at a later time by scoring and cutting through the joints. With the mechanics temporarily positioned, mark with pencil the outline of the support and thoroughly clean the fiberglass surface with rubbing alcohol.

### STEP 3 Attaching the Tail Boom & Tail Pushrod

Before the tail gear box can be assembled onto the tail boom, the tail boom must be secured to the mechanics, the tail pushrod must be installed and the tail pushrod guides must be close to their final positions, however there is no access after the mechanics are installed. Attach the tail boom with the drive shaft assembly and ensure the drive shaft is engaged in the transmission drive shaft. Slide the three tail pushrod guides onto the tail boom and roughly position them equally spaced along the tail boom. Insert the long rudder pushrod from the end of the tail boom but do not attach the plastic pushrod coupler. Complete the remainder of Step 4-9 in the mechanics manual, including attaching the rudder ball link to the tail pitch lever but do not grease the gears in the gearbox. Slide the pushrod back and forth to get the best positioning for the tail guides. Once smooth operation is attained, tape each guide to the tail boom. Following the rudder setup instructions, shorten the threaded section closest the plastic coupler, there is enough thread to remove 5-6mm from each end to position the tail bellcrank at the correct angle.



In addition to Step 4-9 in Scale Manual

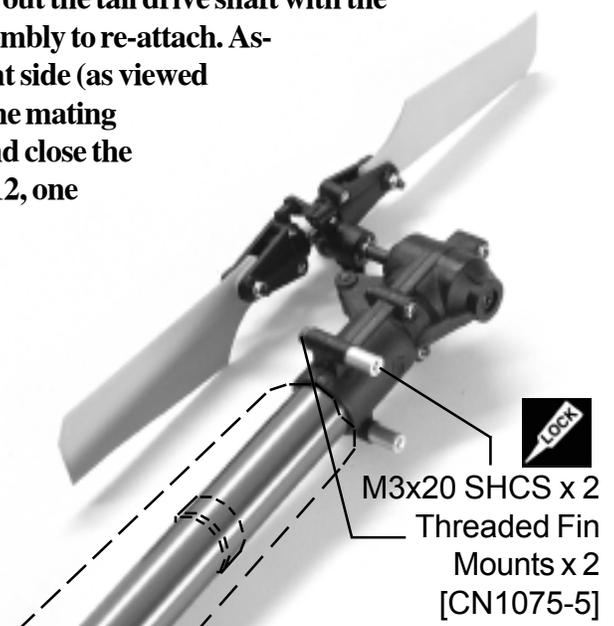
Now remove the tail gearbox and take the entire main mechanics (removing the main shaft & muffler makes this easier) with tailboom and insert into the rear fuselage and observe where the pushrod exists the end of the fiberglass tail boom. Make a pencil mark where the tail pushrod exits the fiberglass, this should be directly underneath the tail boom. The rearmost guide may need to be moved forward to properly fit inside the fiberglass tail boom and a 3/32" [2.5mm] slot cut into the bottom of the tail boom to get proper clearance and free movement. If needed, cut the slot with a moto-tool or razor saw and file the edges smooth. A "trim and test" procedure maybe necessary to repeat until the slot is long enough. Once completed, glue the pushrod guides onto the tail boom with slow-CA (only a few drops around the outside are needed to sufficiently attach the guides).

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### STEP 4 Tail Gearbox Assembly & Vertical Fin Mounts

Insert the main mechanics (with the main shaft removed) with the completed rudder pushrod guides permanently installed, insert the mechanics past the pre-drilled landing gear holes until the end of the tail boom extends past the fiberglass by 1/2" [12mm], be carefull not to pull out the tail drive shaft with the bearings as the forward joint can be disengaged, requiring disassembly to re-attach. Assemble the tail gear box with the tail blade assembly onto the right side (as viewed from behind) over the tail boom, aligning the tail input gear into the mating recesses in the gearbox. Liberally apply grease to the tail gears and close the tail gearbox with left side, securing them together with two M3x12, one M3x10 Socket Cap screws and three M3 Locknuts. Insert two M3x20 Socket Cap screws from the right side of the gearbox and attach two 10mm threaded fin mounts using threadlock. The fin mounts will need to be held with smooth jaw pliers to be sufficiently tightened.

