TO: ALL HOLDERS OF ENGINE-DRIVEN PUMP AND AIR-DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER MODULE ASSEMBLY COMPONENT MAINTENANCE MANUAL 29-11-46

REVISION NO. 16 DATED MAR 01/02

HIGHLIGHTS

All data formerly in manual 29-11-45 is included in this manual 29-11-46.

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 the Revision No. and date on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
106-107	Updated the functional test par. 3.F.(1), (2), (3) to clarify the relief valve operational check.

BOEING

COMPONENT
MAINTENANCE MANUAL

ENGINE-DRIVEN PUMP AND AIR-DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER MODULE ASSEMBLY

PART NUMBERS 271T0068-1,-4 THRU -12

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

58612

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 B10373	OCT 10/82
		PRR N52058	OCT 10/82
		PRR N52225	OCT 10/82
		PRR VDC-N0058	OCT 10/82
		PRR VDC-T0044	OCT 10/82
		PRR VDC-T0059	OCT 10/82
		PRR VDC-T0142	OCT 10/82
		PRR VDC-N0115	JUL 10/83
767-29-0003		PRR VDC-T0192	JUL 10/83
		PRR VDC-N0175	JUL 10/84
	29-1		APR 10/86
757-29-0031		PRR 53135-94R	OCT 01/87
757-29-0040		PRR 54219-R	JUL 01/91
767-29-0043		PRR B11894	OCT 01/92
		PRR B12900-1	SEP 01/95

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

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.

The beginning of the REPAIR section includes a list of the separate repairs and a list of applicable standard Boeing practices.

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 -- Apr 09/91
Assembly -- Apr 09/91

ENGINE DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER MODULE ASSEMBLY

DESCRIPTION AND OPERATION

1. The Engine Driven Pump and Air Driven Pump Pressure and Case Drain Filter Module Assembly is a housing with two filters with shutoff valves, three check valves, a relief valve, a temperature switch, two pressure switches, and two differential pressure indicators. The housing has a port for ground service access to the pressure system, and could have a port for a temperature transmitter.

2. The filter module assemblies are installed on the keelbeam in the main landing gear wheel well and on the left and right engine struts. These units keep the hydraulic fluid clean in the airplane hydraulic systems. See Fig. 1 for a functional schematic diagram of the assembly.

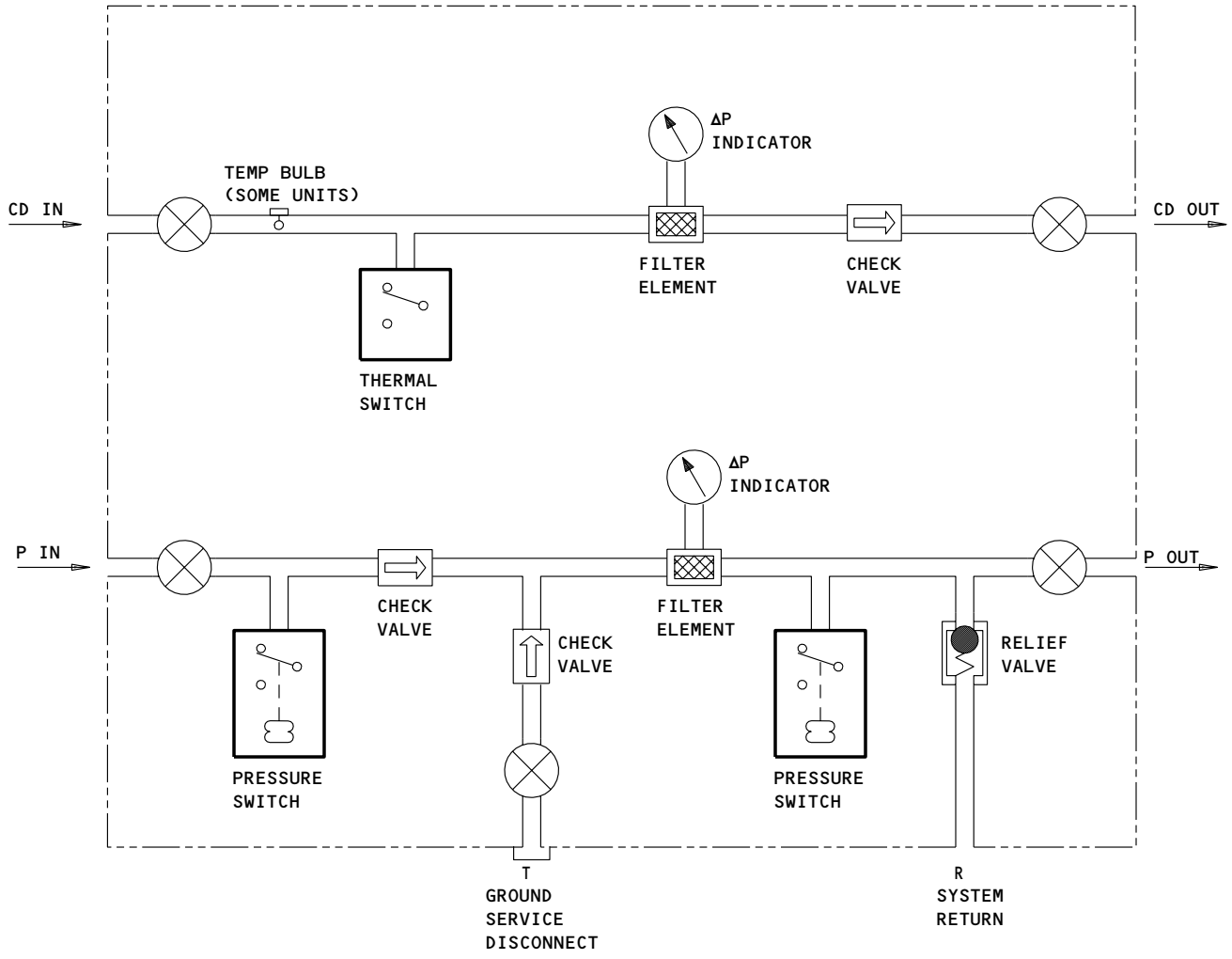
3. Leading Particulars (approximate)

   A. Length -- 18 inches

   B. Width -- 7 inches

   C. Height -- 12 inches

   D. Weight -- 22 pounds



Functional Schematic Diagram
Figure 1

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TESTING AND TROUBLE SHOOTING

1. Equipment and Materials

NOTE: Equivalent substitutes may be used.

A. Handling fixture -- A29003-2

B. Dummy relief valve -- A29003-7

C. Dummy filter elements -- A29003-9, -10

D. Dummy filter case -- A29003-11

E. Switch test box -- A29006-20

F. Hydraulic test stand -- to supply BMS 3-11 hydraulic fluid at controlled pressures up to 4500 psig and rates up to 37 gal/min.

G. Flowmeter with capacity up to 37 gal/min.

H. Pressure gage(s) to measure differential pressure up to 120 psid between input and output sides of filter module assembly

I. Electric power supply -- 18.0-29.5 VDC (28 VDC nominal)

J. Voltmeter

K. Hydraulic fluid bath with temperature monitoring and control (to 300°F minimum)

L. Megohmmeter

2. Preparation for Test

A. Install the unit on handling fixture A29003-2.

B. Remove the plugs from the inlet and outlet ports, if installed. Then connect the unit to the hydraulic test stand.

3. Functional Tests (Fig. 101, 102, 103, IPL Fig. 1)

NOTE: If you do not get the indicated results, refer to Troubleshooting Chart, Fig. 104 for probable cause and corrective procedures.

