

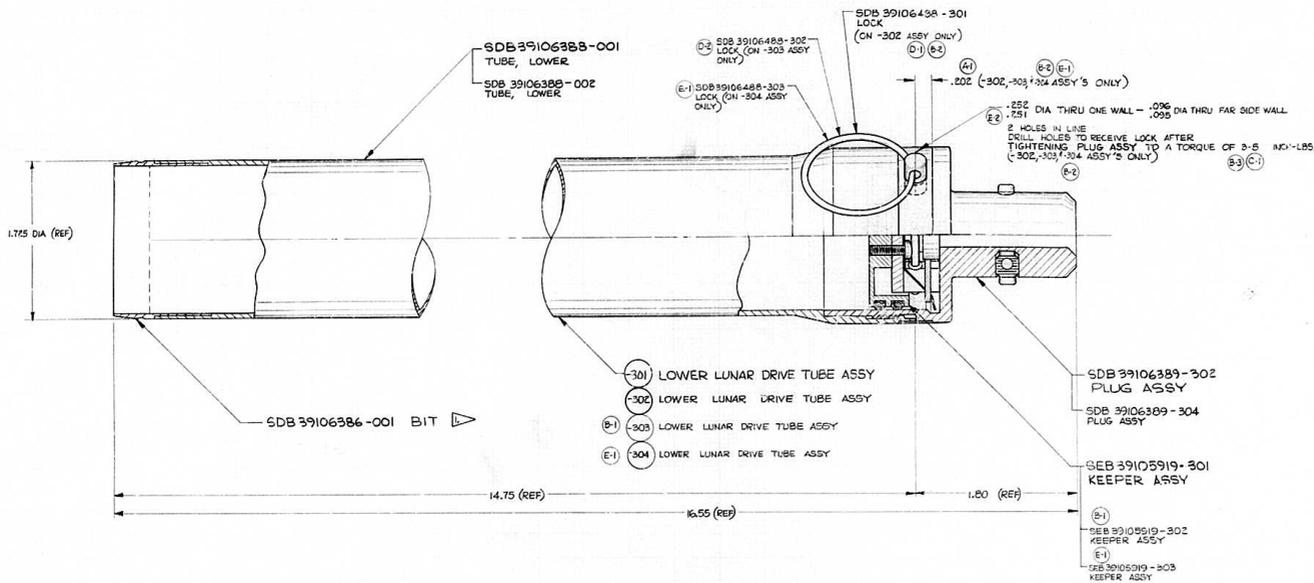
LOWER DRIVE TUBE TECHNICAL DRAWINGS

NOTE: These are archival drawings generated prior to 8/29/1972 and are suitable for reference only. They depict sampling hardware which has been exhibited to the public since that time.

The LOWER DRIVE TUBE ASSY is the device with a bit used for either single or the lower portion of a double drive tube.

CONTENTS:

LOWER DRIVE TUBE ASSY	SEB39106392_E
TUBE, LOWER	SDB39106388_D
TUBE, LOWER	SDB39106388_D_30510
TUBE, LOWER	SDB39106388_E
PLUG ASSY	SDB39106389_F
BIT	SDB39106386_C
LOCK	SDB39106488_E
KEEPER	SEB39105919_D
Related drawings for background-	
UPPER LUNAR DRIVE TUBE ASSY	SEB39106393_E
TUBE, UPPER	SDB39106387_C
TUBE, UPPER	SDB39106387_C_30509



LTR	ZONE	REVISION	DATE	APPROVAL
A	G-4	1. CHANGED DIM (WAS) .189	4-10-71	CSA
B	E-5	1. ADDED -303 CONFIGURATION.	6-9-71	CSA
	G-4	2. ADDED -303 CALLOUT TO LOCK NOTES.		NA
	G-3	3. ADDED TORQUE VALUE TO PLUG ASSY ATTACHMENT.		NA
C	G-3	1. CHANGED TORQUE VALUE (WAS 12-15 INCH-LBS)	6-11-71	CSA
	G-4	1. REMOVED SDB 39106488-301 LOCK L/M FROM -303 ASSY.	6-9-71	CSA
	C-5	2. ADDED SDB 39106488-302 LOCK TO -303 ASSY.		NA
D	L/M	1. ADDED -304 CONFIGURATION	1-29-71	CSA
	E-3	2. CHANGED HOLE CALLOUT (WAS) .252 DIA THRU		NA

QTY	DESCRIPTION	PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
1	LOWER LUNAR DRIVE TUBE ASSY	-304	LOWER LUNAR DRIVE TUBE ASSY		
1	LOCK	SDB 39106488-301	LOCK		
1	KEEPER ASSY	SEB 39105919-303	KEEPER ASSY		
1	LOCK	SDB 39106488-302	LOCK		
1	KEEPER ASSY	SDB 39105919-302	KEEPER ASSY		
1	PLUG ASSY	SDB 39106389-304	PLUG ASSY		
1	TUBE, LOWER	SDB 39106388-002	TUBE, LOWER		
1	LOCK	SDB 39106488-301	LOCK		
1	PLUG ASSY	SDB 39106389-302	PLUG ASSY		
1	TUBE, LOWER	SDB 39106388-001	TUBE, LOWER		
1	BIT	SDB 39106386-001	BIT		
1	KEEPER ASSY	SEB 39105919-301	KEEPER ASSY		
1	LOWER LUNAR DRIVE TUBE ASSY	-303	LOWER LUNAR DRIVE TUBE ASSY		
1	LOWER LUNAR DRIVE TUBE ASSY	-302	LOWER LUNAR DRIVE TUBE ASSY		
1	LOWER LUNAR DRIVE TUBE ASSY	-301	LOWER LUNAR DRIVE TUBE ASSY		

DATE	SIGNATURE	DATE	NATIONAL AERONAUTICS & SPACE ADMINISTRATION
11-11-71	DR L. S. MATTHEW	11-11-71	MANHATTAN SPACECRAFT CENTER HOUSTON, TEXAS
11-15-71	ENG. C. S. ALLTON	11-15-71	
11-17-71	CH. J. J. J. J.	11-17-71	

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE:
 .015 = .10
 .001 = .005
 .000 = .002
 ANGULAR = .010

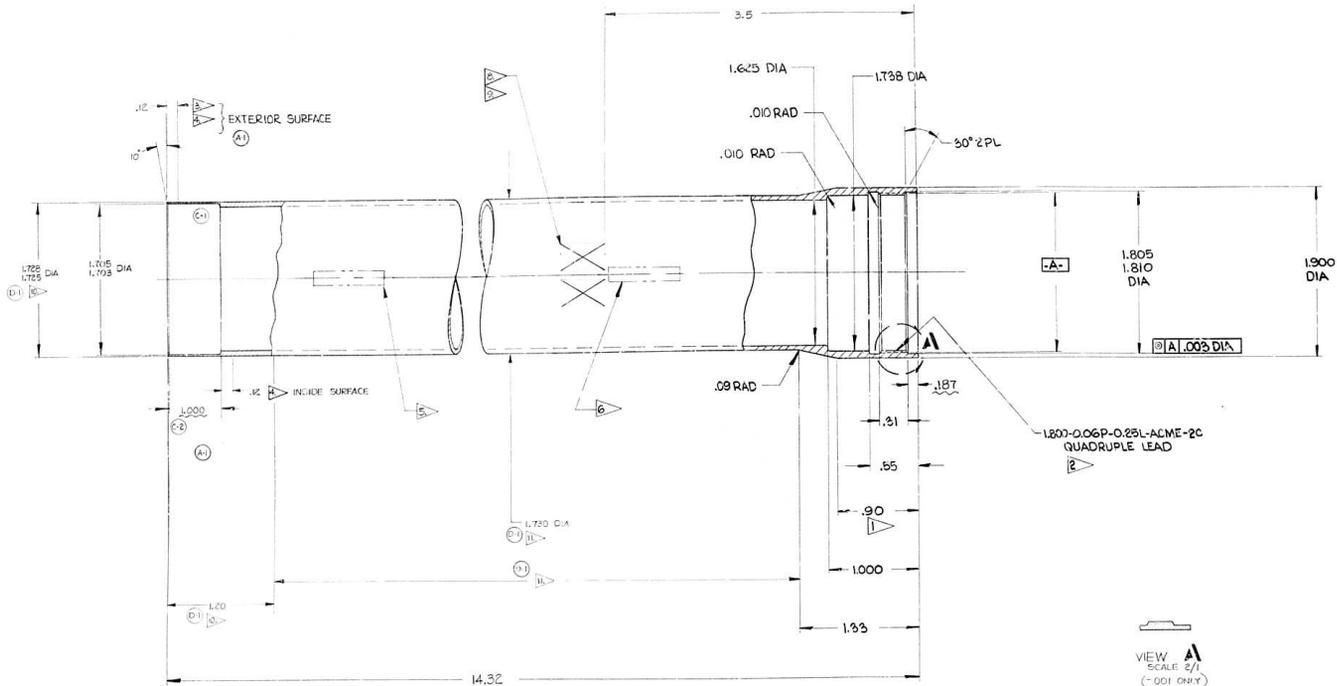
SURFACE FINISH IN MICROINCHES UNLESS NOTED OTHERWISE:
 .125
 .063
 .031
 .015
 .008
 .004
 .002
 .001

N.A. NEXT ASSEMBLY: A.L.H.T.