Cut a piece of 1/4" radio foam 1/2" wide by 2" long (same as used to isolate receiver and battery from vibration), while moving the mechanics to align to the landing gear holes, insert the foam in-between the metal tail boom and the fiberglass tail section, this will cushion the tail boom but make disassembly simple.

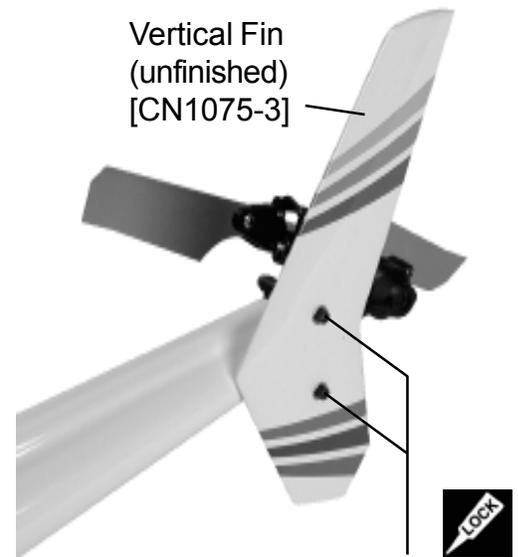


## STEP 5 Vertical Tail Fin

The vertical tail fin is attached with the short portion on the bottom. Slide one M3 Washer onto one M3x12 Socket Cap screw and insert through the pre-drilled hole in the vertical fin, repeat for the second hole. Apply thread lock to the exposed threads and thread into the vertical fin mounts already installed on the tail gearbox. Be careful, tighten until snug and then only a 1/16" of a turn more. Warning, these fasteners only hold the fin in place, overtightening will crush the fin.

### Kit Version

The edges of the fin need to be sanded before the paint is applied. After painting, the holes for the screws will need to be re-drilled to remove any paint that accumulated in the holes.

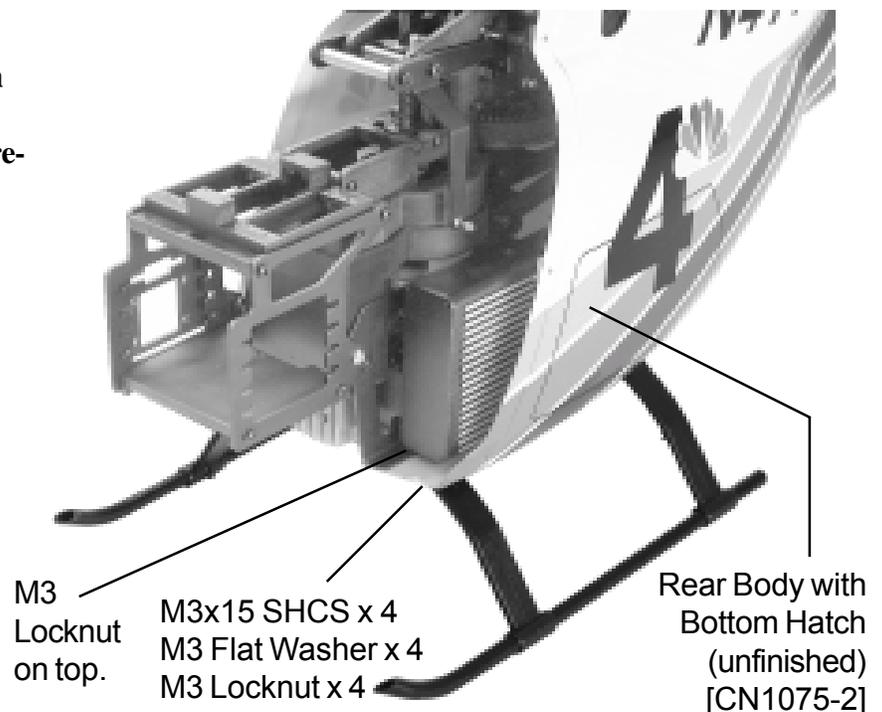


M3x12 SHCS x 2  
M3 Flat Washer x 2  
[CN1075-5]

