

TECHNICAL MANUAL

**S-IVB FORWARD/INSTRUMENT UNIT
UMBILICAL ASSEMBLY, SATURN V**

Prepared under Contract

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by

International Business Machines Corporation

Federal Systems Division

Huntsville, Alabama

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LIST OF EFFECTIVE PAGES

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page.

PAGE	ISSUE
*Title	1 May 69
*A	1 May 69
i	Original
*ii	1 May 69
Section I Tab	
1-1 thru 1-2	1 Sep 67
1-3	1 May 68
1-4 Blank	Original
1-5	1 Sep 67
1-6 Blank	Original
1-7	1 May 68
1-8 Blank	Original
1-9 thru 1-10	1 Sep 67
1-11	Original
1-12 Blank	Original
Section II Tab	
2-1 thru 2-2	1 Sep 67
*2-3	1 May 69
2-4 Blank	Original
2-5	1 Sep 67
*2-6 thru 2-7	1 May 68
2-8 thru 2-11	1 Sep 67
*2-12	1 May 68
2-13 thru 2-14	1 Sep 67
Section III Tab	
*3-1 thru 3-2	1 May 68
Section IV Tab	
4-1	Original
4-2 Blank	Original
Section V Tab	
5-1	Original
5-2 Blank	Original
Section VI Tab	
6-1	1 Sep 67
6-2 Blank	Original
Section VII TAB	
7-1 thru 7-2	1 Sep 67
7-3	Original
7-4	1 Sep 67
*7-5	1 May 69
*7-6	1 May 69
*7-6A	1 May 69
7-6B Blank Added	1 May 68
7-7	Original
7-8	1 Sep 67
7-9 thru 7-10	1 May 68
7-11	1 Sep 67
7-12	1 May 68
7-12A Added	1 May 68
7-12B Blank Added	1 May 68
*7-13	1 May 69
7-14 Blank	Original
*7-15	1 May 69
7-16 Blank	Original
*7-16A	1 May 69
7-16B Blank Added	1 May 68
7-17	Original
7-18 Blank	Original
7-19	1 May 68
7-20 Blank	Original
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7-22 Blank	Original
7-23 Added	1 May 68
7-24 Blank Added	1 May 68

* The asterisk indicates pages changed, added, or deleted by the current change.

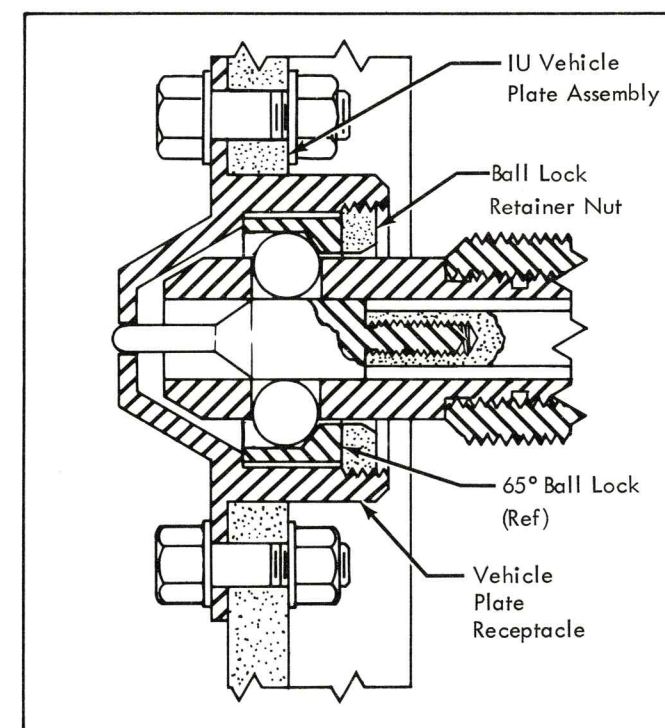
BASIC	CHANGE NO. 1	REVISION	CHANGE NO. 1	CHANGE NO. 2	CHANGE NO. 3			
1 FEB 66	27 MAY 66	1 APRIL 67	1 SEPT 67	1 MAY 68	1 MAY 69			

