

# HTS Leads Installation Reports



FERMILAB  
Technical  
Division

**7500 A HTS Power Leads for the  
LHC DFBX:  
Installation of the Current Leads**

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Rev. Date: Feb. 17, 2004  
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Technical Division

**Installation of the LHC HTS Current Leads**

**Lead: DFLX 01**

FLANGE STAMPED "12"

BOX G

Signed Wayne E. Johnson

Date 6-23-04



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7500 A HTS Power Leads for the  
LHC DFBX:  
Installation of the Current Leads  
at Meyer Tool & Manufacturing

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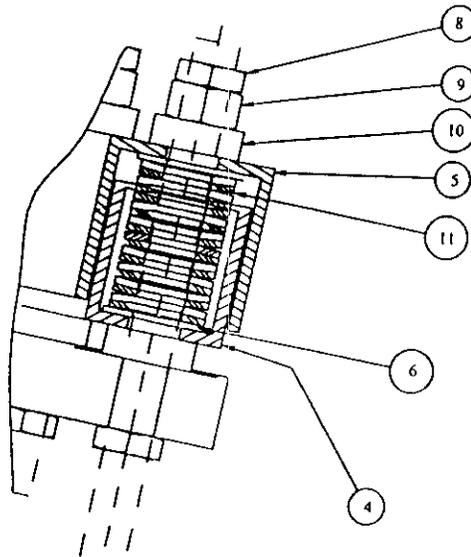


Figure 1.31b An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
  - 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
  - 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 16.75 B 17.00 C 17.50 D 17.75 E 17.35 F 17.35

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 18.95 B 15.20 C 15.70 D 15.95 E 15.55 F 15.55

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts 1/4 turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened 1/4 turn, check off the appropriate line.

A  B  C  D  E  F   
 A  B  C  D  E  F   
 15.23      15.69      15.28      16.19      15.17      14.95

Lead DFLX \_\_\_\_\_



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A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_

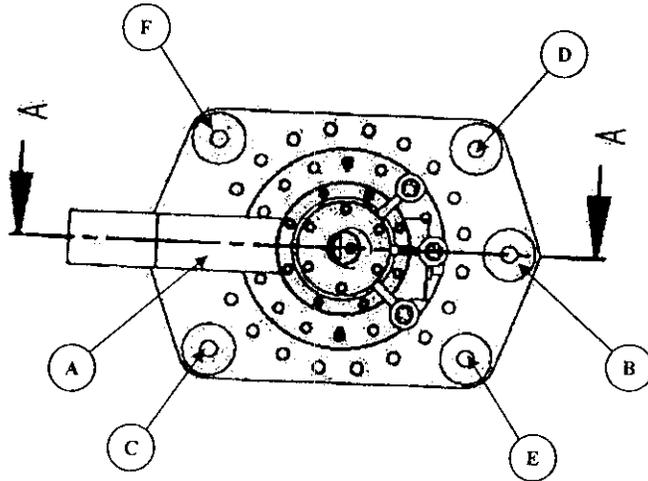
A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

**1.29.5** Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A ~~15.17~~ B ~~15.66~~ C ~~15.31~~ D ~~15.98~~ E ~~15.20~~ F ~~15.52~~

**1.29.6** Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

**1.30** Reduce compression of Belleville washer assemblies.

**1.30.1** Remove the Teflon centering ring from the installed power lead.

**1.30.2** Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

**1.31** Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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Installation of the LHC HTS Current Leads

Lead: DFLX 01

FLANGE STAMPED '12'

BOX G

Signed Wayne E. Johnson

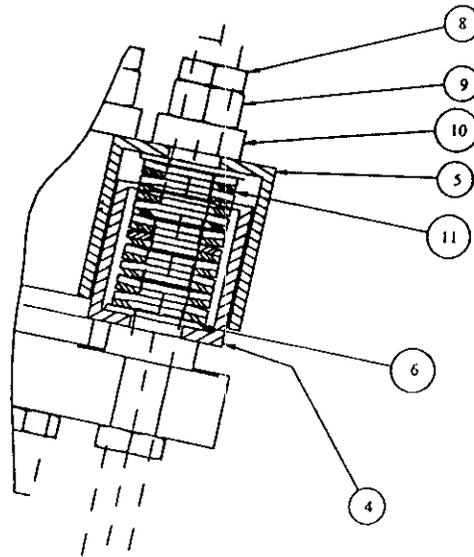
Date 7-7-04



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**Figure 1.31b** An installed Belleville washer assembly.