## STEP 6 Landing Gear & Muffler Attachment

As there is enough space to attach the 30 size muffler after the mechanics are secured to the landing gear, remove it for now. If you have chosen to install the 46-50 size engine, it is very important that the muffler screws are installed loosely in the engine before the side frames are attached, if this is not the case, do it now. Place the mechanics and the rear fuselage on top of the assembled landing gear. Slide one M3 Flat Washer onto one M3x15 Socket Cap screw and insert from the bottom of the front landing strut, through the fiberglass floor and the align to the front hole of the mechanics. Attach one M3 Locknut on the inside using pliers to hold the nut while the bolt is tightened from below. Repeat for the other side. To attach the rear strut, repeat the same procedure but tip the mechanics over the side of a table. Using a 5.5mm nut driver, place a drop of grease on the top of the locknut and insert into the nut driver (this will hold the nut from falling out) and carefully insert the nut driver between the side of the mechanics and the fuselage. You will need to maneuver past the angle supports but with patients and keeping the nut driver horizontal, the rear locknuts can be secured. This can also be accomplished with the muffler installed but more patience is needed as you are unable to see the bolt. Repeat for the other side, this time with the fuel tank as the challenge.

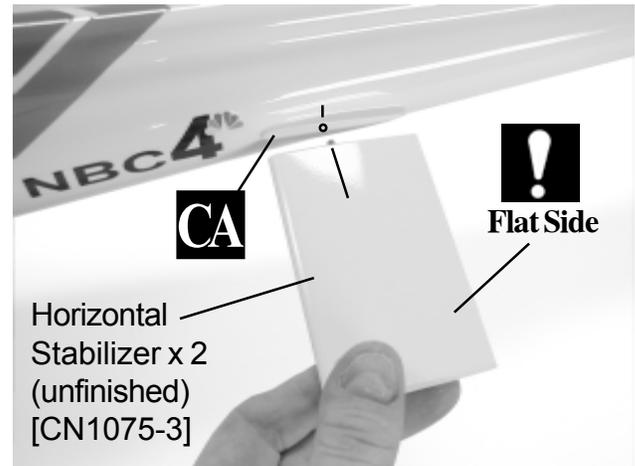
It is assumed that the muffler holes have been cut for the muffler to be installed, the edge of the hole should be fuel proofed with a Polyurethane paint or simple clear nail polish to seal the paint finish to the fiberglass. There is enough room to use a long allen key or hex screwdriver to access the muffler bolts. If you have been test flying the mechanics, clean the muffler bolts, the muffler threads and the through holes on the engine with rubbing alcohol before assembling. Make an aluminum gasket if none is provided with the muffler, after tightening the bolts, torque an additional 1/16" of a turn. Finally, run the pressure line back to the fuel tank and arrange any other fuel lines for optional filler valves or fittings.



The horizontal stabilizers are attached to the tail boom by bonding the edge of the fin to the matching molded protrusion on the tail boom. The threaded rods are only for alignment and do not significantly add to the strength of the joint. Match the horizontal stabilizer to the mating molded section in the tail boom and draw a pencil line at 1/3~1/2 from the leading edge of the stabilizer.

**Kit Version**

After marking, drill a 3/32" [2.5mm] hole centered at the mark on the stabilizer and drill 7/8" [22mm] deep from the end. This is for the threaded rod, soak the hole with CA glue, when dry thread the rod in. Drill a matching 1/8" [3mm] hole in the fuselage, this is only for alignment and the rod should be a snug but easy fit. Once painted, roughen the bonding surface and attach the fin using slow-CA or "Goop" to the tail boom. Apply removeable "magic" tape to the end of the stabilizer to the tail boom top and bottom to ensure the stabilizers dry in the same position.



**ARF Version**

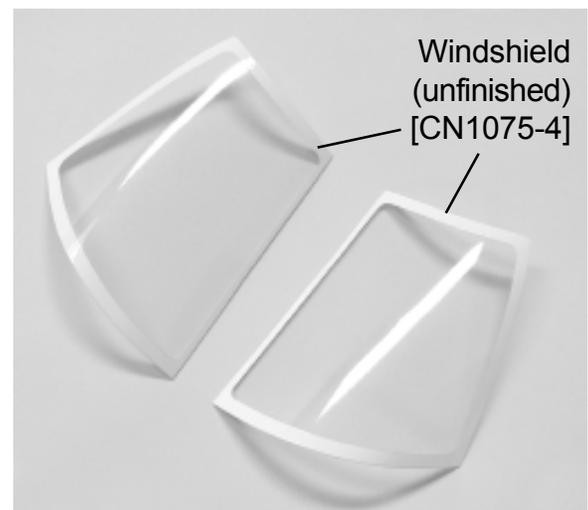
After marking, drill the 1/8" [3mm] hole in the fuselage. The end of the pre-finished stabilizer is bare balsa, carefully soak the end with thin-CA or balsa filler to provide a hard bonding surface. On the fuselage, you have a couple of choices, you can sand the bonding surface with fine-sandpaper to remove the paint and roughen the fiberglass but be carefull not to remove any paint on the tailboom. Alternately, if you are bonding with slow-CA, you can lightly sand the paint surface to remove the gloss finish and bond directly. Follow the taping procedure at the end of the kit version until dry.

