TO: ALL HOLDERS OF NOSE GEAR STEERING CHECK VALVE MODULAR ASSY
COMPONENT MAINTENANCE MANUAL 32-51-40

REVISION NO. 5 DATED JUL 01/03

HIGHLIGHTS

All data that was in 767 CMMs 32-51-41 and 32-51-42 is now included in this CMM 32-51-40.

Pages which have been added or revised are outlined below together with the highlights of the revision. Remove and insert the affected pages as listed and enter Revision No. and date on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
DESCRIPTION & OPERATION 3	Added clarifications and upated callouts.

NOSE GEAR STEERING CHECK VALVE MODULAR ASSEMBLY

PART NUMBER 275T4112-2,-3

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

REVISION RECORD

- Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY	REVISION NUMBER	REVISION DATE	DATE FILED	BY

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR B10275	OCT 01/87

PAGE	DATE	CODE
32-51-40		
TITLE PAGE		
1	OCT 01/87	01
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REVISION RECORD		
1	OCT 01/87	01
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TR & SB RECORD		
1	OCT 01/87	01
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LIST OF EFFECTIVE PAGES		
*1	JUL 01/03	01
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CONTENTS		
1	MAR 01/02	01.1
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1	MAR 01/02	01.1
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101	OCT 01/93	01.1
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1001	OCT 01/87	01
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1003	BLANK	
1004	OCT 01/87	01
1005	MAR 01/02	01.1
1006	MAR 01/02	01.1

* = REVISED, ADDED OR DELETED

TABLE OF CONTENTS

*[1] Special instructions are not necessary. Use standard industry practices and the instructions in SOPM 20-30-03.

*[2] Refer to TESTING/TROUBLE SHOOTING.

INTRODUCTION

The instructions in this manual provide the information necessary to perform maintenance functions ranging from simple checks and replacement to complete shop-type repair.

This manual is divided into separate sections:

1. Title Page
2. Record of Revisions
3. Temporary Revision & Service Bulletin Record
4. List of Effective Pages
5. Table of Contents
6. Introduction
7. Procedures & IPL Sections

Refer to the Table of Contents for the page location of applicable sections. An asterisked flagnote *[ ] in place of the page number indicates that no special instructions are provided since the function can be performed using standard industry practices.

The beginning of the REPAIR section includes a list of the separate repairs, a list of applicable standard Boeing practices, and an explanation of the True Position Dimensioning symbols used.

An explanation of the use of the Illustrated Parts List is provided in the Introduction to that section.

All weights and measurements used in the manual are in English units, unless otherwise stated. When metric equivalents are given they will be in parentheses following the English units.

Design changes, optional parts, configuration differences and Service Bulletin modifications create alternate part numbers. These are identified in the Illustrated Parts List (IPL) by adding an alphabetical character to the basic item number. The resulting item number is called an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless otherwise indicated.

Verification:

Testing/TS -- Jan 13/93
Disassembly -- Jan 13/93
Assembly -- Jan 13/93

NOSE GEAR STEERING CHECK VALVE MODULAR ASSEMBLY

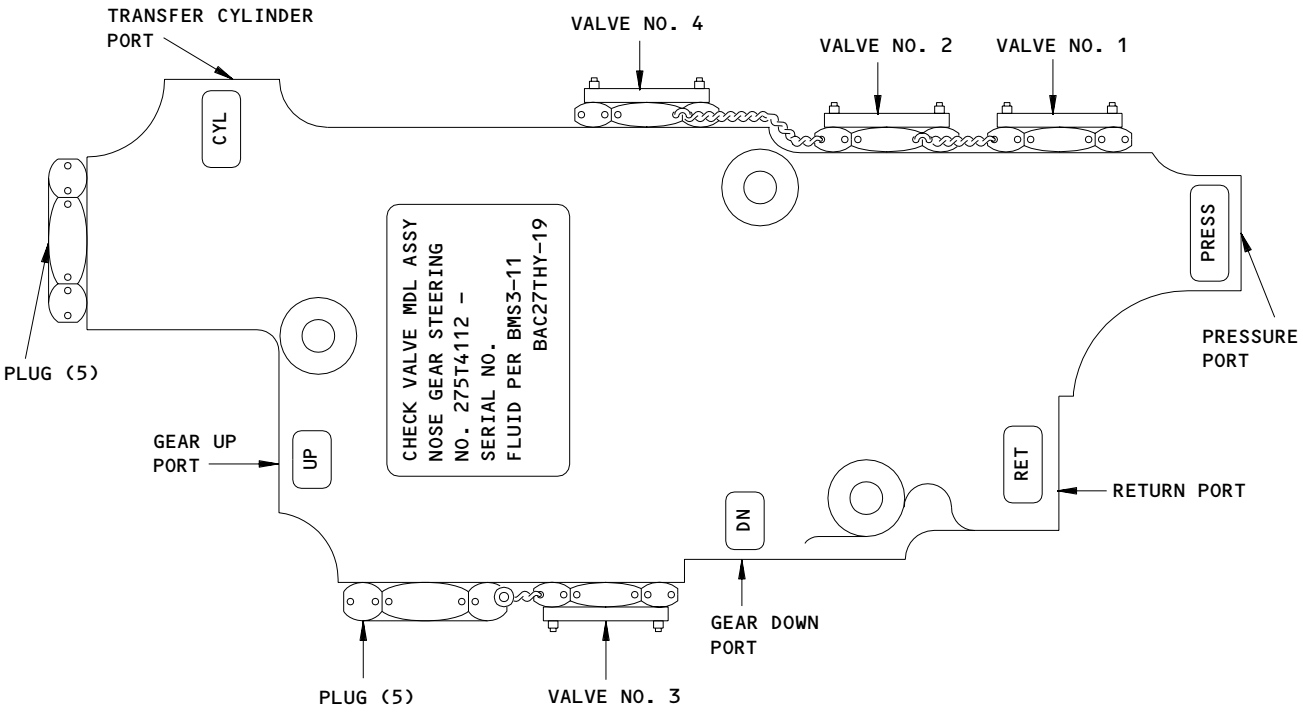
DESCRIPTION AND OPERATION

1. The nose gear steering check valve modular assembly includes a housing assembly, two plugs and four cartridge valves.

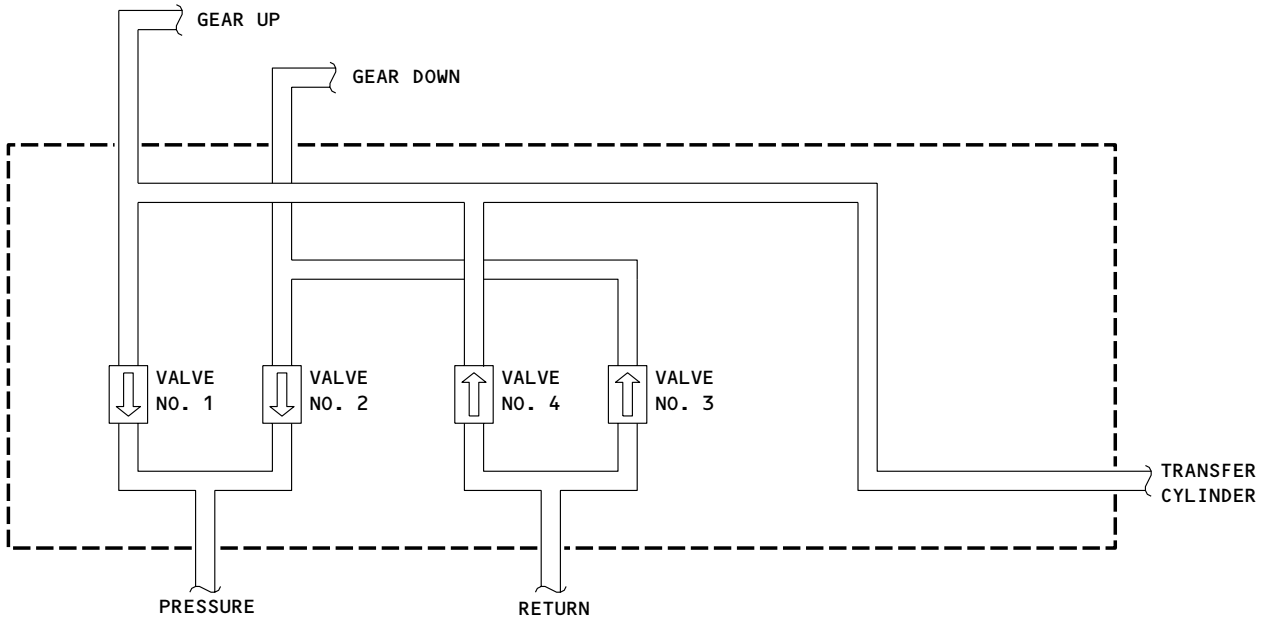
2. The modular assembly supplies constant 3000 psi system pressure to the pressure (PRESS) port and receives constant 50 psi return pressure at the return (RET) port. Valves 1 and 2 (Fig. 1) provide constant system pressure and valves 3 and 4 provide constant return pressure.

