PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE


*A10 WARTHOG W/ GYR Upgrade Package*

- *BMW*
- *Chrysler*
- *Ford*
- *GM*
- *Honda*
- *Hyundai*
- *Mazda*
- *Mitsubishi*
- *Nissan/Infiniti*
- *Peugeot*
- *Porsche*
- *Subaru*
- *Toyota/Lexus*
- *Volkswagen*

**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

# Pro-Cut OEM Summary

The following manufacturers have either made Pro-Cut an essential tool for their dealers, or written technical service bulletins urging dealers to use the Pro-Cut lathe. The bulletins are included in this booklet.

| | |
|---|---|
| **BMW** | 2004- Pro-Cut approved for dealer use worldwide. |
| **Chrysler** | 1996- Chrysler releases new warranty bulletin naming ProCut as preferred repair.<br>2003- DaimlerChrylser names Pro-Cut a required tool for servicing Durango. |
| **Ford Motor Company** | 1998- Ford delivers Pro-Cut brake lathes to every US and Canadian dealer.<br>2002- Ford delivers lathes to every Australian and New Zealand dealer. |
| **General Motors** | 2003- GM names the Pro-Cut 9.2 as an essential tool for US and Canadian dealers. |
| **Honda** | 2007- Pro-Cut approved for dealer use in Canada (not published per request of Honda CAN) |
| **Hyundai** | 1997- Hyundai TSB 97-50-007 names Pro-Cut as recommended tool. |
| **Mazda** | 2011- Pro-Cut approved for warranty service |
| **Nissan/Infiniti** | 2004- Pro-Cut named essential tool in US.<br>2005- Pro-Cut named essential tool in Canada. |
| **Peugeot** | 2001- Peugeot names Pro-Cut for warranty repairs. |
| **Porsche** | 2004- Approved for servicing Porsche 911. |
| **Subaru** | 1994- Subaru picks Pro-Cut for dealers.<br>2003- Subaru drop warranty time from 1.4 hrs to 1.0 hrs per axle. |
| **Toyota/Lexus** | 2002- Pro-Cut approved for warranty service. |
| **Volkswagen** | 2007- Pro-Cut named recommended tool by VW |

The following manufacturers approve the use of the Pro-Cut lathe by their dealers but have not written specific bulletins naming Pro-Cut.

| | |
|---|---|
| **Ferrari** | Approved |
| **Isuzu** | Approved |
| **Kia** | Approved |
| **Mitsubishi** | Approved |
| **Saturn** | Approved |

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

| Geschäftsleitung Management | Service/Beratung Service/Reception | Werkstatt Workshop | Gewährleistung Warranty | Teile und Zubehör Parts and Accessories | Verkauf Sales |
|---|---|---|---|---|---|
| Verantwortlich/Responsible: VS-14/Weigl<br>Nur zum internen Gebrauch/for internal use only | | **Register/Index: 8<br>8 03 04 (137)** | | Code: Vertrieb D<br>KDL d. VGs u. Imp. z.Info | Datum/Date: 09/2004 |

# BMW Service

## Special tools and equipment

# Pro-Cut PFM 9.0 brake lathe

## All

Situation: A new lathe has been approved for turning brake disks on the vehicle.

This lathe is ideal for:

- Low-cost repairs on vehicles with heavily corroded brake disks, so-called in-situ damage
- Processing the brake disks on all front and rear axles, including on 4-wheel-drive vehicles

**Pro-Cut PFM 9.0 brake lathe**

Please refer to Enclosure 1

Procedure: To be ordered from CARTOOL.

CARTOOL GmbH
Straußenlettenstr. 15
D-85053 Ingolstadt, Germany

Tel.: 0841-96500-24 (from within Germany)
Tel.: +49-841-96500-23 (from other countries)
Fax: +49-841-96108-48
e-mail: N.Benzinger@cartool.de

