RAUCH & SPIEGEL

Technical Information

1015.2

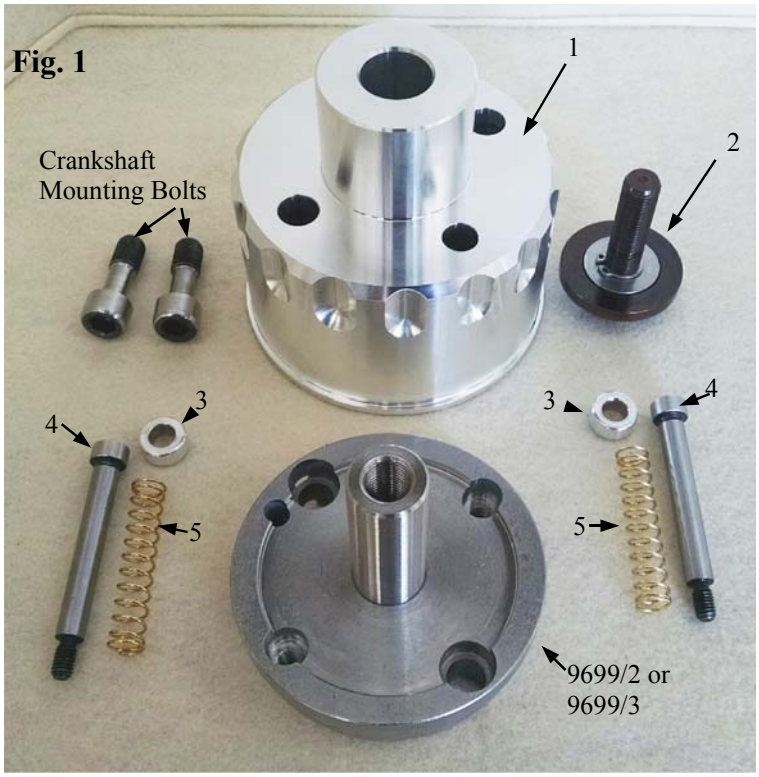
PTFE Crankshaft Seal Installation Tools
9699 + 9699/2, 9699/3
For PORSCHE® Automobiles
Notes on Application and Use

DESCRIPTION As with many other new technologies, the use of special tools and techniques are required in order to successfully implement the installation of the new-type **PTFE** (PolyTetra-FluoroEthylene) crankshaft seals in many 1997 and later Porsche® automobiles. This document is intended to deal specifically with the installation of these new seals on the flywheel end of the crankshaft utilizing Rauch & Spiegel tool numbers 9699 in conjunction with 9699/2 and/or 9699/3. (Applicable models include: Boxster, Boxster S, Cayman, Cayman S (1997-2015) and 911 Carrera models (1999 - 2015).

These R&S tools are interchangeable with those of Porsche® factory origin and of the same number. That is to say that R&S 9699/2 or R&S 9699/3 may be used in conjunction with a Porsche® 9699 press bell and hardware. The R&S 9699 press bell and hardware may also be used in conjunction with the Porsche® 9699/2 or 9699/3. **However, the special R&S Needle Bearing Draw Bolt must always be used with the R&S 9699 Press Bell no matter who's crankshaft arbor is installed. Use of Porsche's "skid washer" draw bolt can damage the precision thrust surface of the R&S 9699 Press Bell. Use only the R&S supplied Needle Bearing Draw Bolt with the R&S 9699 Press Bell and use only the Porsche® skid washer Draw Bolt with the Porsche® 9699 Press Bell.**

9699 PRESS BELL & HARDWARE ASSY. LIST

Item	Qty.	Description	Part No.
1	1	Alloy Press Bell	9699.BELL
2	1	Roller Bearing Draw Bolt Assy.	9699.DBOLT
3	2	Guide Sleeve	9699.GS
4	2	Torque Reaction Guide Bolt	9699.TRB
5	2	Spring	9699.SPRING



Application specific Crankshaft Mounting Bolts are supplied with both the 9699/2 and the 9699/3 Crankshaft Mounting Arbors. Unlike the parts in the list above, these crankshaft mounting bolts are not interchangeable between the 9699/2 and 9699/3 arbors.

