

## Nose Lift Installation Instructions

You should be able to start the installation process with one buddy helping (do not try to install this alone) on a Saturday morning, allow glass to cure over night and fly with the unit late Sunday afternoon.

If you are retrofitting -make a "space template" by tracing the full size drawing of the motor head (from F-22 aft) on some cardboard and check the location of the back of the actuator. You need to make sure that the unit will clear all radios and instruments (read step 3 carefully if you have a radio in the way) or other items which may interfere with the installation. The Cozy Mk-3 (see Chap.11 pg. #6) pitch trim bell crank PTB might need to be relocated to the right about 2 inches. Refer to the drawing for constructing the fiberglass saddle for the new location for PTB. It is important that you decide the clearance necessary for your plane, which may be a bit different from others.

**STEP 1-** Remove the canard and worm drive assembly. Refer to the nose lift plans and mark the section you will cut out of the F22 bulkhead to allow the actuator arms to pass through. Use the full size template. Remove the required material from the strut cover.

**STEP 2-** In this step you will attach the ramp contact interference plate called "the foot", the NG-3 replacement and reinforce the intersection of NG-30 and F-22, which will allow the landing loads to more uniformly be transferred into the F-22 bulkhead. Five-minute epoxy the triangular foam pieces into position as shown in the plans. Glass with 3 plies of BID lapping around the front of F-22 and on to the inside of NG-30 and 3 plies of BID lapping from the out side of NG-30 - around the back of F-22. Do not lay the glass on the inside of NG-30 where the SIDE ARMS of the actuator will go. The NG-3s (for Long EZ) and MKNG-3s (for Cozy MK-4) from Brock are not strong enough. Remove your bracket and trial fit the replacement bracket to the gear strut. Wrap enough plies of BID along with some floc around the strut to fill in the space between the fitting and strut to assure a tight fit. Clamp the NG-3 on the strut with light pressure. After a full cure, drill for the AN3 17-A bolt through the NG-3 as shown (no....your nose gear strut will not be weakened). Pull the plate off of the nose wheel casting and match drill (1/4 inch) the plate on "the foot". Bolt the "the foot" back on.

**STEP 3-** You will need a buddy to help you do a trial installation of the nose-lift unit. Carefully remove the limit switches, side arms and the motor head. Use a 9/16" wrench, remove the bolt on the top of the motor and twist and slide the motor off the actuator tube. Refer to the full size plans to locate where the side arms will go. Check to make sure the NG-30s have an inside dimension of 3 inches, and are parallel. Take a piece of wood and make a feeler gauge exactly 3 inches long and check the width where the side arms will go. If they are not parallel-make certain you sand the NG-30s and put wet floc on the side arms, allow it to cure until "firm" (6 hours at 70 degrees) or a much shorter time using a heat gun. and then squish into the NG-30s and snug the bolts until the side arms are parallel. If the sides are not exactly 3 inches wide- that's OK but they must be parallel. Slide the nose-lift and one of the side arms into position between the NG30s then attach the side arm to the actuator tube then slide the other side arm into position and



attach to the actuator tube. Now, you can slip the top two bolts through the slide plates and NG30s. Install the nuts and make the bolts snug not tight until final assembly. You will need to move the tube of the actuator up or down to install the bottom four bolts. The holes should line up perfectly. If this is a retrofit you may use the spacers and long bolts used in the Brock unit in the bottom four holes. Keep in mind that the side arms must fit tight against the NG-30s.

You may rotate the arms down from the plan location a small amount so the actuator will clear a radio. If you do this you will drill new mounting holes in the aluminum side arms for the top 4 bolts. You should not modify the bottom 2 holes.

You can now install the limit switches and motor on the actuator tube. Make all the bolts good and snug on the limit switches with locktight, but not so tight as you may crush the plastic housing of the switches.

**STEP 4-** Refer to the nose lift drawing (see section A-A) You will need to trim away enough material for the spring to pass through the opening as the gear is extended. Bolt the end of the unit to NG-3 (position the plane level on saw horses) check the angle that the fork assembly makes to the vertical Refer to your Cozy plans- Chapter 13, page 1. The angle should be very close to the 90 degree shown to prevent wheel shimmy.

Note that the manual over-ride shaft is designed to break with excessive torque....(if the motor engages when you are operating the manual over-ride the shaft will snap or break before structure or your hand is broken). The over-ride will also break if you try to spin the shaft with excessive torque. Turn it with care.

**I DO NOT RECOMMEND THE USE ELECTRICAL POWER YET- CHECK THE TRAVEL BY CRANKING THE MANUAL OVER-RIDE UNTIL YOU HEAR THE LIMIT SWITCH CLICK.** In the full up position the limit switch should "click" stopping the travel. Check the full down position. The limit switch should "click" when the gear is fully extended. You can adjust the stopping position of the gear leg by moving the adjustable screws on the slide bar, which engage the limit switches. IF you choose to use electrical power to check the limit switch location, run wires directly from a 12 V battery to the wires from the motor. Touch the wires briefly to check the direction of movement of the actuator. Pay attention to the slide bar as it approaches F-22. Make sure you have trimmed enough material away so that the slide bar does not contact F-22.

**You can break or bend something if you extend the unit beyond the screw head that engages the limit switches Double check that everything electrically works properly before operating with the toggle switch on the panel.**

Once you are satisfied with the stopping point of the nose gear strut - tighten the screws in the adjustable slot in the slide bar securely with LOCTITE (blue dot -removable)





CAUTION- if the limit switch fails, or the screw slips on the slide bar - the nose strut will continue in it's travel until it extends fully (engages the slip clutch) or contacts structure. Damage to structure can occur. Keep your fingers and hands clear of any moving parts - you could be seriously injured.

**STEP 5-** After you have **double-checked** that the side arms are securely bolted to NG-30, complete the wiring using the detailed wiring diagram. Using the correct aircraft electrical installation procedures is critical to problem free operation of the system. If you are not an expert in this area I suggest you contact Bob Nuckolls of AeroElectric Connection at 316-685-8617 and order his book on proper procedures on wiring an aircraft. Bob's procedures will assure that all of your electrical systems will be properly installed. Secure all wire connections (wire tie and silicone) so vibration will not cause a break in the connections. The retract control system (RCS) in your Nose Lift Kit includes the pre-wired control panel, control PC board, micro switches, low airspeed sensor, wiring diagram and system schematics. Carefully study the wiring diagrams before you install the RCS. You will note that the drawings on the wiring diagram do not look like the switches on the nose lift you were shipped. The "new" switches work the same as show on the drawings so hook them up the same as show to NC and COM. 12 gauge wiring is required to the motor, 12 Volts and ground and to the micro switches. RCS includes the pre-wired control panel, which simply plugs into the control PC board. The control panel mounts where the manual crank is shown in the aircraft plans book. This panel contains the gear switch, gear status lamp, test button and has terminals on the back for other lamp test and warning annunciators. The control PC board has the switching relays, lamp test, control logic, and terminal strip for connections to power, ground, and motor. The control PC board and panel can be mounted at anytime but I recommend you wait until you reach the final finishing stage of construction of your plane to avoid damage to the artwork on the control panel and you will change your mind on the final design of the instrument panel lay out many times during construction. If you are flying just put it where the manual crank was. The airspeed sensor is a normally closed switch and needs to be adjusted after your aircraft is finished. Plum it into your pitot system and GENTLY pressurize the Pitot tube to the minimum safe airspeed for a GEAR-UP condition. Using a 1/16" allen wrench adjust the sensor switch to an OPEN state. The switch should close as soon as you reduce the indicated airspeed. Check this setting a couple of times to be sure. The sensor can be easily damaged by over-tightening the set screw.....be careful. The low throttle micro switch can be mounted and adjusted after the aircraft is flying for a better "feel" for what will be a low throttle set point. Do NOT make a connection to the terminal marked 'DN LIMIT SWITCH NO" If you have Nav lights connect the lights to DIM+, this will reduce the intensity of the light on the gear-down and motor-on lamps next to the gear switch for night flying.