CODE IDENT NO: 21356
 SIZE: 1/4" X 1/2" X 1/4"
 TITLE: LOWER LUNAR DRIVE TUBE ASSY
 DRAWING NO: SEB39106392
 SCALE: 2/1
 SHEET: 1 OF 1

MAGNETIC METAL FORMING PROCESS "MAGNEFORM"
 MAXWELL LAB INC., SAN DIEGO, CALIF. OR EQUAL.

FABRICATION TOLERANCES & PRACTICES PER SAE 3103755.
 NOTES: UNLESS OTHERWISE SPECIFIED



VIEW A
SCALE 2/1
(.001 ONLY)

VIEW B
SCALE 2/1
(.001 ONLY)

- Ⓜ O.D. OF TUBE TO BE 1.730 ±.005 DIA IN THIS AREA.
- Ⓝ O.D. OF TUBE TO BE 1.725 DIA IN THIS AREA.
- ▽ ELECTROCHEMICAL ETCH IDENTIFYING NUMBERS AFTER GRIT BLASTING.
- ▽ GRIT BLAST IDENTIFYING NUMBERS WITH #50 ALUMINUM OXIDE GRIT AFTER METAL FINISHING. USE F HIGH STENCILED NUMERALS. IDENTIFYING NUMBER IS TO BE THE LAST TWO DIGITS OF THE SERIAL NUMBER.
- Ⓜ REMOVED.

- ▽ ELECTROCHEMICAL ETCH NEXT ASSY NO. AND SERIAL NO. (EVEN NOS. ONLY) PER MSC-SPEC-M-1.
 - ▽ ELECTROCHEMICAL ETCH PART NO. PER MSC-SPEC-M-1.
 - ▽ DO NOT ANODIZE.
 - ▽ DO NOT ETCH.
 - ▽ BLUNT START (HIGBEE CUT) LEAD THREAD AT POINT TANGENT TO MAJOR OR MINOR DIA AS APPLICABLE.
 - ▽ #6 DP RAISED DIAMOND KNURL.
- NOTES:

4. METAL FINISHING PER SK539106400 ALUMINUM METAL FINISHING, APOLLO HAND TOOLS, EXTERIOR SURFACES ONLY, EXCEPT AS NOTED ON FIELD OF DWG.
 3. ANODIZE PER MIL-A-8625, TYPE II, CLASS 1, INTERIOR SURFACES ONLY, EXCEPT AS NOTED ON FIELD OF DWG.
 2. BREAK ALL SHARP EDGES .015-.020 RAD.
1. FABRICATION TOLERANCES AND PRACTICES PER SK756103755.
- NOTES: UNLESS OTHERWISE SPECIFIED.

REV	REVISION	DATE	APPROVAL
A	F-7 1. REMOVED ALDINE TREATMENT.	1-27-71	CSA
D-6	2. REMOVED FLAG NOTE [A]		CSA
B	B-1 1. CHANGED MATL CALLOUT AND SPEC (WAS) PIPE PER ASTM B429.	2-17-71	CSA
C	F-7 1. REMOVED .025 R.	3-24-71	CSA
E-7	2. CHANGED DIM TO 1.000 (WAS) 1.000.		CSA
D	C-6 1. ADDED FLAG NOTES [B] AND [C]	4-23-71	CSA

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE		SIGNATURES		DATE		NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
0	= .10	ENGINEER	1-27-71				
00	= .02	ENGR. S. ALLTON	1-18-71				
000	= .005	DR. G. S. GARDNER	1/15/71				
ANGULAR	= 2°						
SURFACE FINISH IN MICROINCHES UNLESS NOTED OTHERWISE		APP. AUTH.		DATE			
		63		1/17/71			
PART NUMBER		DESCRIPTION		MATERIAL		SPECIFICATION	
.002		TUBE, LOWER		5061-T6 AL ALY		WW-T-700/5	
.001		TUBE, LOWER		5091-T6 AL ALY TUBE		WW-T-700/6	
52B39106392		A.L.H.T.		E		50639106398	
NEXT ASSEMBLY		SCALE 2/1		DRIVE TUBE		D	

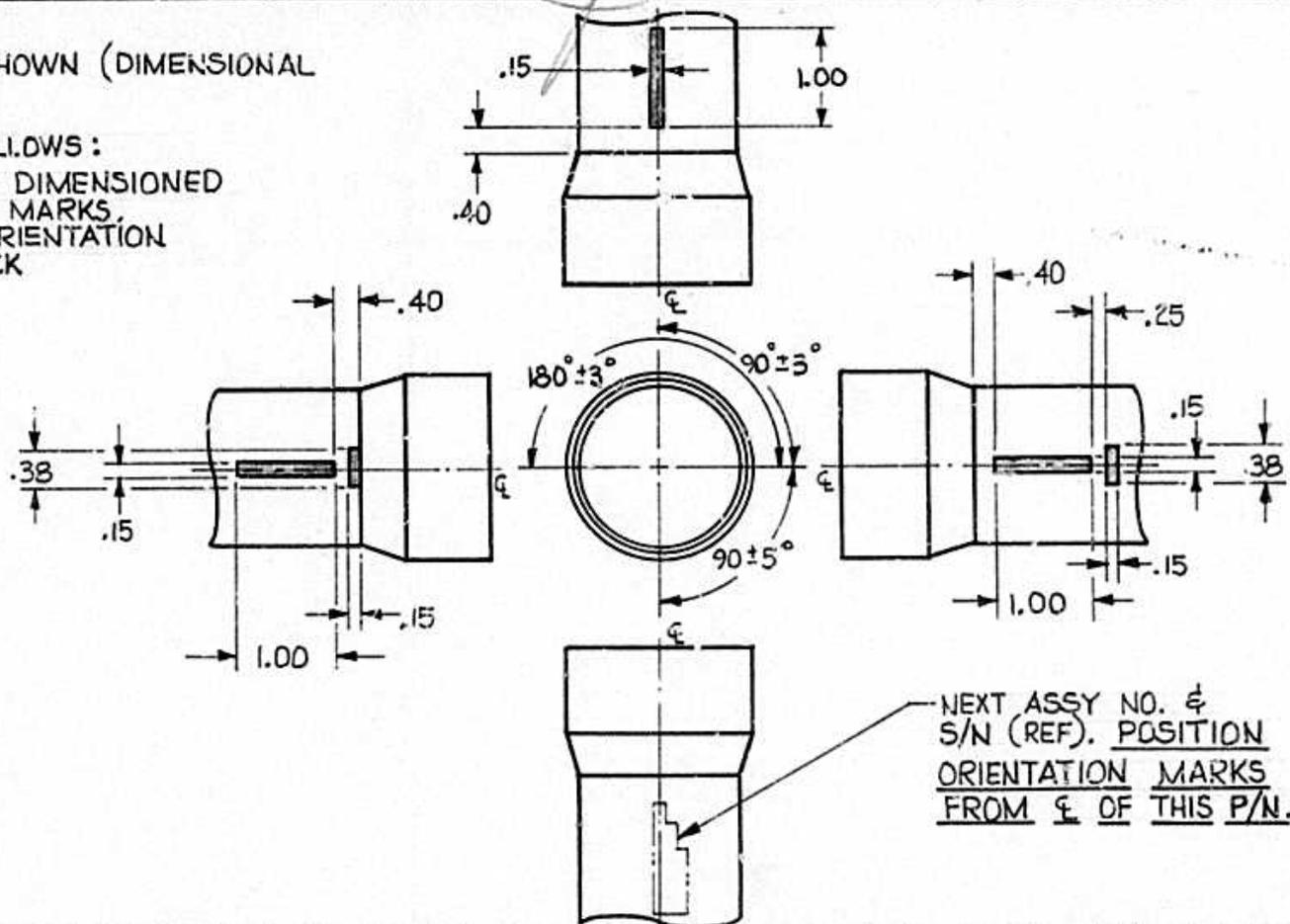
NUMBER 30510	DATE 8-29-72	DRAWING CHANGE NOTICE			SHEET 1 OF 1
DRAWING NO. SDB 39106388	REV. D	REASON FOR CHANGE	ORIGINATOR C. S. ALLTON	DATE 8-29-72	RELEASE
TITLE TUBE, LOWER - DRIVE TUBE		DESIGN IMPROVEMENT	APPROVED		RELEASED Date 8-29-72 Rev D Init AZ
PROJECT	DRAWING TO BE CHANGED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		APPROVED		
DISPOSITION OF EXISTING MATL/PARTS		EFFECTIVITY			
USE AS IS RETURN TO STOCK	<input type="checkbox"/>	REWORK <input checked="" type="checkbox"/>	MODEL	SERIAL NO. 2044, 2046, 2048, 2050, 2052	AUTH. <i>[Signature]</i> 8/29/72

