

**OFF AIRCRAFT MAINTENANCE  
WITH ILLUSTRATED PARTS BREAKDOWN**

**HDU ALIGNMENT/IPD ADJUSTMENT**

**A/A24A-56 HELMET UNIT, INTEGRATED  
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Introduction .....	WP002 00
Testing and Troubleshooting .....	WP004 00
Helmet Assembly Buildup .....	WP006 00
Visor Assembly .....	WP011 00

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Record of Applicable Technical Directives

None

1. IPD ADJUSTMENT.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter Computer	GTMB8A COMMERCIAL	55719 N/A
Helmet Display Unit Test Set Cable	620992-01-00	06VL3
Helmet Mounted Display Test Set	620900-02-01	06VL3
QMB	178-5936	99747
Ruler	GG-R-791	81348
Scissors	3452	70574
* Tip, Hex .050	120003	32652
* Torque Screwdriver 2 - 100 Inch-Ounce	6C486	25795

\* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Glue	A-A-342
Manila Folder	UU-F-1206

2. DISPLAY EXIT PUPIL AND DISPLAY AIMING.

- a. Do HELMET ASSEMBLY BUILDUP per WP006 00.
- b. Make a copy of figure 1 and figure 2.

**NOTE**

The aiming target should be put at crewmember's eye level within ±3 inches.

- c. Position the aiming target (figure 1) at least 8 feet away from seated crewmember.
- d. Using scissors, cut pupil locator (figure 2) out along black edge.

**NOTE**

The manila folder should be less than 1/16 inch thick and should not have any sharp edges or corners.

e. Glue pupil locator (figure 2) on manila folder and trim manila folder to match size and shape of pupil locator.

f. Using a rotary-head punch (common hand tool), make a hole 1/8 to 1/4 inch at marked position on pupil locator.

g. Put helmet mounted display test set (HMDTS) as close to crewmember as possible.

3. MEASURE INTERPUPILLARY DISTANCE (IPD).

**NOTE**

Room should be brightly lit for procedure.

- a. Stand to the side of aircrewmember.
- b. Position yourself at arms length and eye level to the crewmember.
- c. Have crewmember focus on target.
- d. Put small ruler on the bridge of crewmember's nose.
- e. Measure the distance between crewmember's pupils and record this measurement.

4. SETTING INTERPUPILLARY DISTANCE (IPD).

- a. Remove helmet display unit (HDU) from helmet by unlatching visor latch.
- b. Using IPD measurement recorded in step 3.e, refer to table 1 to determine correct map selector switch setting and IPD setting on HDU.
- c. If IPD adjustment is required on HDU, locate the IPD adjustment locking screws on top of HDU (figure 3).
- d. Note the current IPD settings.
- e. Loosen IPD adjustment locking screws on HDU (figure 3).



Be careful not to scratch or damage relay optics when adjusting IPD screws.

f. Hold on to the relay optics assembly (figure 4, sheet 1).

**NOTE**

Moderate force may be required to slide the relay optics assembly to the left or right.

g. Slide the relay optics assembly to the left or right until in desired position (table 1 and figure 3).

h. Using hex .050 tip, adapter, and torque screwdriver, torque the IPD adjustment locking screws to 31-33 inch-ounces (figure 3). (QA)

i. Verify the stop pin is firmly against the end of slot if a narrow or wide setting (table 1) is selected (figure 3).



Be sure correct maintenance practices are followed when working with electrostatic sensitive devices (ESD) (WP002 00).

j. **[ESD]** Locate map selector switches on the display unit microcontroller (figure 4, sheet 1).



Use caution when rotating map selector switches. These switches can be damaged easily by applying excessive down force or torque.

k. **[ESD]** Set switches as applicable (table 1).

Table 1. Map Selector Switch Settings

Measured IPD	59 - 64 mm (2 1/3 - 2 1/2 inches)	64 - 69 mm (2 1/2 - 2 3/4 inches)	64 - 69 mm (2 1/2 - 2 3/4 inches)	69 - 74 mm (2 3/4 - 2 7/8 inches)
IPD Adjustment Locking Screws (Figure 3)	Narrow (Left)	Nominal	Nominal	Wide (Right)
Map Selector Switch 1 (Figure 4)	Full Counter-clockwise	Full Counter-clockwise	Full Clockwise	Full Clockwise
Map Selector Switch 2 (Figure 4)	Full Clockwise	Full Counter-clockwise	Full Clockwise	Full Counter-clockwise

**NOTE**

For nominal measured IPD, Switch 1 and 2 must both be set fully clockwise or fully counterclockwise.