A. Differential pressure indicators (140, 90) check.

(1) Install dummy filter case A29003-11 and element A29003-10 in the location of parts (155, 170), and install dummy element A29003-9 with filter case (40) to simulate completely clogged elements.

(2) Make sure these ports are open: ports P OUT, CD OUT, R and T.

(3) Do these tests at 80-110°F (27-43°C).

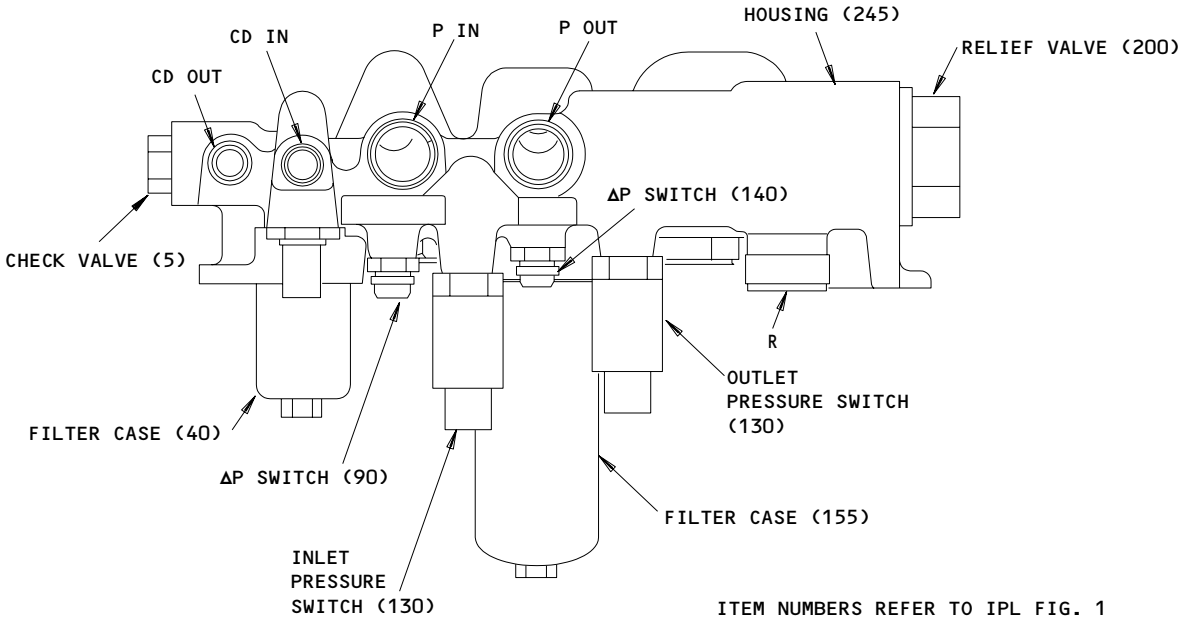
(4) Slowly increase the hydraulic pressure to ports CD IN and P IN until the warning button on differential pressure indicator (90) is completely extended. Make sure the differential pressure is 48-62 psid.

(5) Slowly increase the hydraulic pressure until the warning button on the pressure side of the differential pressure indicator (140) is completely extended. Make sure the differential pressure is 100-120 psid. Decrease the pressure to zero and reset the indicators.

(6) Remove dummy filter case A29003-11 and element A29003-10, and filter case (40) and dummy element A29003-9.

(7) Install packing (45) on filter case (40), then install filter element (50) and the case on the housing. Tighten the case to 270-300 lb-in.

(8) Install packing (160) and backup rings (165) on filter case (155), then install filter element (170) and the case on the housing. Tighten the case to 270-300 lb-in.



Filter Module Assembly Details
Figure 101

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B. Shutoff valve leakage check.

(1) Connect the hydraulic test stand to ports P IN, P OUT, and CD IN.

(2) Apply 10 psig to ports P IN, P OUT, and CD IN. Make sure the leakage from each shutoff valve is not more than 15 drops/min.

(3) Decrease the pressure to zero.

C. Proof pressure tests.

NOTE: These tests are necessary only if the unit was completely disassembled and overhauled.

CAUTION: RELIEF VALVE (200) IS A PRECISION ASSEMBLY. GIVE THIS VALVE PROTECTION, AS IN A CONTAINER WHILE IT IS REMOVED FROM THE HOUSING.

(1) Remove pressure relief valve (200) and install dummy valve A29003-7.

(2) Install an AN814DL-16 plug in port R. Install an AN814DL-8 plug and NAS1612-8 packing in port CD OUT. Make sure port T is open.

(3) Fill the unit with hydraulic fluid and remove caught air from inside the unit.

(4) Slowly apply 4500 psi hydraulic pressure to port P IN and P OUT at the same time. Hold this pressure for 2 minutes. Look for signs of external leakage or permanent set.

(5) Decrease the pressure to zero.

(6) Do step (4) again, with 5 psi for 2 minutes.

(7) Decrease the pressure to zero.

(8) Apply 900 psi pressure to ports CD IN, CD OUT and R. Make sure ports P IN, P OUT, and T are open to atmosphere. Hold the pressure for 2 minutes. Look for signs of external leakage or permanent set.

(9) Decrease the pressure to zero.

(10) Do step (8) aagain, with 5 psi for 2 minuts.

(11) Decrease the pressure to zero.

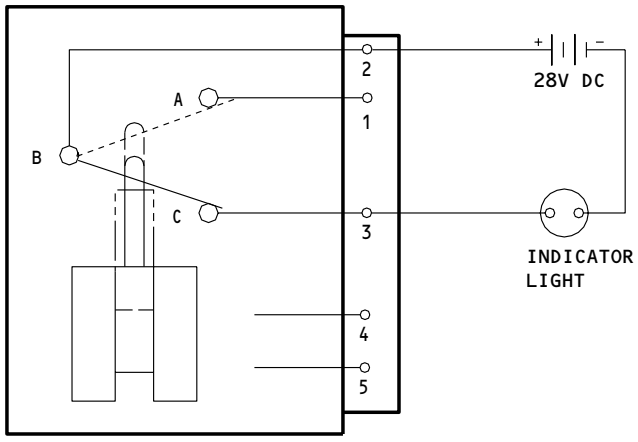
WARNING: MAKE SURE THE HYDRAULIC PRESSURE IS DECREASED TO ZERO BEFORE YOU LOOSEN THE OUTPUT PLUGS OR DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL COULD OCCUR.

(12) Remove the dummy valve and install relief valve (200) with new packings (215, 225) and backup rings (210, 220).

D. Pressure switches (130, 132B, 133B) check.

(1) Connect the inlet pressure switch to test box assembly A29006-20, the power supply, voltmeter (as applicable) and indicator light wired as shown in Fig. 102.

NOTE: The inlet pressure switch is located between differential pressure indicators (90, 140).



Pressure Switch Test Setup
Figure 102

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(2) Seal outlet port P OUT with a plug. Gradually apply pressure to port P IN. As the pressure increases, make sure the indicator light goes off at 2400 psig max (units 271T0068-1, -4, -5, -7, -10, -12) or 1700 psig max units (271T0068-6, -8, -9, -11).