DESCRIPTION OF CHANGE

1. ADD ORIENTATION MARKS AS SHOWN (DIMENSIONAL TOLERANCES $\pm .03$).

2. ADD FLAG NOTE ∇ AS FOLLOWS:

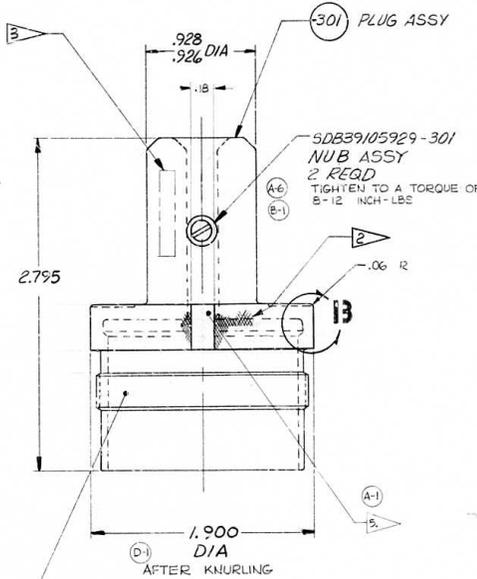
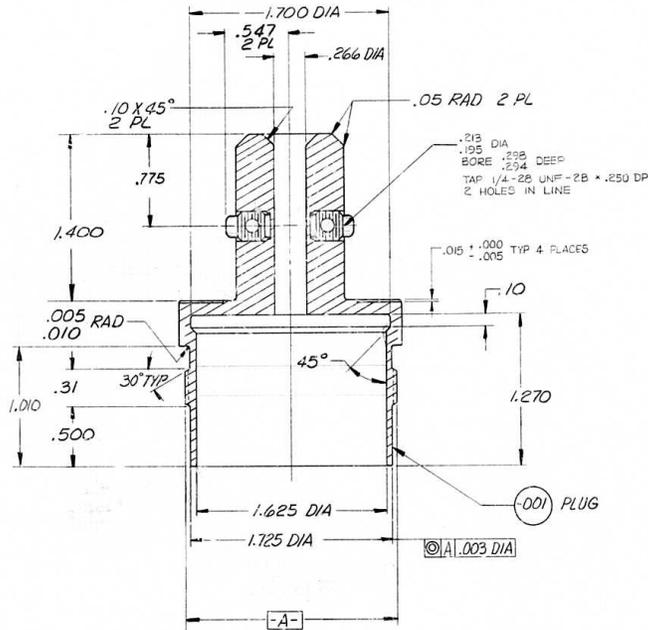
∇ REMOVE FINISH FROM DIMENSIONED AREA OF ORIENTATION MARKS. ELECTROCHEM ETCH ORIENTATION MARKS FOR FLAT BLACK FINISH.



NEXT ASSY NO. & S/N (REF). POSITION ORIENTATION MARKS FROM ϕ OF THIS P/N.

PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION	CHANGE
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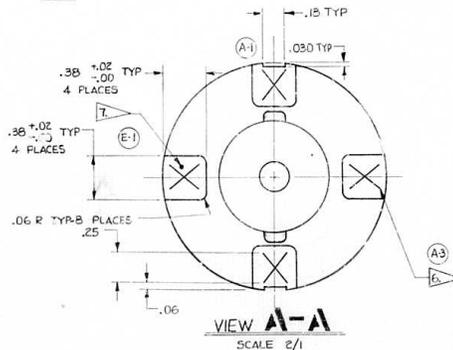
RELEASED
Rev F
4/12/71



VIEW 13
SCALE 2/1
(-.001 & -.002 ONLY)

VIEW 13
SCALE 2/1
(-.003 & -.004 ONLY)

1.800-0.06P-0.25L-ACME-2C
QUADRUPLE LEAD



VIEW A-A
SCALE 2/1

TRIZONE	REVISION	DATE	APPROVAL
A	C-4 1. ADDED NUB ALIGNMENT MARKINGS. 2. ADDED -302, -303 & -304 ASSYS.	1-25-71	CSA
A-5	3. ADDED "UPPER" & "LOWER" DESIGNATIONS (U & L).		
B-B	4. ADDED FLAG NOTES [5] & [6].		
A-B	5. ADDED SERIALIZATION DIRECTIONS TO FLAG NOTE [5].		
D-4	6. CHANGED TIGHTENING TORQUE OF NUB ASSY TO 10-15 IN-LBS (WAS 80-100 IN-LBS)		
B	D-4 1. CHANGED TIGHTENING TORQUE OF NUB ASSY TO 5-12 IN-LBS (WAS 10-15 IN-LBS)	3-10-71	CSA
A-B	1. CHANGED FLAG NOTE [2] (WAS) 96 DP...	3-18-71	CSA
C	D-4 1. ADDED "AFTER KNURLING" TO DIM.	3-22-71	CSA
E	B-6 1. REMOVED BLACK LETTERS, ADDED BLACK RECESSED AREAS, ADDED CLEAR LETTERS.	3-30-71	CSA
B-B	2. CHANGED FLAG NOTE [6], (WAS)...LINE AFTER ANODIZE, ELECTROCHEMICAL ETCH TO BLACK FINISH. USE LETTERS...		
B-B	3. ADDED FLAG NOTE [7].		
F	C-2 1. CHANGED DIMENSION (WAS) .190 .189	4-12-71	CSA

- [E-3] [7] GRIT BLAST RECESSED AREAS WITH #100 GRIT ABRASIVE, ELECTROCHEM ETCH BLACK BEFORE ENGRAVING LETTERS.
- [E-2] [6] ENGRAVE LETTERS USING .030 WIDE LINE AFTER BLACKING RECESSED AREAS. USE LETTERS SHOWN IN TABULATION BLOCK.
- [A-4] [5] GRIT BLAST WITH #50 ALUMINUM OXIDE GRIT, ELECTROCHEMICAL ETCH TO BLACK FINISH, MASK BEFORE ANODIZING.
- [4] ANODIZE PER MIL-A-8625, TYPE II, CLASS 1.
- [3] ELECTROCHEMICAL ETCH FIN & S/N PER MSC-SPEC-M-1. LOCATE APPROX AS SHOWN.
- [A-5] USE ODD S/N ON -301 & -303, USE EVEN S/N ON -302 & -304.
- [2] MEDIUM RAISED DIAMOND KNURL.
- [C-1]

[1] BLUNT START (HIGBEE CUT) LEAD THREAD AT POINT TANGENT TO MAJOR OR MINOR DIA AS APPLICABLE.