For replacement Crankshaft Mounting Bolts the following part numbers should be used:

Tool #	Qty.	Part No.	Specification	
9699/2	2	9699/2.CMB	M10-1.0 x 25	With reduced head diameter.
9699/3	2	9699/3.CMB	M10-1.0 x 29	With reduced upper threaded shaft and head diameter.

Tool Assembly and Maintenance

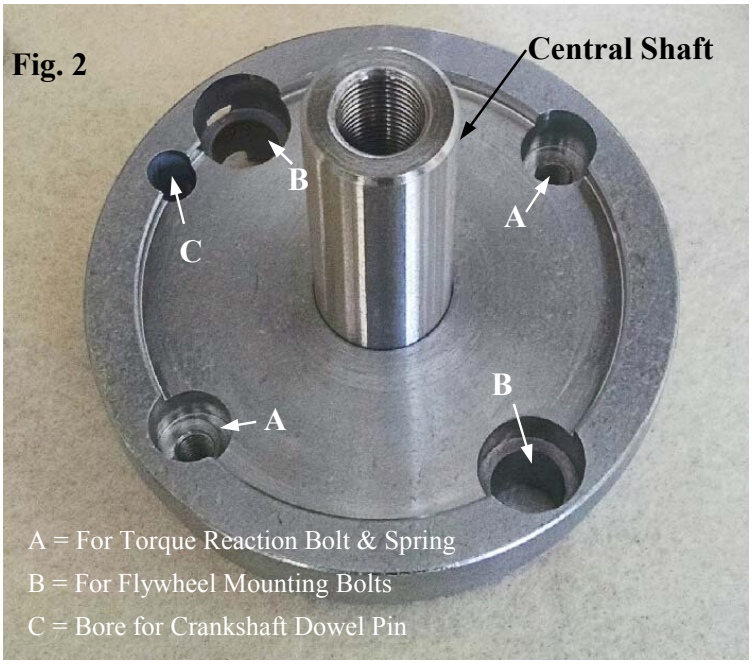
Your new R&S crankshaft seal installation tools are precision instruments with many important nuances. They have been designed and manufactured to last a lifetime of professional use with proper care and maintenance.

To assemble the tool:

1) Place the 9699/2 or 9699/3 on a clean soft cloth crankshaft end down (Fig. 2).

2) Slide one Guide Sleeve (item #3, Fig. 1) up to bottom of head on Torque Reaction Bolt (item #4, Fig, 1) followed by one Spring (item #5, Fig 1). Repeat on the 2nd set of parts to form (2) assemblies. Now carefully thread one of each assembly into the counter-bored holes at Pos. "A", Fig, 2, making sure that the bases of the springs are inside the counter-bores. **Torque the bolts to 72 in/lbs.**

3) Place the (2) Crankshaft Mounting Bolts into the counter-bored M10 clearance holes (Pos. "B", Fig. 2) with heads up. The tool should now appear as in Fig. 3.



4) Looking inside the 9699 Press Bell, locate the (2) larger, counter-bored holes for the Torque Reaction Bolts and Guide Sleeves (items "D", Fig 4). Carefully slide the Press Bell down over the assembled 9699/2 or 9699/3 while making sure that the Central Shaft and the Guide Sleeves are in their correct bores.

Tool Assembly (cont.)

4) (cont.) This should be virtually effortless. If any difficulty is encountered, re-check the positions of the elements and bores. NEVER force anything.

5) The 9699 Press Bell should sort of "bounce" on the Springs and Guide Sleeves. While pressing down on the Press Bell slightly, carefully thread the Roller Bearing Draw Bolt (item #2, Fig. 1) into the threads of the Central Shaft a few turns and then release the Bell. The tool is now completely assembled and should appear as in Fig. 5.