1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.

1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.

1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 16.75 B 17.24 C 17.11 D 17.13 E 17.19 F 16.94

1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 14.95 B 15.44 C 15.31 D 15.33 E 15.39 F 15.14

1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

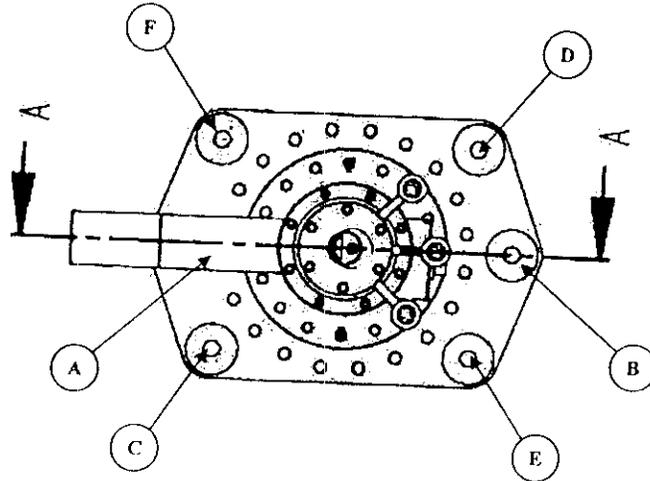


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 14.96 B 15.45 C 15.05 D 15.49 E 15.91 F 15.28

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.

Lead DFLX \_\_\_\_\_



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 01**

Box G

Signed

*Wayne E. Johnson*

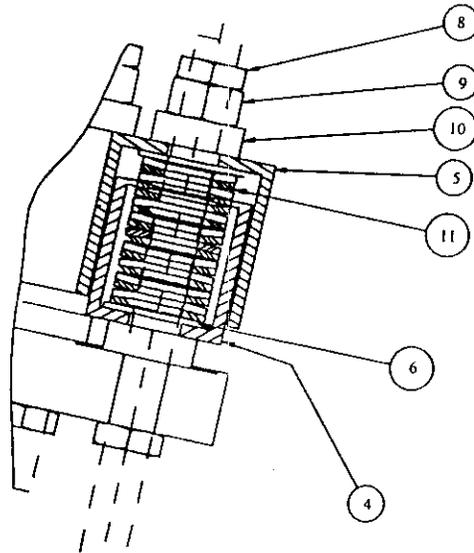
Date 12-7-04



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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.  
 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.  
 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.13 B 17.29 C 17.31 D 16.93 E 17.20 F 16.73

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.33 B 15.49 C 15.51 D 15.13 E 15.40 F 14.93

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading-nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

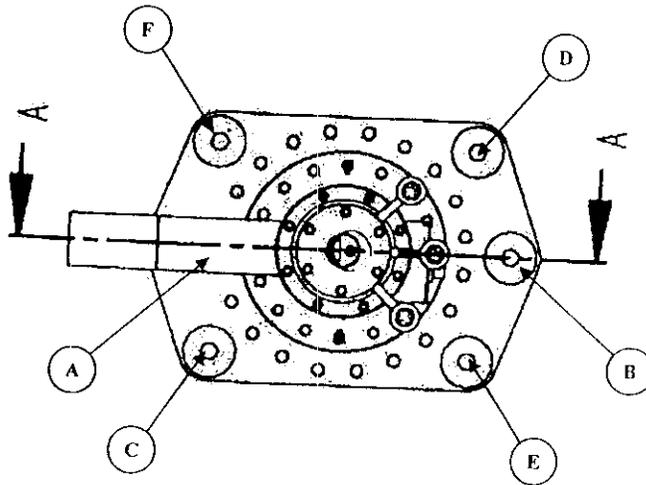


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A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

**1.29.5** Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.20 B 15.42 C 15.46 D 14.70 E 15.35 F 15.54

**1.29.6** Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

**1.30** Reduce compression of Belleville washer assemblies.

**1.30.1** Remove the Teflon centering ring from the installed power lead.

**1.30.2** Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

**1.31** Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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Installation of the LHC HTS Current Leads

Lead: DFLX 02

FLANGE STAMPED "32"