## 5. EXIT PUPIL ALIGNMENT.



Be careful not to damage connector pins when attaching HDU to helmet.

- a. Attach the helmet display unit (HDU) to helmet.
  - (1) Put HDU over universal connector.
  - (2) Engage HDU latch making sure fully seated.
  - (3) Snap side latches on HDU.
- b. Attach the visor to the HDU. Refer to [WP011 00](#).
- c. Connect the upper helmet vehicle interface (HVI) to the quick disconnect connector (QDC) on the Helmet Mounted Display Test Set (HMDTS) ([WP004 00](#)).
- d. Turn on test set.
- e. Start HMD Test on PC.
- f. Make sure the map selector switch setting is correct ([table 1](#)).
- g. Confirm switch setting, nominal, narrow or wide agrees with the IPD setting on test set.

**NOTE**

Make sure liner and earcups are positioned correctly in helmet.

- h. Have crewmember put on helmet.
- i. Position nape strap snug and flat at the base of skull.
- j. Have crewmember attach chin strap.
- k. Have crewmember face aiming target.

**NOTE**

Target should be at least 8 feet away from seated crewmember. Target should be at eye level  $\pm 3$  inches.

- l. Lower the visor until it contacts crewmember's face.
- m. Have crewmember confirm display is visible.

**NOTE**

If a zetaliner is used, it may be required to try a thinner or thicker zetaliner for a correct fit ([WP006 00](#)).

If display cannot be correctly aimed to allow the helmet to sit on the crewmember's head in the correct position, it may be required to fit crewmember with a different size helmet shell, or remove thermal plastic liner (TPL) layers.

n. Make sure the center of display pattern is at the same height as the target.

- (1) If display is too high, rotate helmet forward.
- (2) If display is too low, rotate helmet backward.

## 6. SETTING VERTICAL POSITION OF EXIT PUPIL.

**NOTE**

This procedure establishes an eye position and should be reverified after mask fitting.

- a. Make sure HMDTS is ON ([steps 5d and 5e](#)).
- b. Rotate the visor to the up position.
- c. Have the crewmember, using their right eye, closing left, look through the pupil locator at the target ([figure 4, sheet 2](#)).

**NOTE**

The pupil locator should be positioned so the circle and cross-hair pattern on the pupil locator is facing away from the crewmember. Put the pupil locator as close to the crewmember's face as possible.

- d. Dim the lights in the room.

e. Lower the visor until it contacts the face or pupil locator.

f. Note the location of the green spot of light relative to the pupil locator.

**NOTE**

Make sure helmet is aligned on crewmember's head. Make adjustments as required.

If a zetaliner is used, it may be required to try a thinner or thicker zetaliner for a correct fit (WP006 00).

(1) If the center of the light is above the pupil locator cross-hair, remove a layer of the thermal plastic liner (TPL) or zetaliner.

**NOTE**

The correct up/down position of the display is obtained when the approximate center of the spot of light is even with, or no more than 1/8 inch below, the horizontal cross hair on the pupil locator.

(2) If the center of the light is below the pupil locator cross hair by more than 1/8 inch, adjust liner.

g. Make sure that the large circle target of the pupil locator is completely within the green spot of light produced by the display.

**NOTE**

Make sure helmet is aligned on crewmember's head. Make adjustments as required.

h. If the spot of light is too far to the left or right, the IPD needs to be adjusted. Refer to IPD ADJUSTMENT, this WP.

i. When target circle on the pupil locator is completely contained within the green spot of light, have crewmember remove pupil locator.

j. Make sure the display orientation relative to the aiming target is correct.

k. Put on oxygen mask.

l. Lower visor, insert pupil locator, and verify large circle target of pupil locator is still completely within the green spot of light produced by the display.

m. Turn test set OFF and disconnect quick disconnect connector (QDC).