NOTES:

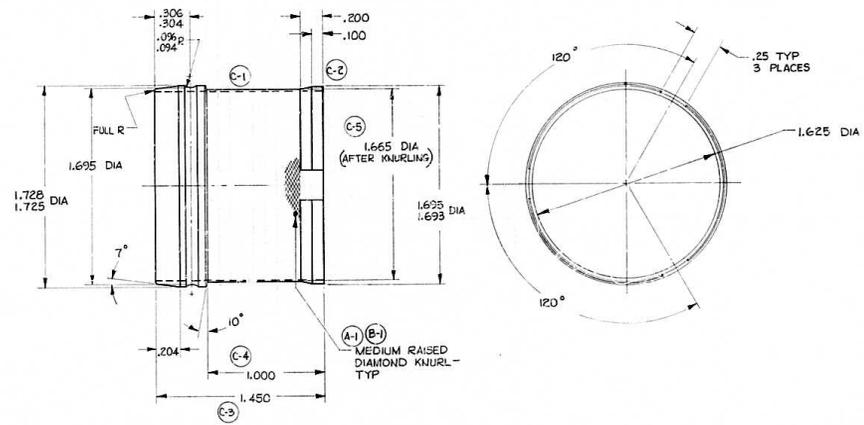
2. BREAK ALL SHARP EDGES .015-.020 R.
1. FABRICATION TOLERANCES AND PRACTICES PER SKZ36108755.
NOTES: UNLESS OTHERWISE SPECIFIED

PLUG DASH NO.	ASSY DASH NO.	"X"	PLUG ASSY	MATERIAL	SPECIFICATION
-304	-304	U	PLUG ASSY		
-303	-303	L	PLUG ASSY		
-001	-201	U	PLUG	6061-T6 AL ALY 2.0 DIA X 2.8 BAR	QQ-A-225/B
-002	-302	L	PLUG	6061-T6 AL ALY 2.0 DIA X 2.8 BAR	QQ-A-225/B
2	2	2	SDB39105929-301 NUB ASSY		NONE
-003	-303	U	PLUG	6061-T6 AL ALY 2.0 DIA X 2.8 BAR	QQ-A-225/B
-004	-304	L	PLUG	6061-T6 AL ALY 2.0 DIA X 2.8 BAR	QQ-A-225/B
-302	-302	U	PLUG ASSY		
-301	-301	L	PLUG ASSY		NONE FINISH

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE	SIGNATURES	DATE	NATIONAL AERONAUTICS & SPACE ADMINISTRATION
.5 = .10 .10 = .02 .02 = .005 .005 = .002 ANGULAR = 2°	DR. T. BROWNING ENG. C.S. ALLTON CH. G. Zander	1-13-71 1/12/71	MANNED SPACECRAFT CENTER - HOUSTON, TEXAS
SURFACE FINISH IN MICRONS UNLESS NOTED OTHERWISE	APP. AUTH.		PLUG ASSY - DRIVE TUBE
63			SCALE 2/1 ENGINE DIV 8/4 SHEET
SDB39106292 SDB39106293			
NEXT ASSEMBLY			

3-12-71 C 10/11

LTR	ZONE	REVISION	DATE	APPROVAL
A	B-5	1. ADDED KNURL TO LANDS.	1-27-71	CSA
A	A-6	2. CHANGED HEAT TREAT TO H 1025 (WAS) H 900.		JW
B	B-5	1. CHANGED KNURL CALLOUT TO 'MEDIUM ...' (WAS) '36 DP ...'	2-1-71	CSA
C	C-6	1. REMOVED RAISED LANDS.	3-12-71	CSA
C	C-5	2. ADDED .100 LONG TAPER AND .100 LONG SHOULDER.		JW
B	B-6	3. CHANGED DIM. TO 1.450 (WAS) 1.050.		
B	B-6	4. CHANGED DIM. TO 1.000 (WAS) .500.		
C	C-5	5. CHANGED DIM. TO 1.665 (WAS) 1.675.		



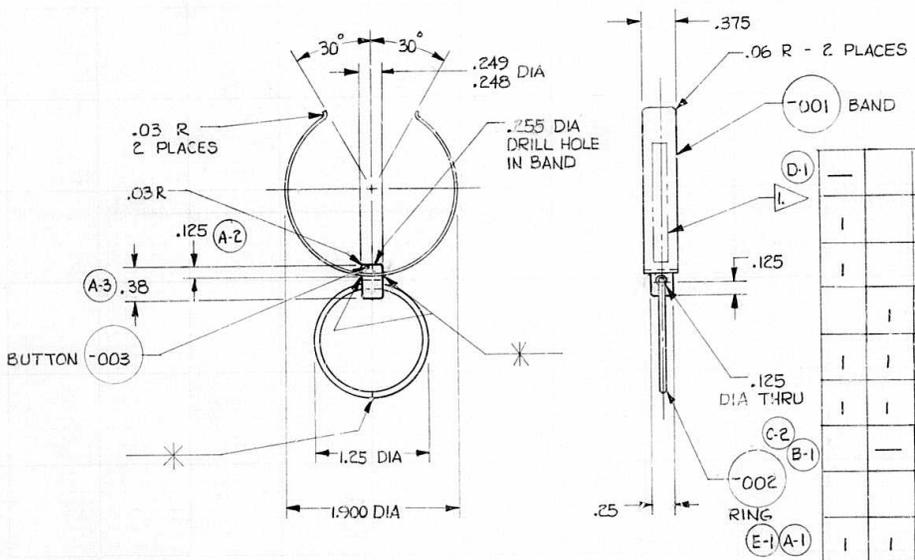
HEAT TREAT TO COND H-1025 (RC 35-42) PER MIL-H-6875.

3. TAG & BAG WITH P/N PER MSC-SPEC-M-1.
 2. ALL EDGES TO BE SHARP EXCEPT AS NOTED.
 1. FABRICATION TOLERANCES & PRACTICES PER SKE3610ST55.
 NOTES: UNLESS OTHERWISE SPECIFIED

-DDI BIT		SST 17-4 PH CONDA RD 2.0 DIA x 1.5 LG		AMS 5643
PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION	
SIGNATURES		DATE	NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER • HOUSTON, TEXAS	
DR C. S. ALLTON		1-15-71	BIT - DRIVE TUBE	
ENG C. S. ALLTON		1-15-71		
CH			CODE IDENT NO. 21356	
APP			SIZE D	
AUTH			DWG NO. SDB39106386	
SEB 39106392			SCALE 2/1	
NEXT ASSEMBLY			ENGRG DIV BN 4 SHEET	

RELEASED
Date 12/17/71
By E PC

LTR	ZONE	REVISION	DATE	APPROVAL
A	L/M	1. CHANGED MATERIAL AND SPEC OF -002 RING (WAS) ... 17-4 PH WIRE COND A... ... AMS 5643.	4-6-71	CSA
B-4		2. CHANGED DIM (WAS) .188.		
B-4		3. CHANGED DIM (WAS) .44.		
A-4		4. ADDED "... & S/N..." TO FLAG NOTE 1.		
B	L/M	1. ADDED -302 ASSY ON SHEET 2.	8-9-71	CSA
A-4		2. ADDED FLAG NOTE 3.		
C	A-4	1. INCORPORATED DCN 22004; CHANGED NOTE 2, (WAS) HEAT TREAT PER MIL-H-6875 TO COND H-1100 (RC 31-3B).	3-24-71	CSA
B-2		2. ADDED FLAG 2 TO -302 CALLOUT IN PARTS LIST.		
D	L/M	1. ADDED -303 ASSY ON SHEET 3.	11-26-71	CSA
B-3		2. ADDED "... HEAT TREAT BEFORE INSTALLING -008 PIN." TO NOTE 2.		
A-4		3. ADDED FLAG NOTE 4.		
E	L/M	1. ADDED "AMS 5673" TO RING SPEC.	12-16-71	CSA



QTY	PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
1	-303	LOCK		
1	-008	PIN	SST 17-4 PH ROD CONDA .094 DIA x 1.9	AMS 5643
1	-007	NUB	SST 17-4 PH ROD CONDA .31 DIA x .2	AMS 5643
1	-006	BOSS	SST 17-4 PH ROD CONDA .31 DIA x .2	AMS 5643
1	-005	STUD	SST 17-4 PH ROD CONDA .25 DIA x .3	AMS 5643
1	-004	C-SPRING	SST 17-7 PH SH COND A .0161 x 5.5 x .4	AMS 5528 AMS 5529
1	-302	LOCK		
1	-003	BUTTON	SST 17-4 PH ROD CONDA .25 DIA x .5	AMS 5643
1	-002	RING	SST 17-7 PH WIRE .06 DIA x 4.0	AMS 5673 OR MIL-W-46078
1	-001	BAND	SST 17-7 PH SH COND A .0161 x 5.5 x .4	AMS 5528 AMS 5529
1	-301	LOCK		

4. HEAT TREAT PER MIL-H-6875 TO COND H-925 (4 HOUR TREATMENT). (D-3)
3. PROJECTION WELD PER MIL-W-12332. (B-2)
2. a. HEAT TREAT (TRANSFORM) @ 1400°F FOR 90 MINUTES AND OIL QUENCH. (C-1)
b. HEAT TREAT TO COND H-1100 (RC 31-3B) PER MIL-H-6875 EXCEPT HEAT TREAT FOR 90 MIN. HEAT TREAT BEFORE INSTALLING -008 PIN. (D-2)
1. ELECTROCHEM ETCH P/N & S/N (A-4)
- NOTES:

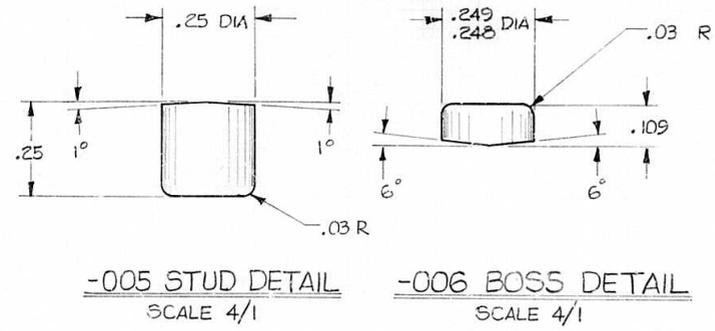
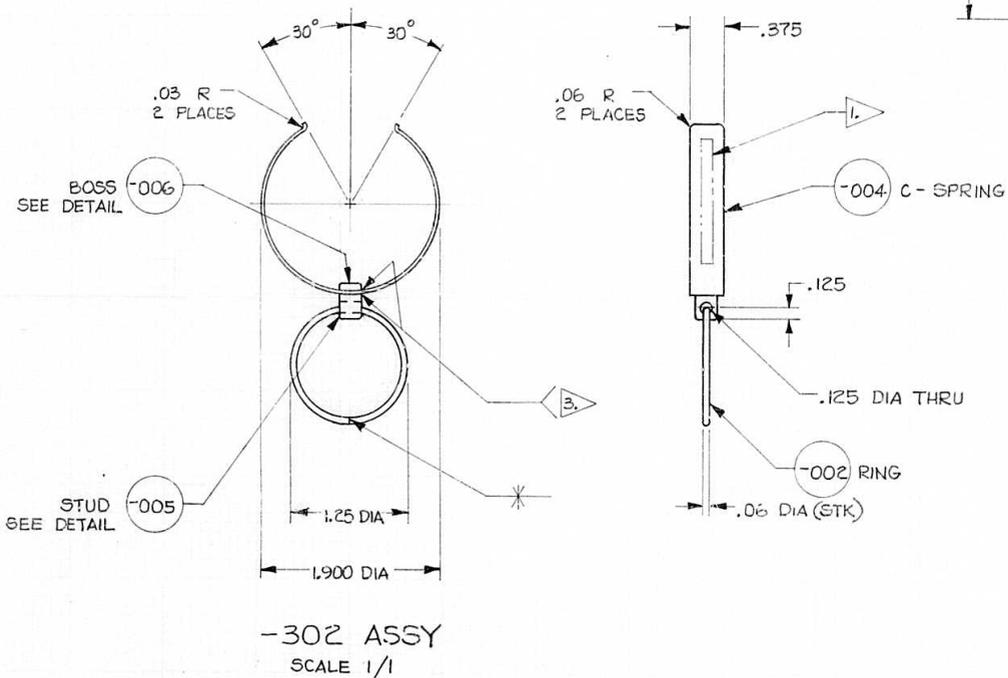
REDUCED

2. WELD PER MIL-W-8611, INSPECT WELDS PER MIL-W-22248, CLASS 4.
1. FABRICATION TOLERANCES & PRACTICES PER SKZ 36103755.
- NOTES: UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE	SIGNATURES	DATE	NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER · HOUSTON, TEXAS	
.0 ± .10 .00 ± .02 .000 ± .005 ANGULAR ± 1°	DR C.S. ALLTON ENG C.S. ALLTON CH	1-13-71 1-13-71	LOCK - DRIVE TUBE	
SURFACE FINISH IN MICRONS UNLESS NOTED OTHERWISE	APP AUTH	63 1/2/71		
SEB 39106392 SEB 39106393	NEXT ASSEMBLY		CODE IDENT NO. 21356	SIZE C
			DWG NO. SDB 39106488	E
			SCALE 1/1	ENGRG DIV BN4
			SHEET 1 OF 3	

RELEASED
12-19-71 E PL

LTR	ZONE	REVISION	DATE	APPROVAL
A		SEE SHEET 1.		
B		SEE SHEET 1.	8-6-71	<i>[Signature]</i>
C		SEE SHEET 1.	8-24-71	<i>[Signature]</i>
D		SEE SHEET 1.		<i>[Signature]</i>
E		SEE SHEET 1.		<i>[Signature]</i>



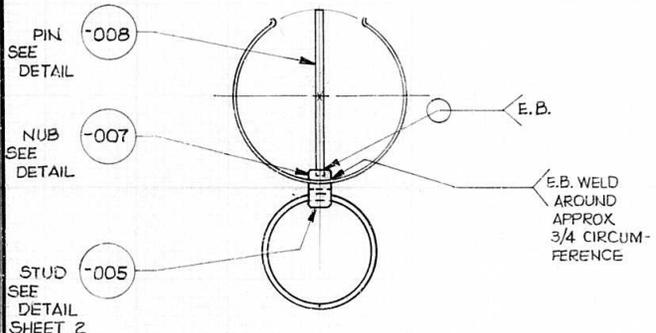
REDUCED

PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
		NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER • HOUSTON, TEXAS	
DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE .0 ± .10 .00 ± .02 .000 ± .005 ANGULAR ±		LOCK - DRIVE TUBE	
SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE ✓		APP	
		AUTH	<i>[Signature]</i> 8/6/71
NEXT ASSEMBLY		CODE IDENT NO.	SIZE DWG NO.
		21356	C SDB 39106488 E
		SCALE 1/1	ENGRG DM/JN 4 SHEET 2 OF 3

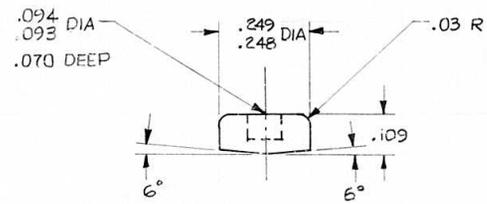
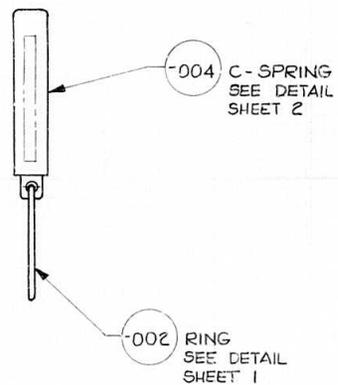
RELEASED
 Date 12-17-71 Rev E Init PC

LTR	ZONE	REVISION	DATE	APPROVAL
A		SEE SHEET 1		
B		SEE SHEET 1		
C		SEE SHEET 1		
D		SEE SHEET 1		
E		SEE SHEET 1		

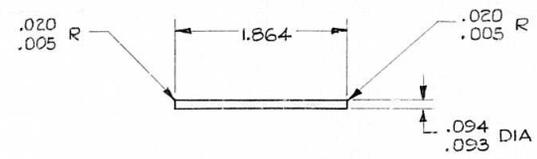
Handwritten initials



-303 ASSY
 SCALE 1/1



-007 NUB DETAIL
 SCALE 4/1



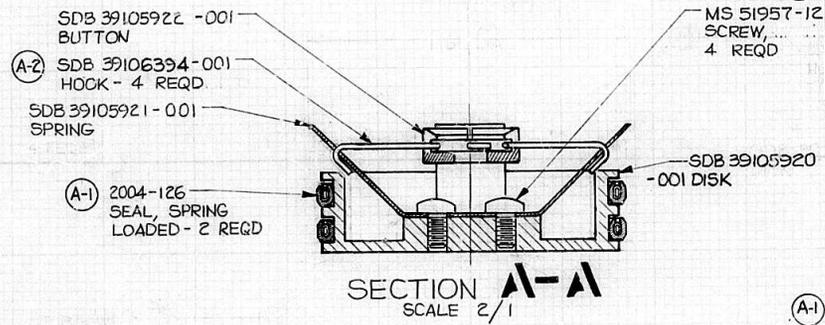
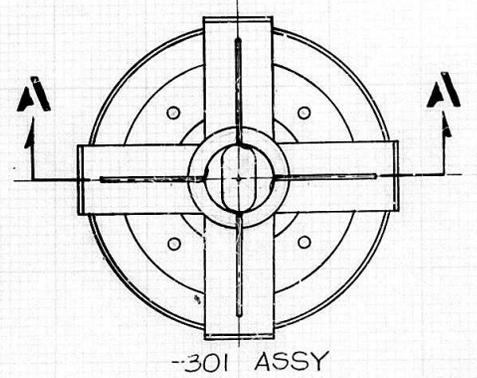
-008 PIN DETAIL
 SCALE 1/1