3. Leading Particulars (Approximate)

   Length -- 11 inches
   Height -- 5 inches
   Width -- 2 inches
   Weight -- 5.0 - 9.0 pounds (dry)
   Operating Medium -- Hydraulic Fluid, BMS 3-11
   Proof Pressure -- 4500 psi



VALVE LOCATION DETAILS

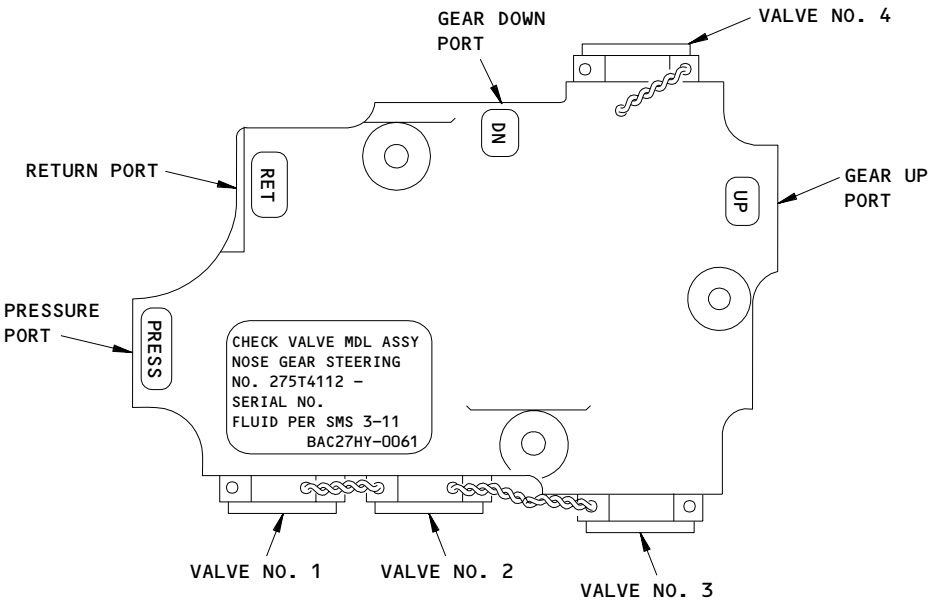


SCHEMATIC DIAGRAM

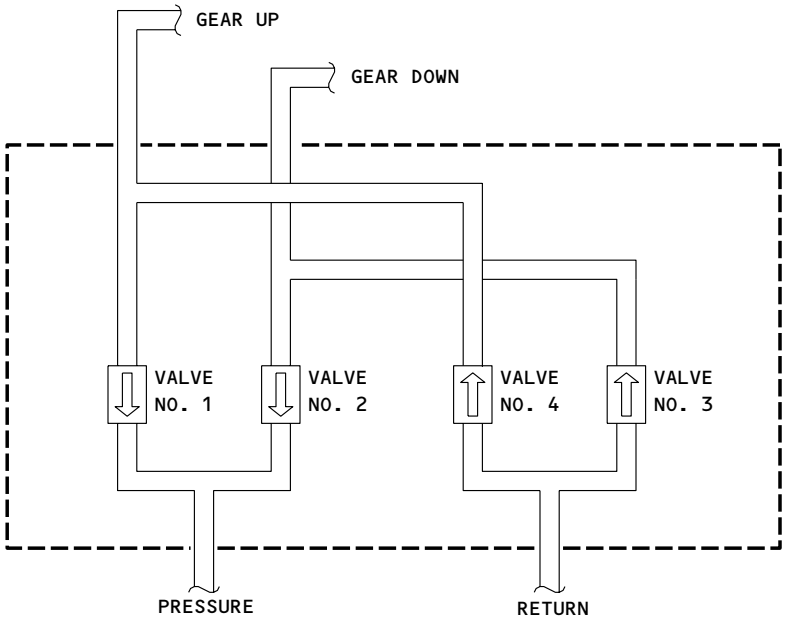
275T4112-2

Nose Gear Steering Check Valve Modular Assembly
Figure 1 (Sheet 1)

578



VALVE LOCATION DETAILS



SCHEMATIC DIAGRAM

275T4112-3

Nose Gear Steering Check Valve Modular Assembly
Figure 1 (Sheet 2)

278634

TESTING AND TROUBLE SHOOTING

1. Test Equipment

NOTE: Equivalent substitutes may be used.