**STEP 8 Windshield Preparation**

The windshield in the kit version needs work as compared to the ARF version where it is ready to be bonded to front body. After the fuselage is painted, the windshields are attached using "Goop" or "R/C 56 Canopy Glue" types of adhesives. For "Goop" it is important to notice that the recessed surface on the front body is 1/4" [6mm] wide that provides the bonding surface for the windshield. This fuselage is designed to have the pilot and rearward windows open, for engine cooling purposes, resist the urge to enclose these windows, as it can cause an engine to overheat and subsequently quit. All very bad for scale helicopters.

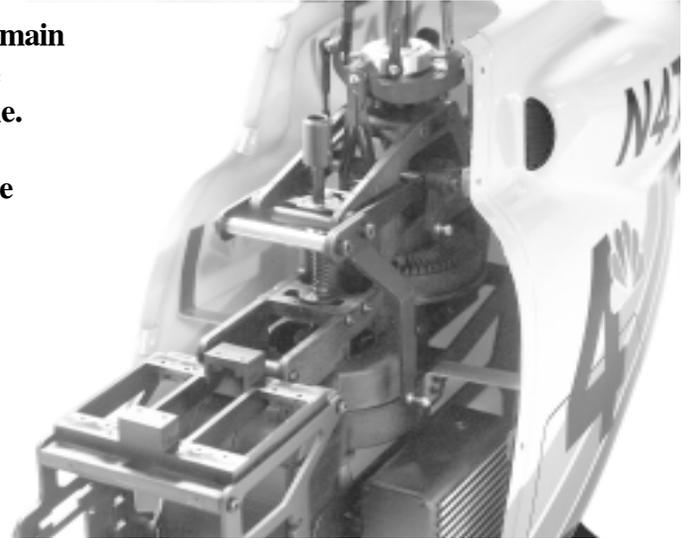
**Kit Version**

Careful inspection will reveal a scribe line around the outside of the each windshield half. Using a black marker, trace the line and cut out both sides. It is simple to rough cut the parts first with heavy shears or tin snips, this removes alot of the excess material making the final trimming much easier with a sharp pair of scissors. Curved hobby scissors are good but be careful, the hobby scissors are really designed to cut small diameter radii and can be difficult to cut in a straight line. To be extra careful, trim to within 1/16" [1.5mm] and sand the edges to get a perfect fit. For finishing, using masking tape or liquid mask (common to R/C car hobbyshops) mask off all areas except the outside 1/4" edge. Using masking tape, cover the entire back side to avoid over-spray while painting and apply paint to match the color planned for the front body section. Let completely dry.



## STEP 9 Attach the Main Rotor Head

Now the rotor head assembly must be re-attached, insert the main shaft through the top bearing, the mast stopper and insert the M3x16 Socket Cap screw below the main gear at a 45° angle. Once through the auto-hub use a 2.5hex key to turn the bolt while holding the M3 Locknut with pliers from the other side at 45° degree angle. Access to the set screws in the mast stopper is possible through the elevator lever assembly (disconnect the lever to do this) but remember to pull up on the main shaft first, tighten one set screw then remove the second to apply threadlock. Finally, remove the first, apply threadlock and tighten in place. If using the slipper unit, access is possible between the starter shaft and the side frames from the front.



## STEP 10 Front Nose

The front nose is attached with four M3x8 Phillips Self Tapping screws from each side. Bonded to the inside are small 3/8" plywood squares that hold the screws in place. Take the time now to mount the gyro, receiver and battery pack (wrapped in foam) inside the front nose if it wasn't already done for test flying. The location for the gyro is on the battery tray beside the collective and throttle servos. Having completed the mechanics, lift the helicopter by the flybar held perpendicular to the length of the helicopter and continue to move the battery pack forward until balance is achieved. It may be necessary to construct an anchor, like a few simple metal hooks bonded to the inside of the nose to hold rubber bands securing the battery pack. If more weight is necessary, adding weight is acceptable but be cautious to the amount, if lead is being used, bond it as far forward as possible. See Step 14.

