



AVS820-HD *SuperVision*® CAMERA
AIRBORNE VIDEO CAMERA SYSTEM



COMPONENT
MAINTENANCE MANUAL

SEPTEMBER 1, 2011

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Initial Issue: Sept 1/11

44-20-820

TITLE-1
SEPT 1/11



AVS820-HD *SuperVision*® CAMERA

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**HIGH
 DEFINITION**

AVS820-HD

SPECIFICATIONS

Zoom, Auto-B/W, TAIL Camera

JUNE/1/2011

Image Sensor	1/3 inch, CMOS
Effective Number of Pixels	2 Megapixel
Horizontal Resolution	> 800TV Lines Standard
Vertical Resolution	> 800TV Lines Standard
Aspect Ratio	HD 16:9 SD 4.3/16:9
Lens	2.5x Optical Zoom, f=5.1 mm (wide) to 51.0 mm (tele), F1.8 to F2.1
Horizontal Angle of View	86° (wide) to 35° (tele)
Vertical Angle of View	50°
Minimum Object Distance	10 mm (wide) to 800 mm (tele)
Scanning System	2:1 interface
Scan Frequency	[59.94 Hz setting] Horizontal : 33.716 kHz, Vertical : 59.94 Hz [60 Hz setting] Horizontal : 33.75 kHz, Vertical : 60 Hz
Sync System	Internal
Sensitivity	F6.8 Standard (200 lx, 3000K)
Minimum Illumination	12 lx (F1.8, 50 IRE)
AUTO-B&W	1.0 lx Black & White (F1.8, 50 IRE)
SN Ratio	56 dB Standard (gain 0 dB, DNR OFF)
White Balance	ATW (Automatic Tracing balance), AWB (Automatic White Balance)
Gain	AUTO (Automatic Gain Control)
Backlight compensation	On/Off
Signal System	HD 1080/59.94i, 1080/50i, 720/59.94p, 720/50p, Y/P _B /P _R SD NTSC (Crop/Squeeze), PAL (Crop/Squeeze)
Video Output	Digital output: HD-SDI (SMPTE 292M) : 0.8 V (p-p) standard 75 Ω unbalanced, BNC or Analog output: NTSC or S-VHS
Interface	Discretes or Serial Data Interface (RS-232C control)
CH Dimension	3"H x 5"W x 7"R
CH Weight	< 32 oz
CCU Dimension	None
CCU Weight	0
Camera Cable Lengths	None
Power Requirement	Regulated 28 VDC / .550 amp
DO160F	Appropriately Tested, EMI & Environmental



AVS820-HD *SuperVision*® CAMERA

INSTALLATION NOTES

INTRODUCTION

The AVS820-HD is a High Definition color video camera system consisting of a custom conforming CAMERA HEAD ENCLOSURE (CH) and CAMERA DOUBLER (CD). Unique features include more than 800 lines of resolution, 2.5x Optical Zoom and 1.0 lux AUTO-Black & White.

Designed primarily to provide passengers with an exciting "*Bird's Eye View*" from the tail of the aircraft. Pilots also benefit from an "*Aircraft Situation Awareness*" that may allow them to check flaps, slats, spoilers, entry doors and thrust reversers, while observing ground crew with APU, fueling trucks, hoses and fire extinguishers.

At any time the passengers may Zoom the camera IN or OUT. Upon landing, a PRESET position may automatically adjust the Zoom to wide angle for taxi, however the Zoom may still be adjusted thereafter.



AVS820-HD *SuperVision*® CAMERA

INSTALLATION NOTES

INSTALLATION

The AVS820-HD CH is hermetically sealed and nitrogen pressurized with a Heated Sapphire Window. A humidity desiccant indicates Nitrogen status. The Heater is automatically controlled ON and OFF by an internal thermistor. Total system weight including CH, CD, connectors, floating nutplates, and screws is 2 pounds. All that is required from the aircraft is 28 vdc/550 mA and Zoom IN/OUT & Preset commands.

The CH and CD are custom fabricated to fit the particular aircraft type and location e.g. Tail, Belly, Pylon, Gear-Door, Inspection Panels, or through the Fuselage, etc. These custom shapes are identified by the last 3 digits of the Part Number (P/N) nomenclature e.g. B4T = Boeing 747 Tail.

The CH and CD normally sandwich the fuselage. The CD may be used as a template to locate the CH 2.5" hole, usually elongated to accommodate viewing angles. Once the CH hole has been cut, the CH should be inserted into the aircraft and turned ON to view picture alignment: bore sight and level. Once the view is correct, the aircraft may be drilled for eight (8) 10x32 attachment screws. These holes are then "Match Drilled" to the CD which is then fitted with floating locking nutplates. The CD should then be secured (riveted) to the inside of the aircraft. The facing surface of the CH and the entire CD have not been painted (alodine only) to provide electrical continuity for Grounding.