A. Hydraulic stand capable of supplying hydraulic fluid, BMS 3-11, at variable controlled pressures of 0 to 4500 psi. Fluid must be filtered per SAE Aerospace Recommended Practices ARP 598.

B. Fittings -- To fit MS33649-8 port.

2. Preparation for Test

A. Install fittings in ports and hook up hydraulic lines.

B. Fill assembly with BMS 3-11 hydraulic fluid and bleed all air.

3. Test

CAUTION: DO NOT APPLY COMPRESSED AIR TO PORTS AT ANY TIME.

A. Proof Pressure Test

(1) Plug return (RET), transfer cylinder (CYL) if applicable, and pressure (PRESS) ports.

(2) Apply 4400-4500 psi pressure to gear up (UP) and gear down (DN) ports.

(3) Hold pressure for three minutes. Check that there is no external leakage or permanent set.

(4) Repeat step (2) and (3) using 3 psi pressure. Check that there is no external leakage.

B. Check Valve Flow Test (Fig. 1)

(1) Valve 1:

(a) Plug all ports except UP and PRESS ports.

(b) Apply 3000 psi pressure gradually to UP port. See that valve cracks open to PRESS port at 2-8 psi. Increase flow to 13 gpm. Pressure drop between UP and PRESS ports must not be more than 150 psi.

(2) Valve 2:

(a) Plug all ports except DN and PRESS Ports.

(b) Apply 3000 psi pressure gradually to DN port. See that valve cracks open to PRESS port at 2-8 psi. Increase flow to 13 gpm. Pressure drop between DN and PRESS ports must not be more than 150 psi.

(3) Valve 3:

(a) Plug all ports except RET and DN ports.

(b) Apply 3000 psi pressure gradually to RET port. See that valve cracks open to DN ports at 2-8 psi. Increase flow to 11 gpm. Pressure drop between RET and DN ports must not be more than 250 psi.

(4) Valve 4:

(a) Plug all ports except RET and UP ports.

(b) Apply 3000 psi pressure gradually to RET port. See that valve cracks open to UP port at 2-8 psi. Increase flow to 11 gpm. Pressure drop between RET and UP ports must not be more than 200 psi.

(5) Connect a hydraulic line to the UP port with the DN, PRESS and RET ports open. Slowly increase pressure until the check valve cracks (8 psi maximum). Make sure there is flow from only the PRESS port.

(6) Connect a hydraulic line to the DN port with the UP, PRESS and RET ports open. Slowly increase pressure until the check valve cracks (8 psi maximum). Make sure there is flow from only the PRESS port.

(7) Connect a hydraulic line to the RET port with the UP and PRESS ports blocked and the DN port open. Slowly increase pressure until the check valve cracks (8 psi maximum). Make sure there is flow from the DN port. Decrease pressure to zero.

(8) Open the UP port. Block the DN port. Slowly increase pressure to the RET port until the check valve cracks. Make sure there is flow from the UP port.

C. Internal Leakage Test -- Check that there is no measurable leakage when the following steps are performed.

(1) Plug all ports except UP and PRESS ports. Apply 3000 psi pressure to pressure (PRESS) port for two minutes and check for leakage at gear (UP) port.

(2) Plug all ports except DN and PRESS ports. Apply 3000 psi pressure to PRESS port for two minutes and check for leakage at DN port.

(3) Plug all ports except UP and RET ports. Apply 3000 psi pressure to UP port for two minutes and check for leakage at RET port.

(4) Plug all ports except DN and RET ports. Apply 3000 psi pressure to DN port for two minutes and observe check for at RET port.

TROUBLE	PROBABLE CAUSE	CORRECTION
Steps B.(1) or C.(1)	Defective cartridge valve (No. 1).	Replace valve No. 1.
Steps B.(2) or C.(2)	Defective cartridge valve (No. 2).	Replace valve No. 2.
Steps B.(3) or C.(3)	Defective cartridge valve (No. 3).	Replace valve No. 3.
Steps B.(4) or C.(4)	Defective cartridge valve (No. 4).	Replace valve No. 4.

Trouble Shooting Chart
Figure 101

4. Corrective Procedures

A. Drain hydraulic fluid from unit.

B. Remove defective parts per DISASSEMBLY and install new parts per ASSEMBLY.

DISASSEMBLY

NOTE: Refer to TESTING/TROUBLE SHOOTING to establish condition or probable cause of any malfunction and to determine extent of disassembly and repair.

1. Parts Replacement (IPL Fig. 1)

   NOTE: The following parts are recommended for replacement. Unless otherwise specified, actual replacement of parts may be based on in-service experience.