CONTENTS

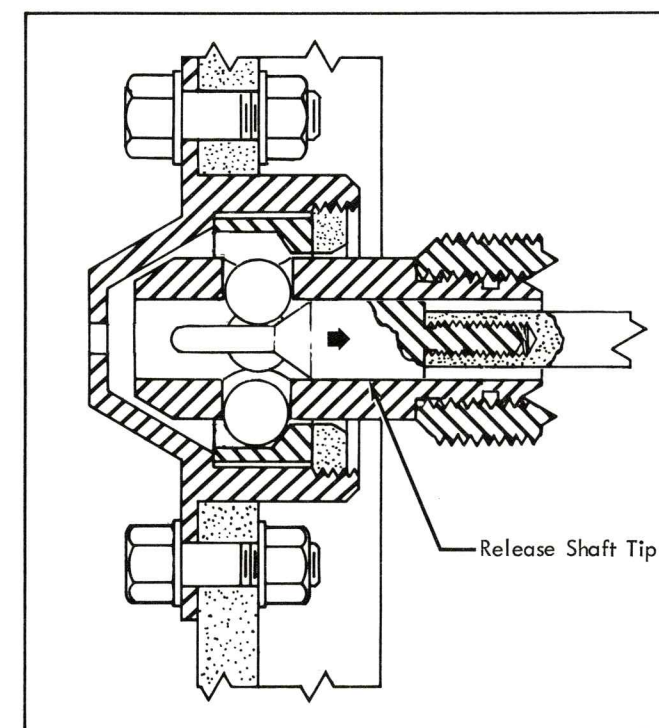
Para		Page	Para		Page
SECTION I GENERAL INFORMATION			SECTION III MAINTENANCE INSTRUCTIONS		
1-1	Introduction	1-1	3-1	General	3-1
1-2	Description	1-1	3-2	Inspection	3-1
1-3	IU Housing Assembly	1-1	3-3	Lubrication	3-1
1-4	Electrical Eject Plate Assembly . .	1-1	3-4	Marking	3-1
1-5	S-IVB Carrier Assembly	1-1	3-5	Repair	3-1
1-6	IU Umbilical Housing Test Assembly	1-2	3-6	IU Housing Assembly	3-1
SECTION II INSTALLATION AND OPERATION			3-7	Electrical Purge and Umbilical Disconnect Unions	3-1
2-1	General Operation	2-1	3-8	Cam Arms	3-1
2-2	Detailed Operation	2-1	SECTION IV SPECIAL TOOLS		
2-3	GN ₂ Eject Sequence	2-1	(Not Applicable)		
2-4	Mechanical Eject System	2-1	SECTION V SCHEMATIC DIAGRAMS		
2-5	Electrical Eject Plate Assembly . .	2-5	(Not Applicable)		
2-6	Electrical Ground System	2-5	SECTION VI HANDLING GUIDELINES		
2-7	IU Umbilical Housing Test Assembly	2-5	6-1	General	6-1
2-8	Installation and Removal Procedures . .	2-5	6-2	Precautions	6-1
2-9	IU Housing Assembly on S-IVB Carrier Assembly	2-5	6-3	Storage	6-1
2-10	Umbilical Assembly on Apollo-Saturn Vehicle	2-6	6-4	Shipping	6-1
2-11	Sleeve Assemblies (Quick-Disconnect Couplings)	2-7	SECTION VII ILLUSTRATED PARTS BREAKDOWN		
2-12	Operator Tube Assembly	2-8	7-1	Identification	7-1
2-13	Pneumatic Connections	2-8	7-2	Arrangements	7-1
2-14	S-IVB Carrier Assembly Pneumatic and Hydrogen Vent Coupling	2-8	7-3	Vendor Part Numbers	7-1
2-15	Hazardous Gas Analyzer Disconnect	2-9	7-4	Standard Part Numbers	7-1
2-16	Electrical Cable Connectors	2-9			
2-17	Electrical Eject Plate Assembly . . .	2-10			
2-18	Electrical Eject Fixture, S-IVB Carrier Assembly	2-13			
2-19	IU Housing Assembly, Shear Pin . .	2-13			

ILLUSTRATIONS

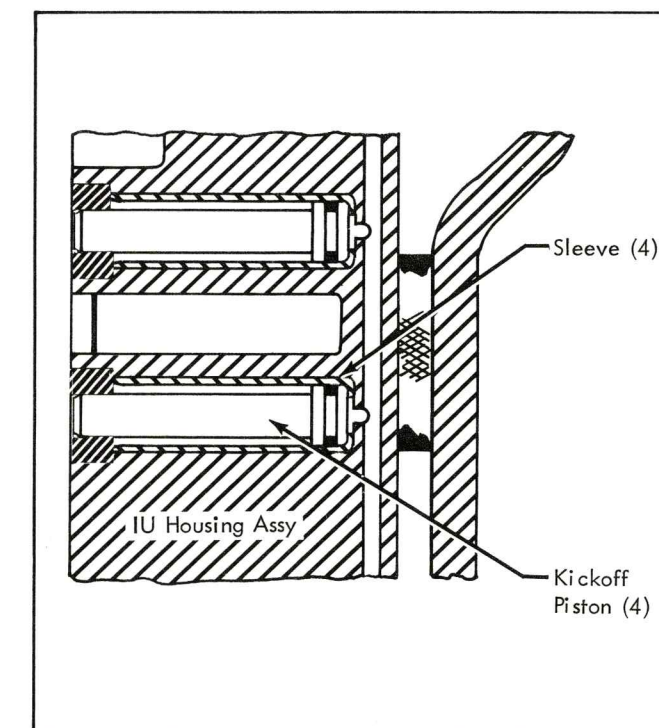
Number	Page	Number	Page
1-1 S-IVB Forward/Instrument Unit Umbilical Assembly Location	1-3	2-6 Hazardous Gas Analyzer Disconnect. .	2-10
1-2 S-IVB Forward/Instrument Unit Umbilical Assembly	1-5	2-7 IU Electrical Connector and Spacer, Installation Details	2-11
1-3 IU Housing Assembly and Associated Components	1-7	2-8 S-IVB Forward Electrical Connector, Installation Details	2-11
1-4 Electrical Eject Plate Assembly. . . .	1-9	2-9 S-IVB Carrier Assembly Electrical Eject System, Installation Details . .	2-13
1-5 S-IVB Carrier Assembly and Associated Components	1-10	2-10 Shear Pin, Installation Details	2-14
1-6 IU Umbilical Housing Test Assembly .	1-11	7-1 S-IVB Forward/Instrument Unit Umbilical Assembly	7-13
2-1 IU Housing Assembly.	2-2	7-2 Instrument Unit Housing Assembly Exploded View	7-15
2-2 4-Ball Lock Assembly and GN ₂ Eject Sequence	2-3	7-3 Forward Umbilical Carrier Assembly Exploded View	7-17
2-3 S-IVB Carrier End Assemblies and Support Brackets	2-7	7-4 4-Ball Lock Assembly Exploded View	7-19
2-4 Quick Disconnect and Butterfly Valve Assembly, Installation Details	2-7	7-5 Electrical Eject Plate Assembly Exploded View	7-21
2-5 Hydrogen Vent Disconnect Assembly, Installation Details	2-9	7-6 Sleeve Assembly Exploded View	7-23