AVS820-HD *SuperVision*® CAMERA

INSTALLATION NOTES (continued)

CAUTION: CH SHOULD NOT BE OPENED as Nitrogen pressure and purge will be lost. No attempt should be made via CH schrader valve to check Nitrogen pressure as it will deplete CH 10 psi Nitrogen charge. It is not recommended to attempt to refill the CH with Nitrogen.

WARNING: DO NOT CHARGE CH NITROGEN IN EXCESS OF 15 psi, AS PERSONAL INJURY MAY OCCUR.

NOTE: The AVS820-HD Camera requires 28 vdc/550 mA. Max amperage is 500 mA with the Sapphire Window Heater ON and 250 mA with the Heater OFF. An internal current limiting device limits max amperage to 1 amp.

NOTE: Zoom is controlled via DISCRETE momentary GNDs or RS232 VISCA.

NOTE: The Heater will cycle OFF and ON for approximately 15 minutes until the Sapphire Window stabilizes at approximately 90° F at 72° F ambient.

NOTE: A CH humidity desiccant indicates Nitrogen status.
"Pale Blue" is normal, less than 30% humidity.
"Pink" is unsatisfactory, more than 30% humidity.
This condition could result in formation of moisture molecules inside CH Enclosure during flight and requires CH to be serviced at AVS.

NOTE: It is possible to rotate the camera in the CH enclosure to level the picture, however this must be accomplished at AVS as CH will need to be vacuumed and re-purged with Nitrogen.

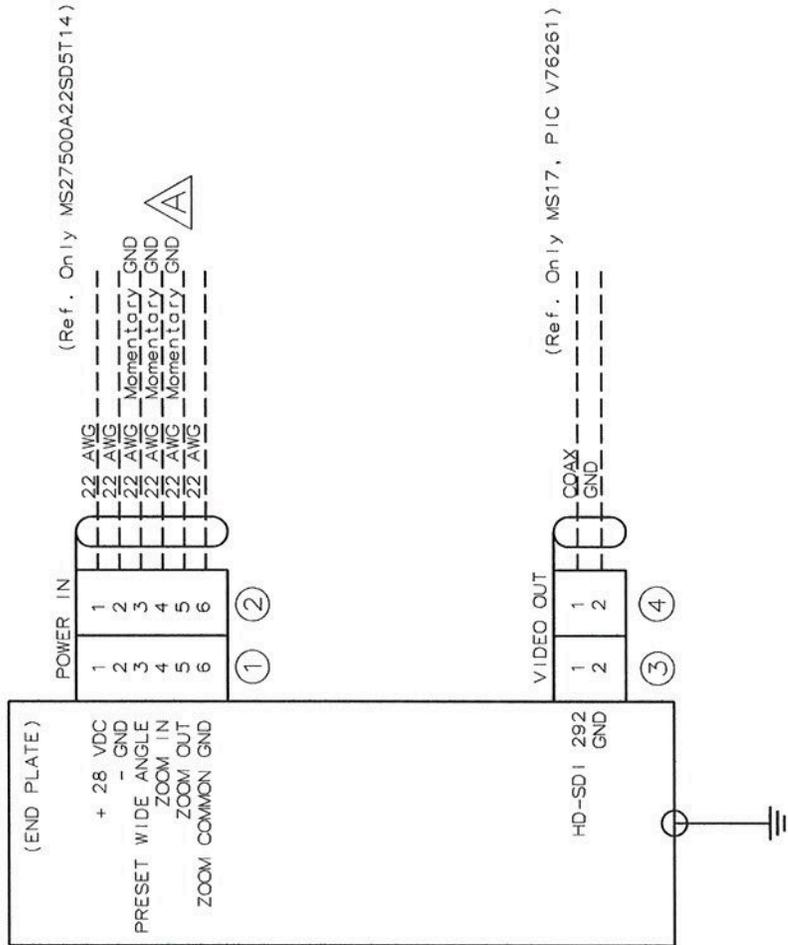
NOTE: Only one video output is available at a time and must be programmed by AVS prior to shipment. These video outputs include:

DIGITAL SDI-292
1080/59.94i/50i
720/59.94p/50p

SD:NTSC
PAL
S-VHS

NOTE UNLESS OTHERWISE SPECIFIED

CAMERA HEAD



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SCHEM
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APPROVED: *J. Brunner*
DATE: 07/06/11