BOX 9

Signed Wayne E. John

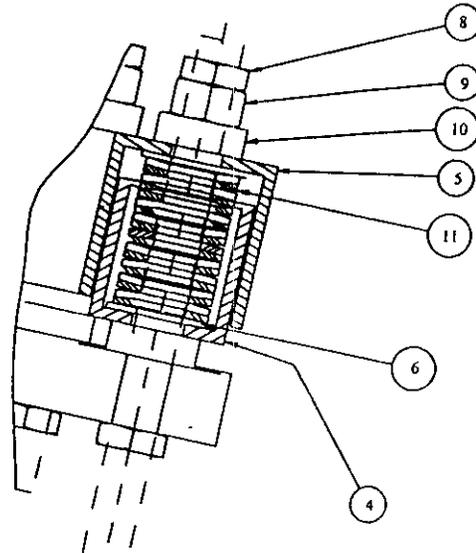
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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.18 B 17.12 C 17.50 D 17.55 E 17.46 F 17.19

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.38 B 15.32 C 15.70 D 15.75 E 15.66 F 15.39

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

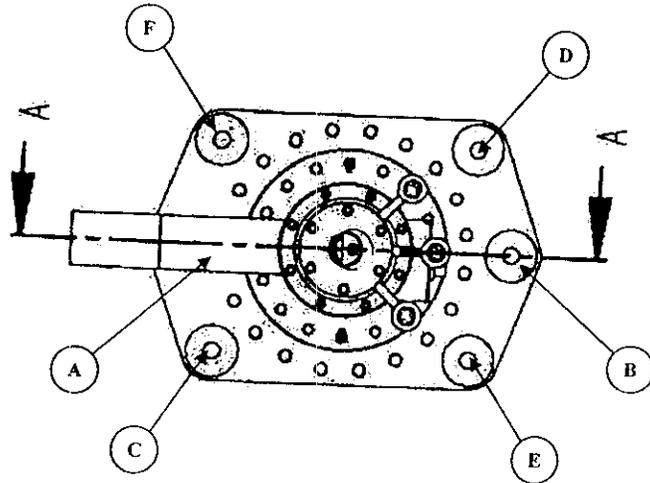


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_  
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_  
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.47 B 15.60 C 15.61 D 16.07 E 15.70 F 15.26

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.

Lead DFLX \_\_\_\_\_



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Installation of the LHC HTS Current Leads

Lead: DFLX 02

Box G

Signed

Wayne S. John

Date

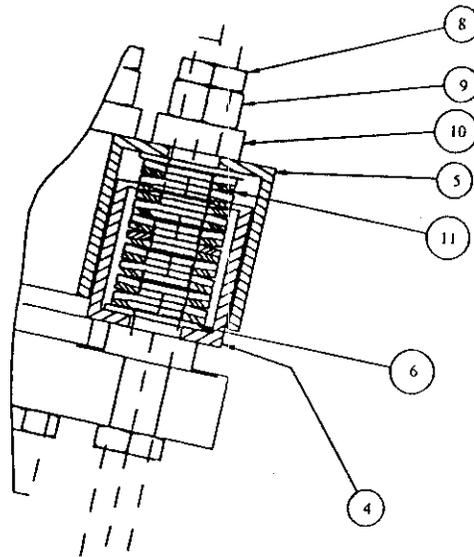
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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.  
 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.  
 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.14 B 17.12 C 17.16 D 17.04 E 16.79 F 17.18

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.34 B 15.32 C 15.36 D 15.24 E 14.99 F 15.38

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading-nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

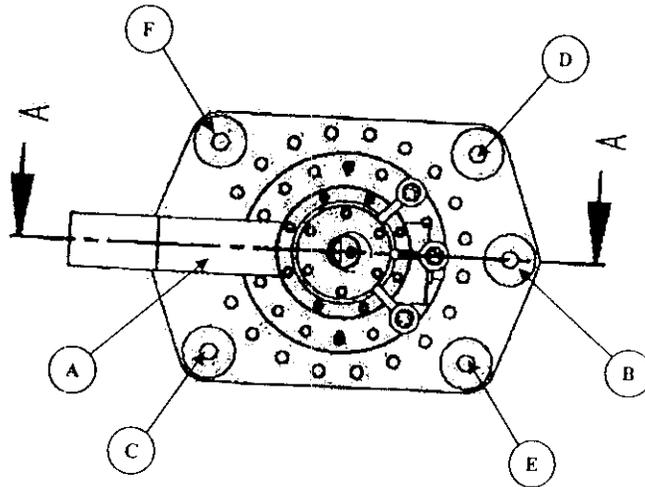


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.77 B 15.36 C 14.85 D 15.08 E 14.99 F 14.52