Tool Care and Maintenance

Maintenance of these tools generally consists of making sure that they are spotlessly clean and oil and grease free. Since the PTFE seals must be installed without even the smallest trace of oil or grease, these R&S tools have been designed to operate without any oil or grease with the exception of (2) places, both completely isolated away from the seal contact areas. For example, the oil soaked sintered bronze bushings present in other tools have been replaced with a Nikasil-like dry-film lube plating directly into all of the bores of the Press Bell. This also allows us to hold much better concentricity and tighter tolerances.

► Always set the tool and any of it's parts on a clean, soft cloth or in it's foam padded box when it is not bolted to a clean crankshaft.

► Never employ air-powered tools for assembly or use of these tools.

► Aways keep these tools spotlessly clean. Even a small amount of dirt or abrasive dust can damage the surface finish and plating.

The Press Bell only may be washed with mild soap and water and dried with compressed air or a soft cloth.

The steel parts (including the Roller Bearing) can be cleaned with aerosol brake parts or electrical contact cleaner, provided that they are of the type the won't leave an oily film and that the parts are immediately and thoroughly blown dry with compressed air. Any time the Draw Bolt or Crankshaft Mounting Arbor is cleaned by this method, one or two drops of motor oil should be applied to the end threads of the Draw Bolt. The Bolt should then be threaded in and out of the of the Central Shaft several times to distribute a thin oil film on the threads. Wipe-off any excess oil.

► To service the Roller Bearing assembly, carefully remove the circlip, lower hard washer, Roller Bearing and upper hard washer. Clean per above, dry with compressed air and re-lubricate with Wurth® HHS-K. Re–assemble per Fig. 6. Make sure circlip is properly seated in groove.

Fig. 3

Fig. 4

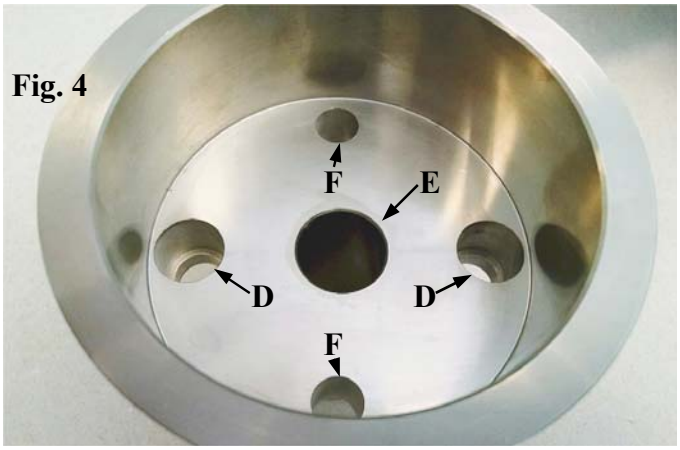
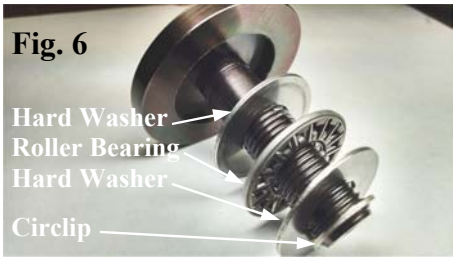


Fig. 5

Fig. 6



INSTALLATION NOTES and TIPS

SAFETY FIRST. ALWAYS wear appropriate personal protective safety equipment, especially safety glasses, while performing the following operations. ALWAYS keep bystanders a safe distance away from any of these operations.

CARE & FEEDING OF PTFE FLYWHEEL SEALS: The "old school" rubber lip seals we've all grown used to required lubrication for installation onto the shaft and usually relied upon a circular spring to hold the sealing lip snugly against the rotating shaft. These new PTFE seals have many quite the opposite requirements:

DO NOT remove the protective plastic inner ring from the new PTFE seal! This plastic ring is essential to prevent damage to the sealing surface during handling and installation. It will be removed during the installation process by the tool (removal by tool applies to genuine Porsche® - type PTFE seal only). If for any reason the protective plastic ring has been removed prior to installation, do not try to re-install it as this action will likely damage the delicate sealing surface. Discard the seal and obtain a new one with an intact protective ring.