AIR LEAKS around where the actuator tube goes through F-22 the can be stopped with soft foam (the same as used for seat cushions) glued in the opening with rubber cement.



Good photos of the Nose lift installed in a Cozy and other interesting information to Canard builders can be seen at Wayne Hick's web sight at <http://www.geocities.com/yosemite/falls/2027>

### Operation of the manual over-ride

The purpose of the over-ride is to be able to manually crank the system down if something electrically fails **In flight**. If you attempt to manually lower the gear on the ground (manually lift the nose) the over-ride **will break** at the point where it goes into the electric motor. The over-ride shaft is designed to break with **excessive** torque on the shaft. Should you need to use the over-ride you must assume that during the retraction or extension an electrical problem like a bad connection just might be an intermittent connection and start the motor to turn again. Always assume that this may happen. You must therefore treat the manual over-ride crank like the propeller of your plane with the mags on. Just as you would not consider moving the prop without switching **off** the mags, you should not move the manual over-ride crank unless the NOSE-LIFT toggle switch is in the **off** position. With everything installed and hooked up electrically- always position the toggle switch in the **off** (center) position and then take the weight off the nose wheel before you try to crank the nose gear up or down manually (place the fuselage on a saw horse to take the weight off the nose wheel). If you begin cranking the manual over-ride up or down and the toggle switch is not in the off position, then when the limit switch rolls off the screw head, the electric motor is switched on and the manual over-ride will begin to spin. With the ratchet and quarter inch socket attached to the over-ride the ratchet will now begin to spin and break or destroy your hand or anything in its path. If it jams against something as it spins then the steel over-ride shaft is designed to break where it enters the motor.

### **Raising the gear electrically on the ground**

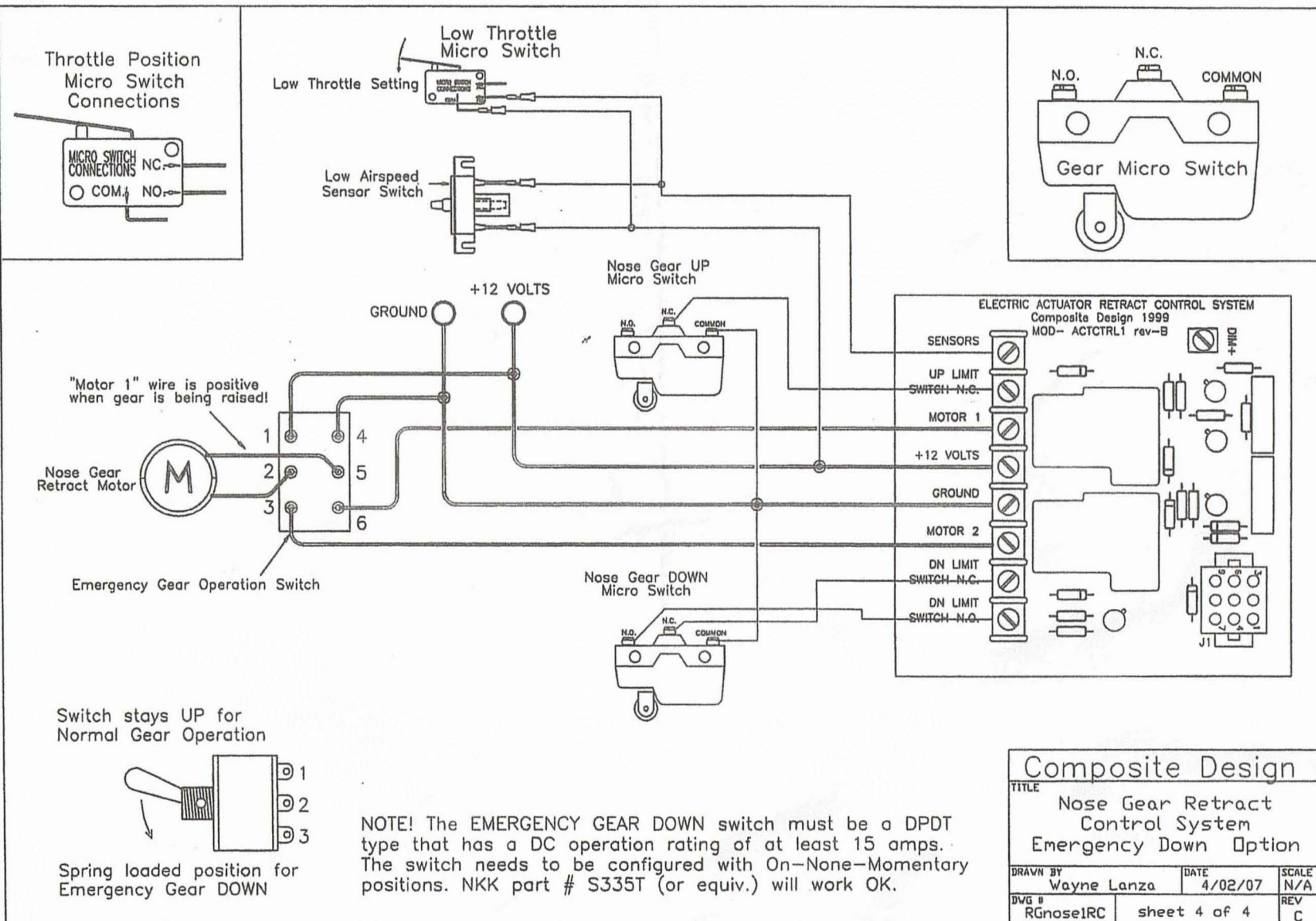
You must check (look through the small Plexiglas window) the position of the nose wheel to make sure the wheel is straight before you retract the gear (lower the nose). If the wheel is cocked at an angle and the gear is retracted you will crush the bottom of the fuselage and destroy the nose fork assembly. This is not a concern on take-off as the wind will straighten the wheel for you.