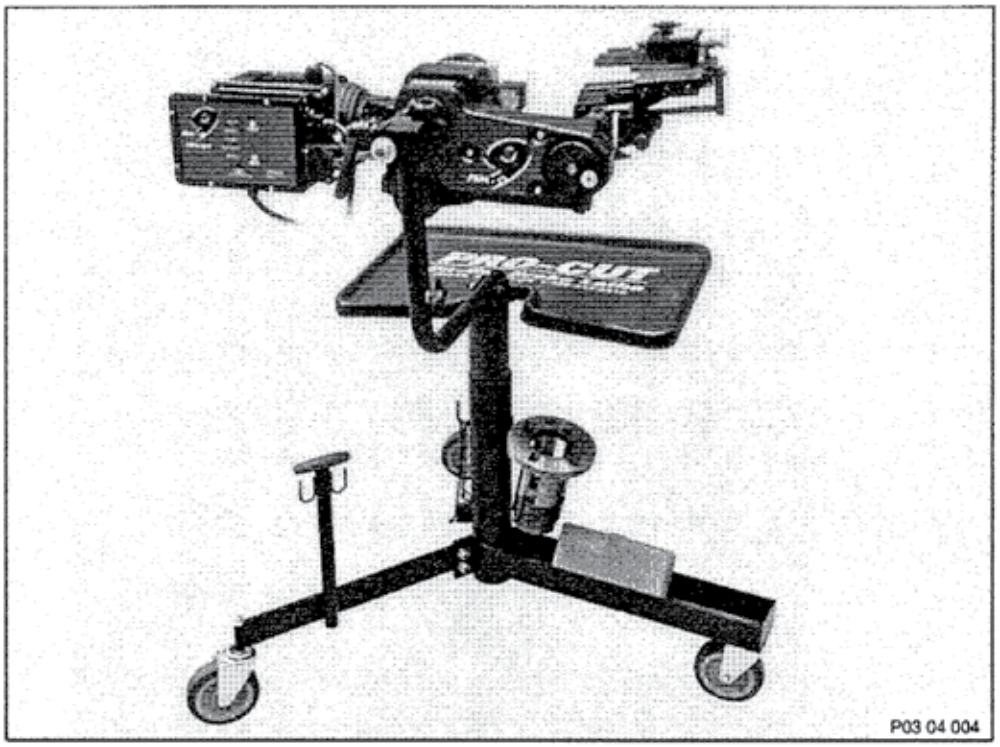
**Bayerische Motoren Werke Aktiengesellschaft**
Technical Support
Workshop Equipment

Enclosure 1: Pro-Cut PFM 9.0 brake lathe
Enclosure 2: Price list

En

Enclosure 1 to SI 8 03 04 (137)
1 2

## Pro-Cut PFM 9.0 brake lathe




Brake lathe for turning brake disks on the vehicle, for all vehicle models.

Order number: 81 63 0 393 685

**Technical data:**

| | |
|---|---|
| Power connection | 110 V or 230 V |
| Frequency | 60 Hz or 50 Hz |
| Power output of motor | 0.71 kW |
| Weight | 26 kg |
| Shaft speed | 126 rpm |
| Forward feed | 0.12 mm/rev" |
| Max. cutting depth | 0.51 mm |
| Max. brake disk thickness | 44 mm |
| Max. brake disk diameter | 412 mm |

Enclosure 1 to SI 8 03 04 (137)
2 2

**Scope of delivery:**

- Pro-Cut PFM 9.0 brake lathe
- Robust equipment trolley, height-adjustable with swarf-collection pan
- Adapter for BMW wheel hubs, hole pattern 5 x 120 and 4 x 100
- Extra-long cutting arm
- Spacer (for brake disks larger than 330 mm diameter)
- 10 pcs. reversible carbide tip
- Vibration damper
- Operating instructions and tool

*Note:*

Other accessories are available from the manufacturer for processing brake disks on non-BMW vehicles.

Enclosure 2 to SI 8 03 04 (137)
1 1

## Pro-Cut PFM 9.0 brake lathe

| Description | Order number | Store price |
|---|---|---|
| Pro-Cut PFM 9.0 brake lathe | 81 63 0 393 685 | 8,550.00 euro |

The quoted prices are net and do not include VAT, shipping or assembly.

Orders should be sent to:

CARTOOL GmbH
Straußenlettenstr. 15
85053 Ingolstadt, Germany

Tel.: 0841-96500-24
Fax: +49-841-96108-48
e-mail: N.Benzinger@cartool.de

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

CHRYSLER

DaimlerChrysler
Current DaimlerChrysler Brake Warranty Policy

## Warranty Bulletin
**Subject: Brake Rotor Refacing**

Effective immediately, brake rotors on all Chrysler Corporation passenger cars and trucks (domestic and import), may be refaced by using on vehicle lathe only. This change in policy, from replacement only, allows the dealership to determine the best repair method based on diagnostic results.