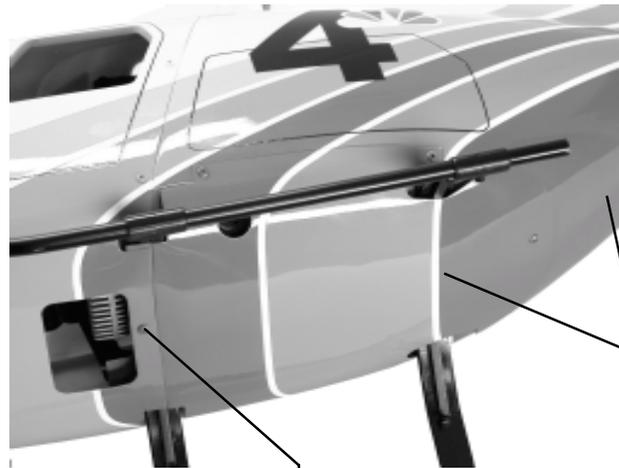


### Kit Version

Mark the four screw locations on the each side of the front nose with a pencil. Using tape, attach the front to the rear body and slowly drill each of the eight holes using a 3/32" [2.5mm] drill bit. Remove the front nose and roughen one side of the eight plywood blocks and the area around the inside hole on the rear body. Remember that the fiberglass parts are molded using Polyester resin and as a result, "Epoxy" type of glue will not bond to the fiberglass. Any time two components are bonded to the fiberglass, slow to medium speed CA (cyanoacrylate) adhesive is necessary. Using slow-CA bond each plywood block in place, clamp until dry. Redrill each hole in the rear body through the plywood blocks and using one M3x8 Phillips Self Tapping screw, insert and form the threads. After the fuselage is painted the front nose can be attached, remember to paint the screws to match the color scheme.

**STEP 11 Bottom Hatch**

If an exhaust diverter is to be used, install before the bottom hatch is attached. The bottom hatch is already cut to fit the landing gear on the scale mechanics. Start by inserting the rear cutouts and gently flexing the ears to engage the rear struts, next grasp the hatch with both hands, fingers on the side edges and thumbs centered at the front and gently bend the hatch in a “U” shape to allow the front lip of the hatch to be inserted under the edge of the front nose. Secure the hatch using six M3x8 Phillips Self Tapping Screws.



Rear Body with Bottom Hatch (unfinished) [CN1075-2]

M3x8 Self Tapping Screws x 6 [CN1075-5]

**Kit Version**

Mark the six screw locations on the hatch with a pencil. Using tape, attach the hatch to the rear body and slowly drill each of the six holes using a 3/32” [2.5mm] drill bit. Remove the hatch and roughen one side of the six plywood blocks and the area around the inside hole on the rear body. Using slow-CA bond each plywood block in place, clamp until dry. Redrill each hole in the rear body through the plywood blocks and using one M3x8 Phillips Self Tapping screw, insert and form the threads. After the fuselage is painted the hatch can be attached, remember to paint the screws to match the color scheme.

**STEP 12 Attaching the Windshields**

Apply a thin 1/16” [1.5mm] bead of adhesive centered in the recessed surface. Pick up the windshield by the edges only, remember “Goop” or “Goop Fingerprints” cannot be removed if they touch a clear part. Using single-use “Hobby grease syringes” are great and really make this a simple task as the adhesive width and amount can be easily controlled. Let dry for 24 hours. An excellent alternative is to use “R/C 56 Canopy Glue” from any airplane hobbyshop. This adhesive remains white until fully cured in 24-48 hours (slow but very good) but can be cleaned up using a cloth and will not damage or scuff clear parts. When dry, it is very strong. After bonding, apply “magic” tape to secure the windshield halves until dry.