   A. Backup ring (15, 40, 50), packings (10, 35, 45), lockwire.

CAUTION: THIS IS A PRECISION PART. AVOID ALL UNNECESSARY HANDLING. PARTS MUST BE PROTECTED AT ALL TIMES WHEN NOT IN WORK.

2. Disassembly

   A. Remove lockwires.

   B. Remove four cartridge valves (30A) and two plugs (5A) from housing assembly (55).

   C. Remove backup rings (40, 50) and packings (35, 45) from cartridge valve (30A).

   D. Remove backup rings (15) and packing (10) from plugs (5A).

CHECK

1. Check all parts for obvious defects in accordance with standard industry practices.

2. Penetrant check per 20-20-02 -- Housing (70, IPL Fig. 1).

REPAIR - GENERAL

1. Content

   A. Repair, refinish and replacement procedures are included in separate repair sections as follows:

P/N	NAME	REPAIR
275T4113	HOUSING	1-1
- - -	MARKER	2-1

2. Standard Practices

   A. Refer to the following standard practices as applicable, for the following repair procedures.

20-30-03 General Cleaning Procedures
20-41-01 Decoding Table for Boeing Finish Codes
20-41-02 Application of Chemical and Solvent Resistant Finishes
20-44-02 Temporary Protective Coatings
20-50-04 Installation of Permanent Drill Passage Pin and Plug
20-50-05 Application of Aluminum Foil and Other Markers
20-50-06 Installation of O-rings and teflon seals
20-60-01 Solvents
20-60-02 Finishing Materials
20-60-04 Miscellaneous Materials

3. Materials

NOTE: Equivalent substitutes can be used.

A. Adhesive -- BMS 5-55 (SOPM 20-60-04)

B. Protective Finish -- BMS 10-55, Type 1 (SOPM 20-60-02)

C. Solvent -- Aliphatic Naphtha TT-N-95 type 1 or 2 (replaces BMS 3-2, type 1 or 2) (SOPM 20-60-01)

HOUSING ASSEMBLY - PLATING REPAIR 1-1

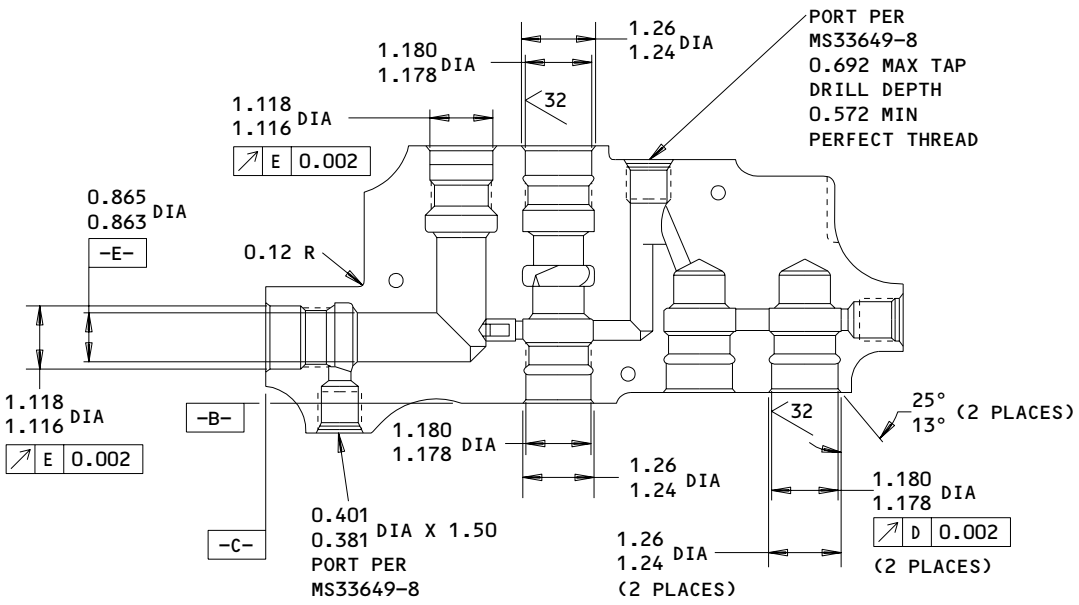
275T4113-2, -3

NOTE: Refer to REPAIR - GENERAL for a list of applicable standard practices. For repair of surfaces which is only replacement of the original finish, refer to Refinish instructions, Fig. 601.