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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Installation of the LHC HTS Current Leads

Lead: DFLX 03

FLANGE STAMPED "8"

BOX G

Signed Wayne E. John

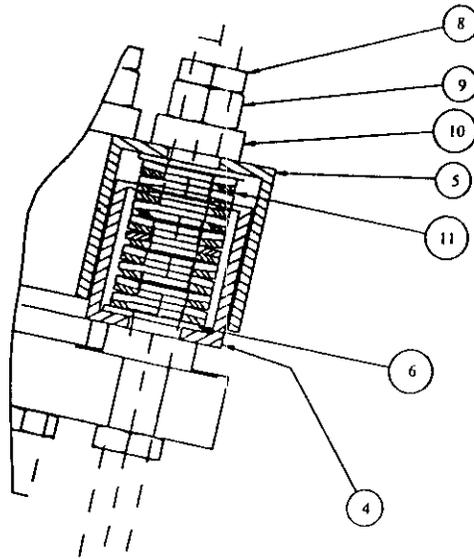
Date 6-23-04



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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.  
 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.  
 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 20.51 B 20.34 C 20.10 D 20.32 E 21.10 F 20.68

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 18.71 B 18.54 C 18.20 D 18.52 E 19.30 F 18.88

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

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Lead DFLX \_\_\_\_\_

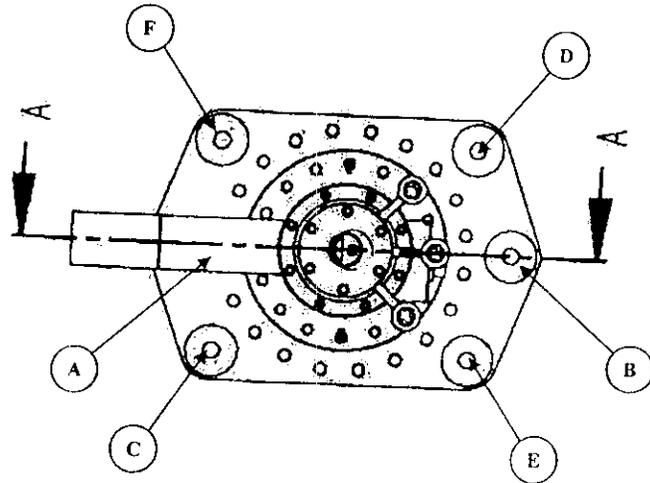


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A  B  C  D  E  F   
 A  B  C  D  E  F   
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 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 18.75 B 19.78 C 18.04 D 18.63 E 19.30 F 18.62

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 03**

Box G

Signed

*Way E Johnson*

Date

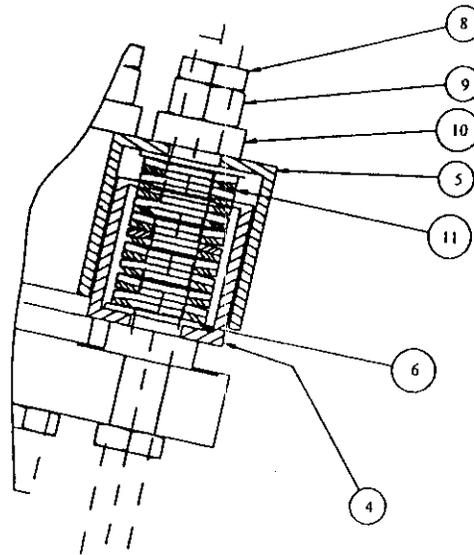
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**Figure 1.31b** An installed Belleville washer assembly.

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A 20.08 B 20.04 C 20.29 D 20.05 E 20.55 F 21.06

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 18.28 B 18.24 C 18.49 D 18.25 E 18.75 F 19.26

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading-nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