RELEASED

ZONE	REV	DESCRIPTION	DATE	APPROVED
D4	A	"WAS" Hard GND "NOW" Momentary GND	07-06-11	J. BRUNNER

REVISIONS	DATE	APPROVED

No.	PART No.	PART NAME	QTY	MATERIAL	ZONE	MFR/REMARK
4	W50 103 A002	COAX CABLE PLUG	1	WAS USE W50 103 A002		FISHER
3	08EE 103 A002	COAX PANEL RECEPTACLE	1	WAS USE 08EE 103 A002		FISHER
2	W50 103 A056-130	CABLE PLUG	1	WAS USE W50 103 A056-130		FISHER
1	08EE 103 A056-130	PANEL RECEPTACLE	1	WAS USE 08EE 103 A056-130		FISHER

UNLESS OTHERWISE SPECIFIED	APPROVALS	DATE
DIMENSIONS IN INCHES XX 1.01 1.17 XXX 1.02 1.17	DRW: J. BRUNNER	05/20/11
MATERIAL SEE NOTES	ENGR: J. BRUNNER	05/20/11
FINISH SEE NOTES	CHKD: J. BRUNNER	05/20/11
DO NOT SCALE DRAWING	THIS IS A PRODUCTION	

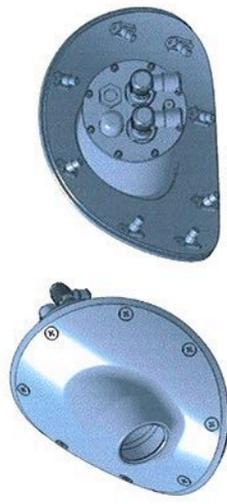
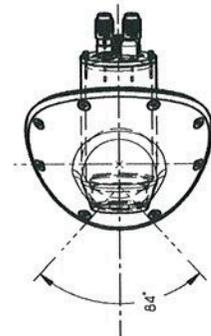
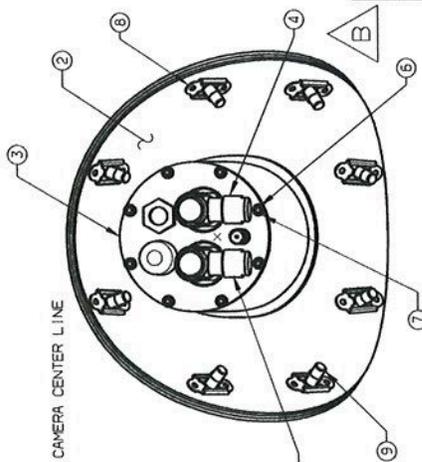
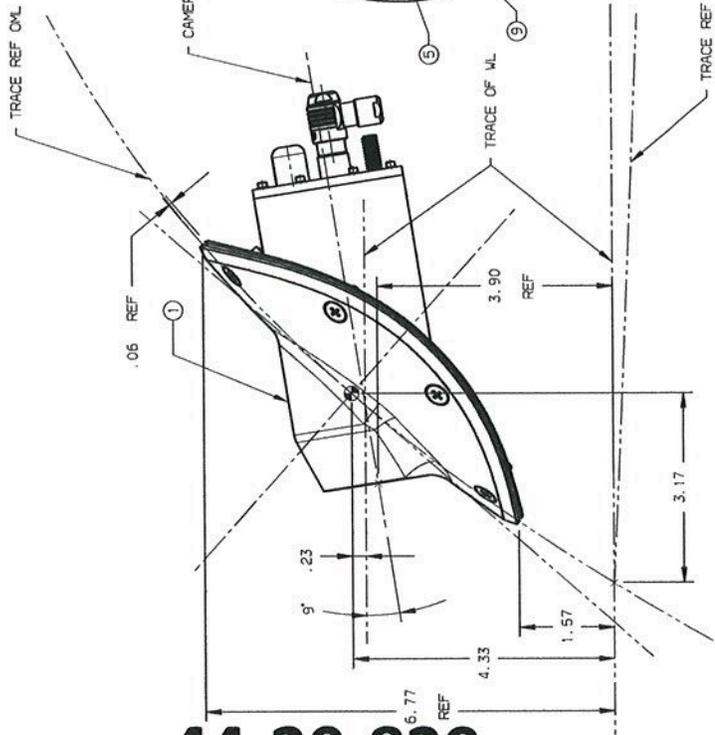
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AERIAL VIEW SYSTEMS, INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AERIAL VIEW SYSTEMS, INC. IS PROHIBITED.

AERIAL VIEW SYSTEMS
34425 COLUMBIAN LANE - HUNTSVILLE, AL 35894
TITLE:
WIRING SCHEMATIC -
WSO CONNECTORS
SIZE: 4L002
PAGE CODE: AYS820-025-W01
REV. A

SCALE: 1/1
WEIGHT: 1.00
SHEET: 1 OF 1

NOTE UNLESS OTHERWISE SPECIFIED

1. IDENTIFY PARTS USING PERMANENT INK IN A CONTRASTING COLOR, BY METHODS OF HAND LETTERING, ETCHING, STYLUS, RUBBER STAMP, LABELING OR BAGGED WITH THE MINIMUM INFORMATION AS FOLLOWS: PART NUMBER, REVISION LEVEL.
2. CHEM FILM (ALODINE) ALUMINUM PARTS.
3. FOR MACHINED PARTS, REMOVE ALL BURRS AND BREAK ALL EDGES / CORNERS 0.01/0.03, EXCEPT AS NOTED.
4. MATERIAL: 6061-T6 ALUMINUM ALLOY PER QQ-A-225/8.
5. DIMENSION IN (): REFERENCE ONLY.
6. TOTAL WEIGHT WITH INTERNAL COMPONENT IS APPROXIMATELY 2.0 LBS.