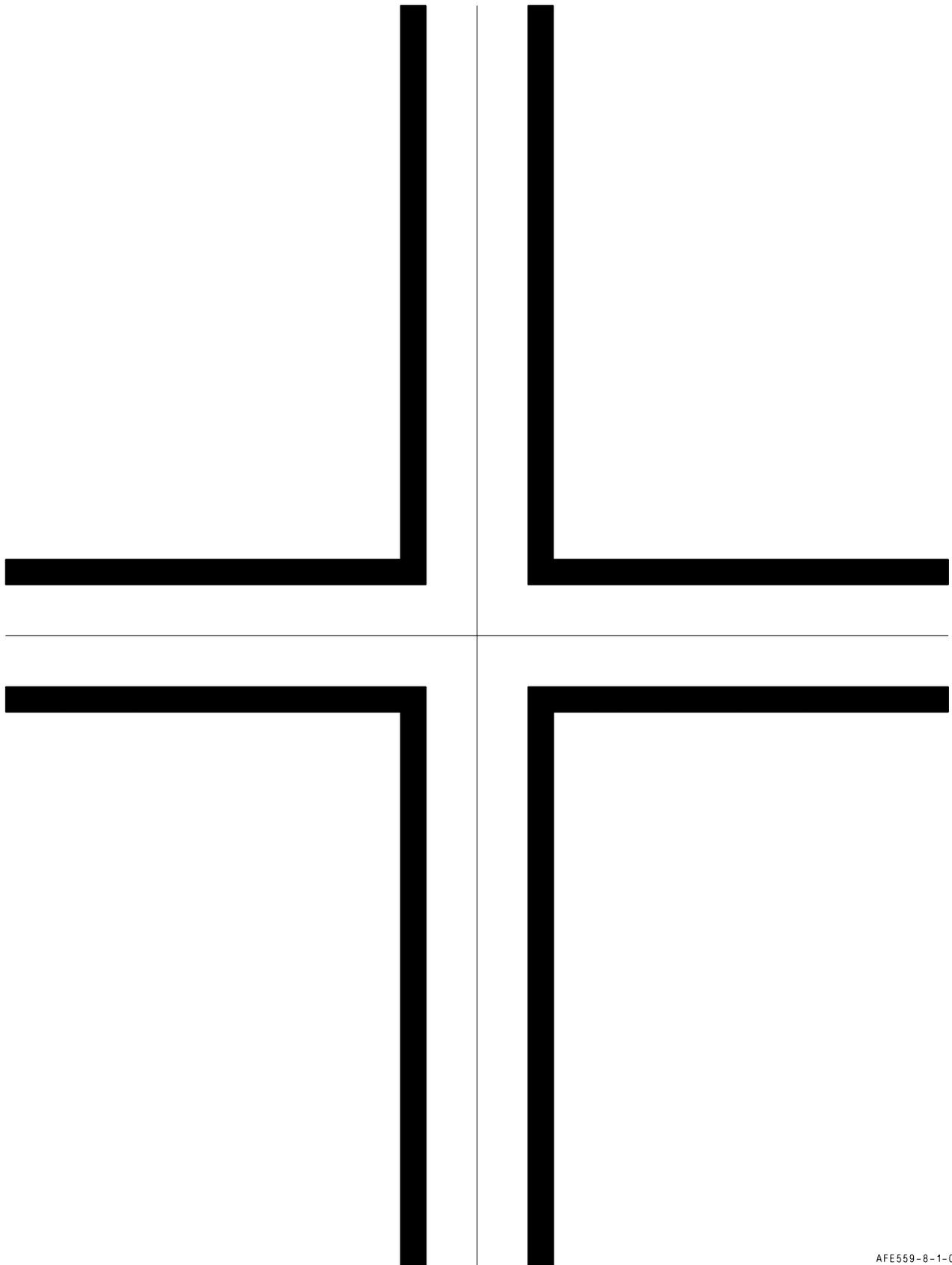