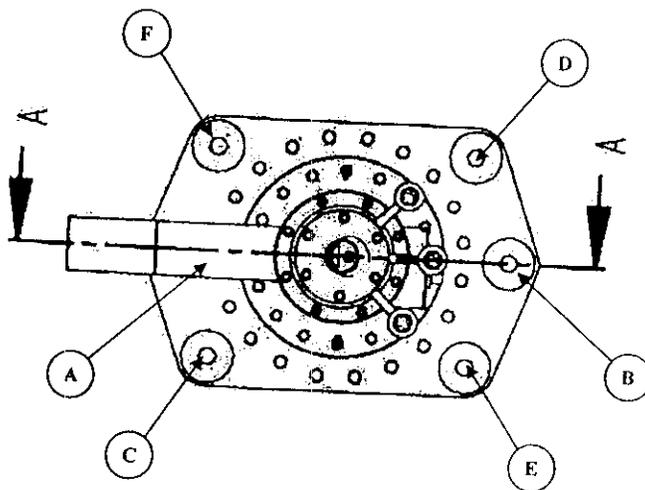


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A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 18.28 B 18.40 C 17.84 D 17.45 E 18.59 F 19.36

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.

Lead DFLX \_\_\_\_\_



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 04**

FLANGE STAMPED "17"

BCXG

Signed Wayne E. Johns

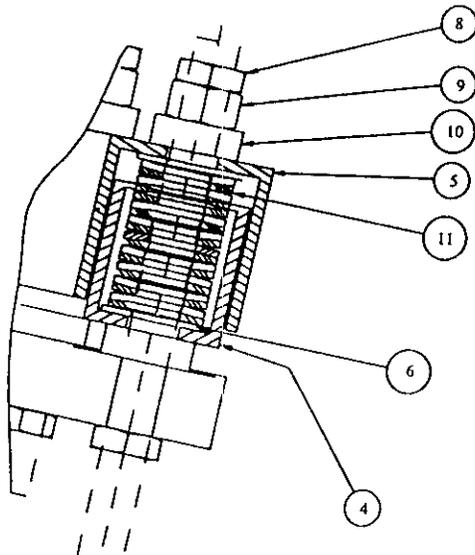
Date 6-24-04



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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.20 B 17.24 C 17.05 D 17.56 E 17.24 F 17.40

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.40 B 15.44 C 15.25 D 15.76 E 15.44 F 15.60

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

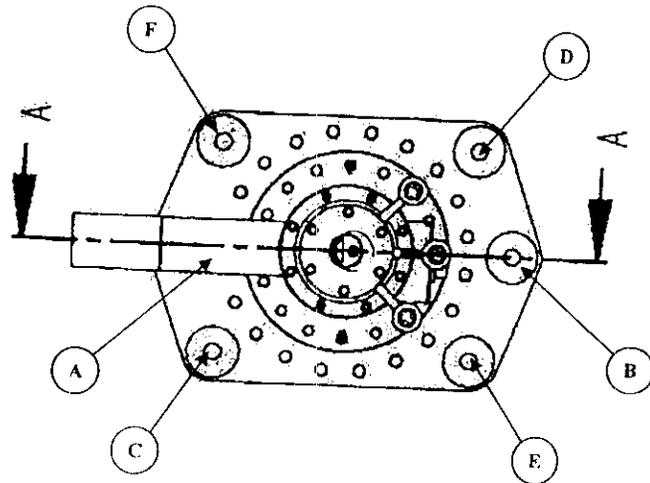


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.77 B 15.52 C 15.23 D 15.63 E 15.51 F 15.20

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 04**

**Box G**

Signed

*Wayne E. Johnson*

Date

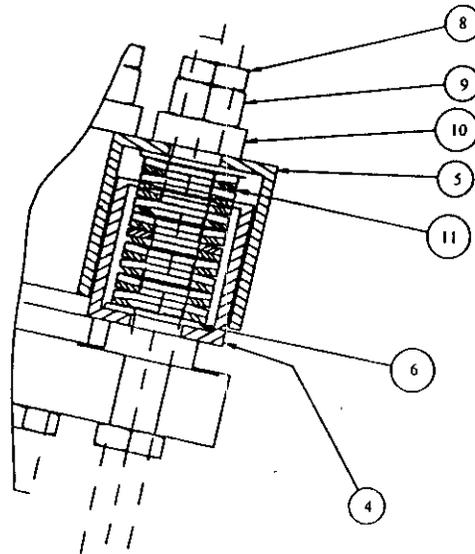
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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.31 B 17.57 C 17.09 D 17.18 E 17.40 F 17.11

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.51 B 15.77 C 15.29 D 15.38 E 15.60 F 15.31