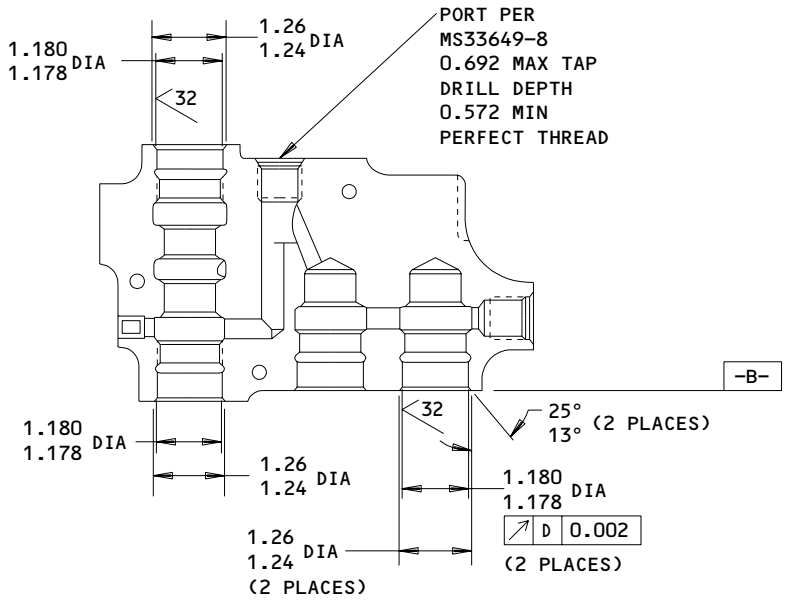
1. Pin and Plug Replacement

A. Remove the old pin (65) and plug (60) from housing assy (55).

B. Install a replacement pin and plug per SOPM 20-50-04.



275T4113-1



275T4113-4

REFINISH

CHROMIC ACID ANODIZE
ALL OVER (F-17.09)

MATERIAL

AL ALLOY

ALL DIMENSIONS ARE IN INCHES

Housing Repair
Figure 601

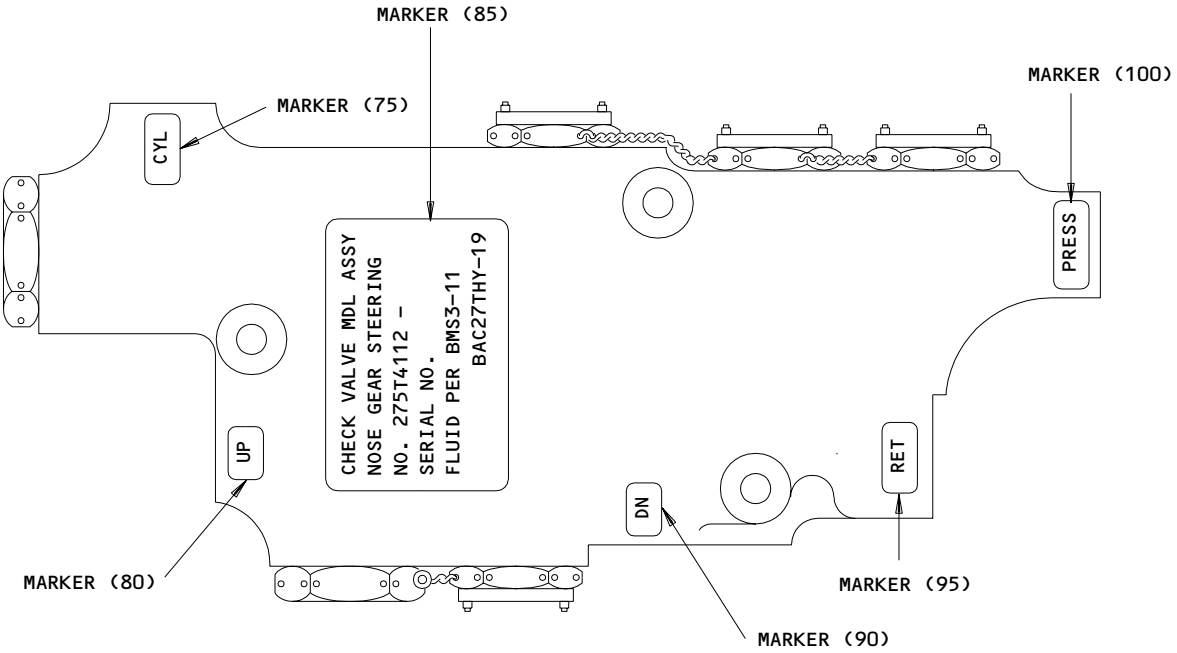
91390

MARKER - REPAIR 2-1

BAC27THY-2, -3, -4, -19, -23, -26

1. Nameplate and Markers Replacement

A. Replace defective markers or nameplate per SOPM 20-50-05. See Fig. 601 for locations.



Marker Restoration Location
Figure 601

579

ASSEMBLY

1. Materials

NOTE: Equivalent substitutes can be used.