NO oil, grease, dirt, dust, sharp edges, nicks, dings or corrosion of any type may be present on the crankshaft's sealing journal or flywheel mounting surfaces. Similar conditions must exist in the seal bore of the crankcase prior to installation of the new seal. Absolute cleanliness and absence of any lubricants (oil, grease or even fingerprints) on any surface that contacts the new seal is required to effect a successful installation.

The PTFE seal must be installed perfectly straight and square onto the crankshaft and seated to the prescribed depth in the seal bore of the crankcase. Tool 9699/2 used in conjunction with the 9699 Press Bell and hardware will properly and squarely seat the seal at the prescribed 13mm depth (relative to the crankshaft's flywheel mounting surface) on 1997—2008 models with an (8) flywheel bolt crankshaft. Tool 9699/3 used in conjunction with the Press Bell and hardware will do the same to the 7mm prescribed depth on 2009-2015 models with (10) flywheel bolt crankshafts.

After Installation (pushing-in of the seal to full depth) the tool must be left undisturbed and not be loosened or removed for a period of time. This is necessary to allow the new PTFE seal lip to extrude evenly around the crankshaft's journal and provide a very fine custom fit to the individual crankshaft. The amount of time recommended for this varies from 1-2 hours (currently recommended by Porsche® for genuine seals) to 4 hours (recommended by some aftermarket manufacturers, i.e.: Victor Reinz®).

INSTALLATION PROCESS

1) Obviously, you must gain access to the old leaking seal in order to replace it. The procedures required to accomplish this (i.e.: engine and/or transmission and flywheel removal and replacement) are beyond the scope of this document. The best source for acquiring this information can be found in the Porsche® factory workshop manual for the particular car in question. These manuals are available on the Porsche website: https://techinfo2.porsche.com/PAGInfosystem/VFModuleManager?Type=GVOStart or www.alldata.com. These manuals contain the extensive and necessary information you'll need to gain access to the offending seal. In addition they contain essential information on how to properly and safely remove the old seal and properly clean the crankshaft as well as how to put the car back together when you've successfully changed the seal. **Please Note that the Porsche® factory information differs from the instructions in this document with regard to care and use of the 9699, 9699/2 and 9699/3 tools. Specifically with regard to: Loading the new seal onto the tool, Torque specifications for tool-related fasteners and how to care for the tool. Where the factory information varies from the information in this document with regard to the aforementioned, the information in this document must be closely followed.** Also, the Porsche® manuals do not contemplate the installation of an aftermarket seal (i.e.: Victor Reinz®) which utilizes a different style of protective plastic ring and requires a different technique for initial mounting.

2) The old seal has been removed and your crankshaft surfaces and seal bore are spotless and contaminate, grease, oil and burr free according to Porsche® manual instructions.

▲ **The following deviates from Porsche® manual instructions in terms of procedural steps and torque requirements related to the tools themselves. We believe the following method works better and the torque limits must be strictly adhered to in order to prevent tool damage.**

3) Place a clean soft towel on your workbench and then place the new PTFE seal, open side down, on the towel. Note that the collar on the inside of the Protective Plastic Ring should be down against the towel. (See Fig, 8)

4) Place the crankshaft end of the assembled 9699/2 or 9699/3 into the opening at the top of the Protective Plastic Ring and press down on the tool gently until the tool is squarely seated in the Plastic Ring and the upper edge of the Plastic Ring is evenly seated against the bottom of the tool's largest diameter all the way around. (See Fig. 9)

5) Bolt the 9699/2 or 9699/3 (with seal in position) onto the crankshaft making sure that the crankshaft's fly-wheel locating pin is positioned properly into the tool's Pin Bore (item C, Fig. 2). Finger tighten the bolts, recheck for proper placement of the crankshaft's pin in the tool and torque the (2) mounting bolts to 8-10 ft./lbs. (96-120 in./lbs.).

