

# 0844 MINIATURE AIRCRAFT USA XL-PRO C.N.C. MACHINED ALUMINUM HEAD BLOCK AND FLYBAR SUPPORT

Fits all X-Cell and XL-Pro models equipped with standard rotor systems. Replaces parts #0289 through 0298.

*Please read all instructions carefully prior to installation.*

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②	0331	② 0329

## SUGGESTED RELATED M.A./USA NEW ACCESSORIES:

- 0847 C.N.C. adjustable flybar control arm kit. Includes 3 position adjustable C.N.C. gold anodized control arms and graphite flybar stiffeners.
- 0846 New special blade axle kit including longer stainless steel precision ground axle and special spacers to minimize loads on the inboard radial bearings and improve collective response under load.

## ROTORHEAD ASSEMBLY

The 0844 is shipped with the flybar pivot assembly factory installed. The remaining procedures are simply to install the axle and blade holders. At this time it is suggested that you carefully examine each bearing for damage or wear. Sometimes a "marginal" bearing can be still functioning in it's original position but removal and reassembly is just

enough to "put it over the edge" thereby causing problems. If any bearings appear "notchy" under load or are rusted (thrust bearings) they must be replaced. Additionally, the axle should be checked for straightness.

Begin re-assembly by installing (4) #0844-2 O-ring dampeners within the recesses in the head block. Install these without lubrication. Work the ends of the axle into the O-rings without causing any cutting from a sharp edge (you may wish to slightly chamfer the edge of the step on the axle or slide the O-ring onto the axle prior to insertion into the head block).

Any previously utilized axle spacers such as #0329 or #0331 may still be used although flight testing will still be necessary to fine tune the dampening to suit your needs.

Remove the original #0299 flybar bearings from the delta plates on your original head block. These will be pressed into each end of the new flybar support tube #0840-25 within the head block. Apply a little oil to the outside diameter of each bearing and gently tap each into position taking care not to install them crooked. Each will be flush with the outside edge when fully installed.

Select (2) #0113 M3x10.5 threaded steel double balls and (2) #0597-1 brass spacers. Apply Loctite and install each as shown in the drawing.

Install the flybar control arms (regular or C.N.C. type) and flybar using only the 0840-7 M4 washers as spacers next to each #0299 bearing.

### **PRELIMINARY FITTING AND INSTALLATION OF THE ROTORHEAD.**

Two areas are to be carefully checked for fit prior to installation on the model - The washout hub and the mainshaft.

If you have the #0219 plastic washout hub or "early" style aluminum hub, trial fit the hub onto the anti-rotation guide pins in the head block to ensure a smooth fit. Some hubs may be snug on the pins and will require relief of the holes. A small jewelers file or appropriate drill will easily remedy the situation. "Late Style" Aluminum hubs are already sized for these pins.

**NOTE:** We cannot guarantee correct fitment of any aftermarket copies of the X-Cell washout assembly. You will find it best to use only genuine X-Cell parts and accessories in this position.

Check to see that the head block will freely slide over the mainshaft diameter. If not, deburr the mainshaft (especially from previous static tracking screws) and/or polish the diameter with 600 grit paper.

All XL-Pro main head blocks are 100% C.N.C. milled without secondary operations. The centerline accuracy is without question, however, the same cannot be said for some mainshaft

cross holes. This can cause difficulty during assembly. The #0844 head block does not utilize the conventional 3.0mm bolt to retain the head upon the shaft. Instead, a 3.0mm hardened precision ground dowel pin is captured with an M4 Socket set screw. Since these dowels are a true 3.0mm diameter (M3 bolts are not) and mainshaft hole may be slightly off-center, you should trail fit the head and dowel pin. The chamfered end is used for entry. A small access hole on the opposite side of the head will allow a 2.0mm wire or 1.5 Allen driver to be used to push the dowel out after the set screw is removed. If the dowel will not fully insert through the main shaft with moderate pressure, rotate the head 180 degrees upon the shaft and repeat. If neither position will work, the mainshaft cross hole must be enlarged slightly using a 3.0 - 3.1mm drill (.120).

This is easily accomplished since all M.A./USA mainshafts are only heat treated on the "autorotation" end to avoid embrittlement in stress areas. Be sure to deburr the edges. Do not attempt to modify the block.

The rotorhead is further secured to the mainshaft by the tightening of each #0067 M3x14 socket head bolt located at the base of the headblock. These should be Loctited and only installed as shown on the drawing.

### SET-UP NOTES

Your choice of bell mixers and/or ratios may call for a spacer or pivot bolt change. #0333 plastic bell mixers require no spacers or bolt change. In some cases you may wish to use the forward hole in the pitch arm to improve the geometry of each pushrod. This is optional and will not adversely affect the flight characteristics.

If you are using the adjustable aluminum bell mixers #106-01 or kit #0538 you must use the mixer as shown in the drawing with the raised center section (supporting the second bearing) and the balls facing inward towards the head block. This is accomplished by using longer #0095 pivot bolts and the M3 aluminum spacers #0572-8. In this arrangement, the various ratios can each be tested and either hole in the pitch arm is useable (although the forward most hole is desirable for improved pushrod geometry in most cases).

All pitch adjustments should be re-checked. Pushrod lengths may need readjustment. Correct adjustment of the short links #0135 and rods #0313 requires a "set-up" decision. If you desire level bell mixers at zero pitch (as in a 3-D set-up with symmetrical blades) you should remove 1.0mm of plastic from the base of each #0135 link. This will result in an adjustable pushrod length of 23.5 - 24.0mm as measured from each control ball center. For an FAI set-up and/or semi-symmetrical blades, the links need not be modified. In either situation, some variations will occur depending on the particular bell mixer position and ratio chosen. In any case, either ball on each #0113 double ball can be utilized depending on which gives better geometry for the pushrod connection.

An "Extreme Throw" 3-D set-up will dictate that the flybar control arms be angled downward enough to provide clearance of the ball link and the blade grip at full cyclic throw of +/- 7 degrees (read at the blade tips).

For future reference in servicing or repair of this rotorhead, it is essential that all bolts and set screws (with the only exception being the #0057 set screw next to the M3 dowel pin #0840-6) require proper tightening and Loctite. The washout anti-rotation guide pins are installed with permanent Loctite and a small press. Failure to follow these recommendations will result in damage to your helicopter.

0844 M.A./USA C.N.C. ALUMINUM HEAD BLOCK FOR ALL X-CELL HELICOPTERS.  
REPLACES PARTS 0289 THROUGH 0298.

0315 Axle  
(New 0846 is recommended)