A. Hydraulic Fluid -- BMS 3-11, Type 4 (SOPM 20-60-03)

B. Assembly Lube -- MCS 352 (SOPM 20-60-03)

2. Assembly (IPL Fig. 1)

CAUTION: THIS IS A PRECISION PART. GIVE THE PART PROTECTION AT ALL TIMES WHEN NOT IN WORK.

A. Apply a thin layer of hydraulic fluid or assembly lube to packings (35, 45) and install on cartridge valves (30A) with backup rings (40, 50) per 20-50-06.

B. Apply a thin layer of hydraulic fluid or assembly lube to packings (10) and install on plugs (5A) with backup rings (15) per 20-50-06.

C. Apply assembly lube to cartridge valves (30A) and plugs (5A) and install in housing assembly (55).

D. Tighten cartridge valves (30A) and plugs (5A) to 425-500 lb-in.

E. Do the functional test.

F. After the test, lockwire cartridge valves (30A) by the double twist method per (SOPM 20-50-02).

G. Partially drain the hydraulic fluid from the assembly and put caps or plugs in all the ports.

H. Give the unit protection and put it away by standard industry practices and the instructions in SOPM 20-44-02 and 20-70-01.

ILLUSTRATED PARTS LIST

1. This section lists and illustrates replaceable or repairable component parts. The Illustrated Parts Catalog contains a complete explanation of the Boeing part numbering system.

2. Indentures show parts relationships as follows:

    Assembly
      Detail Parts for Assembly
      Subassembly
      Attaching Parts for Subassembly
        Detail Parts for Subassembly

    Detail Installation Parts (Included only if installation parts may be returned to shop as part of assembly)

3. One use code letter (A, B, C, etc.) is assigned in the EFF CODE column for each variation of top assembly. All listed parts are used on all top assemblies except when limitations are shown by use code letter opposite individual part entries.

4. Letter suffixes (alpha-variants) are added to item numbers for optional parts, Service Bulletin modification parts, configuration differences (except left- and right-hand parts), product improvement parts, and parts added between two sequential item numbers. The alpha-variant is not shown on illustrations when appearance and location of all variants of the part is the same.

5. Service Bulletin modifications are shown by the notations PRE SB XXXX and POST SB XXXX.

    A. When a new top assembly part number is assigned by Service Bulletin, the notations appear at the top assembly level only. The configuration differences at detail part level are then shown by use code letter.

    B. When the top assembly part number is not changed by the Service Bulletin, the notations appear at the detail part level.