(3) Gradually decrease the pressure. Make sure the indicator light comes back on between 2000 and 1800 psig (units 271T0068-1, -4, -5, -7, -10, -12) or between 1350 and 1200 psig (units 271T0068-6, -8, -9, -11).

(4) Decrease the hydraulic pressure to zero. Disconnect the test box from the inlet pressure switch. Connect the test box to the outlet pressure switch.

NOTE: The outlet pressure switch is located nearest relief valve (200).

(5) Decrease the hydraulic pressure to zero between P OUT and check valves.

WARNING: MAKE SURE THE HYDRAULIC PRESSURE IS DECREASED TO ZERO BEFORE YOU LOOSEN THE OUTPUT PLUGS OR DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL COULD OCCUR.

(6) Remove the plug from outlet port P OUT. Gradually apply pressure to P OUT. A plug in inlet port P IN is not necessary because check valve will stop the reverse flow. As the pressure increases, make sure the indicator light goes off at 2400 psig max (with 271T0068-1, -4, -5, -7, -10, -12) or 1700 psig max (units 271T0068-6, -8, -9, -11).

(7) Gradually decrease the pressure. Make sure the indicator light comes back on between 2000 and 1800 psig (between 1350 and 1200 psig for 271T0068-6, -8, -9, -11 assemblies).

(8) Dcrease the hydraulic pressure to zero. Disconnect the test box from the pressure switch.

E. Flow and pressure drop check

(1) Adjust the flow to 35 gal/min. from P IN to P OUT. Make sure the pressure drop across the unit is not more than 60 psid at a temperature of 68-110°F (20-43°C).

(2) Adjust the flow to 5 gal/min. from CD IN to CD OUT. Make sure the pressure drop across the unit is not more than 15 psid at 68-110°F (20-43°C).

F. Relief valve operational check

(1) Close port P IN. Open ports T and P OUT. Connect the hydraulic test stand return with a bleeder to port R. Slowly apply hydraulic pressure to port P OUT. Make sure there is no visible flow from the return port until the relief valve cracks open at 3400-3600 psig for all units.

NOTE: The relief valve cracks open when the drops of fluid from the port change to a steady flow.

(2) Increase the pressure to get a flow of 37 gal/min. at port R. Make sure the pressure drop at this flow rate is not more than 3900 psig for all units.

(3) Decrease the pressure until the flow stops from the return port. Make sure the reseat pressure is 3300 psig min. for all units.

NOTE: The relief valve reseats when the steady flow changes to a maximum 20 cc/min. leakage after a 2-minute period.

G. Hydraulic temperature switch test (30)

(1) Connect a megohmmeter across pins 1 and 2 of the switch and put the sensing end of the switch in the fluid bath as shown in Fig. 103.

(2) Increase the temperature of the fluid bath and make sure the switch closes between 225 and 235°F.

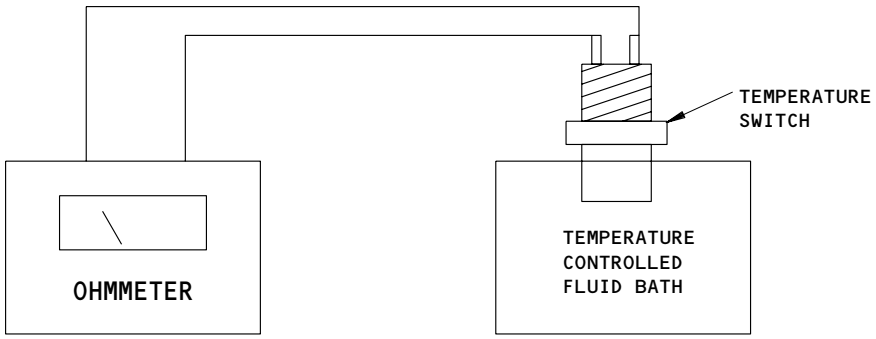
(3) Let the temperature of the fluid bath decrease, and make sure the switch opens between 205 and 165°F.

(4) Remove the switch from the bath. Clean the switch and dry it.

(5) Be sure the switch is fully dry. Do the test of insulation resistance with the switch in air.

(6) Connect a jumper wire to pins 1 and 2 of the switch. Connect the megohmmeter between the switch housing and pin 1. Apply 500v dc for 1 minute. Make sure the resistance across the insulation is 200 megohms minimum.

(7) Disconnect the megohmmeter from the switch.



Temperature Switch Test Setup
Figure 103

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4. Post-Test Procedures

A. Disconnect the unit from the hydraulic test stand.

B. Remove the unit from the handling fixture. Install lockwire and put the unit away per ASSEMBLY, par. 4.L and on.

TROUBLE	PROBABLE CAUSE	CORRECTION
Too much leakage at shutoff valve	Defective sleeve (70, 190) or fitting (55, 175)	Examine valve seating surfaces. Clean or replace parts.
	Defective spring (65, 185)	Replace spring
	Defective packing (75, 195)	Replace packing
Differential pressure indicator warning button will not extend or extends out of range	Defective indicator (90,140)	Replace indicator
Too much pressure drop across unit at usual flow rates	Dirty filter element (50,170)	Replace filter element
	Defective check valve (5,105)	Replace check valve
External leakage at proof pressure	Defective packing	Replace packing in area of leakage
	Defective housing (245) or filter case (40, 155)	Replace housing or case
Pressure switch will not operate, or operates out of range	Defective switch (130, 132B, 133B)	Replace switch
Relief valve cracking or reseat pressure out of range	Defective relief valve (200)	Replace valve
Too much pressure drop across relief valve	Defective relief valve (200)	Replace valve
Leakage from port T during relief valve test	Defective check valve (105)	Replace check valve (105) located closest to port T
Leakage from port P IN during relief valve test	Defective check valve (105)	Replace check valve (105) located between case (40) and case (155)

Trouble Shooting Chart
Figure 104

DISASSEMBLY

NOTE: See TESTING/TROUBLESHOOTING to find the condition of the component or the cause of malfunctions and to see how much disassembly is necessary without completely tearing down and rebuilding the component.

1. Equipment

   NOTE: Equivalent substitutes can be used.

   A. A29003-2 -- Handling fixture

   B. A29003-3 -- Wrench assembly, sleeve retainer

   C. A29003-4 -- Wrench assembly, sleeve retainer

   D. A29003-5 -- Wrench assembly, shutoff valve

   E. A29003-6 -- Wrench assembly, shutoff valve

2. Parts Replacement (IPL Fig. 1)

   NOTE: These parts are recommended for replacement. Replacement of other parts can be by in-service experience.

   A. Packings (10, 20, 35, 45, 60A, 75, 85A, 95, 100A, 115, 125, 135, 145A, 150, 160, 180A, 195, 215, 225)

   B. Backup rings (15, 25, 110, 120, 165, 210, 220)

3. Disassembly

   CAUTION: RELIEF VALVE (200) IS A PRECISION ASSEMBLY. GIVE THIS VALVE PROTECTION, AS IN A CONTAINER.

   A. Use standard industry practices and these steps.

   CAUTION: BE SURE TO LIFT THE SLEEVES OFF THE VALVE SEATING SURFACES BEFORE YOU REMOVE THE RELATED FITTINGS, TO PREVENT DAMAGE TO THE SURFACES.