**Enjoy -not having to lift that heavy nose anymore, and when you taxi up to the FBO and lower the nose electrically you will be the coolest dude on the ramp.**





# Standard Wiring Scheme — With Override



F22  
AS VIEWED  
FROM REAR

UP

BL-0

TOP OF F-22

F-22  
CUT OUT  
FULL SIZE  
TEMPLATE

5.4"

ADDITION  
ON TOP OF  
NG-30

SEE  
SIDE  
VIEW

GLASS (3 PLYS BID)  
ON THE SIDE OF NG-30  
AND AROUND F-22  
ON THE FRONT  
& BACK

NG-30

- CAUTION -  
THE SLIDE BAR  
MAY NEED TO  
PASS THRU THE  
BULKHEAD HERE  
IN THE FULL UP  
POSITION

.6"

CUT OUT

3.0"

3.50"

CUT OUT

THIS TEMPLATE

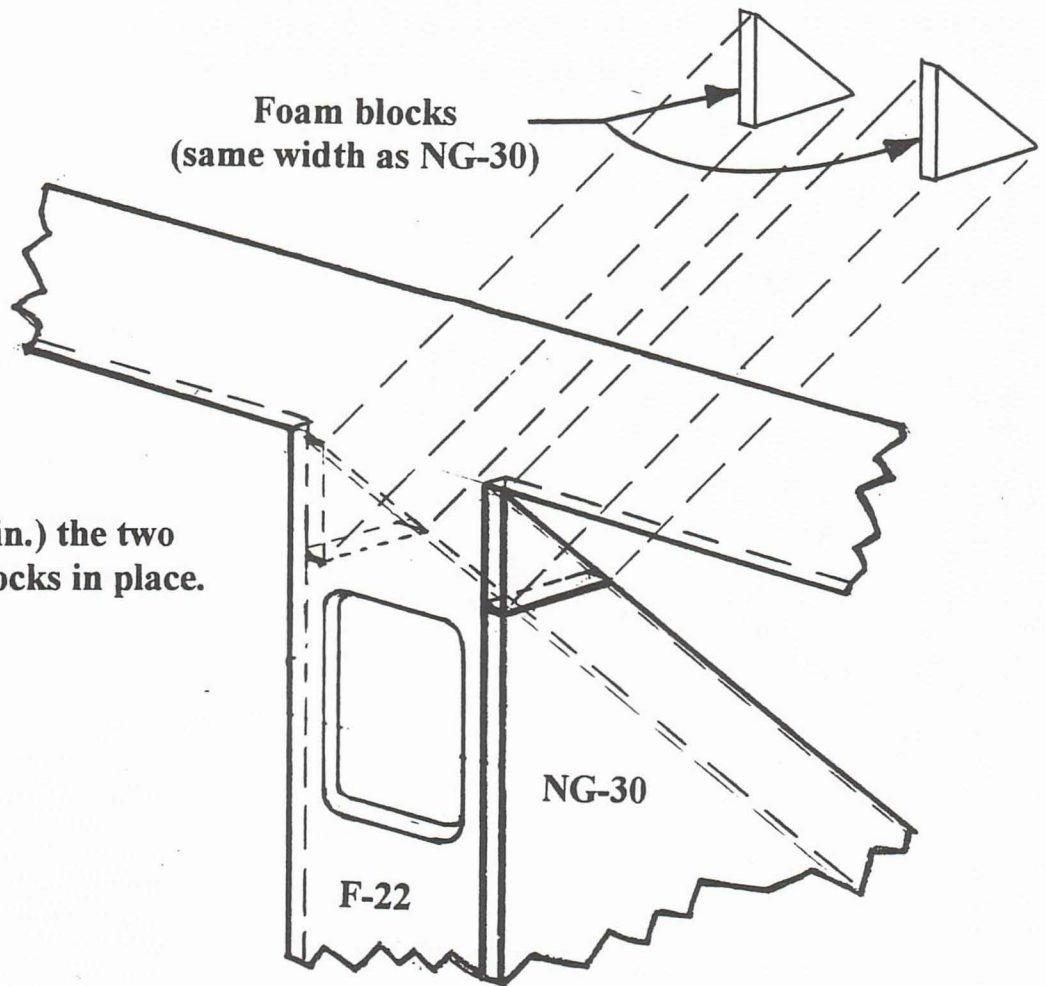


## F-22 / NG-30 REINFORCING DETAIL

Foam blocks  
(same width as NG-30)

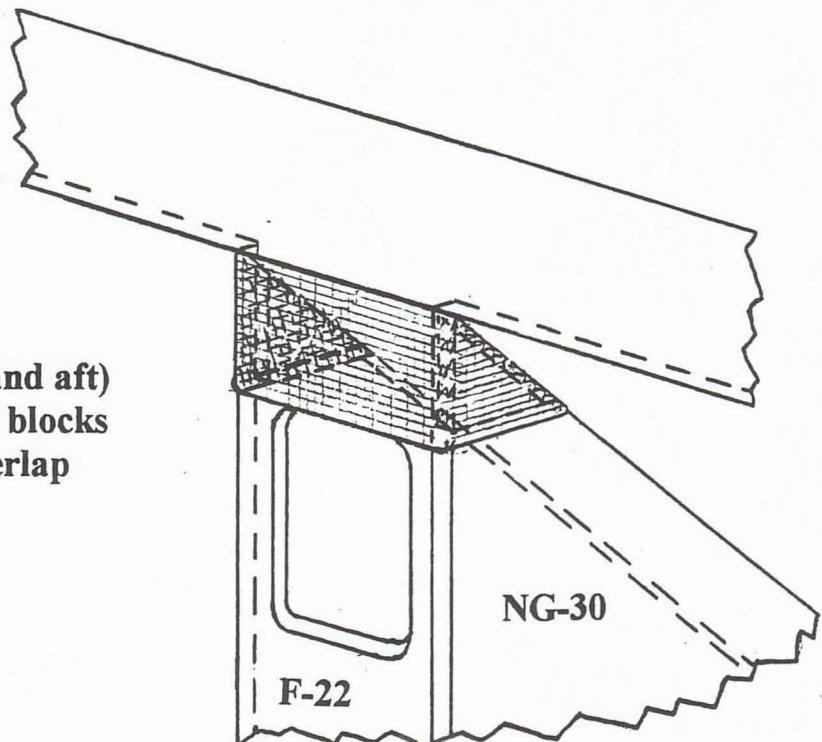
### STEP 1

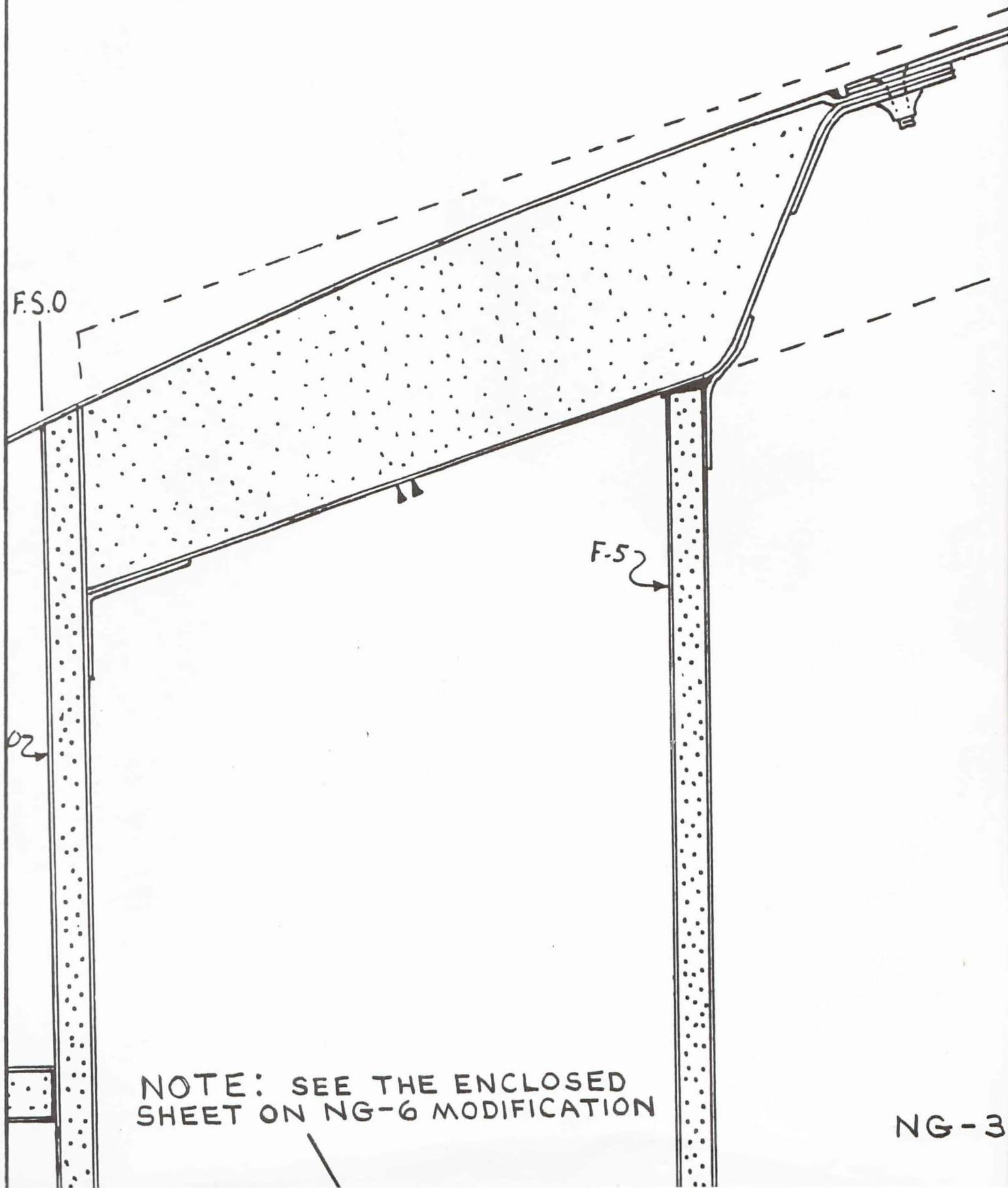
Cut to fit and epoxy (5 min.) the two  
Triangle Shaped foam blocks in place.  
(see plan, side view)