**STEP 13 Fueling, Glow Plug Extension and Antenna Routing**

If you have not already considered these items, now is the time. Most scale helicopter present new challenges to simply change the glow plug when shrouded inside the fuselage. Century makes most items to solve these as follows: CN2054 Universal Glow Wrench (check for compatibility), CN2222 Remote Glow Plug Adapter - absolutely essential for all model helicopters and CNT4444 In-line fueling valve with filter and filler - avoids pulling the fuel line from the carburator to fuel the helicopter. The antenna wire needs to be routed in a path that avoids the wire from touching any metal surfaces or servo wires. It is best that all the servo leads be collected and secured on one side of the mechanics leaving the opposite side for the antenna. Whether you prefer the original wire or use a “mini-whip” antenna, make sure that anytime the wire needs to cross any metal, use a short 1/2” [12mm] length of fuel tubing to insulate the wire and attach with a tie wrap. Clean installations always work best.

## STEP 14 Final Balancing

Congratulations, you have a fine looking scale Twinstar helicopter kit.

The final work is in the balancing of the helicopter before flying. With the main blades and tail blades installed, pickup by the flybar with your fingers and look to see how level the helicopter hangs in the fore-aft direction. If necessary, add nose weight to the to very front of the fuselage. This can be glued inside the front fuselage section in front of the battery pack. Generally, 4-6 ounces is the maximum weight that should be added to the nose if you are using a 30 size engine.



Do not be concerned that the flybar comes close to the top of the fuselage. While working on the helicopter the angle of the flybar to the main shaft is not realistic and when in flight, the flybar will not deflect half the distance possible.

Happy flying with your gorgeous Twinstar fuselage.

## STEP 15 Decals

For best results, apply the decals after the paint work is started and all the colors have been applied but before any clear topcoat has been applied. Following this method will allow the decals to be sandwiched in the finish for greatest appearance and longevity.



For the kit version, the next couple of pages describe the basic procedure to prepare and paint the fuselage.

## **Section Three: Preparing and painting the kit version.**

This section is written to cover painting and detailing of fiberglass components using in Century's scale helicopter kits. Some included references may describe components of different kits, not exclusive to this detail instruction manual.

### **Introduction to Fiberglass**

When considering the strength compared to the space age canopies that are common on most pod and boom helicopters there is no contest. This plastic material is virtually indestructible at the penalty of being virtually un-paintable without specialized and expensive automotive primers and paints, there is also a very limited range of color available. The reason you are reading this page is that you have come to your senses and wanted to fly a model that looks and holds all the prestige of a real helicopter.

### **Flexibility**

A wonderful attribute of fiberglass is in its flexibility. Century and Funkey take care and pride in craftsmanship that goes into every fuselage. However, fiberglass parts will migrate (change shape) while inside the shipping box. When two mating components are brought together and they do not align or mate, the culprit is a warped part. Many become upset and wish to lay blame but dealing with this is very simple when explained a simple procedure. Using a heat gun set at the high setting at a distance of 1-2 feet away, evenly heat the warped part until the outside surface is hot to the touch and the part has become pliable (flexible). Using adhesive tape, mate the two fiberglass parts together and let both parts sit until both parts have reached room temperature. Remove the tape and now both parts are stable and match one another. In some instances, depending on the location of the warp, the part may need to be held in an overextended position to achieve the proper shape when the part is finished.

### **Working with Fiberglass**

Difficult to work with, we disagree. Fiberglass is easier to repair than you think. Using today's CA type of adhesives, a severe crack in a fuselage can be simply fixed and the repaired section is much stronger than in its original state. Add touchup paint and no one would ever know it had been damaged. There is a limit to this type of thinking where purchasing the replacement fiberglass part is simply cheaper and less work than performing major reconstructive surgery.

### **The Paint Job.**

There is no magic to a good paint job, the true secret is time, patience and common sense. A beginner who thinks that they can throw paint onto a fuselage Friday night before flying on Sunday is dreaming, the helicopter would be flyable but even that is a stretch. The average beginner will spend the better part of a month to apply a good clean paint job.

### **Preparing the fuselage for painting.**

After opening the kit version of the fuselage, examine all the fiberglass components to see where work needs to be done to allow a simple "bring up" of the fuselage. "Bring up" describes the necessary steps to complete all the jobs in order to start priming the fiberglass parts. Typical work that is done at this stage is rough sanding on seams and jointed components, filling of surface imperfections, adding panel lines and rivets, cutting required holes and preparation for priming.