3D ISO VIEW
FOR ENGINEERING REFERENCE ONLY
SCALE : NONE

TOP VIEW
SCALE: 1/4

BACK VIEW

SIDE VIEW

CAMERA ASSEMBLY NOT SHOWN FOR CLARITY (10) B

CH
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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
2B3	B	ADDED ASSEMBLY VIEW	7/14/2011	J. BRUNNER
B5	B	ADDED CAMERA ASSEMBLY CALLOUT	7/14/2011	J. BRUNNER

No.	PART No.	PART NAME	QTY	MATERIAL	ZONE
10	AVS620-G25-W01	CAMERA ASSEMBLY	1		AVS
9	M521694-025	10/32 X 0.686 SCREWS	8	SS	
8	M5210296-3	10/32 SELF-LOCK FLOATING NUT PLATE	8	SS	
7	M530333-69	#2 INTERNAL STAR LOCKWASHER	8	SS	
6	M516995-4	2-56 X 1/8 SOCKET HEAD SCREW	8	SS	
5	W50 103 A056-130	CABLE PLUG	1	W50 103 A056-130	FISHER
4	W50 103 A022	COAX CABLE PLUG	1	W50 103 A022	FISHER
3	AVS620-G25-102	CAMERA END PLATE ASSY	1		AVS
2	AVS620-G25-004	CAMERA DOUBLER	1	6061-T6	AVS
1	AVS620-G25-101	CAMERA HEAD WELD ASSY	1		AVS

PARTS LIST

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UNLESS OTHERWISE SPECIFIED	APPROVALS	DATE
DRAWN J. BRUNNER	APPROVED J. BRUNNER	05/19/11
DESIGNED J. BRUNNER	ENGINEER J. BRUNNER	05/19/11
CHECKED J. BRUNNER	THIRD MILE PRODUCTION	05/19/11