### STEP 2

Glass inside and outside (fore and aft)  
Of F-22 and around new foam blocks  
with 3 Plys. of bid lapping. Overlap  
existing glass,  $\frac{1}{2}$  inch min.

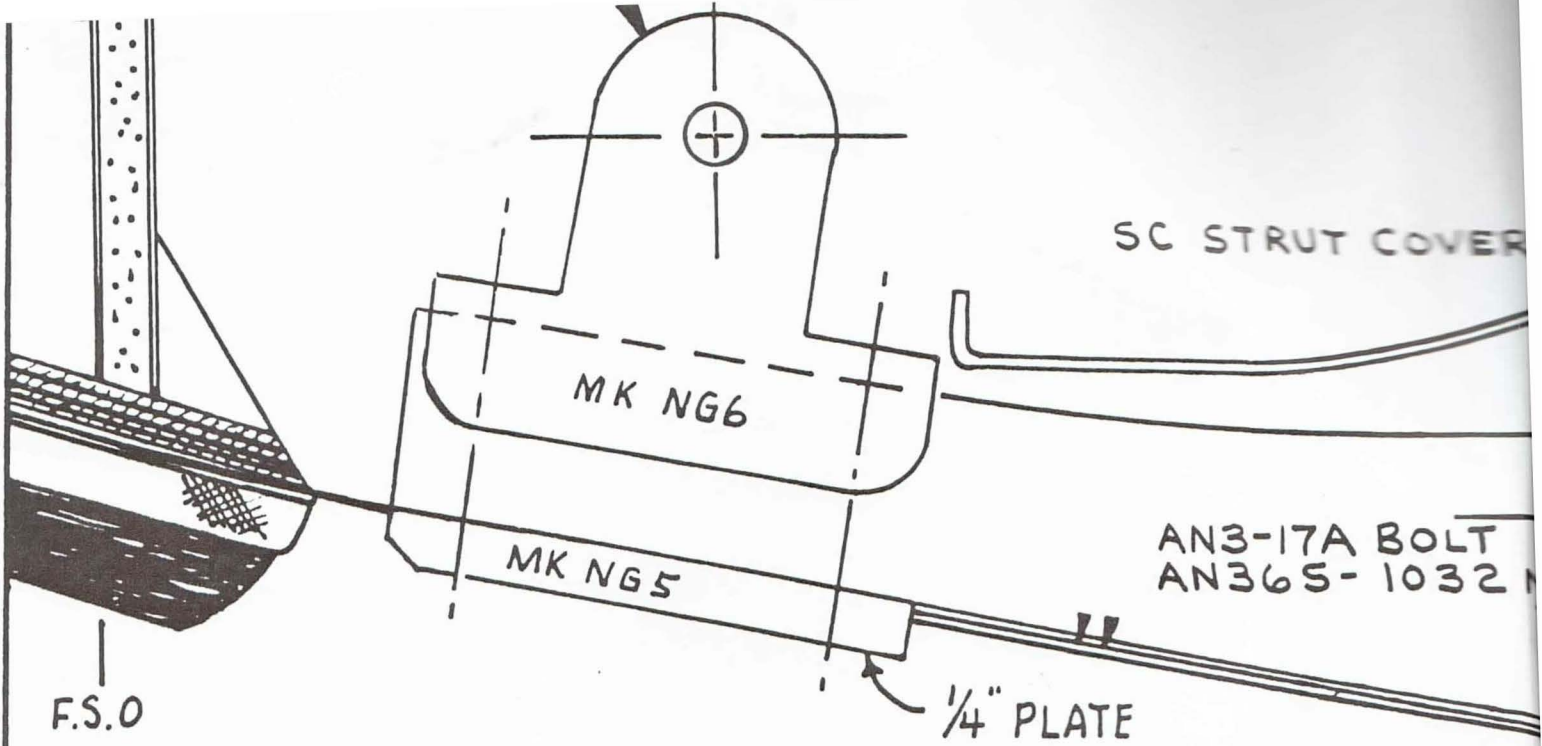




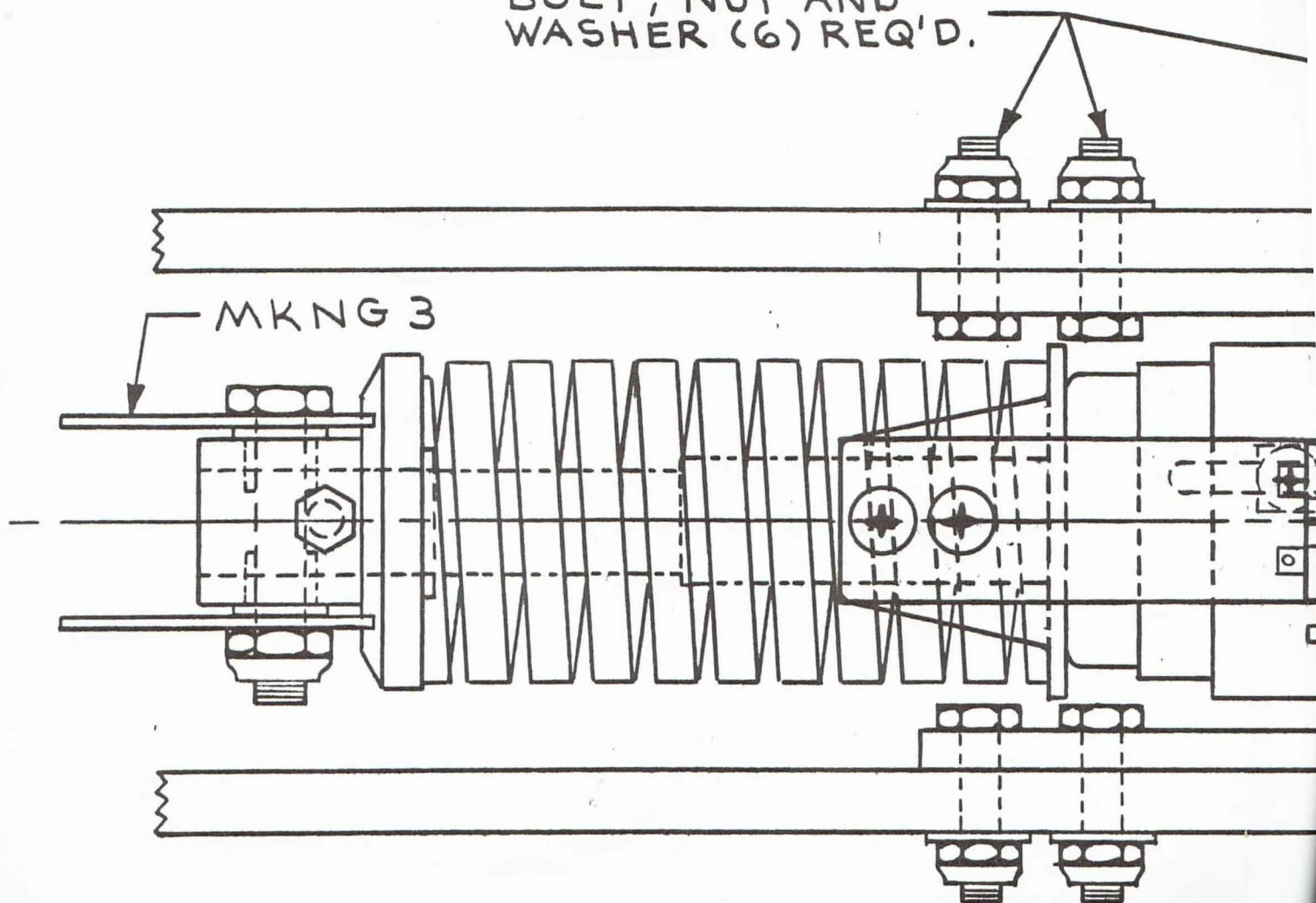
NOTE: SEE THE ENCLOSED  
SHEET ON NG-6 MODIFICATION

NG-3





BOLT, NUT AND  
WASHER (6) REQ'D.



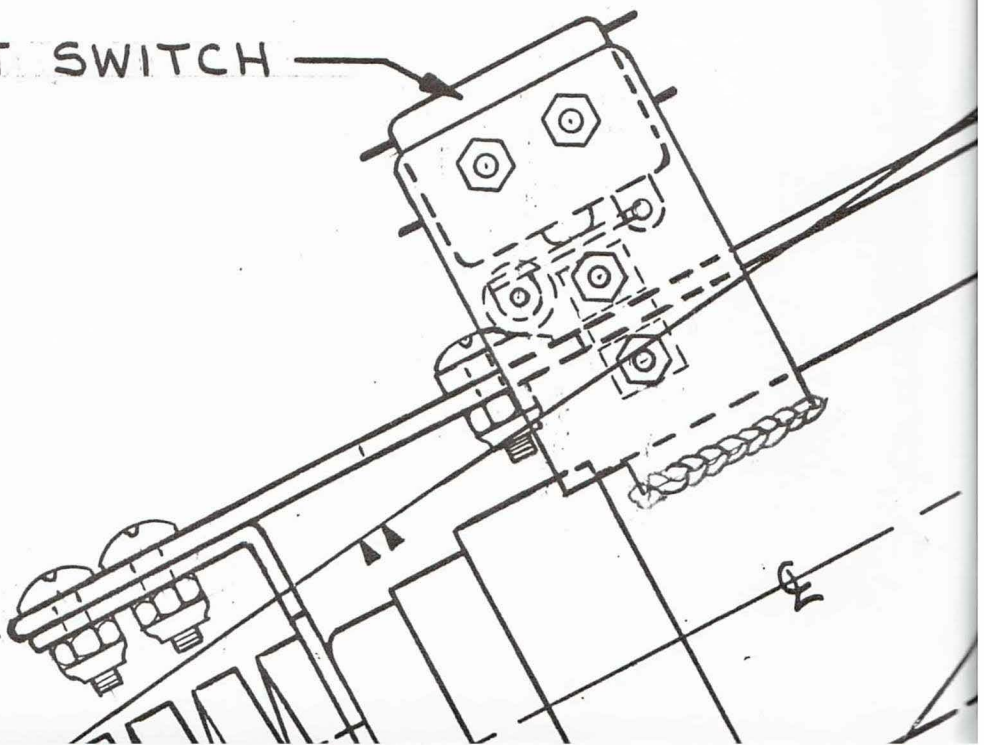
NOTE: FIVE MIN. E  
(SAME AS USED IN  
NG-30 AS SHOWN A  
OF BID LAPPING 1 IN  
OF F-22. GLASS T  
BID LAPPING ON TH  
- DO NOT GLASS WH  
(SEE "F-22 / NG-30

: DUE TO THE HIGH LEVEL  
BRATION - APPLY LOCTITE  
E DOT REMOVABLE) TO THE  
ENERS ON THE ACTUATOR.  
PECIAL ATTENTION TO THE  
SCREWS.