Proper diagnostic procedures are found in section 5 of the appropriate vehicle's service manual. The maximum/minimum brake specifications and tolerance which are listed there are for reference purposes only. The minimum rotor thickness is cast into all rotors and must be strictly adhered to. Brake rotors that do not meet the minimum specifications must be replaced.

When refacing rotors, the technician must record the beginning and ending disc flatness, lateral run out and rotor thickness values on the back of the repair order hard copy. If this information is not recorded on the back of the hard copy, the repair is subject to charge back. All policies and procedures outlined in this bulletin also apply to sublet brake rotor repairs. Beginning and ending specifications must be recorded on the sublet invoice.

Updated labor operation time schedule pages are included as an attachment to this bulletin in the CMMS/COMPAK of 12/27. They contain labor operation numbers and appropriate time allowances for refacing brake rotors.

Chrysler Engineering has evaluated various on-vehicle brake rotor lathes and found the Pro-Cut lathe provides the preferred results. This equipment is available through Pentastar Service Equipment (PSE). You may contact PSE headquarters at (800) 223-5623 for assistance in obtaining a unit that will fit your needs. The equipment must be capable of maintaining the following brake rotor tolerances and produce a smooth even finish without directional burrs:

.025 mm (.001") disc flatness
.051 mm (.002") lateral run out, as measured at the center of the braking surface
.0051 mm (.0002") rotor thickness variation

The use of an off vehicle or non-capable brake rotor lathe may not correct an existing condition and may in fact cause additional problems. Therefore, refacing with an off vehicle or non-capable lathe is prohibited and not reimbursable under the terms of this bulletin, or Chrysler Corporation's new vehicle warranty. The specifications and procedures outlined in the vehicle's appropriate service manual and the lathe operator's manual, if more stringent, must be followed whenever brake rotors are refaced.

K.A. Murrenus
Manager,
Warranty Administration

CHRYSLER Jeep SERVICE

Stick with the Specialists®

# WARRANTY BULLETIN

| | |
|---|---|
| **TO:** Dealer Principal, Service Mgr., Parts Mgr. and Warranty Claims Administrator<br><br>**SUBJECT:** ON-VEHICLE BRAKE LATHE WARRANTY SYSTEM EDIT CHANGES | **NO:** D-07-10<br>**DATE:** April, 2007<br><br>**FOR:** X Dealers<br>Business Centers |

**PURPOSE:**
To inform dealers of a new warranty system edit to allow payment of warranty claims for disc brake rotor refacing only if the dealer has the proper On-Vehicle Brake Lathe service equipment.

**TIMING:**
Target July 9, 2007

**ACTION:**
Dealers should only submit rotor refacing claims if they use an approved On-Vehicle Brake Lathe or, if the repair is a sublet, to a facility with an approved on-vehicle brake lathe equipment.

**ADDITIONAL INFORMATION:**
Dealers submitting disc brake rotor refacing claims, who do not have approved on-vehicle brake lathe equipment, will have their claims rejected with a message code "**TL1**": "*This repair requires an approved DCX On-Vehicle Brake Lathe.*"

This action does not apply to sublet repair claims. However, dealers are responsible for insuring that all repairs performed by approved sublet repair facilities conform to the necessary standards and quality set forth by DaimlerChrysler.

Refer to the Warranty Administration Manual, Claim Procedure Section, Page CP-4 for additional details regarding brake rotor replacement or refacing.

NOTE: Brake rotors that do not meet the minimum specifications, before or after refacing, must be replaced.

To order the approved On Vehicle Brake Lathe, see **DealerCONNECT>eStore/Market Center> eStore sites>Pentastar Service Equipment;** ***Type*** **"Lathes" in the search box.** Questions related to equipment orders should be directed to **teamPSE** at 1-800-223-5623.

**Please ensure that all affected dealership personnel are aware of this bulletin.**

**WARRANTY OPERATIONS**

# SERVICE BULLETIN

**NUMBER:** 05-003-06

**GROUP:** Brakes

**DATE:** July 21, 2006



**OWNERS MUST PRESENT AN "INSPECTION CERTIFICATE" TO HAVE THIS BULLETIN PERFORMED OR DEALERS MAY USE VIP TO VERIFY APPLICABILITY. THIS INSPECTION OR INSPECTION AND REPAIR MUST TAKE PLACE BEFORE OCTOBER 20, 2006.**

***SUBJECT:***

Front Brake Inspection Procedure - Class Action Lawsuit Titled "Robert Lubitz et al. vs. DaimlerChrysler Corp". Case No. BER-L-4883-04

***OVERVIEW:***

This bulletin provides a front brake inspection procedure.

