SERVICE **BULLETIN**

Carrier Corporation **North American Operations**

Title: **Spring Washer Improvement**

Number: **C9833**
Date: **12/10/98**
Supersedes: **New**
Models Affected: **23XL "D" frame Compressors** **Date:** **N/A**

Purpose:

To inform the field of an improved 23XL "Belleville type" spring washer which produces increased clamping force to the outer bearing race on "D" frame compressors.

Reference:

Bulletins **C9803 23XL** Slide Valve Rework Procedure
C9804 23XL Slide Valve Support

Dimensions. .140" (3.56mm)
.150" (3.8mm)
.169" (4.3mm)
.197" (5.0mm)

Background:

The outer bearing clamping force, applied by the deflection of the current production spring washer, is significantly influenced by the tolerance build-up of the outlet casing machining, bearings, spacer and spring washer. When the combined tolerance build reduces washer deflection towards the minimum required, the spring washer on some D frame compressor male rotor bearing has rotated, wearing the spacer, washer and slide casing surface.

Information:

A new .169"(4.3mm) thick spring washer will be implemented as standard during 1999, replacing the current washer and providing a significant increase in clamping force to the outer rotor bearings on D frame 23XL compressors. When the planned spring washer change is implemented, the standard washer and spacer will be available through RCD.

In the interim, Service Engineering has had a quantity of thicker .169"(4.3mm) spring washers produced for replacement of current spring washers that have been found to have spun on existing D frame compressors. The new replacement .169"(4.3mm) spring washers have to be ordered through Service Engineering until the change is implemented as standard production.

When requesting a new .169"(4.3mm) spring washer, follow the retrofit procurement requirements by first obtaining the specified dimensions from your machine.

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Retrofit Requirements: Requesting Branch

1) Referring to the page 3 diagram, accurately measure the **"A"** (Outlet casing bolting surface to outer bearing race) depth dimension.
2) Accurately measure the spacer height dimension **"B".**
3) Inspect the slide valve casing, in the spring washer contact area, for grooving due to washer rotation. If grooving is present, measure depth of grooving as accurately as possible.
4) Provide these dimensions, unit model number, job name and machine serial number to Service Engineering, along with your request for a thicker .169"(4.3mm) spring washer.

Retrofit Requirements: Service Engineering

5) Calculate the existing **Compressed Spring Washer Height** - **"C"** (C = A - B)
Measureable slide casing grooving must be added to **"C"** for a final value.
6) Calculate the **Optimized Spacer Height Required,** dimension **"O",** to obtain the targeted spring washer deflection of.140"(3.56mm).
"O" = A - (Averaged washer free height - .140"(3.56mm))
7) Compare the calculated **Optimized Spacer Height "O",** required to obtain the target spring deflection of.140"(3.56mm), to the **Measured Spacer Height "B".** If the existing spacer height dimension **"B"**, is within +/-.002"(.05mm) of "O", the existing spacer may be used with the new spring washer.

Optimized Spacer Height: "O" =_____
Measured Spacer Height "B" =_____

8) If **"O"** is more than .005"(.13mm) greater than **"B"**, a new spacer must be machined to dimension **"O"**. If **"B"** is more than .005"(.13mm) greater than **"O"**, then the existing spacer must be remachined to the **"O"** dimension.

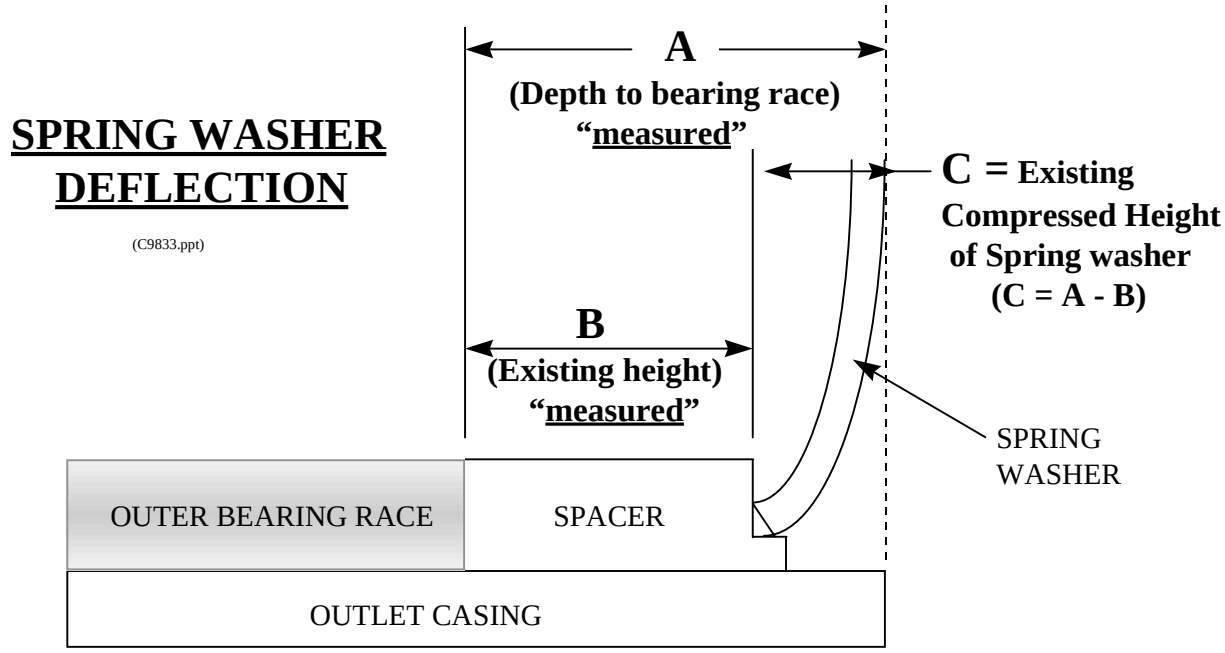
Spring washer deflection limit check:

9) If a spring washer is deflected too far, it will bottom out and lose its clamping force. The limit for this application is 90% of available washer deflection. Service Engineering will confirm that the **targeted 140"(3.56mm) deflection** does not exceed 90% of the available deflection height for the selected washer by the following procedure.

9a) The "*averaged free height*" of the selected washer is established by averaging the 4 height measurements written on the face of the washer received.
9b) The "*average deflectable height* **"Hd"**" for the thicker spring washer will be determined by subtracting the .169"(4.3mm) washer thickness from the *"averaged free height*".
9b) Divide .140"(3.56mm) by the **"Hd"**value. If the result is greater than .9, the selected spring washer cannot to be used.

Installation:
The interim .169"(4.3mm) washers from Service Engineering are machined from .197"(5.0mm) washers. To optimize the upgrade, a deflection of .140"(3.56mm) +/-.005"(.13mm) has been targeted. If the old spacer will produce a spring deflection within .140"(3.56mm) +/-.005"(.13mm), and it has not been worn by rotation, it can be reused. Otherwise, the new spacer must be machined to the specific requirements of the unit retrofit, determined from the prior calculation processes.

When the standard change is made in 1999, special machining of the spacers is not expected since the *pounds to deflection* curve profile of stamped .169”(4.3mm) washers is *more flat* over a broader range of deflection. If a spacer had worn due to rotation, it would be replaced with a standard replacement spacer obtained through RCD.



Measure dimensions “**A**” and “**B**” = (_____ & _____) **(BSS-Field)**

Calculate washer “existing” compressed height (C = A - B) = (_____)

Calculate “Optimum Spacer” height “O”

O = **A** - (Averaged washer free height - .140) = (_____)