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

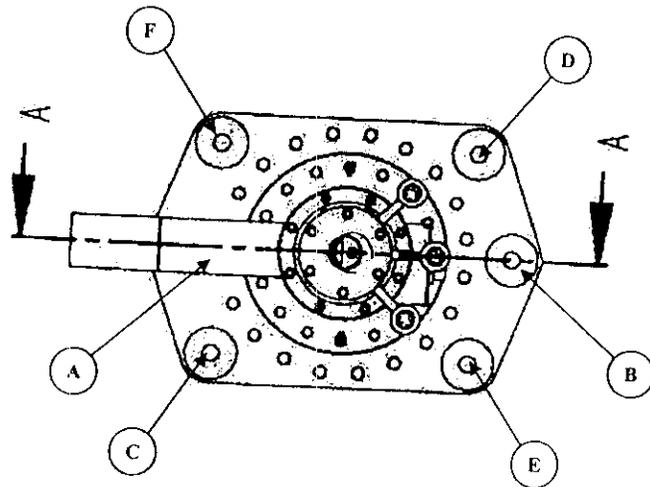


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- A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A ✓ B     C ✓ D ✓ E     F ✓  
 A     B     C     D     E     F      
 A     B     C     D     E     F



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

**1.29.5** Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.28 B 15.68 C 15.42 D 15.33 E 15.74 F 15.31

**1.29.6** Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

**1.30** Reduce compression of Belleville washer assemblies.

**1.30.1** Remove the Teflon centering ring from the installed power lead.

**1.30.2** Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

**1.31** Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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Installation of the LHC HTS Current Leads

Lead: DFLX 05

FLANGE STAMPED "1"

BOX G

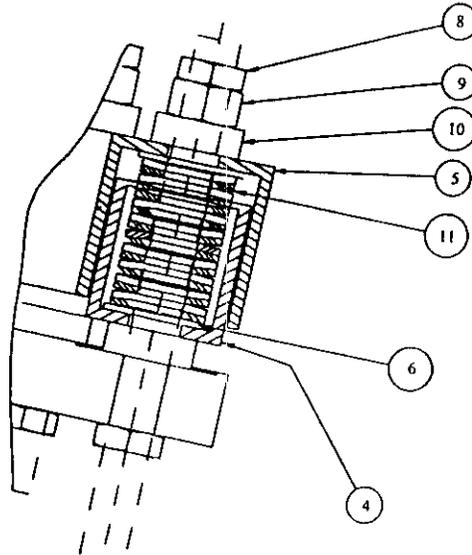
Signed Wayne E. Johnson Date 6-24-04



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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.10 B 17.09 C 16.93 D 17.30 E 17.26 F 17.21

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.30 B 15.29 C 15.13 D 15.50 E 15.46 F 15.41

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX

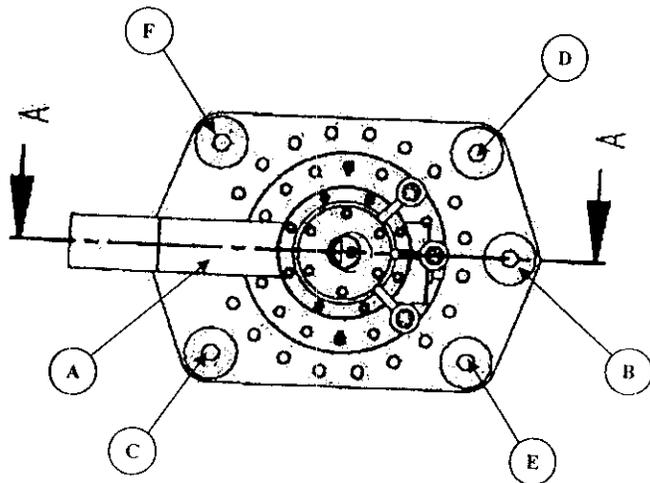


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
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 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_ F \_\_\_\_\_



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.45 B 15.32 C 15.41 D 15.68 E 15.23 F 15.46

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 05**

Box G

Signed

*Way E. Johnson*

Date

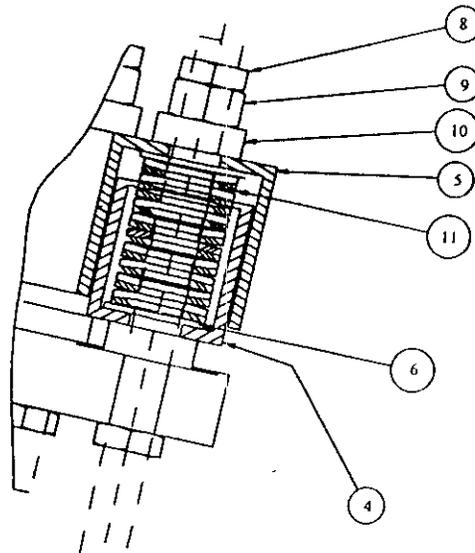
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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.19 B 16.96 C 16.64 D 17.21 E 17.11 F 17.17