   B. Use sleeve retainer wrenches A29003-3, -4 to lift sleeves (70, 190) off the valve seating surfaces, and remove fittings (55, 175) with wrenches A29003-5, -6.

C. Refer to applicable vendors instructions for overhaul of relief valve (200).

CHECK

1. Examine all parts for defects by standard industry practices.

2. Penetrant examine the following parts (Ref IPL Fig. 1) per SOPM 20-20-02.

   A. Cases (40, 155)

   B. Housing assembly (245)

REPAIR - GENERAL

1. Content

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

P/N	NAME	REPAIR
BAC27THY206	MARKER	1-1
7585549	NAMEPLATE	1-1
7586454	NAMEPLATE	1-1
7586782	NAMEPLATE	1-1
7586783	NAMEPLATE	1-1
7586897	NAMEPLATE	1-1
7586898	NAMEPLATE	1-1

2. Standard Practices

   A. Refer to the following standard practices, as applicable, for details of procedures in individual repairs.

      20-30-03 General Cleaning Procedures
      20-50-12 Application of Adhesives

3. Materials

   NOTE: Equivalent substitutes may be used.

   A. Adhesive -- Type 75 (Ref SOPM 20-50-12)

NAMEPLATE OR MARKER REPLACEMENT - REPAIR 1-1

BAC27THY206
7585549, 7586454, 7586782, 7586783, 7586897,
7586898, 7586898-001, 7586898-002, 7586898-003

NOTE: Refer to REPAIR-GEN for a list of applicable standard practices. Refer to IPL Fig. 1 for item numbers.

1. Nameplate/Marker Replacement

A. Remove the old nameplate/marker (240), and strap (242), if installed.

B. Clean and prepare the mounting surface per 20-30-03.

C. Units 271T0068-1, -4 thru -7

(1) Install a replacement nameplate (240) with Type 75 adhesive per SOPM 20-50-12.

(2) Bend the tab of the nameplate over, and apply the adhesive under and over the bent tab.

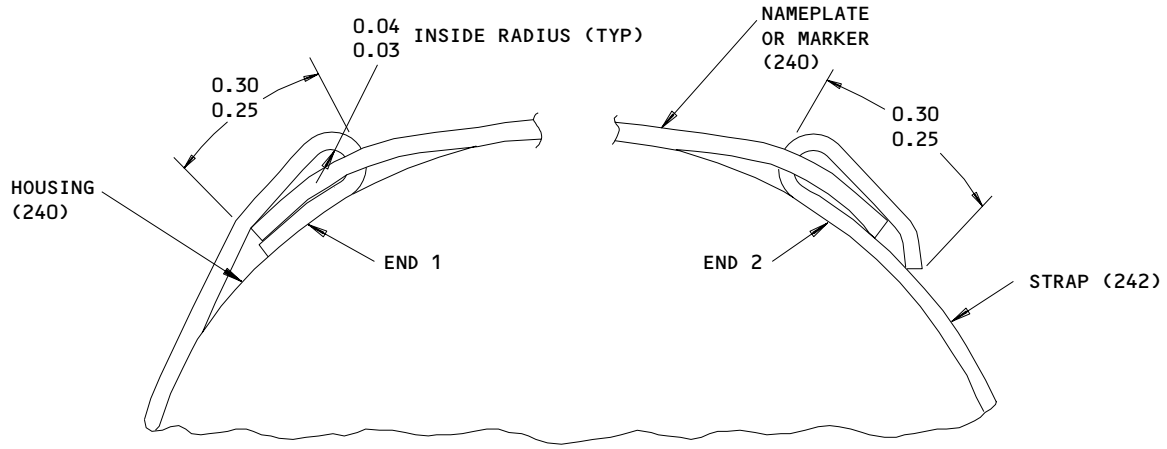
D. Units 271T0068-6, -8 thru -11

(1) Install a replacement nameplate (240) with a new strap (242) and Type 75 adhesive per SOPM 20-50-12 and the instructions shown in Fig. 601.

(2) Bend the tab of the nameplate over, and apply the adhesive under and over the bent tab.

E. Units 271T0068-12

(1) Install a replacement marker (240) with a new strap (242) and Type 75 adhesive per SOPM 20-50-12 and the instructions shown in Fig. 601.



NOTE: THE STRAP CAN BE USED ONLY ONCE. MAKE SURE THE STRAP AND NAMEPLATE ARE TIGHT ON THE MOUNTING SURFACE.

1. BEND THE NAMEPLATE TO A RADIUS SLIGHTLY SMALLER THAN THE HOUSING RADIUS.
2 BEND THE CORNERS OF THE NAMEPLATE SLIGHTLY TOWARDS THE MOUNTING SURFACE.
3. BEND STRAP END 1, PUT THRU THE HOLE IN THE NAMEPLATE AND BEND STRAP END DOWN AS SHOWN.
4. HOLD THE NAMEPLATE ON THE HOUSING AND PUT STRAP THRU HOLE.
5. SLIGHTLY BEND STRAP END 2 WHILE YOU PULL TO MAKE THE NAMEPLATE AND STRAP TIGHT.
6. CUT STRAP END 2 TO THE DIMENSION SHOWN.
7. WHILE YOU PULL, USE A SUITABLE TOOL TO MAKE THE FINAL BEND OF STRAP END 2 AND TO MAKE THINGS TIGHTER. BE CAREFUL NOT TO TEAR THE NAMEPLATE HOLE BY TOO MUCH TENSION.
8. BEND STRAP END 2 DOWN OVER THE EDGE OF THE NAMEPLATE AND HIT LIGHTLY WITH A SOFT NOSED HAMMER.

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Nameplate Installation
Figure 601

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ASSEMBLY

1. Materials

NOTE: Equivalent substitutes can be used.

A. Hydraulic fluid -- BMS 3-11 (Ref SOPM 20-60-03)

B. Lockwire -- MS20995C32 (Ref SOPM 20-60-04)

2. Equipment

NOTE: Equivalent substitute can be used.

A. A29003-2 -- Handling fixture

B. A29003-3 -- Wrench assembly, sleeve retainer

C. A29003-4 -- Wrench assembly, sleeve retainer

D. A29003-5 -- Wrench assembly, shutoff valve

E. A29003-6 -- Wrench assembly, shutoff valve

3. Lubricants, Compounds

A. Lubricate packings, backup rings, and threads with hydraulic fluid before assembly.

4. Assembly (IPL Fig. 1)

A. Install housing (245) on fixture A29003-2.

B. Install packings (215, 225) and backup rings (210, 220) on relief valve (200), then install the relief valve in the housing. Tighten the valve to 125-150 lb-in.

C. Install packings (95, 100A) on differential pressure indicator (90) and packings (145A, 150) on indicator (140). Install the indicators in the housing and tighten them to 160-175 lb-in.

D. Install packing (35) on thermal switch (30), then install the switch in the housing. Tighten the switch to 75-100 lb-in.

E. Install packings (115, 125) and backup rings (110, 120) on check valves (105), then install the valves in the housing. Tighten the check valves to 125-150 lb-in.

F. Install packings (10, 20) and backup rings (15, 25) on check valve (5), then install the valves in the housing. Tighten the check valve to 100-125 lb-in.

G. Install packing (85A) on plug (80), then install the plug in the housing. Tighten the plug to 200-225 lb-in.

H. Install case drain filter and shutoff valve.

(1) Install packing (75) in the housing.