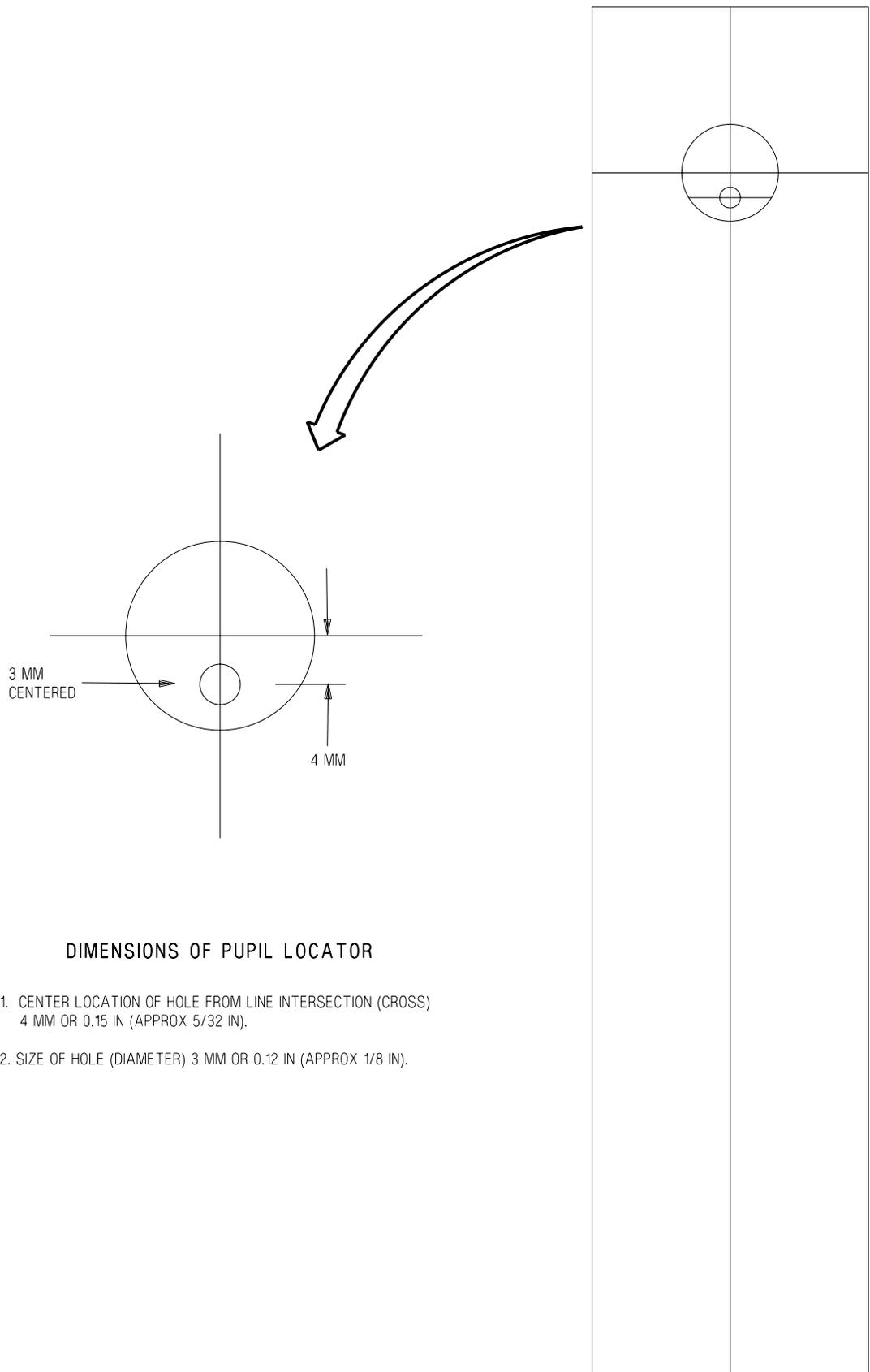