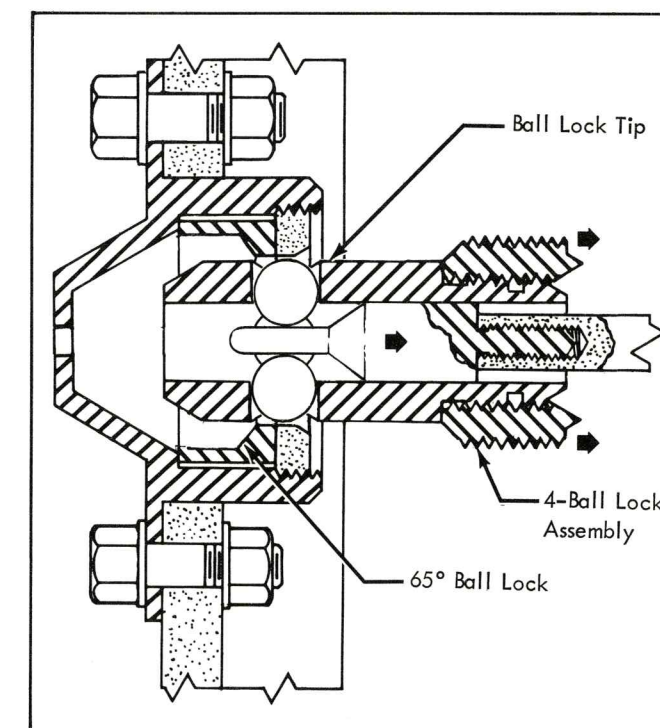
1 4-Ball Lock locked with Vehicle Plate Assembly