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.39 B 15.16 C 14.84 D 15.41 E 15.31 F 15.37

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading-nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

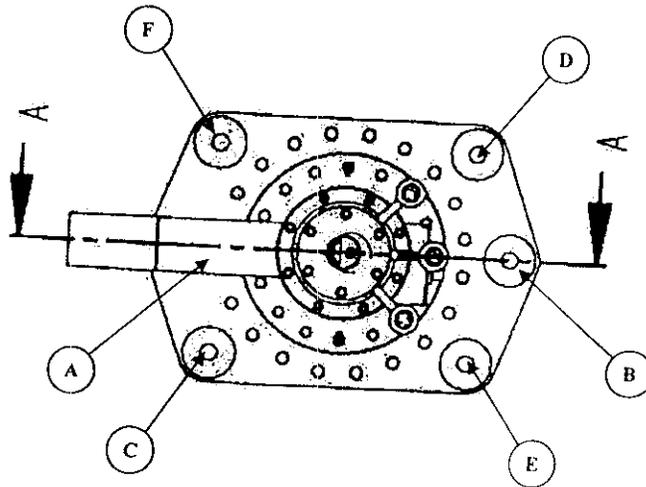


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A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓  
 A ✓ B ✓ C ✓ D ✓ E ✓ F ✓



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.75 B 15.24 C 14.75 D 15.11 E 15.20 F 15.13

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 08**

FLANGE STAMPED "35"

BOX G

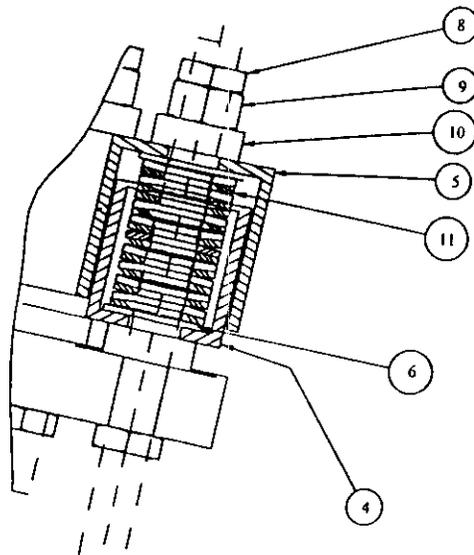
Signed Wayne S. Johnson Date 6-23-04



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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.
- 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.
- 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.20 B 17.71 C 17.49 D 16.96 E 17.32 F 17.30

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.40 B 15.91 C 15.69 D 15.16 E 15.52 F 15.50

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

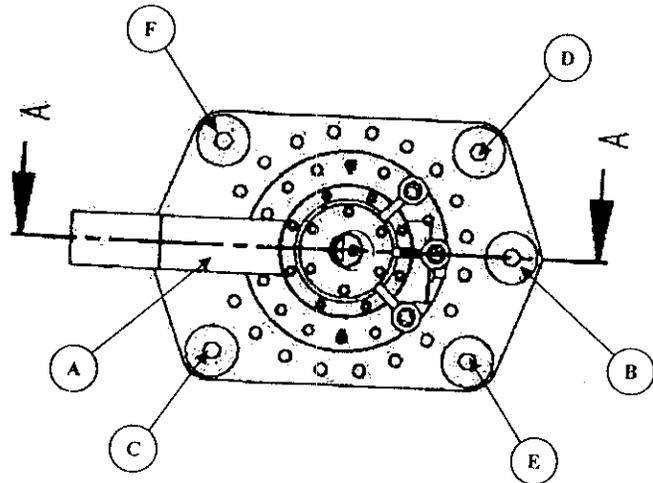


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- A  B  C  D  E  F
- A  B  C  D  E  F
- A  B  C  D  E  F
- A  B  C  D  E  F
- A  B  C  D  E  F
- A  B  C  D  E  F



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.49 B 16.40 C 15.47 D 15.20 E 15.51 F 15.77

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.