Figure 1. Aiming Target



**DIMENSIONS OF PUPIL LOCATOR**

1. CENTER LOCATION OF HOLE FROM LINE INTERSECTION (CROSS)  
4 MM OR 0.15 IN (APPROX 5/32 IN).
2. SIZE OF HOLE (DIAMETER) 3 MM OR 0.12 IN (APPROX 1/8 IN).

Figure 2. Pupil Locator

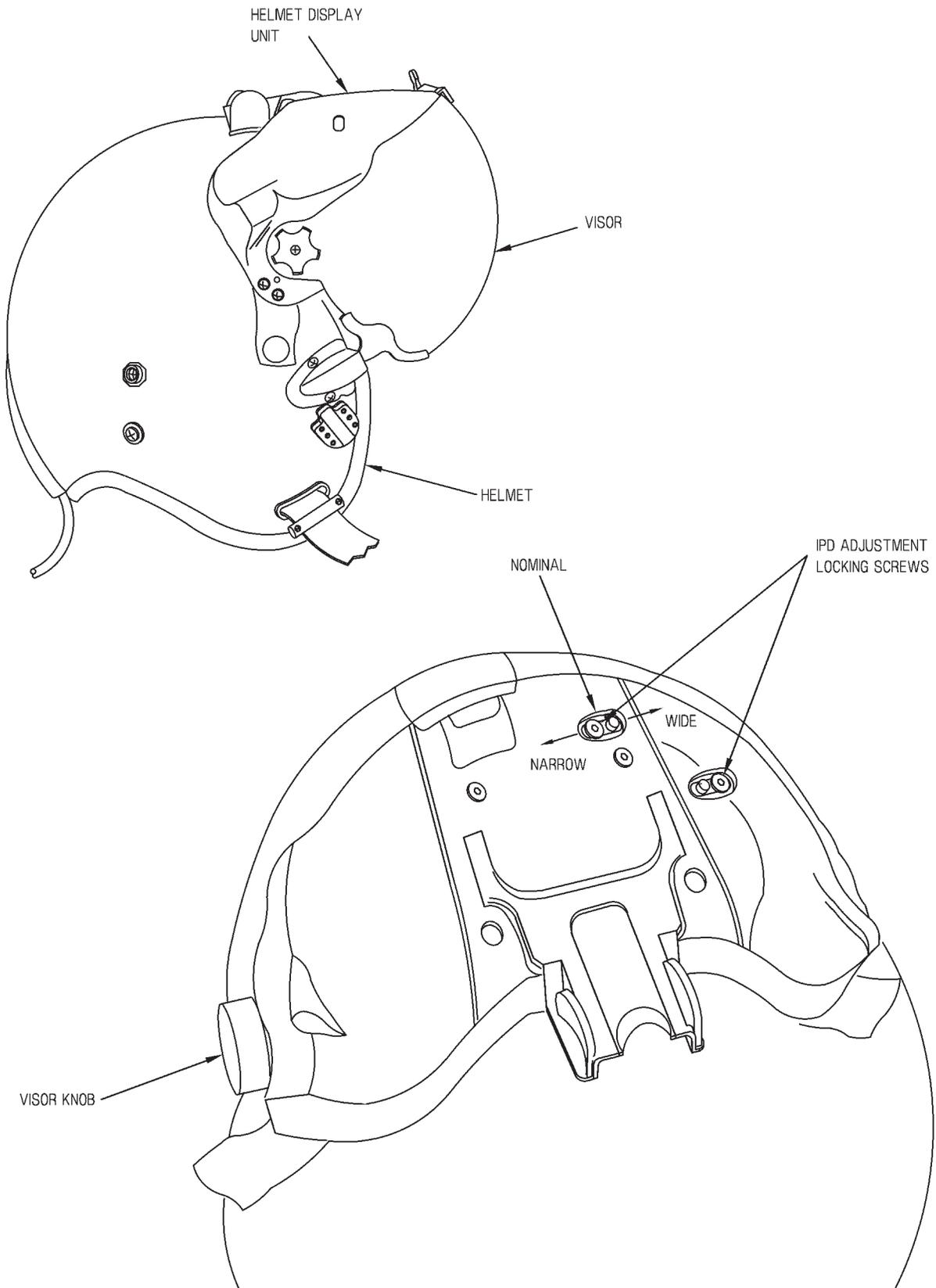


Figure 3. Helmet Display Unit

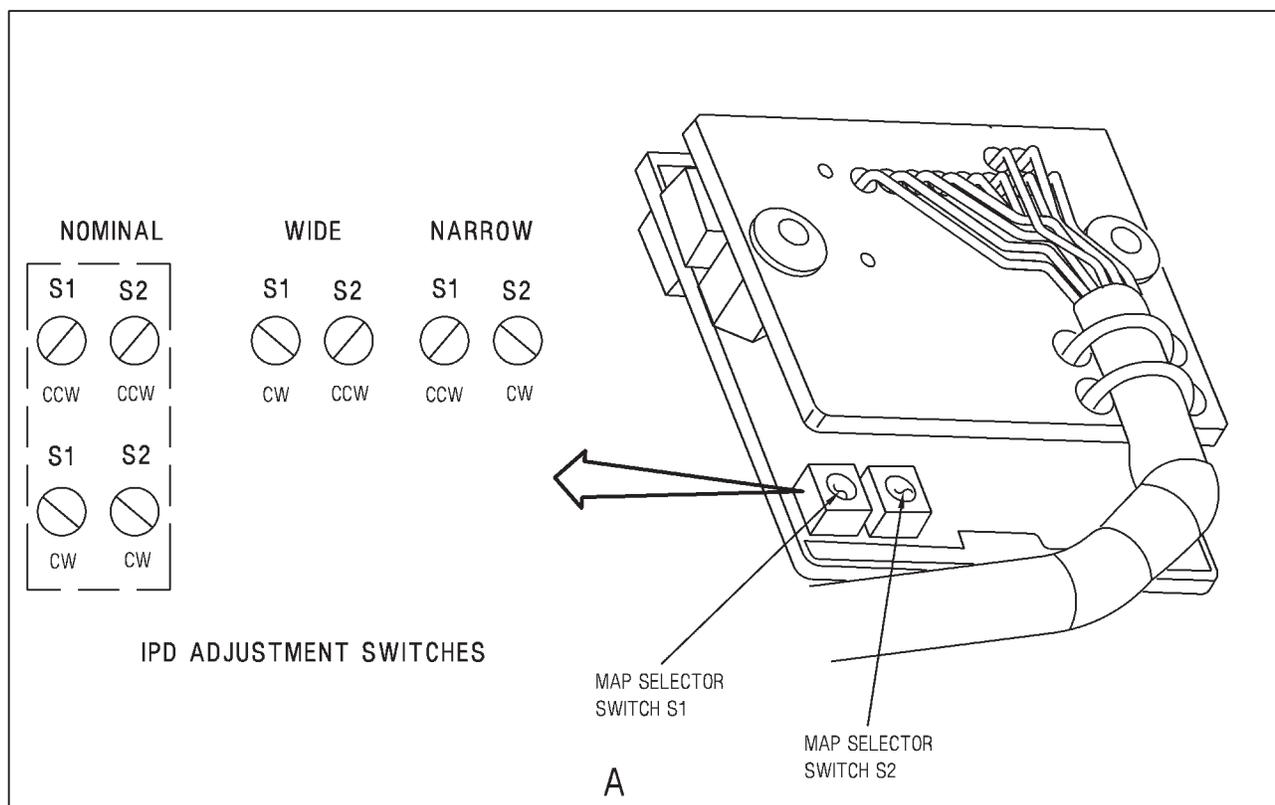
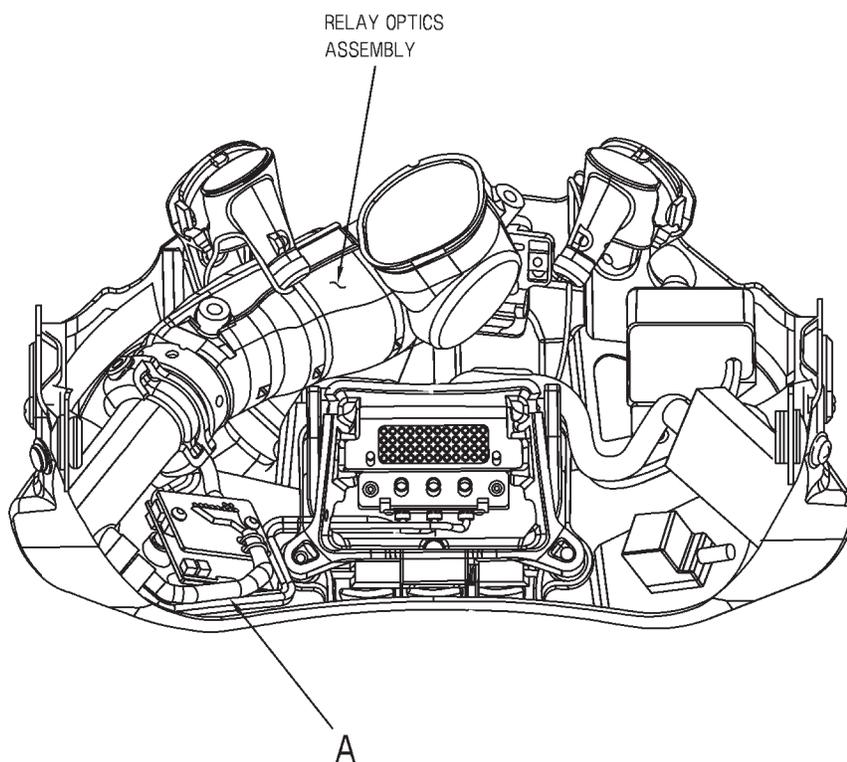