(2) Put spring (65) on sleeve (70), then install these parts in the housing. Use wrench A29003-4 to hold the sleeve in the housing, in the valve-open position, until you can install the fitting (55). Be careful not to damage the valve seating surfaces with the wrench.

(3) Install packing (60A) on fitting (55), then install the fitting with wrench A29003-6. Tighten the fitting to 200-225 lb-in.

(4) Remove wrench A29003-4 to release the sleeve.

(5) Install packing (45) on filter case (40), then install filter element (50) and the case on the housing. Tighten the case to 270-300 lb-in.

I. Install pressure filter and shutoff valve.

(1) Install packing (195) in the housing.

(2) Put spring (185) on sleeve (190), then install these parts in the housing. Use wrench A29003-3 to hold the sleeve in the housing, in the valve-open position, until you can install the fitting (175). Be careful not to damage the valve seating surfaces with the wrench.

(3) Install packing (180A) on fitting assembly (175), then install the fitting with wrench A29003-5. Tighten the fitting to 350-400 lb-in.

(4) Remove wrench A29003-3 to release the sleeve.

(5) Install packing (160) and backup rings (165) on filter case (155), then install filter element (170) and the case on the housing. Tighten the case to 270-300 lb-in.

J. Install packings (135A) on pressure switches (130,132B,133B) and install the switches in the housing. Tighten the switches to 160-175 lb-in.

K. Do a test of the unit per TESTING/TROUBLESHOOTING.

L. Install lockwire by the double-twist method of SOPM 20-50-02, in these locations:

(1) Check valve (5) to housing (245)

(2) Thermal switch (30) to housing

(3) Filter case (40, 155) to housing

(4) Relief valve (200) to housing

(5) Indicator (90) to nearest check valve (105)

(6) Remaining check valve (105) to nearest pressure switch (130, 132B, 133B)

(7) Remaining pressure switch (130) to indicator (140)

5. Storage

A. Put some hydraulic fluid in the unit and install shipping plugs (230, 235). It is not necessary to fill the unit with hydraulic fluid.

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

FITS AND CLEARANCES

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	5	CHECK VALVE	100 - 125	
1	30	THERMAL SWITCH	75 - 100	
1	40,155	CASE	270 - 300	
1	55	FITTING	200 - 225	
1	80	PLUG	200 - 225	
1	90,140	INDICATOR	160 - 175	
1	105	CHECK VALVE	125 - 150	
1	130,132B, 133B	PRESSURE SWITCH	160 - 175	
1	175	FITTING ASSEMBLY	350 - 400	
1	200	RELIEF VALVE	125 - 150	

* REFER TO SOPM 20-50-01 FOR TORQUE VALUES OF STANDARD FASTENERS.

Torque Table
Figure 801

58627

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes can be used.