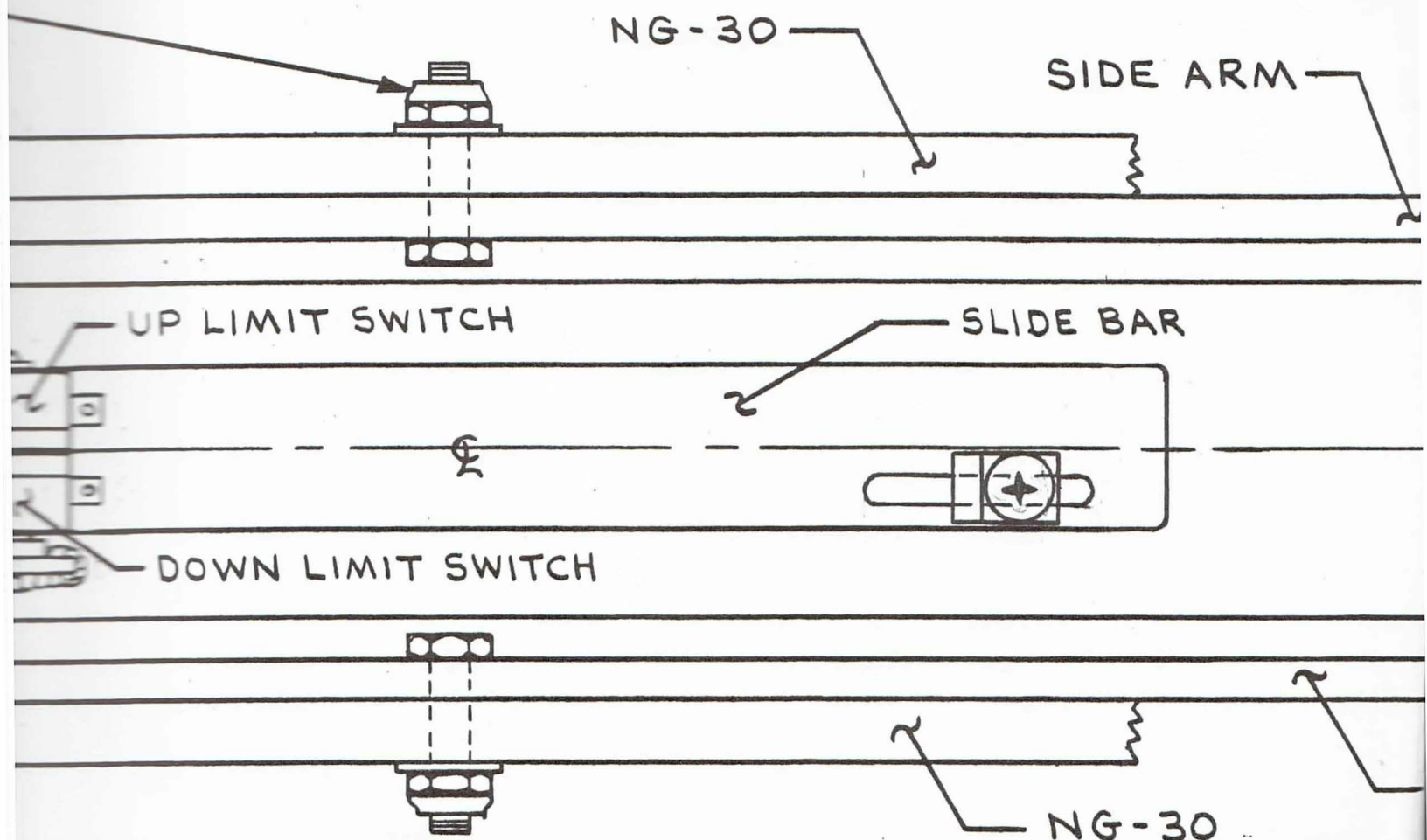
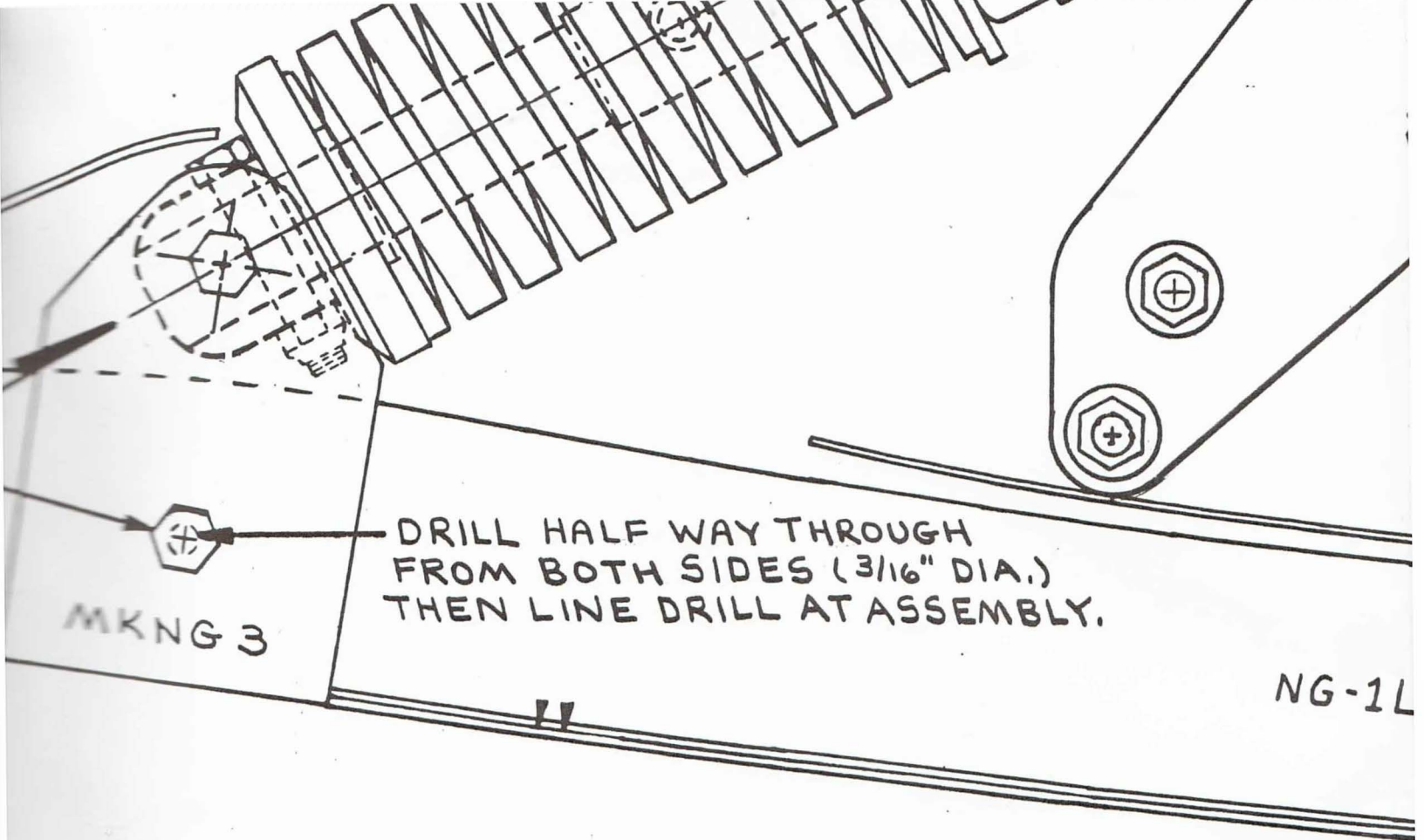
NG-

SLIDE BAR -