Figure 4. HDU Alignment (Sheet 1 of 2)

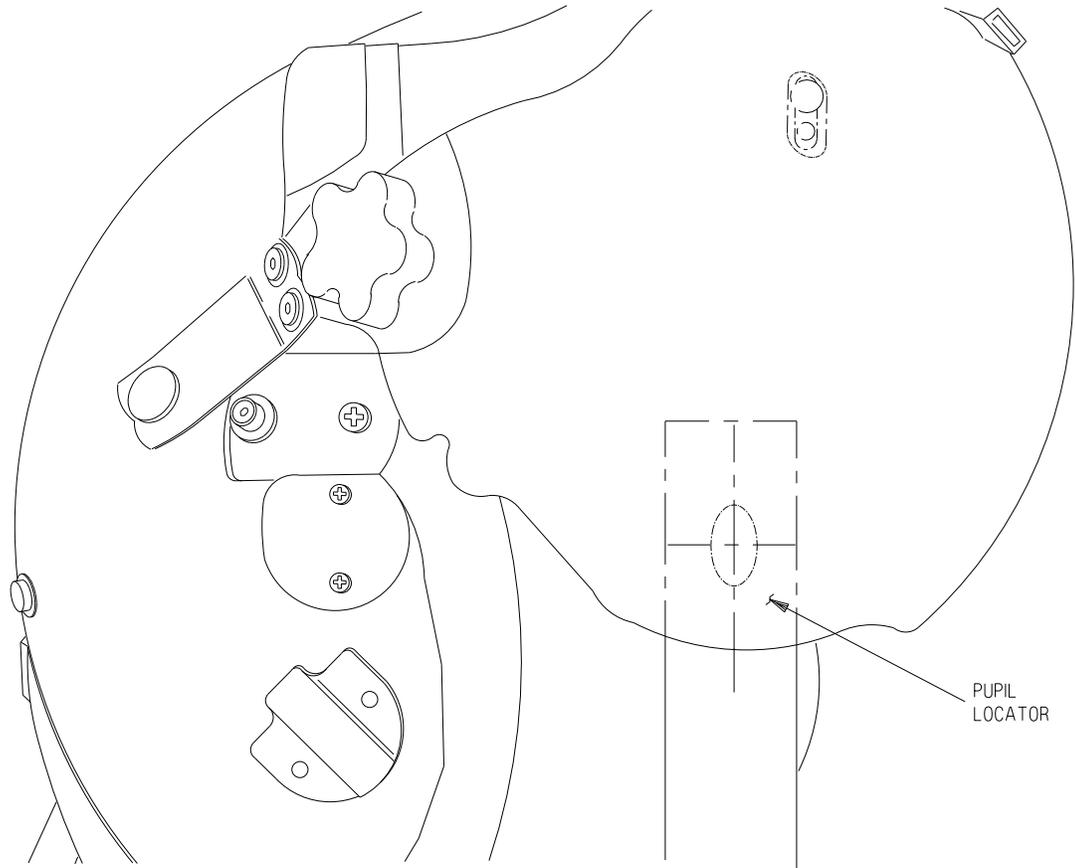


Figure 4. HDU Alignment (Sheet 2)