1. Start by thoroughly washing all fiberglass parts in mild detergent and warm water, this will remove any residue remaining from the molding process. Next wipe down all the parts with Acetone (from the hardware store). The Acetone will remove all traces of oil or grease that will affect the adhesion of two fiberglass parts or between the paint and the fiberglass. Now using fine steel wool or an abrasive pad commonly used for scrubbing dishes, scuff all surfaces that will be joined or receiving paint. What is important to note here is that we are breaking through the topmost resin surface and creating the best surface for adhesive or primer to adhere to.

The prepared finish will have very fine score marks usually seen when the part is held to the light at a slight angle.

2. This is the time to rough sand any accessories or small parts, using the 320 grit sandpaper, that will be assembled and attached at different positions on the fuselage. These can be marking lights, engine exhausts, scale fuel tanks, horizontal and vertical stabilizers, guns, antenna or any scale details being bonded to the fuselage. These accessories should be test assembled to make sure that all parts are prepared, and you will be able to see any problems that may arise in trying to paint these parts. Some thought should be put into how to hold the part as it is being painted. Go ahead and bond these parts at this time using the slow CA glue. A quick note on adhesives, as the fuselage resin is polyester, **do not use any regular 5-30 minute epoxies to bond** two fiberglass components together. Stabilit is specially formulated for this purpose and excellent for fillets. Epoxy and polyester will not bond properly to one another, but epoxy is good to bond unlike substances like wood or metal to themselves or other parts.

3. Once the detail parts have been built into sub assemblies, they are ready to paint, use a filler in sections that have gaps or slight surface imperfections, occasionally there are voids (air bubbles in the resin) that occur near the surface that need to be filled. There are a lot of good fiberglass fillers on the market, it is best to check with your local hobby shop to get a recommended product. Try to stay away from porous fillers designed for wood as they will shrink and are not a good choice for large areas.

4. Most major windows and accessory holes have been pre-cut by Century, leaving only those that have a user dependency like the type of exhaust system used on the helicopter or the exact exit position for the cooling fan shroud. For these fuselages that have been explicitly designed for the Century's scale mechanics, almost all of these concerns have been considered and finished at the factory. This leaves the hole for the exhaust, if you are using the recommended scale muffler (CN3058 .32-.38 or CN3059 .46-.50) then these dimensions have been included on a template in the Scale Mechanics Manual for the 30 size engine, the 46-50 requires a slight adjustment.