UP LIMIT SWITCH







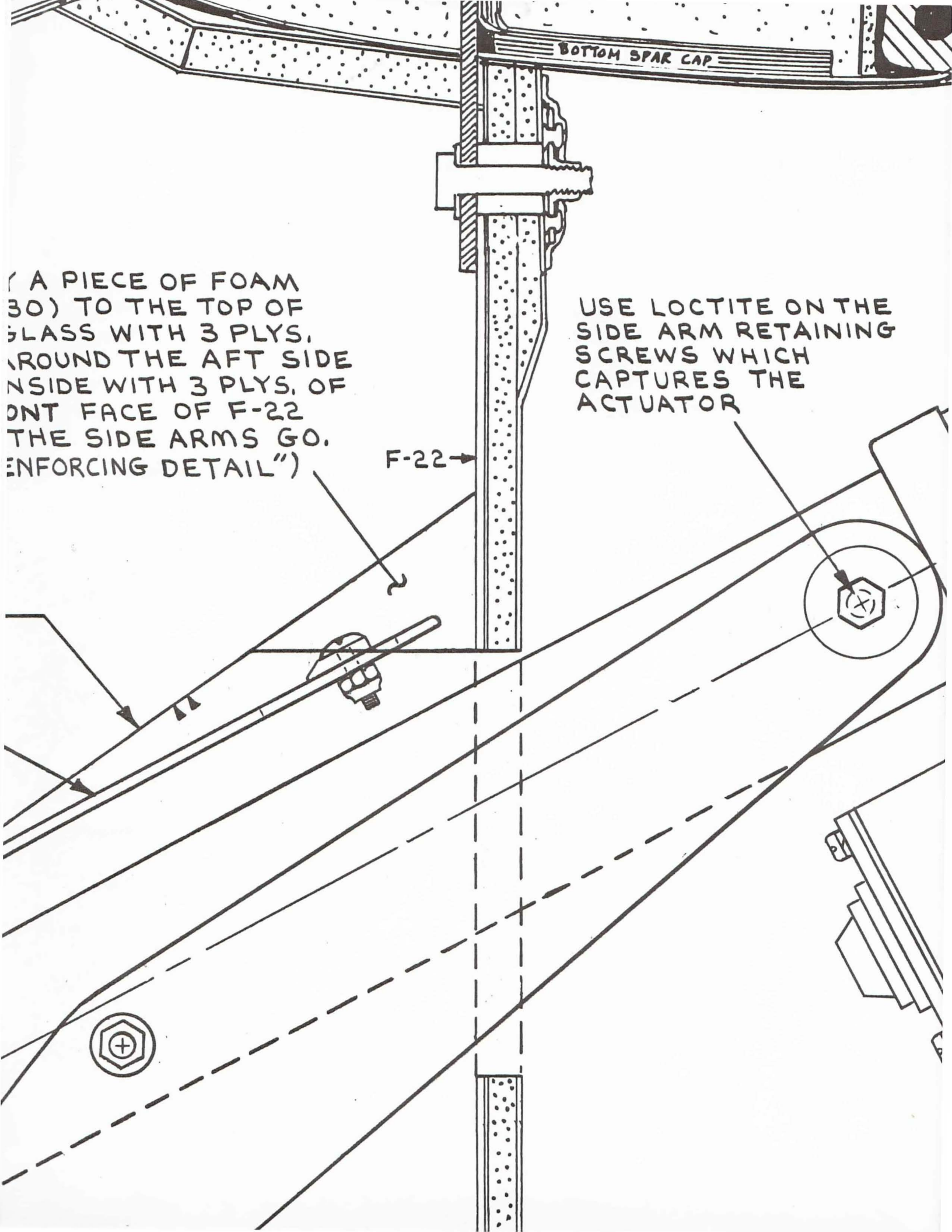
SECTION A-A (TOP VIEW)