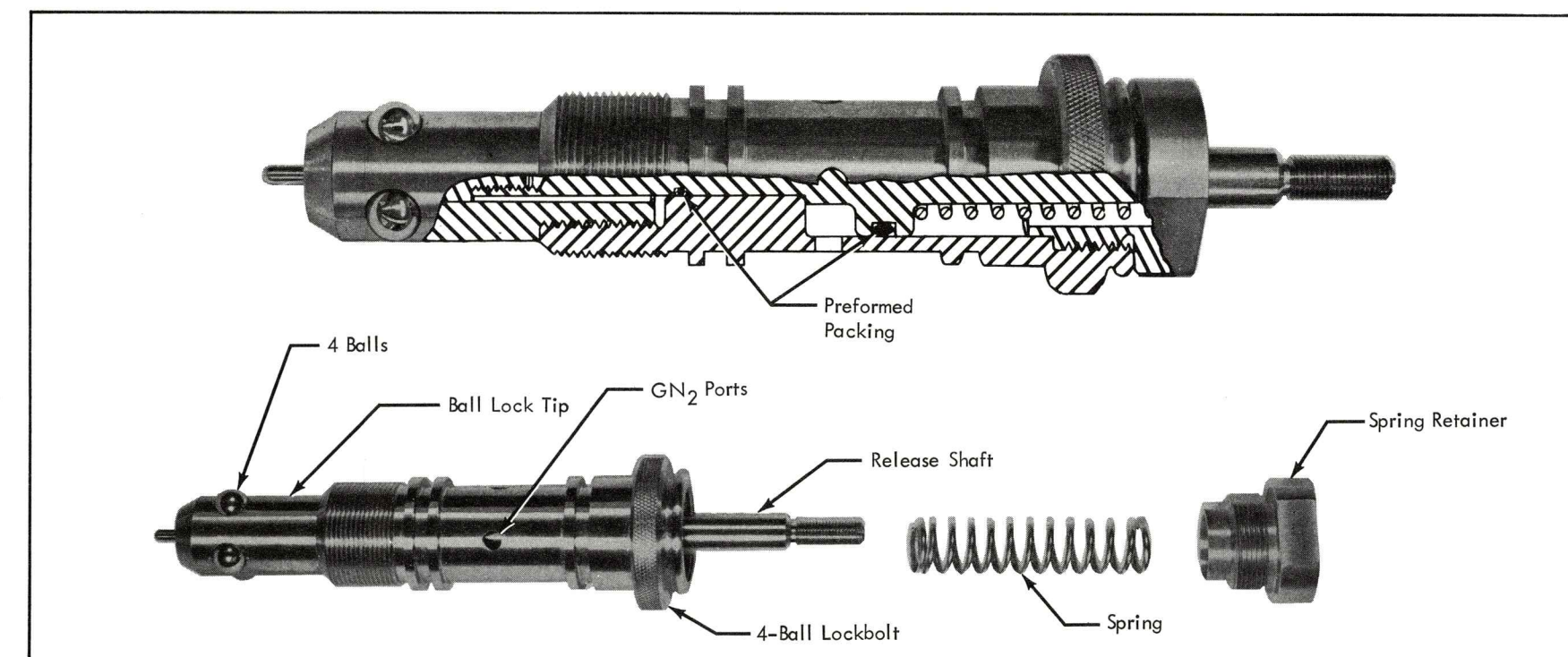
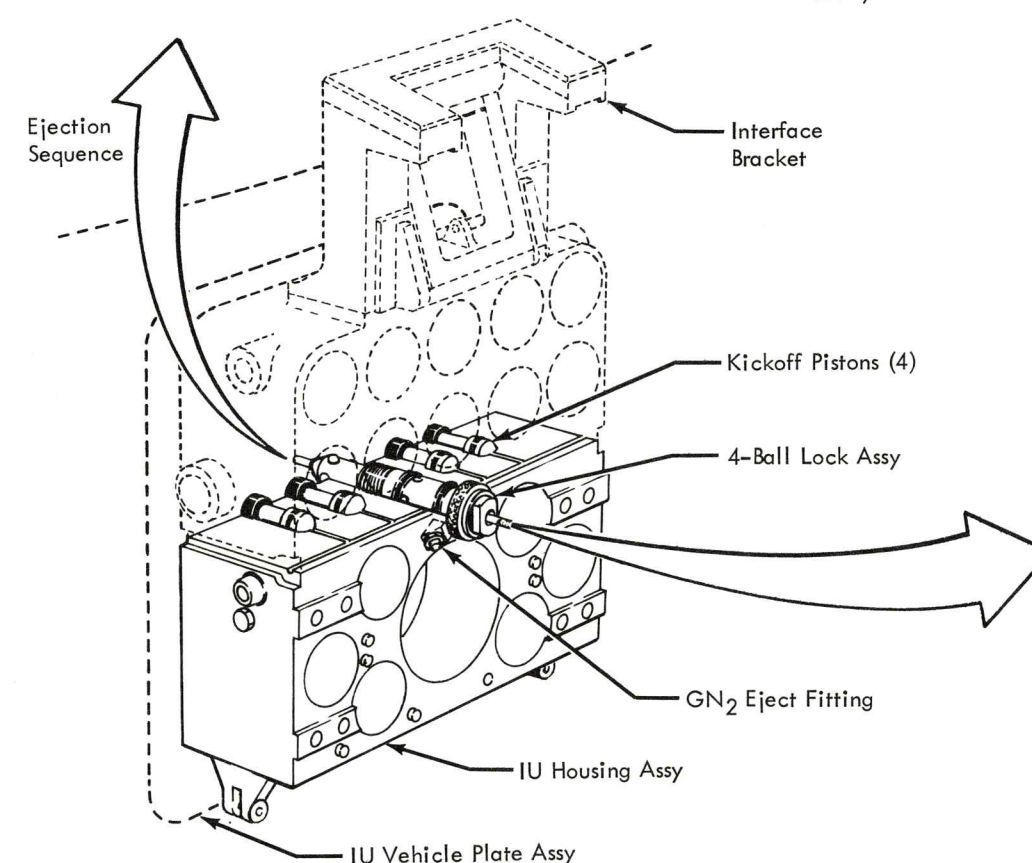
2 750 psig GN₂ applied to 4-Ball Lock Assembly actuates release shaft and moves release shaft back. Upper ball falls by gravity action into cavity



3 Simultaneously, 750 psig GN₂ is applied through channels within IU Housing Assembly, and actuates four kickoff pistons. Pistons slam against IU Vehicle Plate Assembly and force IU Housing Assembly back and away.



4 Movement of IU Housing Assembly back and away from IU Vehicle extracts 4-Ball Lock Assembly from IU Vehicle Plate receptacle completing total unlock of IU Housing Assembly from IU Vehicle Plate Assembly. IU Housing Assembly is subsequently withdrawn to Apollo-Saturn Service Arm (not shown).