TITLE: AVS620-G25 CAMERA

SIZE: D 4L002

SCALE: 1/2

SHEET: 1 OF 2

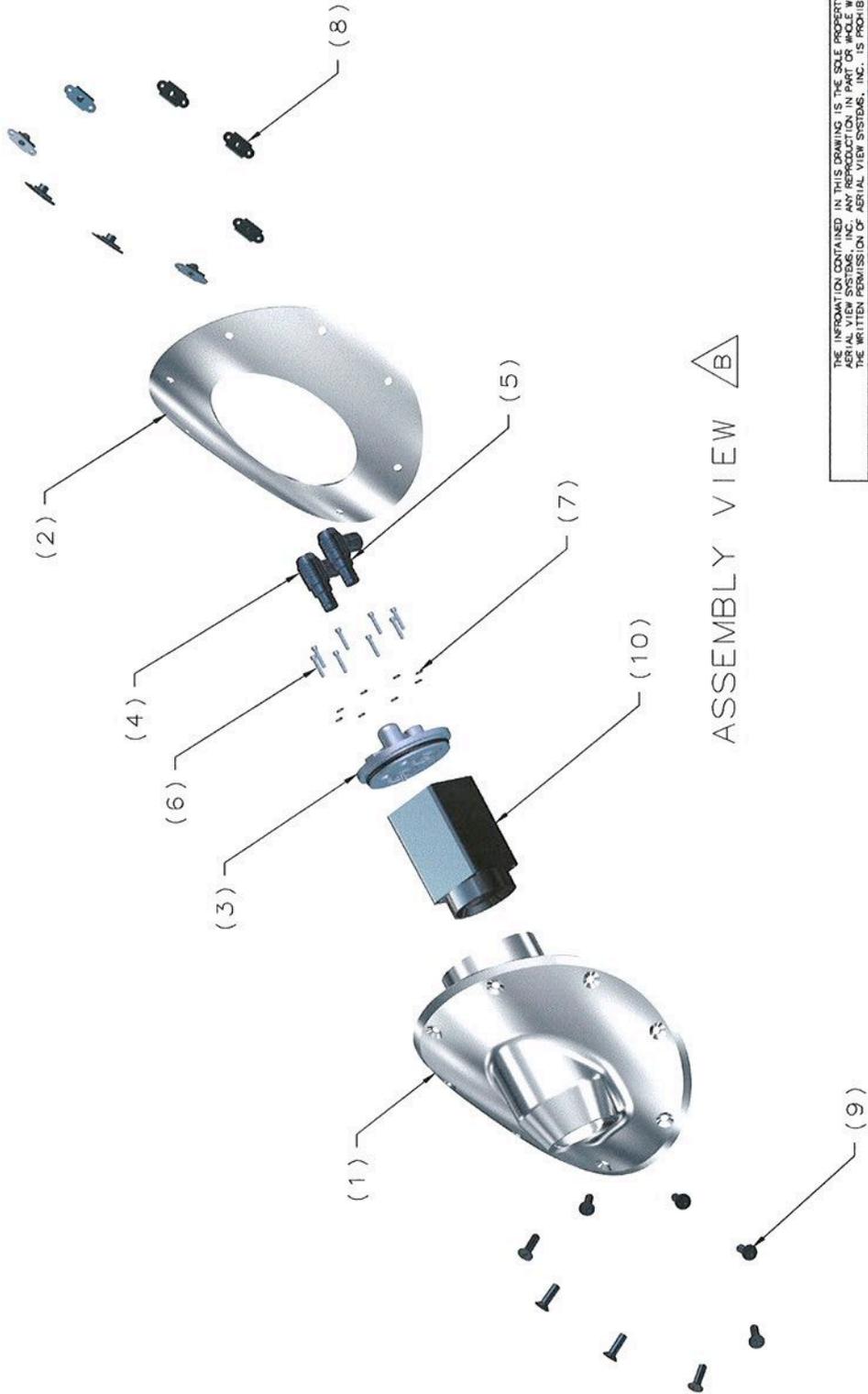
APPROVED: *J. Brunner*
DATE: 07-26-2011

44-20-820

NOTE UNLESS OTHERWISE SPECIFIED

44-20-820

CH
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SEPT 1/11



REVISIONS		DATE	APPROVED
ZONE	REV	DESCRIPTION	

UNLESS OTHERWISE SPECIFIED		APPROVALS	DATE
DIMENSIONS ARE IN INCHES	FRACTING	DRAWN J. BRUNNER	05/19/11
XX 1:01 1" = 1"	1/2"	ENGINEER J. BRUNNER	05/19/11
MATERIAL	SEE NOTES	CHECKED J. BRUNNER	05/19/11
FINISH	SEE NOTES	THIS IS AN ISOMETRIC DRAWING	
DO NOT SCALE DRAWING		SCALE 1/2"	

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AVS	AERIAL VIEW SYSTEMS
13487 CHEMICAL LANE, HUNTINGTON BEACH, CA 92649	
TITLE:	AVS820-G25 CAMERA
SIZE	DWG No. AVS820-G25-100
REV. B	D 4L002
SCALE 1/2"	WEIGHT - 1.025 LBS
	SHEET 2 OF 2

DRAWING TITLE:

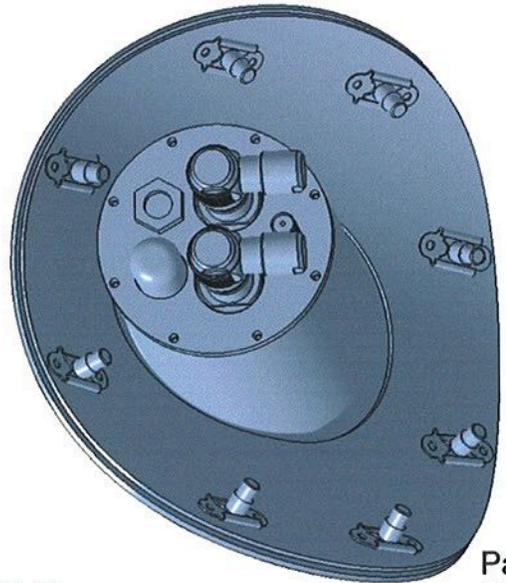
AVS820-G25 CAMERA

DRAWING NUMBER:

AVS820-G25-100

PARTS LIST / DRAWING NUMBERS / NOMENCLATURE:

1	AVS820-G25-101	CAMERA HEAD WELD ASSY
1	AVS820-G25-102	CAMERA BACK PLATE ASSY
1	AVS820-G25-004	CAMERA DOUBLER
8	MS21059L-3	10/32 SELF-LOCK FLOATING NUT PLATE
8	MS24694C52	10/32 X .656 SS SCREWS
1	WSO 103 A002	CABLE PLUG
1	WSO 103 A056-130	CABLE PLUG
8	MS16995-4	2-56 X ½ SS SOCKET HEAD SCREW
8	MS353333-69	#2 SS INTERNAL STAR LOCKWASHER