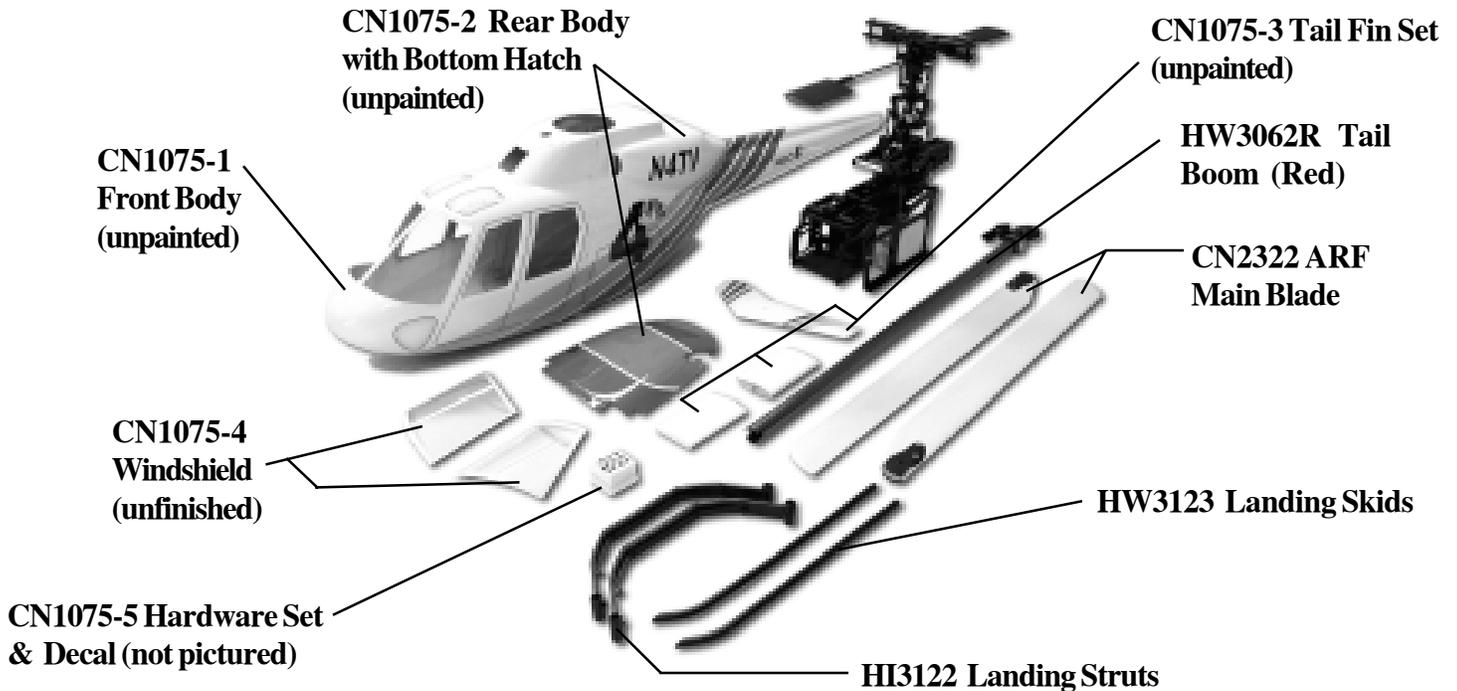
4a. When making cutouts or holes in the surface of the fiberglass the best procedure is to drill a pilot hole using a 1/16" drill bit at corners or along a curve. Start with a permanent marker to draw the opening or window. The pilot holes serve to avoid leaving sharp corners which given the nature of a model helicopter will be the focal point for stress cracking originating from corners. Once the holes have been made, use the moto-tool for all other roughing cuts. The cut off wheel is the best for straight lines and either the sanding drum or the curved stone is used for smoothing edges. If the cut out is a window, do not use the moto-tool for the final work. Switch to a sanding blocks, square blocks of various sizes for straight edges and round dowels for rounded corners.

4b. In the case of the exhaust opening, it should end up being 1/8" larger across the outside diameter of the exhaust pipe that extends below the bottom of the fuselage. After drawing the circle, use grinding stone and move in small circles until the hole is at the size wanted.

5. Priming the fuselage accomplishes two tasks: firstly, the primer paint is designed to aggressively adhere to the surface being painted and provide the best surface for the colored paint to adhere to; secondly, all surface imperfections will become visible. Depending on the particular imperfection, light sanding with number 600 or 800 sand paper and the second priming will take care of 90% of the highly visible problems. The remaining 10% need to be filled, let dry, sanded again and then sprayed with the second coat of primer. The primer process will be repeated until the surface is as perfect as your patience and time permit.

6. Select your paint color and follow the directions on the particular brand of paint being used as each manufacturer has different requirements.

# Twinstar Replacement Parts



## Common Replacement Parts:

CN1075-1	Front Body (unpainted) .....	1
CN1075-2	Rear Body with Bottom Hatch (unpainted) .....	1
CN1075-3	Tail Fin Set (unpainted) .....	1
CN1075-4	Windshield (unfinished) .....	1
CN1075-5	Hardware Set & Decal (logos & text only) .....	1
CN1075-6	Detail & Scale Mechanics Manual .....	1
CN2322	ARF Main Rotor Blades (550mm) Pair .....	1
HI3122	Landing Struts (Twinstar) .....	2
HW3123	Landing Skids (Twinstar) .....	2
HW3062R	Tail boom (Red anodized is for Twinstar & Long Ranger) .....	1
HW3064C	Tail Pitch Control Rod Set need trim 10 or 20mm (for all) .....	1

## Optional Parts:

CN0427	Hex one way start extension .....	1
CN2054	Universal Glow Plug Wrench .....	1
CN2222	Remote Glow Plug Connector .....	1
CN3014	Exhaust Diverter 30 size, 45° Degree .....	1
CN3015	Exhaust Diverter 40-60 size, 90° Degree .....	1
CN3016	Exhaust Diverter 40-60 size, 45° Degree .....	1
CN3058	32-38 Scale Muffler (optional) .....	1
CN3059	46-50 Scale Muffler (optional) .....	1
CNT4444	Branch Valve w/Filter & Filling Nozzle Set .....	1

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