Parts Listing for Figure 7-2 (Cont)

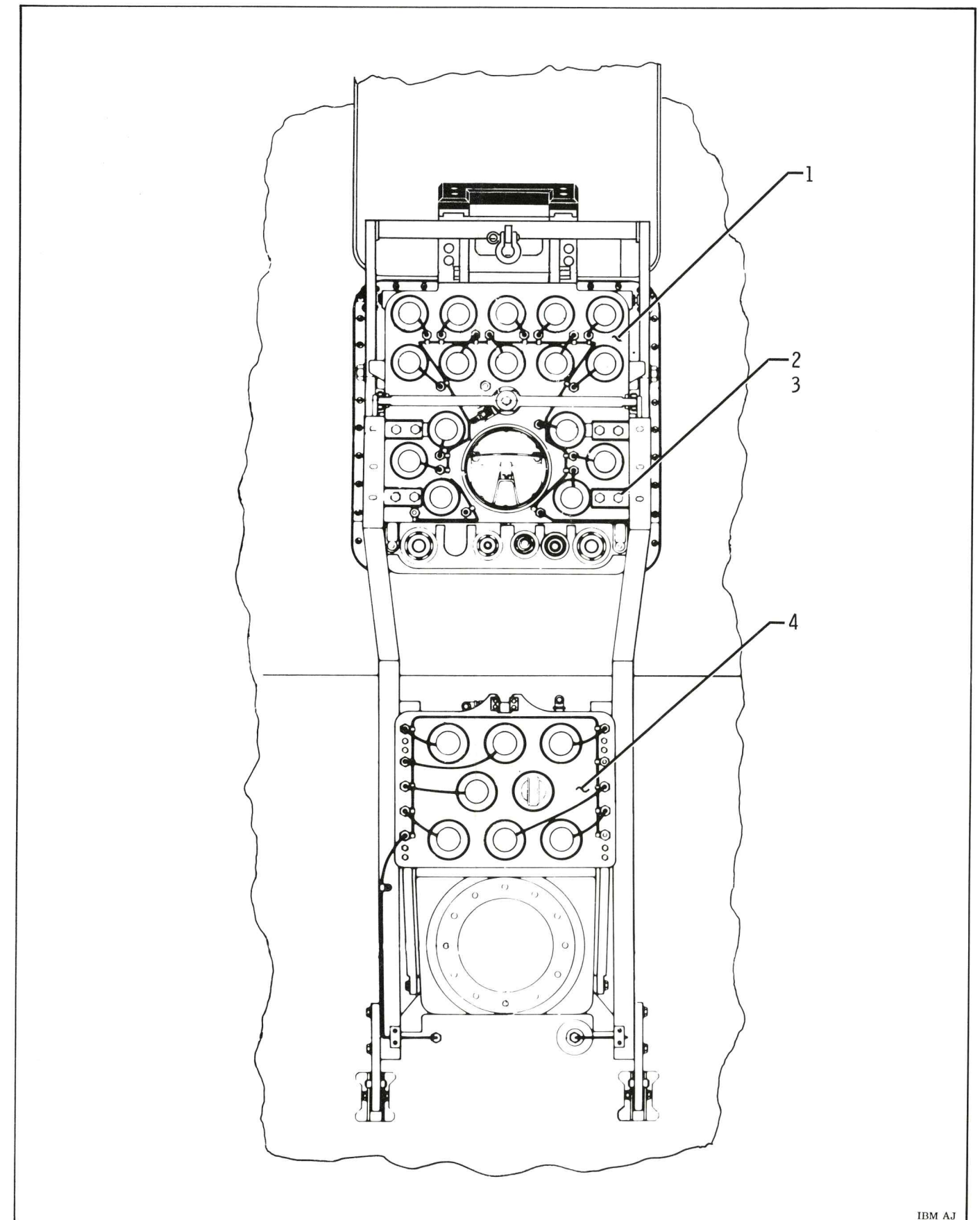
FIG. 7-2 INDEX NUMBER	PART NUMBER	DESCRIPTION							UNITS PER ASSY	SPARE PART AVAILABLE
		1	2	3	4	5	6	7		
16	11Z00318-001	.	.	PLATE, Retaining	.	.	.	.	1	*
17	NAS1352C08H10	.	.	SCREW, Cap	.	.	.	.	2	*
		---	*	---						
18	75Z14731-001	.		CAM ARM, Left-Hand	.	.	.	.	1	*
19	75Z14731-002	.		CAM ARM, Right-Hand	.	.	.	.	1	*
				ATTACHING PARTS						
20	11Z00009-001	.		BOLT	.	.	.	.	2	*
21	11Z00012-001	.		WASHER	.	.	.	.	4	*
22	NAS1351C4-16	.		SCREW	.	.	.	.	8	*
23	AN960C416	.		WASHER	.	.	.	.	4	*
24	NAS1351C4-14	.		SCREW	.	.	.	.	4	*
		---	*	---						
25	11Z00021-001	.		PIN, Cam	.	.	.	.	2	*
				ATTACHING PARTS						
26	MS21042-6	.		NUT, Self-Locking	.	.	.	.	2	*
27	11Z00022-001	.		SCREW, Roller	.	.	.	.	2	*
		---	*	---						
28	11Z00023-001	.		CAM ROLLER	.	.	.	.	2	*
29	11Z00251-001	.		PIN, Shear	.	.	.	.	2	*
30	11Z00250-001	.		RETAINER	.	.	.	.	2	*
				ATTACHING PARTS						
31	MS21045-31	.		NUT	.	.	.	.	4	*
32	AN960-10	.		WASHER	.	.	.	.	4	*
33	MS16998-31	.		SCREW	.	.	.	.	4	*
		---	*	---						
34	11Z00252-001	.		SHIM	.	.	.	.	2	*
35	11Z00254-001	.		CAP	.	.	.	.	2	*
36	75Z14730-001	.		TORQUE TUBE ASSY	.	.	.	.	1	*
37	11Z00011-001	.		CAM, Release, Left-Hand	.	.	.	.	1	*
38	11Z00011-002	.		CAM, Release, Right Hand	.	.	.	.	1	*
				ATTACHING PARTS						
39	11Z00034-001	.		SCREW, Cam	.	.	.	.	2	*
40	AN960C616L	.		WASHER	.	.	.	.	2	*
		---	*	---						
41	7916253-001	.		SLIDE ASSY	.	.	.	.	2	*
42	11Z00049-001	.		RETAINER, Coupling	.	.	.	.	1	*