BOTTOM SPAR CAP

(A PIECE OF FOAM  
30) TO THE TOP OF  
GLASS WITH 3 PLYS.  
AROUND THE AFT SIDE  
INSIDE WITH 3 PLYS. OF  
FRONT FACE OF F-22  
THE SIDE ARMS GO.  
ENFORCING DETAIL")

USE LOCTITE ON THE  
SIDE ARM RETAINING  
SCREWS WHICH  
CAPTURES THE  
ACTUATOR

F-22





SIDE ARM

NG IL

MKNG15

.095 STEEL  
(4130)

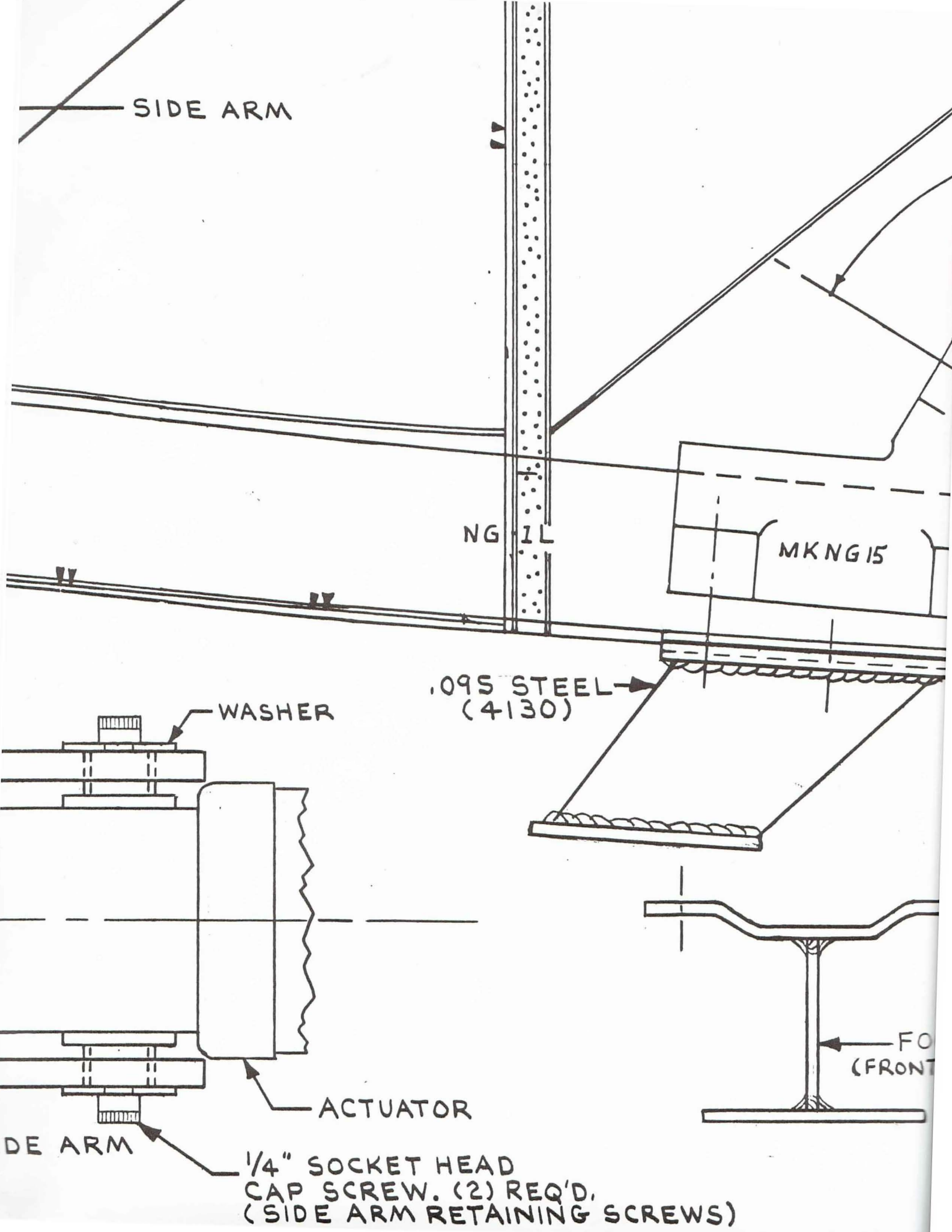
WASHER

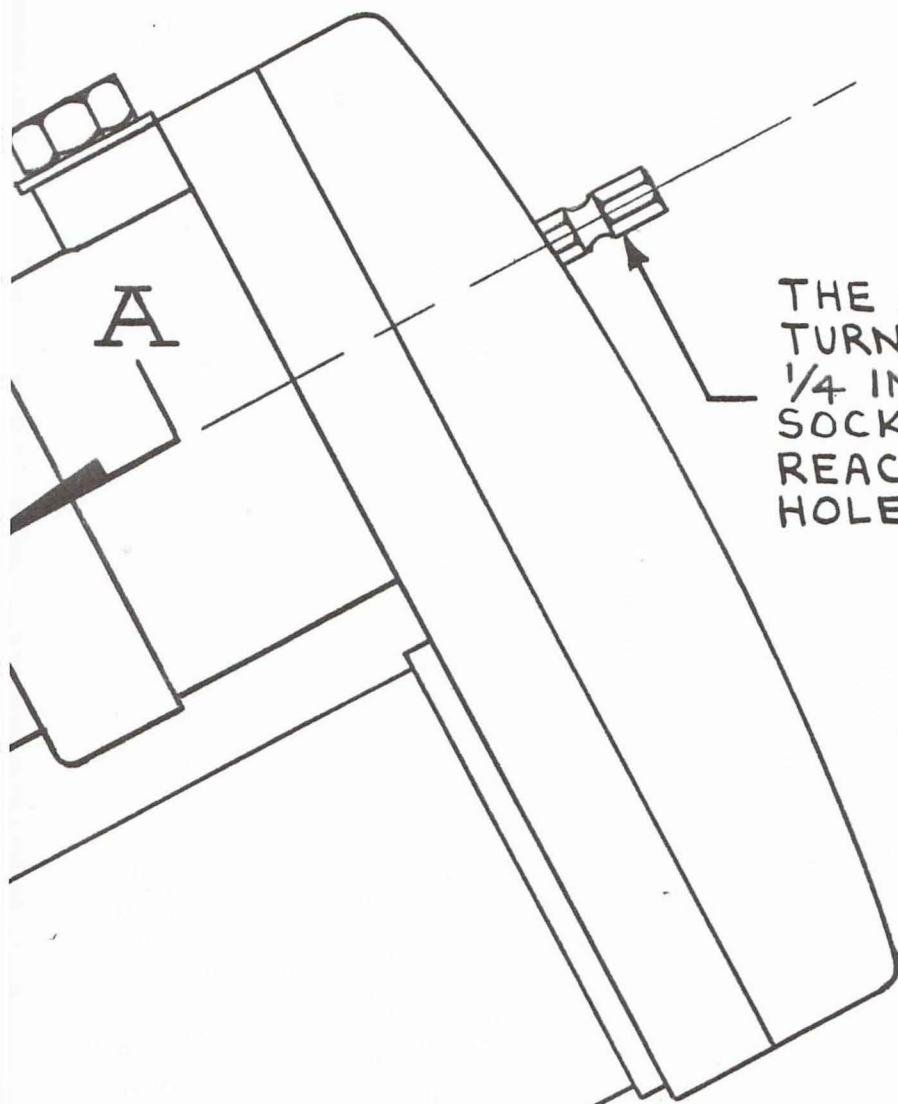
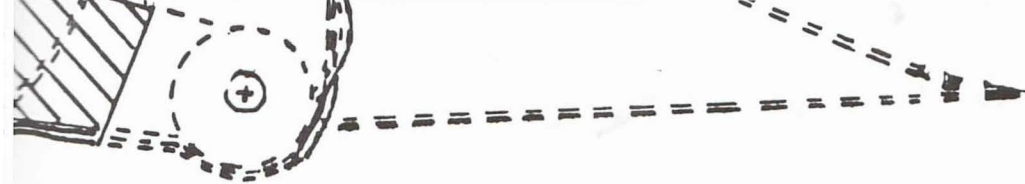
ACTUATOR

DE ARM

1/4" SOCKET HEAD  
CAP SCREW. (2) REQ'D,  
(SIDE ARM RETAINING SCREWS)

FO  
(FRONT)