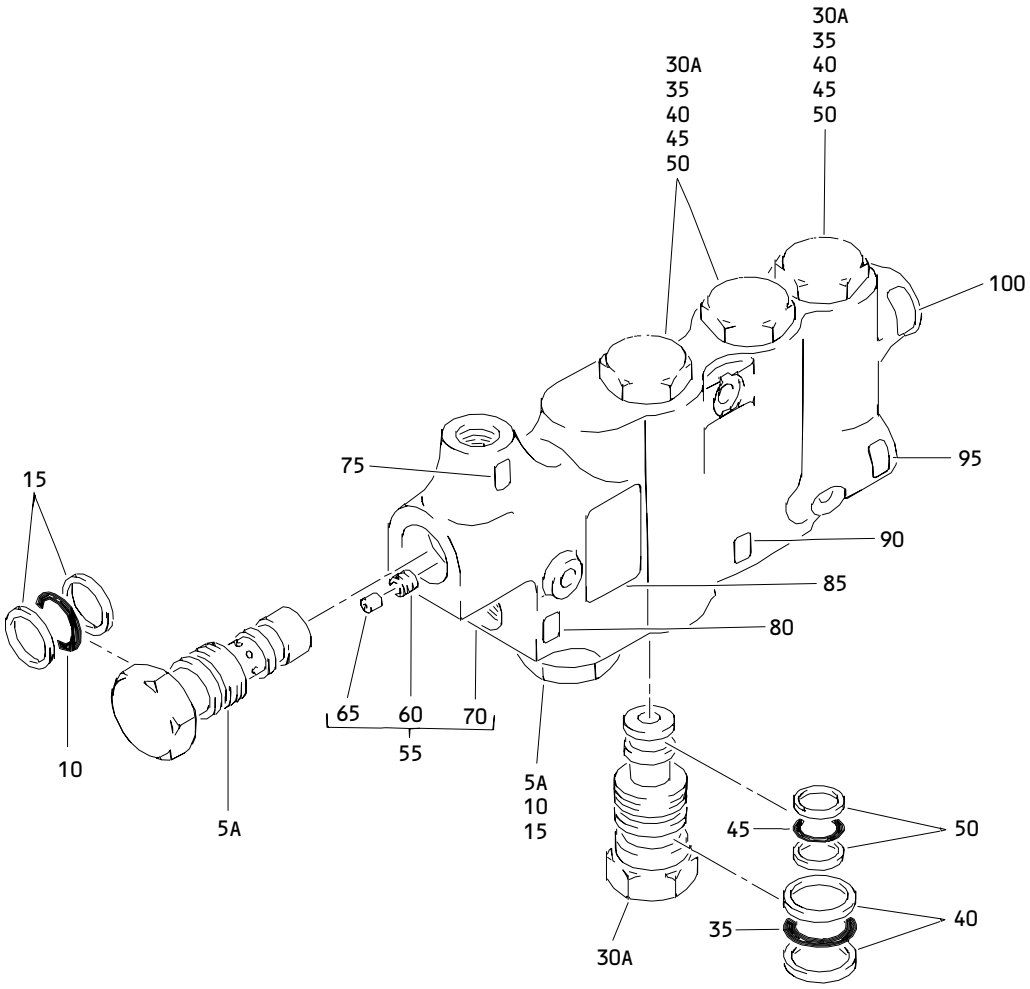
6. Parts Interchangeability

Optional (OPT)	The parts are optional to and interchangeable with other parts having the same item number.
Supersedes, Superseded By (SUPSDS, SUPSD BY)	The part supersedes and is not interchangeable with the original part.
Replaces, Replaced By (REPLS, REPLD BY)	The part replaces and is interchangeable with, or is an alternate to, the original part.

VENDORS

92003 PARKER-HANNIFIN CORPORATION
18321 JAMBOREE BOULEVARD
IRVINE, CALIFORNIA 92713

99240 CRISSAIR, INCORPORATED
38905 TENTH STREET EAST
PALMDALE, CALIFORNIA 93550-3415



Nose Gear Steering Check Valve Modular Assembly
Figure 1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	275T4112-1		DELETED		
-1A	275T4112-2		MODULAR ASSY-NG STEERING CHECK VALVE	A	RF
-1B	275T4112-3		DELETED		
-1C	275T4112-3		MODULAR ASSY-NG STEERING CHECK VALVE	B	RF
5	6216		DELETED		
5A	275T0001-1		.PLUG	A	2
10	NAS1611-119		.PACKING	A	2
15	MS27595-119		.RING-BACKUP (OPT ITEM 15A)	A	4
-15A	BACR12BM119		.RING-BACKUP (OPT ITEM 15)	A	4
20	NAS1611-115		DELETED		
25	MS27595-115		DELETED		
30	S270T242-1		DELETED		
30A	2790521-102		.VALVE-CARTRIDGE (V92003) (SPEC S270T242-1) (OPT 1C1244 (V99240))		4
35	NAS1611-213		.PACKING		4
40	MS27595-213		.RING-BACKUP (OPT ITEM 40A)		8
-40A	BACR12BM213		.RING-BACKUP (OPT ITEM 40)		8
45	NAS1611-116		.PACKING		4
50	MS27595-116		.RING-BACKUP (OPT ITEM 50A)		8
-50A	BACR12BM116		.RING-BACKUP (OPT ITEM 50)		8

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
55	275T4113-1		.HOUSING ASSY	A	1
-55A	275T4113-4		.HOUSING ASSY	B	1
60	BACP20AX37D		..PLUG		1
65	BACP20AX37DP		..PIN		1
70	275T4113-2		..HOUSING- (OPT ITEM 70A) (USED ON ITEM 55)		1
-70A	275T4113-3		..HOUSING- (OPT ITEM 70) (USED ON ITEM 55)		1
-70B	275T4113-4		..HOUSING (USED ON ITEM 55A)		1
75	BAC27THY26		.MARKER	A	1
80	BAC27THY2		.MARKER		1
85	BAC27THY19		.NAMEPLATE	A	1
85A	BAC27THY0061		.NAMEPLATE	B	1
90	BAC27THY3		.MARKER		1
95	BAC27THY4		.MARKER		1
100	BAC27THY23		.MARKER		1