Parts Listing for Figure 7-2 (Cont)

FIG. 7-2 INDEX NUMBER	PART NUMBER	DESCRIPTION							UNITS PER ASSY	SPARE PART AVAILABLE
		1	2	3	4	5	6	7		
43	BLC4B11S	.	PIN, Ball-lok (MFD by 84256)	.	.	.	.	.	2	*
		.	---	*	---					
44	11Z00038-023	.	SLEEVE ASSY (For details, see Figure 7-6)	.	.				1	
45	11Z00038-013	.	SLEEVE ASSY (For details, see Figure 7-6)	.	.				1	
46	11Z00038-015	.	SLEEVE ASSY (For details, see Figure 7-6)	.	.				1	
46A	11Z00038-017	.	SLEEVE ASSY (For details, see Figure 7-6)	.	.				1	
46B	11Z00038-021	.	SLEEVE ASSY (For details, see Figure 7-6)	.	.				1	
47	AN815-6C	.	UNION	.	.	.	.	.	1	*
48	MC266E906	.	PACKING, Preformed (O-Ring)	.	.	.	.	.	1	*
49	AN815-4C	.	UNION	.	.	.	.	.	1	*
50	MC266E904	.	PACKING, Preformed (O-Ring)	.	.	.	.	.	1	*
51	11Z00027-001	.	CABLE ASSY	.	.	.	.	.	1	*
		.	ATTACHING PARTS	.	.	.	.	.		
52	11Z00050-001	.	BLOCK, Clamp Assy (2 pieces)	.	.	.	.	.	2	*
53	MS35278-68	.	SCREW	.	.	.	.	.	4	*
54	AN960PD10L	.	WASHER	.	.	.	.	.	4	*
		.	---	*	---					
55	7916175-001	.	CABLE ASSY	.	.	.	.	.	1	*
		.	ATTACHING PARTS	.	.	.	.	.		
56	7916415-001	.	JACK, Giant (MFD by 71002)	.	.	.	.	.	18	
		.	---	*	---					
57	7916252-001	.	PISTON, Kickoff	.	.	.	.	.	4	*
58	MC266E115	.	PACKING, Preformed (O-Ring)	.	.	.	.	.	4	*
		.	ATTACHING PARTS	.	.	.	.	.		
59	11Z0025-001	.	RETAINER, PISTON	.	.	.	.	.	4	*
		.	---	*	---					
59A	7916243-001	.	SLEEVE (Press Fit)	.	.	.	.	.	4	*
60	11Z00255-001	.	PLUG	.	.	.	.	.	1	*
61	AN814-2D	.	PLUG, Bleeder	.	.	.	.	.	2	*
62	MC266E902	.	PACKING, Preformed (O-Ring)	.	.	.	.	.	2	*
63	7914394-001	.	PLATE, Identification	.	.	.	.	.	1	*
64	11Z00253-1	.	BUSHING	.	.	.	.	.	2	*
65	(Deleted)	.		.	.	.	.	.		
66	(Deleted)	.		.	.	.	.	.		