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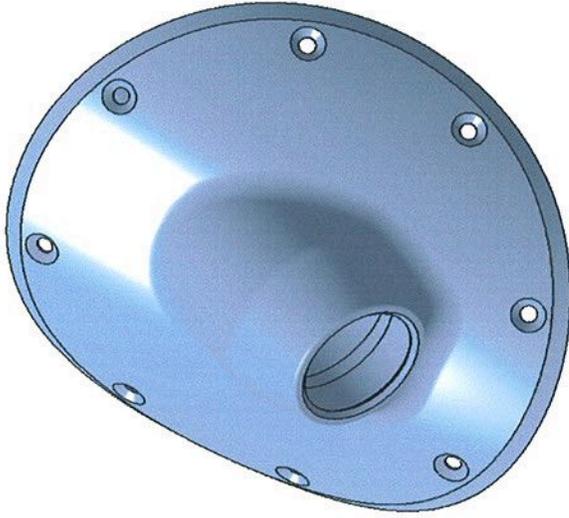
DRAWING TITLE:

CAMERA PLATE

DRAWING NUMBER:

AVS820-G25-001

44-20-820



DRAWING TITLE:

CAMERA HEAD WELD ASSY

DRAWING NUMBER:

AVS820-G25-101

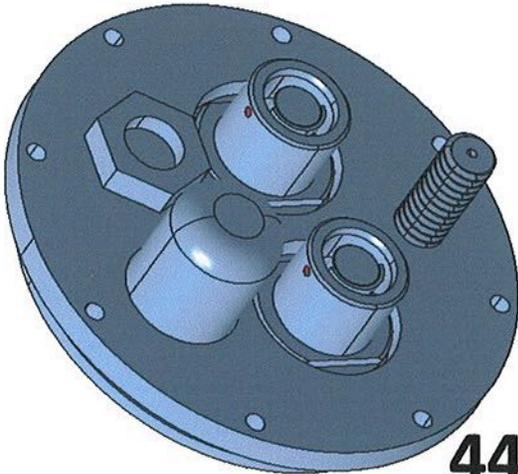
DRAWING TITLE:

CAMERA TUBE

DRAWING NUMBER:

AVS820-G25-002





44-20-820

DRAWING TITLE:

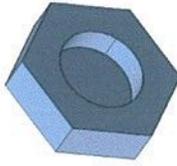
CAMERA BACK PLATE ASSY

DRAWING NUMBER:

AVS820-G25-102



PART NUMBER:
FHS-0420-16
 NOMENCLATURE:
GND STUD, 1/4-20, ASSY



PART NUMBER:
TA286-30
 NOMENCLATURE:
HUMIDITY INDICATOR



PART NUMBER:
A31483
 NOMENCLATURE:
SCHRADER VALVE

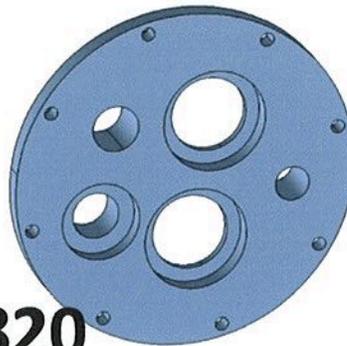


DRAWING TITLE:

CAMERA BACK PLATE

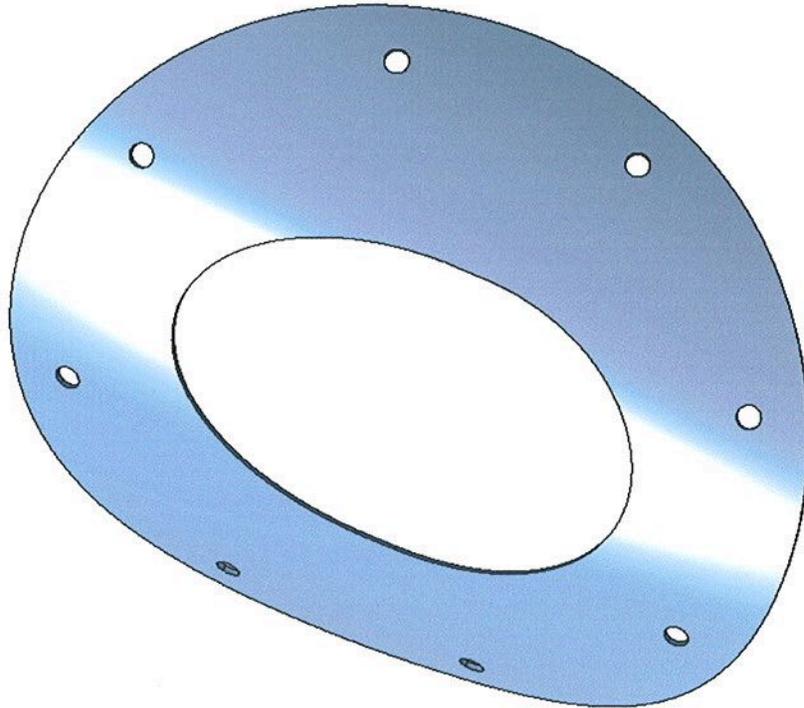
DRAWING NUMBER:

AVS820-G25-003



PART NUMBER:
DBEE 103 A002
 NOMENCLATURE:
PANEL RECEPTACLE

PART NUMBER:
DBEE 103 A056-130
 NOMENCLATURE:
PANEL RECEPTACLE



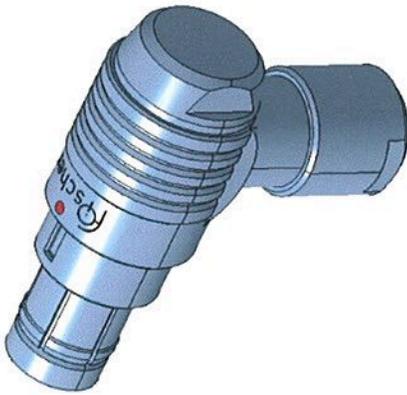
DRAWING TITLE:

CAMERA DOUBLER

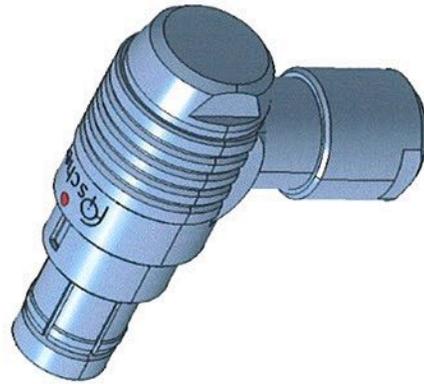
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44-20-820



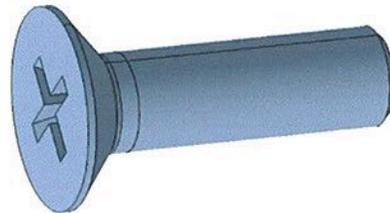
PART NUMBER:
WSO 103 A002
NOMENCLATURE:
CABLE PLUG



PART NUMBER:
WSO 103 A056-130
NOMENCLATURE:
CABLE PLUG



PART NUMBER:
MS21059L-3
NOMENCLATURE:
NUT PLATE



PART NUMBER:
MS24694C52
NOMENCLATURE:
FASTENER



AVS820-HD *SuperVision*® CAMERA CONFIGURATIONS

PART NUMBER

820-1-28-D11-B4T (example)

PART NUMBERING IS AS FOLLOWS

AAA-B-CC-XXX-YYY

WHERE

AAA = BASE PART # **820**

B = ZOOM (O=Optical 10 x Zoom)
 (1=2.5 x Zoom)
 (2=20 x Zoom)
 (3=30 x Zoom)
 (4=40 x Zoom)

CC = VOLTAGE (12=12 VDC)
 (13=12-28 VDC)
 (28=28 VDC)
 (15=115 VAC)

XXX = COMMUNICATION / VIDEO FORMAT / LENGTH-CONNECTORS

X__ = COMMUNICATION _X_ = VIDEO FORMAT __X = CONNECTORS

(D=DISCRETE) (2=RS-232 VISCA TTL)	(1=DIGITAL SDI-292 1080/59i) (B=DIGITAL SDI-292 1080i/50i)	(1=FISCH DBEE 103) (2=FISCH DBEE 104)
(4=RS-485)	(C= DIGITAL SDI-292 720/59p) (D= DIGITAL SDI-292 720/50p) (E= HD Y/P _b /P _r) (F= SD Y/P _b /P _r) (G= SD NTSC) (H= S-VHS) (I= PAL) (J= ETHERNET)	

YYY = AIRCRAFT TYPE (e.g. B4T = Boeing 747 Tail)

CONFIG
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AVS820-HD *SuperVision*® CAMERA PERIODIC MAINTENANCE

MAINTENANCE

THERE IS NO CAMERA HEAD FIELD MAINTENANCE.

Periodically, the Camera Assembly is to be returned to Aerial View Systems for inspection and servicing. Recommended servicing interval is 5 years or 2,500 flight hours, whichever occurs later.

Exchange Camera Assembly units will be available to facilitate uninterrupted feature usage.

CAUTION: CH SHOULD NOT BE OPENED as Nitrogen pressure and purge will be lost. No attempt should be made via CH schrader valve to check Nitrogen pressure as it will deplete CH 10 psi Nitrogen charge. It is not recommended to attempt to refill the CH with Nitrogen.

WARNING: DO NOT CHARGE CH NITROGEN IN EXCESS OF 15psi, AS PERSONAL INJURY MAY OCCUR.