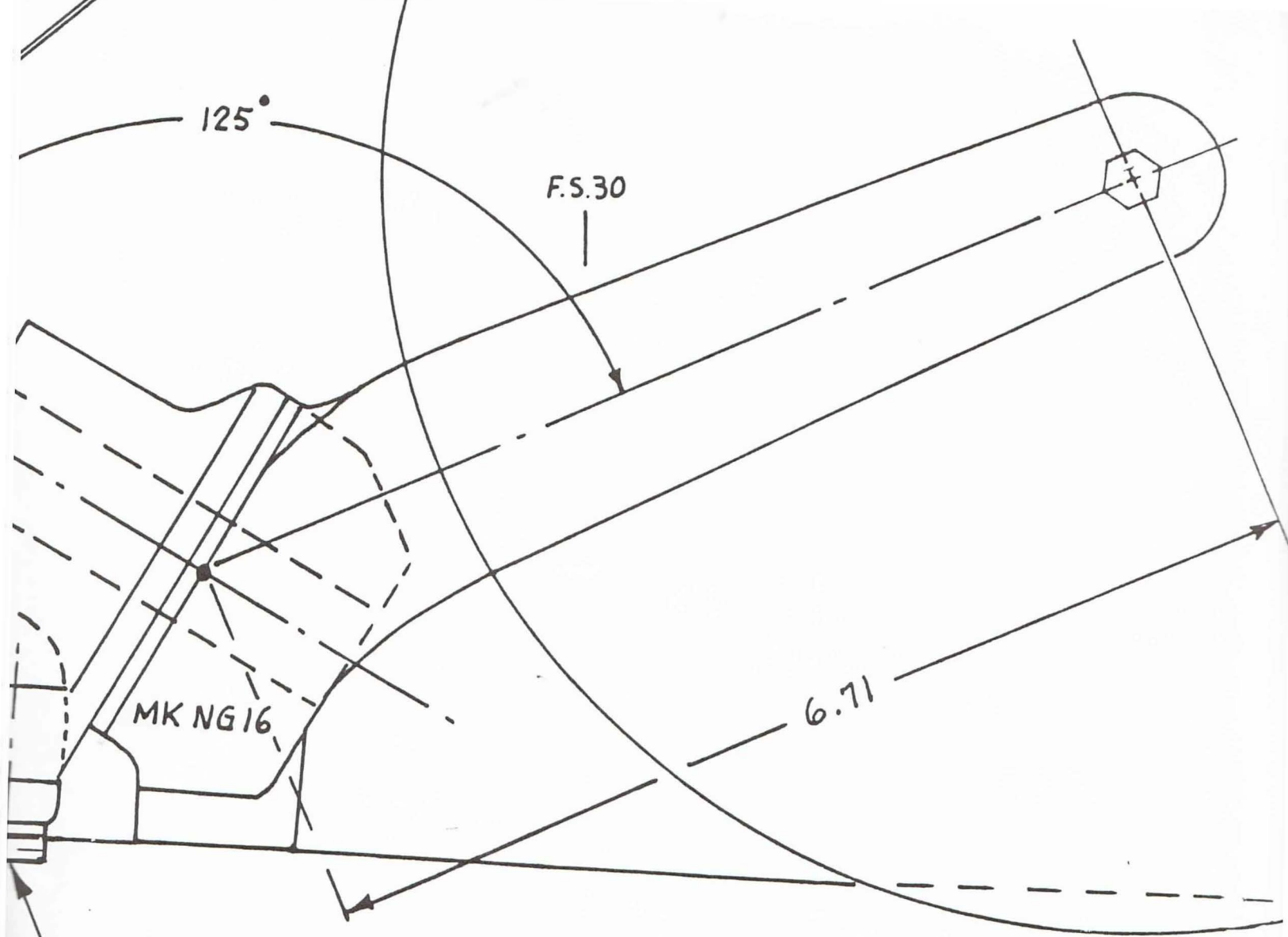




THE MANUAL OVERRIDE IS  
TURNED WITH A STANDARD  
1/4 INCH RATCHET AND  
SOCKET. THIS IS EASILY  
REACHED THROUGH THE LEG  
HOLES.

— W.L.10





REMOVE YOUR STEEL PLATE  
AND MATCH DRILL THE PLATE  
ON THE "FOOT" FOR THE 1/4" BOLTS.  
INSTALL THE FOOT WITH WET FLOX. WAIT  
UNTIL THE FLOX HAS NEARLY HARDENED AND  
THEN TIGHTEN THE 4 BOLTS TO A LIMIT OF 10  
INCH POUNDS. DO NOT OVER-TIGHTEN THE BOLTS  
AS A GREATER AMOUNT OF TORQUE WILL  
PLACE EXCESS STRESS ON THE EARS OF  
MKNG15 WHICH MAY CAUSE THE EARS  
OF THE CASTING TO FAIL.