REDUCED

PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE .0 = .10 .00 = .02 .000 = .005 ANGULAR ±	SIGNATURES	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	
	DATE	MANNED SPACECRAFT CENTER · HOUSTON, TEXAS	
SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE	DR C.S. ALLTON	LOCK - DRIVE TUBE	
	ENG C.S. ALLTON		
NEXT ASSEMBLY	CH	CODE IDENT NO. 21356 SIZE C DWG NO. SDB 39106488 E	
	APP	SCALE 1/1 ENGRG DIV JN 4 SHEET 3 OF 3	
	AUTH <i>W.C. Amber</i>	1/24/71	

RELEASED
Date 11-26-71 Rev 1.0
11-26-71 J DPX

LTR	ZONE	REVISION	DATE	APPROVAL
A	C-4	1. REPLACED *2004-126 SPRING SEALS WITH *2004-126 SPRING SEALS.	1-18-71	CSA
	C-4	2. REPLACED SDB 39105923-301 CABLE ASSYS WITH SDB 39106394-001 HOOKS.		CSA
B		1. ADDED -302 CONFIGURATION & SHEET 2	7-22-71	CSA
C	L/M	1. ADDED RETAINER CALLOUT TO L/M	7-21-71	CSA
D	L/M	1. ADDED -303 CONFIGURATION ON SHEET 3.	11-26-71	CSA



QTY	QTY	QTY	PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
			-303	KEEPER ASSY		
4			MS 51957-15	SCREW, MACH-PAN HD	CRES CROSS-REC #4-40 UNC-2B x 3/8	
2			SDB 39107602-001	BUSHING, KEEPER		
1			SDB 39107601-001	MOUNT, KEEPER		
1			(C-1) SDB 39106970-001	RETAINER, KEEPER		
4			-501	SCREW, FLAT HEAD	CRES 0-80 x .12 LG	*
4	4		SDB 39107435-001	I-HOOK, KEEPER		
1	1		SDB 39105922-002	BUTTON, KEEPER		
1	1		SDB 39105921-002	SPRING, KEEPER		
4	4		MS 51957-12	SCREW, MACH-PAN HD	CRES CROSS RECESSED #4-40 UNC-2A x 3/16	
(A-1) 2	2	2	2004-126	SEAL, SPRING LOADED	SST 302 & TEFLON 1.562 O.D. x 1.375 I.D.	▷
(A-2)		4	SDB 39106394-001	HOOK		
		1	SDB 39105922-001	BUTTON		
		1	SDB 39105921-001	SPRING		
1	1	1	SDB 39105920-001	DISK		
(B-1)			-302	KEEPER ASSY		
			-301	KEEPER ASSY		

▷ BAL SEAL ENGRG CO, TUSTIN, CALIF. OR EQUAL.

REDUCED

NOTES:
 1. FABRICATION TOLERANCES & PRACTICES PER SKZ 36103755.
 NOTES: UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE .0 ± .10 .00 ± .02 .000 ± .005 ANGULAR ± —	SIGNATURES DR C.S. ALLTON ENG C.S. ALLTON CH	DATE 8-21-70 1-18-71	NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER • HOUSTON, TEXAS KEEPER ASSY — DRIVE TUBE
	SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE OTHERWISE ✓	APP AUTH [Signature] 9/25/70	
SEB 39106392 SEB 39106393 NEXT ASSEMBLY	SIZE C	DWG NO. SEB 39105919	D
SCALE 2/1		ENGRG DIV B N 4	SHEET 1 OF 3

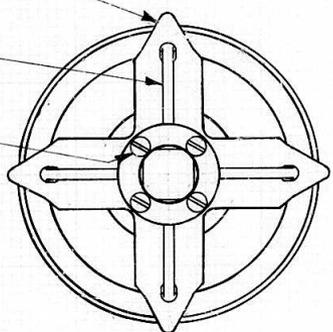
12-26-71 D 104

LTR	ZONE	REVISION	DATE	APPROVAL
A		SEE SHEET 1.		<i>[Signature]</i>
B		SEE SHEET 1.		<i>[Signature]</i>
C		SEE SHEET 1.		<i>[Signature]</i>
D		SEE SHEET 1.		<i>[Signature]</i>

SDB 39105921-002
SPRING, KEEPER

SDB 39107435-001
I-HOOK, KEEPER
4 REQD

SCREW -501
4 REQD



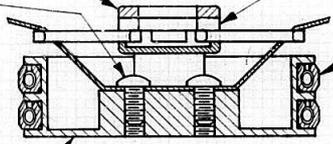
-302 ASSY
SCALE 2/1

SDB 39106970-001
RETAINER, KEEPER

M5 5195T-12
SCREW
4 REQD

SDB 39105922-002
BUTTON, KEEPER

2004-126
SEAL, SPRING LOADED
2 REQD



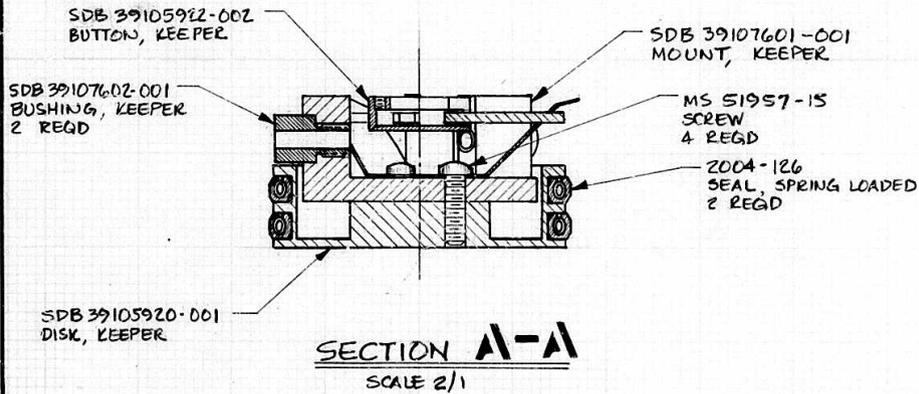
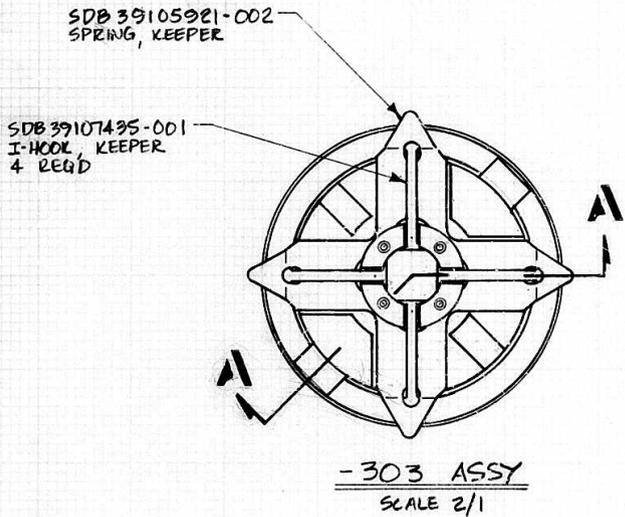
SDB 39105920-001
DISK, KEEPER

REDUCED

PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE .0 ± .10 .00 ± .02 .000 ± .005 ANGULAR ±		NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER • HOUSTON, TEXAS	
SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE		APP AUTH <i>[Signature]</i> 7/23/71	
NEXT ASSEMBLY		CODE IDENT NO. 21356 SIZE C DWG NO. SEB 39105919 SCALE 2/1 ENGRG DIV JN 4 SHEET 2 OF 3	
		KEEPER ASSY- DRIVE TUBE	
		D	

RELEASED
Date 11/26/71 By [Signature]

LTR	ZONE	REVISION	DATE	APPROVAL
A		SEE SHEET 1.		
B		SEE SHEET 1.		
C		SEE SHEET 1.		
D		SEE SHEET 1.		