NOTE: A CH humidity desiccant indicates Nitrogen status.
"Pale Blue" is normal, less than 30% humidity.
"Pink" is unsatisfactory, more than 30% humidity.
This "Pink" condition could result in formation of moisture molecules inside CH Enclosure during flight and requires CH to be serviced at AVS.

CLEANING

Outside of Camera Head, the sapphire lens may be cleaned with a cotton swab & acetone.

CAUTION: DO NOT APPLY ACETONE TO PAINT.



AVS820-HD *SuperVision*® CAMERA
TEST PROCEDURE
(Final Test Production Procedures)

COMPONENTS

P.N.

Camera Head (CH)

820-X-28-XXX-XXX

Power Cable with Connector

Fischer WSO or S103 A056-130+

Video Cable with Coaxial Connector

Fischer WSO or SE 103 A002 05.7

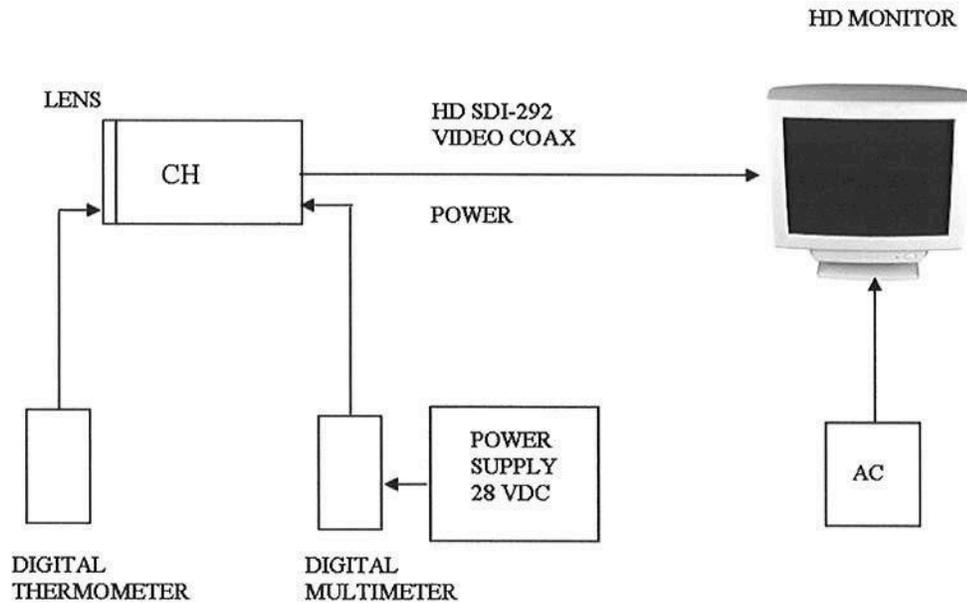
HD Video Monitor

28 VDC Power Supply, >1 amp

Digital Multimeter

Digital Thermometer

SET UP:





AVS820-HD *SuperVision*® CAMERA
TEST PROCEDURE
(Final Test Production Procedures)

TEST PROCEDURE (continued):

1. Turn-ON Power Supply
2. Turn-ON Monitor
3. Apply 28 VDC to Camera Head via Power Harness
4. Check ampres:
 - 210mA +/-0.020
 - 220mA +/-0.020 when Zooming
 - 450mA +/-0.030 for approximately 15 minutes while sapphire Heater ON.
 - 210 mA +/-0.020 with sapphire Heater OFF.

NOTE: Heater will cycle OFF and ON for approximately 15 minutes until sapphire window stabilizes at approximately 90° F at 72° F ambient.

5. Max temp for sapphire lens is 110° F +/-10° prior to Heater OFF.
6. Check HD SDI-292 Digital video quality:
 - Color
 - Contrast
 - Brightness
 - Noise
 - Interference
 - Rolling lines
 - Distortion
 - Artifacts
7. Ground Pin 4 to Pin 6 for Zoom IN
8. Ground Pin 5 to Pin 6 for Zoom OUT
9. Ground Pin 3 to Pin 6 for PRESET Zoom



AVS820-HD *SuperVision*® CAMERA TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
No Video Picture	28 VDC not present	CHECK: 1) Aircraft camera 1 amp circuit breaker 2) VERIFY: 28 VDC present at pin #1 & Ground at pin #2 of power connector WSO 103 A056-130+
No Video Picture	Video Ground SHORTED	CHECK: 1) Verify that video Ground has no continuity with aircraft Ground. Especially at panel-mount connectors.
Noisy Distorted Video Picture	Poor video signal continuity at connectors	CHECK: 1) Disconnect CH connectors and clean with contact cleaner then reconnect. 2) Test video directly with alternative video monitor bypassing aircraft video cable routing, switches, DVR and amplifiers to determine noise source.