1. A29003-49 -- Hydraulic Filter Overhaul Tool Set, which includes these components:

   A. A29003-2 -- Handling Fixture

   B. A29003-3 thru -6 -- Wrench Assemblies

   C. A29003-7 -- Dummy Relief Valve

   D. A29003-8 -- Dummy Check Valve

   E. A29003-9, -10 -- Dummy Filter Elements

   F. A29003-11 -- Dummy Filter Case

   G. A29003-12 -- Dummy Differential Pressure Indicator

2. A29006-19 -- Switch Test Equipment, which includes -20 Test Box Assembly and -3, -4 Adapter Cable Assemblies.

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

02107 FLOUROCARBON CO OHIO DIV
DOVER, OHIO 44622
CANCELLED NO REPLACEMENT

02750 EATON CORP PRESSURE SENSORS DIV
15 DURANT AVENUE
BETHEL, CONNECTICUT 06801-1901

05228 PTI TECHNOLOGIES INC
950 RANCHO CONEJO BLVD
NEWBURY PARK, CALIFORNIA 91319

06177 PNEUDRAULICS INC
8575 HELMS AVENUE
RANCHO CUCAMONGA, CALIFORNIA 91730-4519

07128 TETRAFLUOR INC
2051 EAST MAPLE AVENUE
EL SEGUNDO, CALIFORNIA 90245-5009

18350 PALL AEROPOWER CORP
6301 49TH STREET NORTH
PINELLAS PARK, FLORIDA 34665-5798

26303 GREENE TWEED IND INC ADVANTEC DIV
7101 PATTERSON DRIVE PO BOX 5037
GARDEN GROVE, CALIFORNIA 92645-5037

26879 CORONADO MFG INC
11069 PENROSE AVENUE
SUN VALLEY, CALIFORNIA 90352-2722

35918 LEWIS ENGINEERING CO
238 WATER STREET
NAUGATUCK, CONNECTICUT 06770-2803

92003 PARKER-HANNIFIN CORPORATION
18321 JAMBOREE BOULEVARD PO BOX C-19510
IRVINE, CALIFORNIA 92713

VENDORS

94878 RAYBESTOS-MANHATTAN INC PACIFIC COAST DIV
FULLERTON, CALIFORNIA 92631
BUSINESS DISCONTINUED

96906 MILITARY STANDARDS PROMULGATED BY MILITARY
DEPARTMENTS UNDER AUTHORITY OF DEFENSE
STANDARDIZATION MANUAL 4120 3-M

97814 SEALTRON INC
9705 READING RD
CINCINNATI, OHIO 45215

97820 SHAMBAN W S AND CO
711 MITCHELL ROAD PO BOX 665
NEWBURY PARK, CALIFORNIA 91320-2214

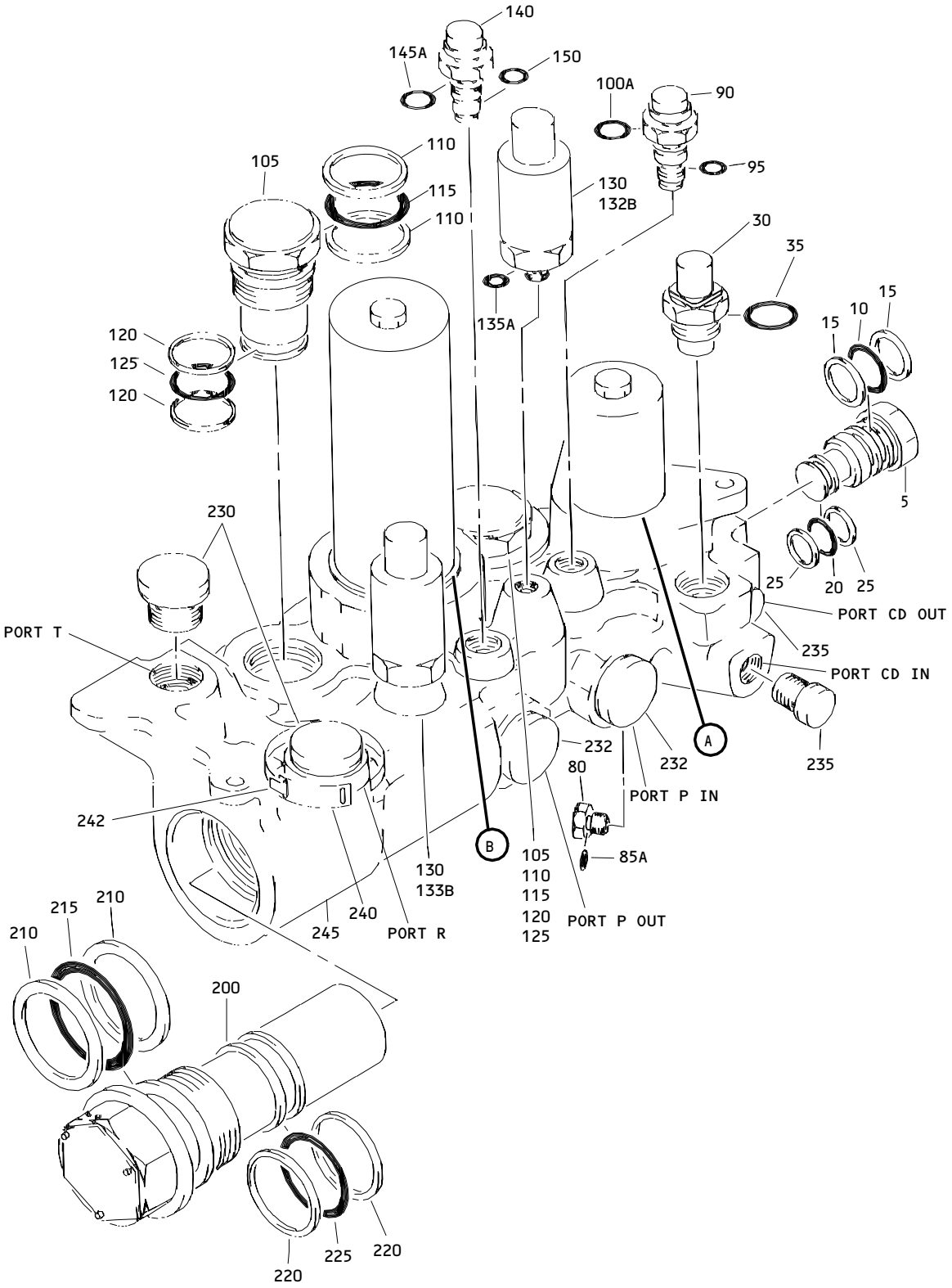
99643 STERER ENG AND MFG CO
4690 COLORADO BLVD PO BOX 39787 GRIFFITH STATION
LOS ANGELES, CALIFORNIA 90039-1106

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
AC9008E1		1	50	1
AC9008E11		1	50	1
AC9012F1		1	170	1
AC9012F2		1	170	1
AN814-6DL		1	80	1
BACR12BM116		1	25B	2
BACR12BM125		1	120B	4
BACR12BM213		1	15B	2
BACR12BM223		1	110B	4
BACR12BM225		1	220G	2
BACR12BM231		1	165B	2
BACR12BM327		1	220C	2
BACR12BM330		1	210B	2
BAC27THY206		1	240P	1
MS27595-116		1	25A	2
MS27595-125		1	120A	4
MS27595-213		1	15A	2
MS27595-223		1	110A	4
MS27595-225		1	220E	2
MS27595-231		1	165A	2
MS27595-327		1	220A	2
MS27595-330		1	210A	2
MS28774-116		1	25	2
MS28774-125		1	120	4
MS28774-213		1	15	2
MS28774-223		1	110	4
MS28774-225		1	220D	2
MS28774-231		1	165	2
MS28774-327		1	220	2
MS28774-330		1	210	2
M8791-1-116		1	25C	2
M8791-1-125		1	120C	4
M8791-1-213		1	15C	2
M8791-1-223		1	110C	4
M8791-1-225		1	220F	2
M8791-1-327		1	220B	2
M8791-1-330		1	210C	2
NAS1611-014		1	95	1
		1	150	1
NAS1611-116		1	20	1
NAS1611-125		1	125	2
NAS1611-213		1	10	1
NAS1611-223		1	115	2
NAS1611-225		1	225A	1
NAS1611-226		1	45	1
		1	75	1
NAS1611-228		1	215A	1

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
NAS1611-229		1	195	1
NAS1611-231		1	160	1
NAS1611-327		1	225	1
NAS1611-330		1	215	1
NAS1612-12		1	35	1
NAS1612-6		1	85A	1
		1	135A	2
NAS1612-8		1	100A	1
		1	145A	1
S270T242-1		1	5	1
S270T242-3		1	105	2
S270T242-5		1	105A	2
S271N202-1		1	200C	1
S271N202-2		1	200D	1
		1	200H	1
S271N202-3		1	200J	1
		1	200K	1
S271T005-1		1	140	1
S271T005-2		1	90	1
		1	90B	1
S271T005-3		1	140A	1
S271T005-4		1	140B	1
S271T005-5		1	90A	1
S271T452-15		1	132	
		1	132B	1
S271T452-18		1	133	
		1	133B	1
S271T452-2		1	130	2
S271T452-8		1	130B	2
S271T452-9		1	130A	2
S271T454-1		1	30	1
TC125UK00Z		1	140	1
TC125UK00ZY1		1	140A	1
TC125UK06Y		1	90	1
		1	90B	1
1122364		1	30	1
1831-2		1	200A	1
1831-3		1	200B	1
		1	200F	1
1841		1	200C	1
1850		1	200E	1
		1	200G	1
211C223-176		1	130	2
211C223-209		1	130B	2
211C223-211		1	130A	2
211C223-296		1	130B	2
211C223-297		1	130A	2