REDUCED

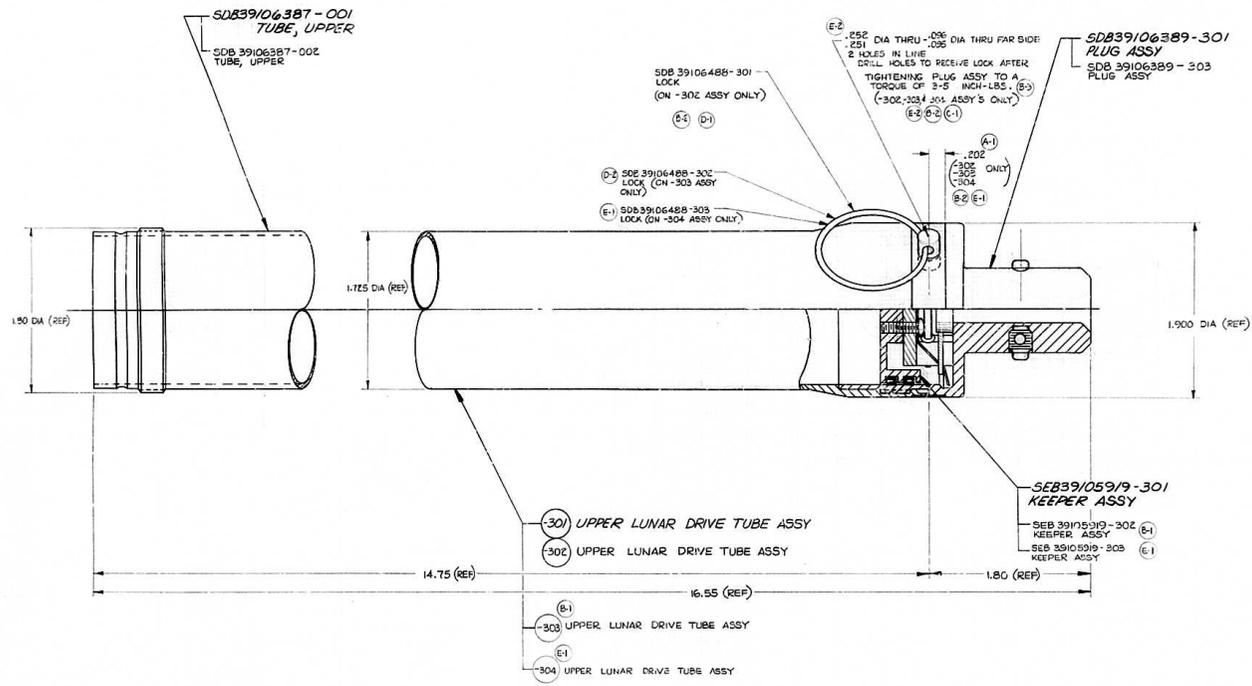
PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE .0 ± .10 .00 ± .02 .000 ± .005 ANGULAR ±		NATIONAL AERONAUTICS & SPACE ADMINISTRATION MANNED SPACECRAFT CENTER • HOUSTON, TEXAS	
SURFACE FINISH IN MICRINCHES RMS UNLESS NOTED OTHERWISE		KEEPER ASSY— DRIVE TUBE	
NEXT ASSEMBLY		CODE IDENT NO. 21356	SIZE C
		DWG NO. SEB 39105919	SHEET 3 OF 3

SIGNATURES
DR C.S. ALLTON 11-23-71
ENG C.S. ALLTON 11-23-71
CH
APP
AUTH *W.C. Huber* 11/24/71

DATE 11-23-71
DATE 11-23-71
SCALE 2/1
ENGRG DIV JN 4

11/26/71
 RELEASED BY: E
 DATE: 11/27/71

LTB/REV	REVISION	DATE	APPROVAL
A-F-4	1. CHANGED DIM. (WAS) .185.	4-11-71	CSA JHT
B-F-4	1. ADDED -303 CONFIGURATION. 2. ADDED -303 CALLOUT TO LOCK NOTES. 3. ADDED TORQUE VALUE TO PLUG ASSY ATTACHMENT.	6-7-71	CSA JHT
C-F-4	1. CHANGED TORQUE VALUE (WAS 12US INCH-LBS.).	9-11-71	CSA JHT
D-F-5 L/M	1. REMOVED SDB39106488-301 LOCK FROM -303 ASSY. 2. ADDED SDB39106488-302 LOCK TO -303 ASSY.	8-9-71	CSA JHT
E-L/M C-5	1. ADDED -304 CONFIGURATION. 2. CHANGED HOLE CALLOUT (WAS) .032 DIA THRU.	11-26-71	CSA JHT



REV	DESCRIPTION	DATE	APPROVAL	MATERIAL	SPECIFICATION
(E-1)	-304 UPPER LUNAR DRIVE TUBE ASSY				
(E-1)	SDB 39106488-303 LOCK				
(E-1)	SEB 39105919-303 KEEPER ASSY				
(D-2)	SDB 39106488-302 LOCK				NONE
(E-1)	SEB 39105919-302 KEEPER ASSY				NONE
(E-1)	-303 UPPER LUNAR DRIVE TUBE ASSY				NONE
(D-1)	SDB 39106488-301 LOCK				NONE
(/)	SDB 39106389-303 PLUS ASSY				HAFT
(/)	SDB 39106387-002 TUBE, UPPER				NOVA
(/)	SDB 39106389-301 PLUG ASSY				NOVA
(/)	SDB 39106387-001 TUBE, UPPER				NONE
(/)	SEB 39105919-301 KEEPER ASSY				NONE
(-)	-302 UPPER LUNAR DRIVE TUBE ASSY				NONE
(-)	-301 UPPER LUNAR DRIVE TUBE ASSY				NOVA

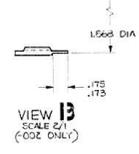
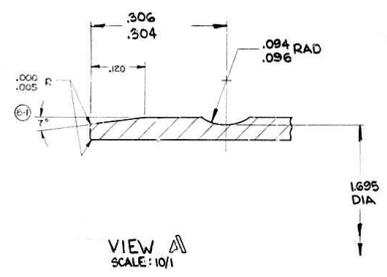
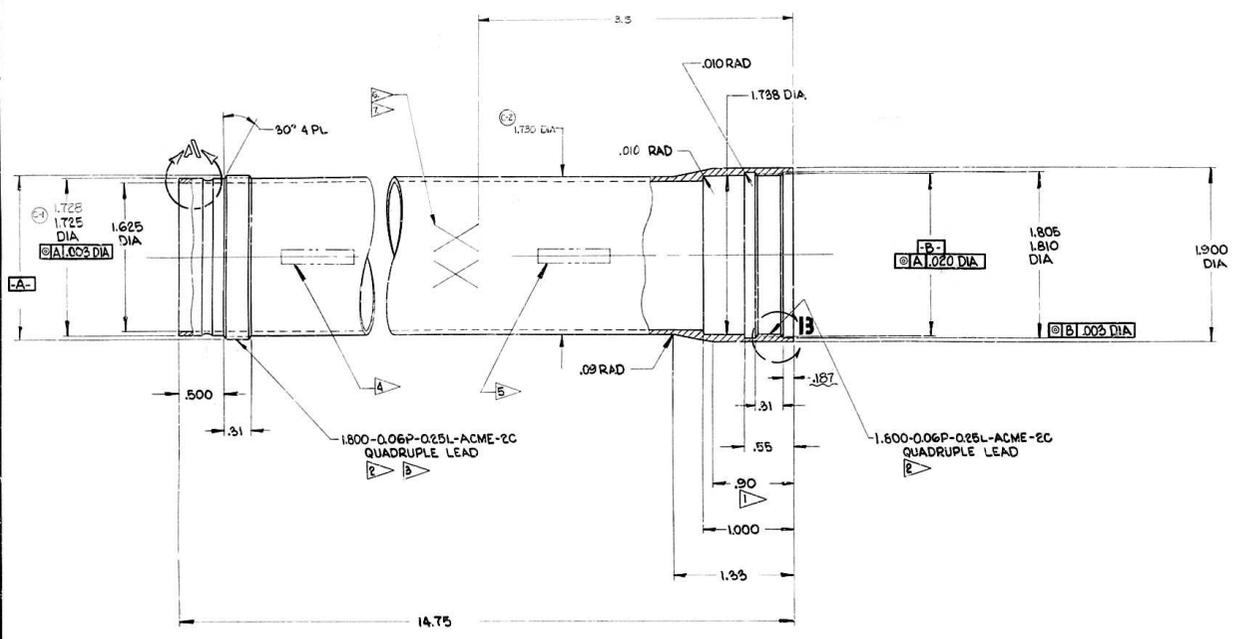
PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION
-304	UPPER LUNAR DRIVE TUBE ASSY		
-303	UPPER LUNAR DRIVE TUBE ASSY		
-302	UPPER LUNAR DRIVE TUBE ASSY		
-301	UPPER LUNAR DRIVE TUBE ASSY		

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE:
 ± .10
 .005
 .005
 ANGULAR -
 SURFACE FINISH IN MICRONS RMS UNLESS NOTED OTHERWISE
 DIM. C.S. ALLEIGH 11-25-71
 CH & S. J. 11/27/71
 APPROVED: [Signature]
 DATE: 11/27/71
 NATIONAL AERONAUTICS & SPACE ADMINISTRATION
 MANNED SPACECRAFT CENTER
 HOUSTON 1, TEXAS
 UPPER LUNAR DRIVE TUBE ASSY
 CODE IDENT NO. 2/356 E
 DRAW NO. SEB39106393 E
 SCALE 2/11
 SHEET 211 OF 211

1. FABRICATION TOLERANCES & PRACTICES PER SKS 26103755.
 NOTES: UNLESS OTHERWISE SPECIFIED

62771 REVISED BY *DLX*

TRZ/ZONE	REVISION	DATE	APPROVAL
A-1	1. CHANGED MAT L CALLOUT AND SPEC (WAS) PIPE PER ASTM-B-429.	01-71	CSA
B-C-7	1. ADDED TAPER AND RADII TO TIP.	03-71	CSA
C-D	1. CHANGED DIM (WAS) 1.725 ± .005.	06-071	CSA
	2. CHANGED DIM. (WAS) 1.725 ± .005.		