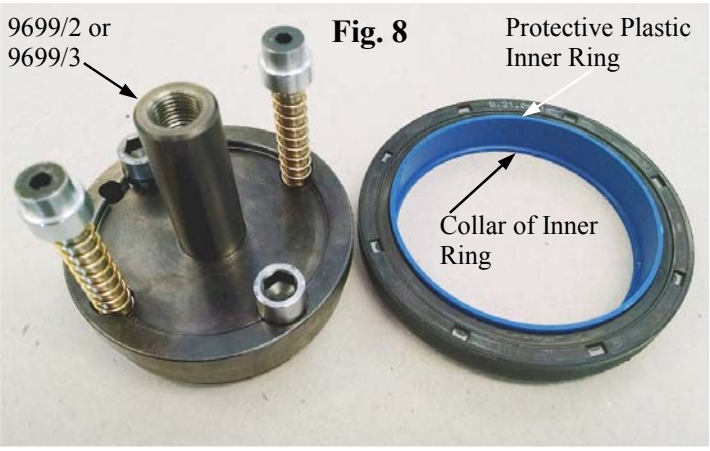


Fig. 8

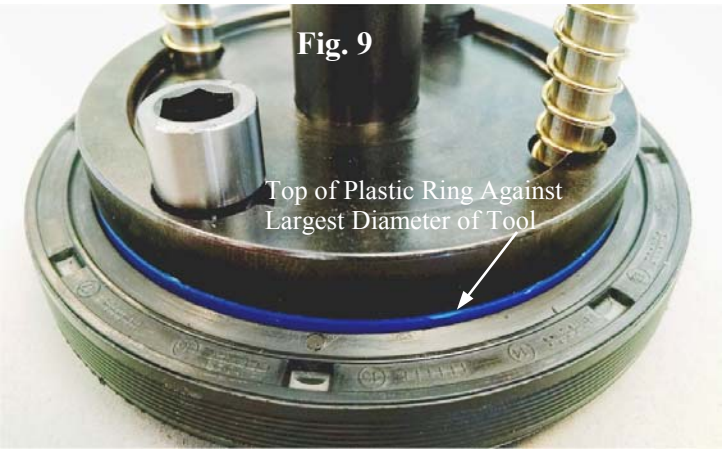


Fig. 9

6) Carefully align the 9699 Press Bell with the mounted 9699/2 or 9699/3 while making sure that the Central Shaft and the Guide Sleeves are in their correct bores in the Press Bell (See "Tool Assembly", P2). Carefully slide the Press Bell towards the crankshaft until it just begins to contact the outer face of the seal. (see Fig. 10)
Now, carefully thread the Roller Bearing Draw Bolt into the Central Shaft (Fig. 2) with fingers until the Draw Bolt Bearing contacts the outer end of the Press Bell (should be 3-4 turns) while holding Press Bell in position with the other hand.

7) Now proceed to install the new PTFE seal to the correct depth by continuing to thread the Draw Bolt in until a "stop" is felt. This should take very little effort with a short-handle ratchet wrench and a 19 mm socket. The depth is set and the "stop" is felt when the largest diameter portion of the 9699/2 or 9699/3 "bottoms-out" in the Press Bell. **NOTE: The torque limit on the Draw Bolt is 20 ft./lb. to avoid damage to the roller bearing. It should not take anywhere near that amount of torque to properly seat the seal! NEVER use air-powered tools to drive any of the parts of the 9699, 9699/2 or 9699/3.**

8) Leave the tool in place for the time specified in the Porsche® manual (usually 1-2 hours), and then remove the tool. Upon removal, the Plastic Ring will remain on the tool. It should be left there to protect the edges of the tool until the next use. Carefully lever-off the sleeve at the Pin bore (item C, Fig, 2) with a small screwdriver to remove it.

9) Check that the seal is at the correct depth and seated squarely by measuring from the crankshaft's flywheel mounting surface to the outer face of the seal at four points separated by approximately 90º. The correct depth for 9699/2 is 13 mm and for 9699/3 it is 7 mm. Tolerance is ± 0.3 mm.

10) Re-assemble the car per Porsche® manual instructions.

Fig. 10