Parts Listing for Figure 7-2 (Cont)

FIG. 7-2 INDEX NUMBER	PART NUMBER	DESCRIPTION							UNITS PER ASSY	SPARE PART AVAILABLE
		1	2	3	4	5	6	7		
67	(Deleted)									
68	(Deleted)									
69	791590-001	.		SEAL ASSY, Upper Umbilical					1	*
70	7915950-001-01	.	.	STRIP (Glued to Index No. 72 by using . . .					2	*
				Adhesive 7911973-001)						
71	7915950-001-02	.	.	STRIP (Glued to Index No. 72 by using . . .					1	*
				Adhesive 7911973-001)						
72	7915950-001-03	.	.	SEAL (Glued to Index No. 83 by using . . .					1	*
				Adhesive DC 140 (MFD by 71984)						
				ATTACHING PARTS						
73	MS51957-32	.		SCREW, Pan Head #6					16	*
74	AN960C6L	.		WASHER, Flat					34	*
75	NAS1021C06	.		NUT, Self Locking					24	*
76	MS51957-29	.		SCREW					2	*
				---*---						
77	7915949-001	.		SEAL ASSY, Lower Umbilical					1	*
78	7915949-001-01	.	.	STRIP (Glued to Index No. 79 by using . . .					1	*
				Adhesive 7911973-001)						
79	7915949-001-02	.	.	SEAL (Glued to Index No. 83 by using . . .					1	*
				Adhesive DC 140 (MFD by 71984)						
				ATTACHING PARTS						
80	MS51957-32	.		SCREW, Pan Head #6.					8	*
81	AN960C6L	.		WASHER, Flat					16	*
82	NAS1021C06	.		NUT, Self Locking					8	*
				---*---						
83	11Z00003-003	.		HOUSING, Umbilical Assembly					1	*
84	KNHL1011SSX	.	.	INSERT (MFD by 98004)					2	*
85	KNHL518SSX	.	.	INSERT (MFD by 98004)					2	*
86	KNHL616SSX	.	.	INSERT (MFD by 98004)					12	*
87	7916179-001	.	.	INSERT					1	*



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Figure 7-1
S-IVB Forward/Instrument Unit Umbilical Assembly Major Subassemblies
7-13/7-14