- ④ ELECTROCHEMICAL ETCH IDENTIFYING NUMBERS AFTER GRIT BLASTING.
 - ⑤ GRIT BLAST IDENTIFYING NUMBERS WITH #50 ALUMINUM OXIDE GRIT AFTER METAL FINISHING. USE 1" HIGH STENCILED NUMBERS. IDENTIFYING NUMBER IS TO BE THE LAST TWO DIGITS OF THE SERIAL NUMBER.
 - ⑥ ELECTROCHEMICAL ETCH NEXT ASSY NO. AND SERIAL NO. (ODD NOS. ONLY) PER MSC-SPEC-14-1.
 - ⑦ ELECTROCHEMICAL ETCH PART NO. PER MSC-SPEC-14-1.
 - ⑧ DO NOT ETCH.
 - ⑨ BLUNT START (HIGBEE CUT) LEAD THREAD AT POINT TANGENT TO MAJOR OR MINOR DIA AS APPLICABLE.
 - ⑩ 96 DP RAISED DIAMOND KNURL.
- NOTES:

4. METAL FINISHING PER 6XB99106400 ALUMINUM METAL FINISHING, APOLLO LUNAR HAND TOOLS, EXTERIOR SURFACES ONLY, EXCEPT AS NOTED ON FIELD OF DWG.
 5. ANODIZE PER MIL-A-8625, TYPE II, CLASS I, INTERIOR SURFACES ONLY.
 2. BREAK ALL SHARP EDGES .015-.020 RAD.
1. FABRICATION TOLERANCES AND PRACTICES PER 6XZ99106T55.
- NOTES: UNLESS OTHERWISE SPECIFIED.

PART NUMBER		DESCRIPTION	MATERIAL	SPECIFICATION
-002	TUBE, UPPER	6061-T6 AL ALY TUB	2.00 ± .012 ID × 14.8	WW-T-100/6
-001	TUBE, UPPER	6061-T6 AL ALY TUB	2.00 ± .012 ID × 14.8	WW-T-100/6

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE	SIGNATURES	DATE	NATIONAL AERONAUTICS & SPACE ADMINISTRATION
0 ± .10	DR <i>[Signature]</i>	1-5-70	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
00 ± .02	ENCL. B. ALLTON	1-28-71	
000 ± .005	CH <i>[Signature]</i>	11/3/71	
ANGULAR ± 2°	APP. <i>[Signature]</i>		
SURFACE FINISH IN MICRONS UNLESS NOTED OTHERWISE	APPROV. <i>[Signature]</i>		

CODE IDENT NO.	SIZE	DWG NO.	
5EB99106995	21556 E	5DB99106987	C

SCALE: 2/1 ENGRS DIV B114 SHEET

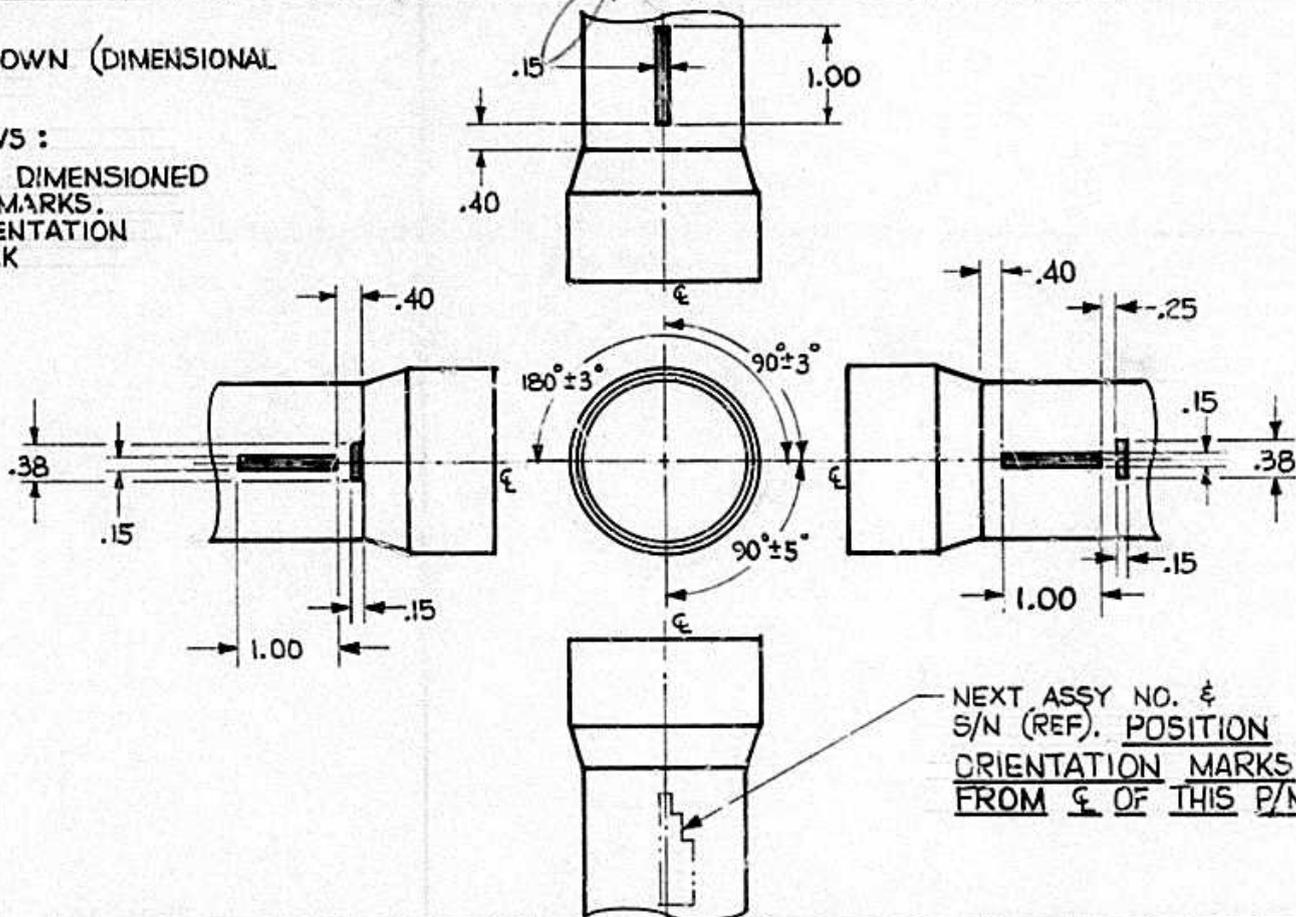
NUMBER 30509	DATE 8-29-72	DRAWING CHANGE NOTICE			SHEET 1 OF 1
DRAWING NO. SDB 39106387	REV. C	REASON FOR CHANGE DESIGN IMPROVEMENT	ORIGINATOR C.S. ALLTON	DATE 8-29-72	RELEASE
TITLE TUBE, UPPER - DRIVE TUBE		EFFECTIVITY	APPROVED	APPROVED	RELEASED
PROJECT	DRAWING TO BE CHANGED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		APPROVED		Date 8-29-72
DISPOSITION OF EXISTING MATL/PARTS		MODEL	SERIAL NO. 2031, 2033, 2035, 2037	AUTH: <i>W. Williams</i>	8/29/72
USE AS IS RETURN TO STOCK	<input type="checkbox"/>	REWORK CONDEMN	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DESCRIPTION OF CHANGE

1. ADD ORIENTATION MARKS AS SHOWN (DIMENSIONAL TOLERANCES $\pm .03$).

2. ADD FLAG NOTE \triangle AS FOLLOWS:

\triangle REMOVE FINISH FROM DIMENSIONED AREA OF ORIENTATION MARKS. ELECTROCHEM ETCH ORIENTATION MARKS FOR FLAT BLACK FINISH.



PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION	CHANGE
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