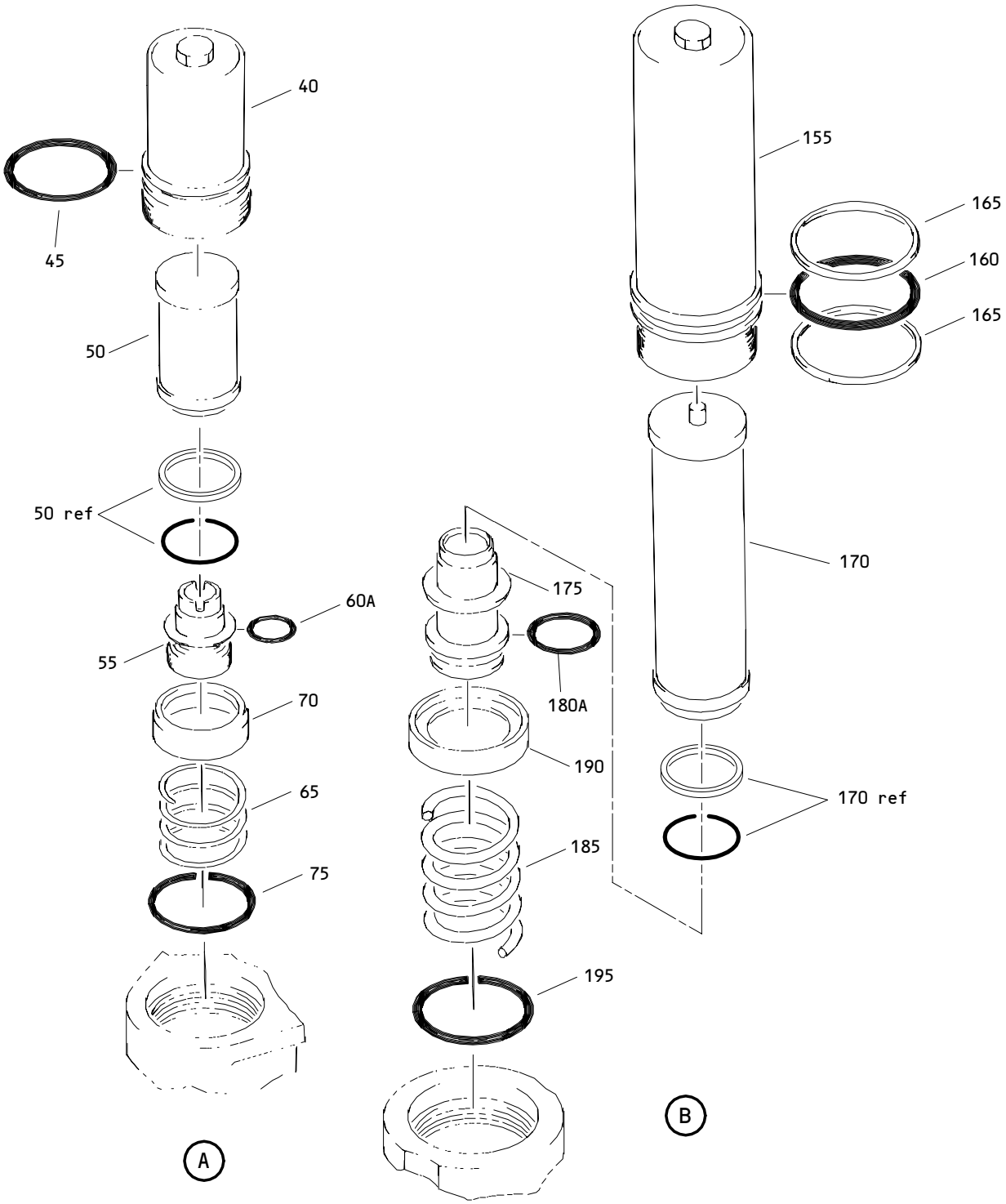
PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
211C223-326		1	133B	1
211C223-327		1	132B	1
211C233-326		1	133A	
211C233-327		1	132A	
271T0044-1		1	40	1
271T0047-1		1	40A	1
271T0055-1		1	200	1
271T0068-1		1	1	RF
271T0068-10		1	1G	RF
		1	1J	
271T0068-11		1	1H	RF
271T0068-12		1	1K	RF
271T0068-4		1	1A	RF
271T0068-5		1	1B	RF
271T0068-6		1	1C	RF
271T0068-7		1	1D	RF
271T0068-8		1	1E	RF
271T0068-9		1	1F	RF
271T0070-1		1	155	1
271T0070-3		1	155B	
		1	155C	1
271T0070-5		1	155D	1
		1	155E	1
271T0070-6		1	155F	1
271T0071-1		1	245	1
271T0071-2		1	245B	1
271T0071-3		1	245C	1
271T0071-4		1	245D	1
271T0071-5		1	245E	1
		1	245F	1
271T0071-6		1	245G	1
271T0072-1		1	155A	1
2790521-102		1	5	1
2790523-101		1	105A	2
2790523-102		1	105	2
60B00204-1		1	170	1
60B00211-3		1	50	1
68770		1	200D	1
		1	200H	1
68770-1		1	900	
		1	200J	1
69-35587-14		1	242	1
7506161		1	70	1
7506162		1	65	1
		1	65A	1
7515128		1	170	1

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
7553276		1	50	1
7553414		1	55	1
7578741		1	235	2
7578743		1	232A	2
7578744		1	230	2
		1	232	2
7582484		1	60A	1
7582485		1	180A	1
7585532		1	190	1
7585549		1	240	1
7585755		1	175	1
7585901		1	185	1
7586201		1	240N	1
7586454		1	240A	1
7586630		1	90A	1
7586631		1	140B	1
7586782		1	240E	1
7586783		1	240G	1
7586897		1	240H	1
7586898		1	240J	1
7586898-001		1	240K	1
7586898-002		1	240L	1
7586898-003		1	240M	1
7589401		1	65B	1



Engine Driven Pump and Air Driven Pump
Pressure and Case Drain Filter Module Assembly
Figure 1 (Sheet 1)

T64457



Engine Driven Pump and Air Driven Pump
Pressure and Case Drain Filter Module Assembly
Figure 1 (Sheet 2)

T64458

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	271T0068-1		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER	A	RF
-1A	271T0068-4		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER	B	RF
-1B	271T0068-5		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER (PRE SB 767-29-3) (PRE SB 767-29-43)	C	RF
-1C	271T0068-6		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER	D	RF
-1D	271T0068-7		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER (POST SB 767-29-3) (PRE SB 767-29-43)	E	RF
-1E	271T0068-8		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER	F	RF
-1F	271T0068-9		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER (PRE SB 757-29-0040)	G	RF
-1G	271T0068-10		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER (POST SB 767-29-0043)	H	RF
-1H	271T0068-11		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER (POST SB 757-29-0040)	I	RF
-1J	271T0068-10		DELETED		

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1K	271T0068-12		MODULE ASSY-ENG DRIVEN PUMP AND AIR DRIVEN PUMP PRESSURE AND CASE DRAIN FILTER	J	RF
5	2790521-102		.VALVE-CHK (V92003) (SPEC S270T242-1)		1
10	NAS1611-213		.PACKING		1
15	MS28774-213		.RETAINER (OPT)	A-I	2
-15A	MS27595-213		.RETAINER (OPT)		2
-15B	BACR12BM213		.RING-BACKUP		2
-15C	M8791-1-213		.RETAINER-BACKUP (V96906) (OPT)	J	2
20	NAS1611-116		.PACKING		1
25	MS28774-116		.RETAINER (OPT)	A-I	2
-25A	MS27595-116		.RETAINER (OPT)		2
-25B	BACR12BM116		.RING-BACKUP		2
-25C	M8791-1-116		.RETAINER-BACKUP (V96906) (OPT)	J	2
30	1122364		.SWITCH-HYDRAULIC TEMP (V35918) (SPEC S271T454-1) (CONTAINS SEAL P/N 37443 (V97814))		1
35	NAS1612-12		.PACKING		1
40	271T0044-1		.CASE (OPT ITEM 40A)		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-40A	271T0047-1		.CASE (OPT ITEM 40)		1
45	NAS1611-226		.PACKING		1
50	7553276		.FILTER ELEMENT ASSY- (V05228) (SPEC 60B00211-3) (OPT AC9008E1 (V18350)) (OPT AC9008E11 (V18350))		1
55	7553414		.FITTING (V05228)		1
60A	7582484		.PACKING (V05228)	A-I	1
65	7506162		.SPRING-SLEEVE (V05228)	A-D	1
-65A	7506162		.SPRING-SLEEVE (V05228) (OPT)	E-J	1
-65B	7589401		.SPRING-SLEEVE (V05228) (OPT)	E-J	1
70	7506161		.SLEEVE (V05228)		1
75	NAS1611-226		.PACKING		1
80	AN814-6DL		.PLUG AND BLEEDER		1
85A	NAS1612-6		.PACKING		1
90	TC125UK06Y		.INDICATOR (V18350) (SPEC S271T005-2)	B-J	1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-90A	7586630		.INDICATOR (V05228) (SPEC S271T005-5) (OPT)	B-J	1
-90B	TC125UK06Y		.INDICATOR (V18350) (SPEC S271T005-2)	A	1
95	NAS1611-014		.PACKING		1
100A	NAS1612-8		.PACKING		1
105	2790523-102		.VALVE-CHK (V92003) (SPEC S270T242-3)	AB	2
-105A	2790523-101		.VALVE-CHK (V92003) (SPEC S270T242-5)	C-J	2
110	MS28774-223		.RETAINER (OPT)	A-I	4
-110A	MS27595-223		.RETAINER (OPT)		4
-110B	BACR12BM223		.RING-BACKUP		4
-110C	M8791-1-223		.RETAINER-BACKUP (V96906) (OPT)	J	4
115	NAS1611-223		.PACKING		2
120	MS28774-125		.RETAINER- (OPT)	A-I	4
-120A	MS27595-125		.RETAINER (OPT)		4
-120B	BACR12BM125		.RING-BACKUP		4