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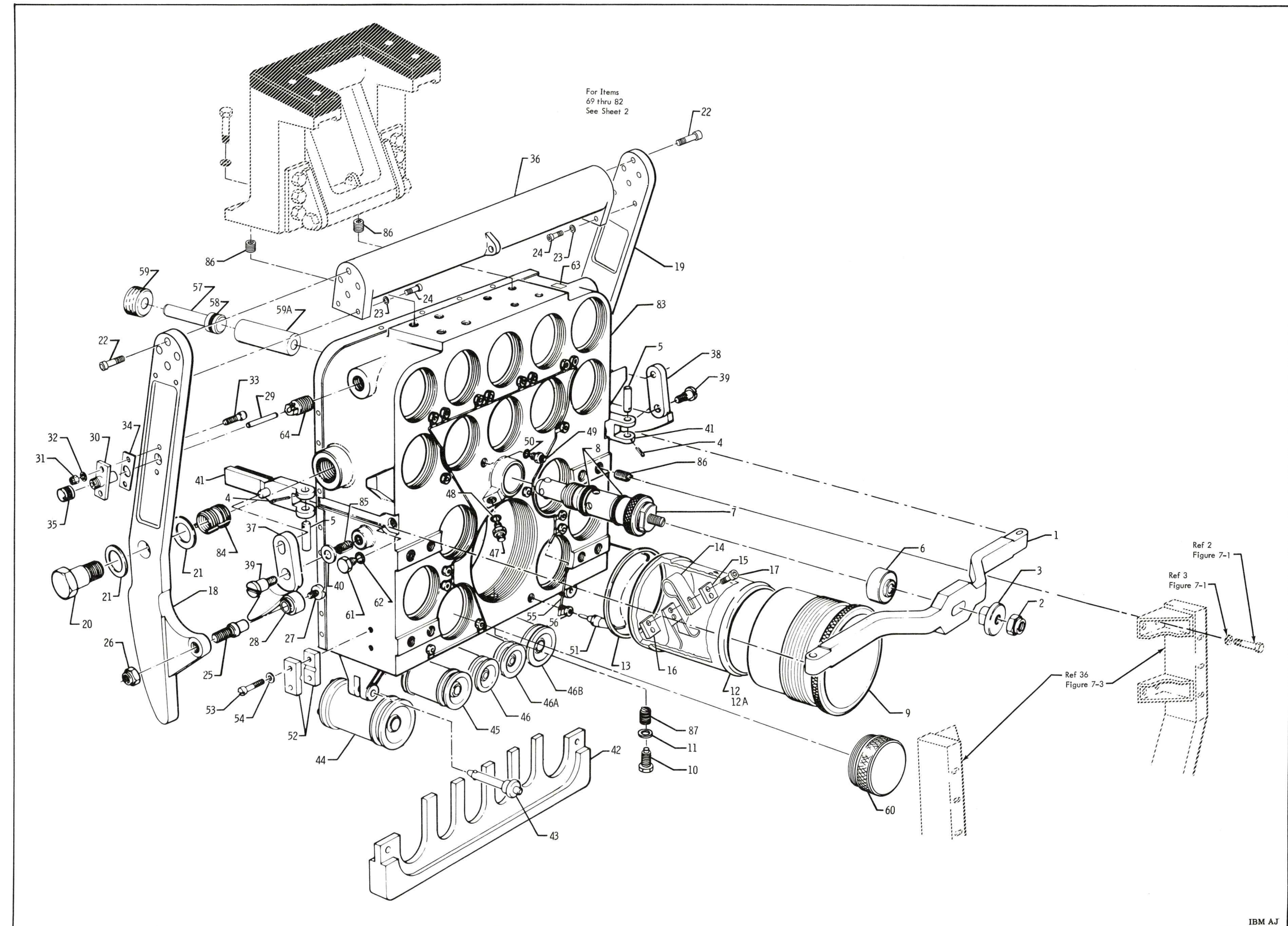
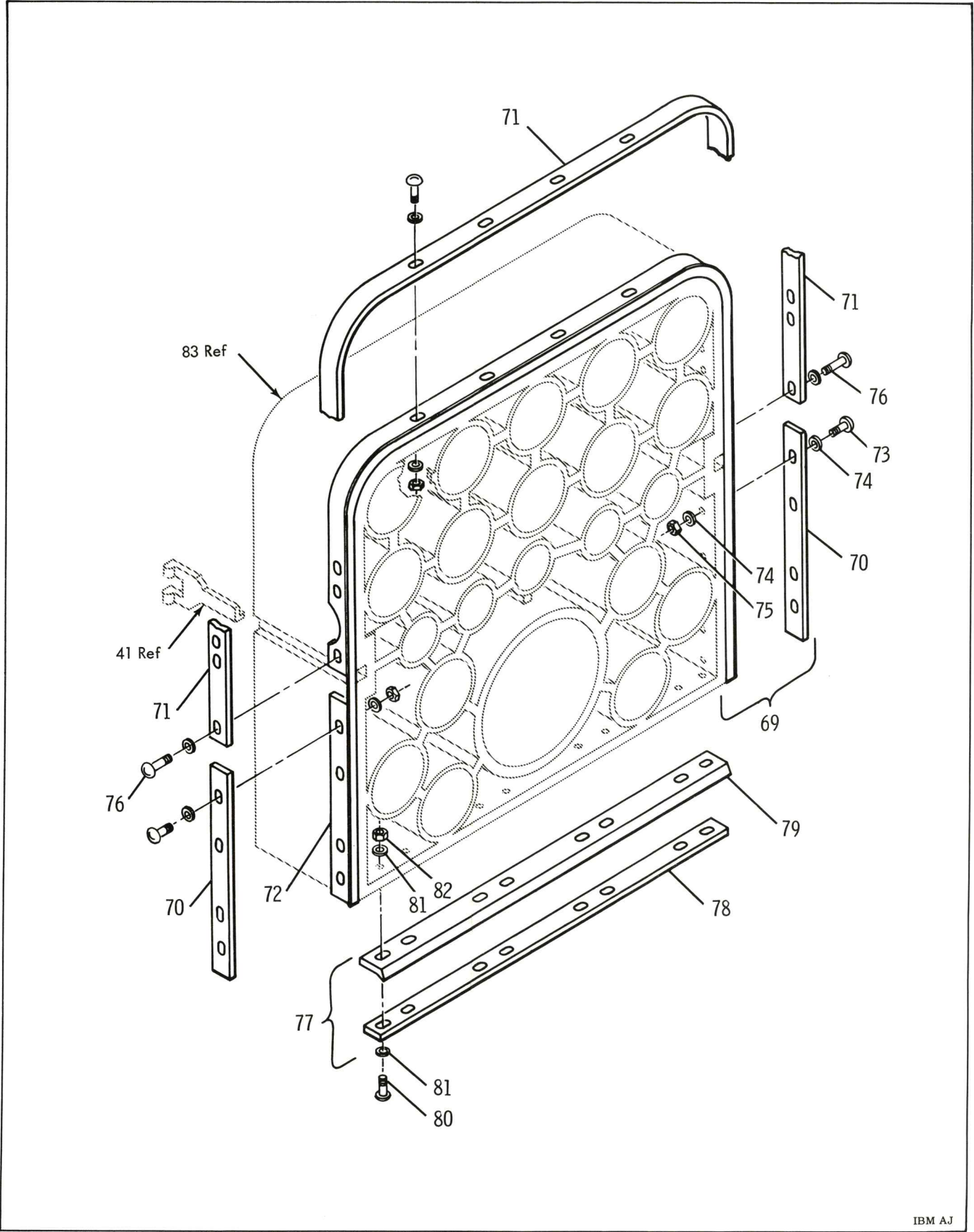


Figure 7-2
Instrument Unit Housing Assembly, Exploded View (Sheet 1)

Changed 1 May 1969

7-15/7-16



IBM A.J

Figure 7-2
S-IVB Instrument Unit Housing Assembly, Exploded View (Sheet 2)

Added 1 May 1968

7-16A/7-16B