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**Installation of the LHC HTS Current Leads**

**Lead: DFLX 08**

**Box G**

Signed

*Wayne E. Johnson*

Date

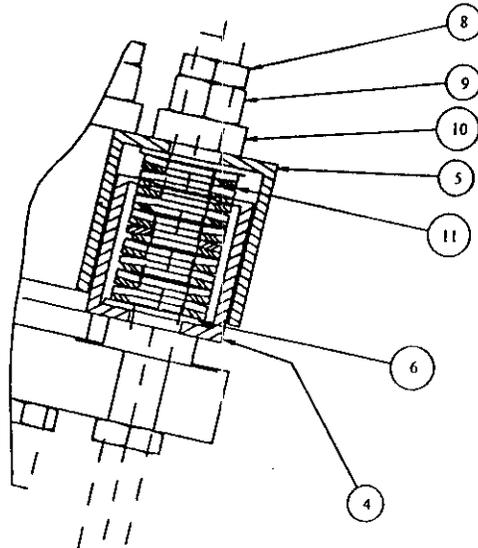
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**Figure 1.31b** An installed Belleville washer assembly.

- 1.29 Tighten the 6 Belleville washer assemblies to apply load to the PEEK seal.  
 1.29.1 Back down the tensioning rod nuts used in Step 1.25 so they are about 5 mm below the power lead flange.  
 1.29.2 Tighten the 6 loading nuts finger-tight. With adjustable parallels, measure and record the gap 'y' indicated in Figure 1.31a between Item 5 (Belleville washer holder upper half) and the power lead top flange at the 6 locations specified in Figure 1.32.2. Units are mm.

A 17.67 B 17.39 C 17.17 D 17.79 E 17.30 F 17.27

- 1.29.3 For each of the six studs: remove the adjustable parallel, adjust it for 1.8 mm of compression, and return the adjustable parallel into position under the Belleville washer holder. Record the adjusted heights of the adjustable parallels. Units are mm.

A 15.87 B 15.59 C 15.37 D 15.99 E 15.50 F 15.47

- 1.29.4 Using the sequence A through F in Figure 1.32.2, sequentially tighten the loading-nuts ¼ turn until the total compression is 1.8 mm at each of the six locations. As each loading nut is tightened ¼ turn, check off the appropriate line.

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

A ✓ B ✓ C ✓ D ✓ E ✓ F ✓

Lead DFLX \_\_\_\_\_

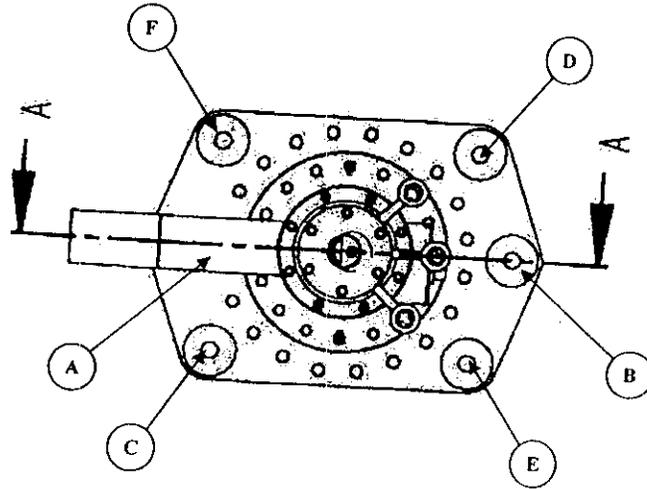


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 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F   
 A  B  C  D  E  F



**Figure 1.32.2** The specified sequence for tightening the Belleville washer assemblies.

1.29.5 Remove the adjustable parallels from under each Belleville washer assembly, then replace them and measure the final gaps 'y' in Figure 1.31a. Units are mm.

A 15.51 B 15.61 C 15.80 D 16.21 E 15.48 F 14.79

1.29.6 Attach a Conflat flange with a pressure gauge and a fill valve to the gas outlet port. Pressurize to 10 psig. The seal is acceptable if the pressure loss is less than 1 psi after 2 minutes.

1.30 Reduce compression of Belleville washer assemblies.

1.30.1 Remove the Teflon centering ring from the installed power lead.

1.30.2 Back off the loading nuts sequentially to reduce the Belleville compression to 0.75 mm (0.030 in).

1.31 Tighten down the jam nuts to secure the loading nuts on the installed Belleville washer assemblies.