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-120C	M8791-1-125		.RETAINER (V96906) (OPT)	J	4
125	NAS1611-125		.PACKING		2
130	211C223-176		.SWITCH-PRESSURE HYDR (V02750) (SPEC S271T452-2)	A	2
-130A	211C223-211		.SWITCH-PRESSURE HYDR (V02750) (SPEC S271T452-9) (OPT 211C223-297 (V02750))	BCEHJ	2
-130B	211C223-209		.SWITCH-PRESSURE HYDR (V02750) (SPEC S271T452-8) (OPT 211C223-296 (V02750))	DF	2
132	S271T452-15		DELETED		
132A	211C233-327		DELETED		
132B	211C223-327		.SWITCH-PRESSURE HYDR (V02750) (SPEC S271T452-15)	GI	1
133	S271T452-18		DELETED		
133A	211C233-326		DELETED		
133B	211C223-326		.SWITCH-PRESSURE HYDR (V05228) (SPEC S271T452-18)	GI	1
135A	NAS1612-6		.PACKING		2
140	TC125UK00Z		.INDICATOR- (V18350) (SPEC S271T005-1)	A	1
-140A	TC125UK00ZY1		.INDICATOR- (V18350) (SPEC S271T005-3) (OPT ITEM 140B)	B-J	1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-140B	7586631		.INDICATOR- (V05228) (SPEC S271T005-4) (OPT TO ITEM 140A)	B-J	1
145A	NAS1612-8		.PACKING		1
150	NAS1611-014		.PACKING		1
155	271T0070-1		.CASE (OPT ITEM 155A)	A-D	1
-155A	271T0072-1		.CASE (OPT TO ITEM 155)	A-D	1
-155B	271T0070-3		DELETED		
-155C	271T0070-3		.CASE (OPT TO ITEM 155D)	EFGI	1
-155D	271T0070-5		.CASE (OPT ITEM 155C)	EFGI	1
-155E	271T0070-5		.CASE	H	1
-155F	271T0070-6		.CASE	J	1
160	NAS1611-231		.PACKING		1
165	MS28774-231		.RETAINER (OPT)	A-J	2
-165A	MS27595-231		.RETAINER (OPT)		2
-165B	BACR12BM231		.RING-BACKUP		2
170	7515128		.ELEMENT-FILTER (V05228) (SPEC 60B00204-1) (OPT AC9012F1 (V18350)) (OPT AC9012F2 (V18350))		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
175	7585755		.FITTING ASSY- (V05228)		1
180A	7582485		.PACKING- (V05228)	A-I	1
185	7585901		.SPRING- (V05228)		1
190	7585532		.SLEEVE- (V05228)		1
195	NAS1611-229		.PACKING		1
200	271T0055-1		.VALVE-RELIEF (OPT)	A	1
-200A	1831-2		.VALVE-RELIEF (V06177)	A	1
-200B	1831-3		.VALVE-RELIEF (V06177) (OPT)	CE	1
-200C	1841		.VALVE-RELIEF (V06177) (SPEC S271N202-1) (OPT)	D	1
-200D	68770		.VALVE-RELIEF (V99643) (SPEC S271N202-2)	D	1
-200E	1850		.VALVE-RELIEF (V06177)	CE	1
-200F	1831-3		.VALVE-RELIEF (V06177)	B	1
-200G	1850		.VALVE-RELIEF (V06177) (OPT)	FHIJ	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	-200H	68770		.VALVE-RELIEF (V99643) (SPEC S271N202-2) (OPT)	F	1
	-200J	68770-1		.VALVE-RELIEF (V99643) (SPEC S271N202-3) (PREF)	F-J	1
	-200K	68770-1		DELETED		
R	210	MS28774-330		.RETAINER-*[1] (OPT)	A-I	2
	-210A	MS27595-330		.RETAINER-*[1] (OPT)		2
	-210B	BACR12BM330		.RING-BACKUP *[1]		2
R	-210C	M8791-1-330		.RETAINER-*[1] (V96906) (OPT)	J	2
	215	NAS1611-330		.PACKING-*[1]		1
	-215A	NAS1611-228		.PACKING-*[2]	DF	1
	220	MS28774-327		.RETAINER-*[1] (OPT)	A-I	2
	-220A	MS27595-327		.RETAINER-*[1] (OPT)		2
	220B	M8791-1-327		.RETAINER-BACKUP (V96906) (OPT)	J	2
	-220C	BACR12BM327		.RING-BACKUP *[1]		2
	-220D	MS28774-225		.RETAINER-*[2] (OPT)	DF	2
	-220E	MS27595-225		.RETAINER-*[2] (OPT)	DF	2

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-220F	M8791-1-225		.RETAINER-BACKUP (V96906) (OPT)	J	2
-220G	BACR12BM225		.RING-BACKUP *[2]	DF	2
225	NAS1611-327		.PACKING-*[1]		1
-225A	NAS1611-225		.PACKING-*[2]	DF	1
230	7578744		.PLUG AND GASKET ASSY SHIPPING (V05228)	A-GI	2
232	7578744		.PLUG AND GASKET ASSY SHIPPING (V05228)	A-GI	2
-232A	7578743		.PLUG AND GASKET ASSY SHIPPING (V05228)	H	2
235	7578741		.PLUG AND GASKET ASSY SHIPPING (V05228)	A-I	2
240	7585549		.NAMEPLATE (V05228)	A	1
-240A	7586454		.NAMEPLATE (V05228)	B	1
-240E	7586782		.NAMEPLATE (V05228)	C	1
-240G	7586783		.NAMEPLATE (V05228)	D	1
-240H	7586897		.NAMEPLATE (V05228)	E	1
-240J	7586898		.NAMEPLATE (V05228)	F	1
-240K	7586898-001		.NAMEPLATE (V05228)	G	1
-240L	7586898-002		.NAMEPLATE (V05228)	H	1
-240M	7586898-003		.NAMEPLATE (V05228)	I	1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-240N	7586201		.NAMEPLATE-BLANK (V05228)	CEH	1
-240P	BAC27THY206		.MARKER	J	1
-242	69-35587-14		.STRAP	DF-J	1
245	271T0071-1		.HOUSING	A	1
-245B	271T0071-2		.HOUSING (OPT)	BCDFG	1
-245C	271T0071-3		.HOUSING (OPT)	BCDFG	1
-245D	271T0071-4		.HOUSING (OPT)	E	1
-245E	271T0071-5		.HOUSING	B-G	1
-245F	271T0071-5		.HOUSING	HIJ	1
-245G	271T0071-6		.HOUSING (OPT)	H	1
-900	68770-1		DELETED		

*[1] Used with items 200 thru 200C, 200E thru 200G, 200J, 200K
*[2] Used with items 200D, 200H