***MODELS:***

| | | |
|---|---|---|
| 2003 - 2004 | (WJ) | Grand Cherokee |

**NOTE: This bulletin applies to vehicles bought/leased AND operated in the United States.**

***SPECIAL TOOLS/EQUIPMENT REQUIRED:***

| | ProCut | Hunter |
|---|---|---|
| One of the Following DaimlerChrysler Approved On Car Disc Rotor Lathes: | PC-610, PC-CHRYSLER, PC-TRUCK, PC-CROSTRUCK, PC-PFMTRUCK, PC-PFMCHRYSLER, PC-PFM900, PC-PFMCHRYSLER-95, PC-PFMTRUCK-95, PC-PFM900-95, PC-PFM90.2, PC-PFM90.4, PC-PFM90, PC-PFM92-5, PC-PFM90-5, PC-PFM90-2 | H-OCL360, H-OCL360-LT-PRO, H-OCL360-LT-PSE, H-OCL360A, H-OCL360A-LT-PRO, H-OCL360A-LT-PSE, H-OCL360S, H-OCL360S-LT-PRO, H-OCL360S-LT-PSE, H-OCL400, H-OCL400-LT-PRO, H-OCL400-LT-PSE |

Jeep SERVICE

Stick with the Specialists™

***INSPECTION PROCEDURE:***

1. While road testing the vehicle between 65 and 95 kph (40 and 60 mph), lightly apply the brakes. Document on the hard copy of the repair order whether or not there is pulsation while braking.
2. **Was there a brake pulsation while braking during the test drive?**
   a. NO >> go to Step #1 of Procedure A
   b. YES >> go toStep #1 of Procedure B.

**PROCEDURE A**

1. Raise the vehicle on a suitable hoist.
2. Remove the lug nuts from the front wheel.
3. Mark one wheel stud and corresponding wheel hole so the wheel can be reinstalled in the same relative position that it is removed from.
4. Remove front wheel and tire assembly.
5. Visually inspect the front brakes for any abnormalities and record the findings on the hard copy of the repair order.
6. Repeat steps Step #2 - Step #5 for the other side of the vehicle.
7. Install both front wheel and tire assemblies using the marks made in Step #3. Torque the lug nuts in a criss-cross pattern to 14 Nm (10 ft. lbs.).
8. Lower the vehicle.
9. Using the same criss-cross pattern, final torque the lug nuts to 135 Nm (100 ft. lbs.).
10. Advise the vehicle operator of the inspection results.

**PROCEDURE B**

1. Drain small amount of fluid from master cylinder brake reservoir with clean suction gun.
2. Raise the vehicle on a suitable hoist.
3. Remove both front wheel and tire assemblies.
4. Bottom caliper pistons into the caliper by prying the caliper over (Fig. 1).

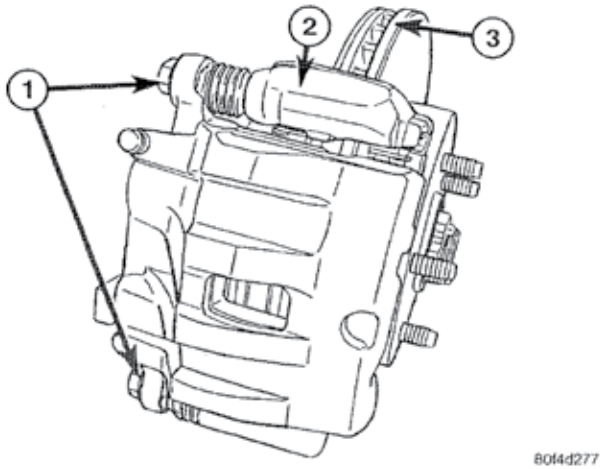



***Fig. 1 CALIPER MOUNTED***

1 - CALIPER SLIDE BOLTS
2 - CALIPER ADAPTER
3 - ROTOR

5. Remove the caliper slide bolts.
6. Remove the caliper from the adapter.
7. Secure the caliper assembly to nearby suspension part with a wire. Do not allow the brake hose to support the weight of the caliper .
8. Repeat Step #4 to Step #7 on the opposite side of the vehicle.

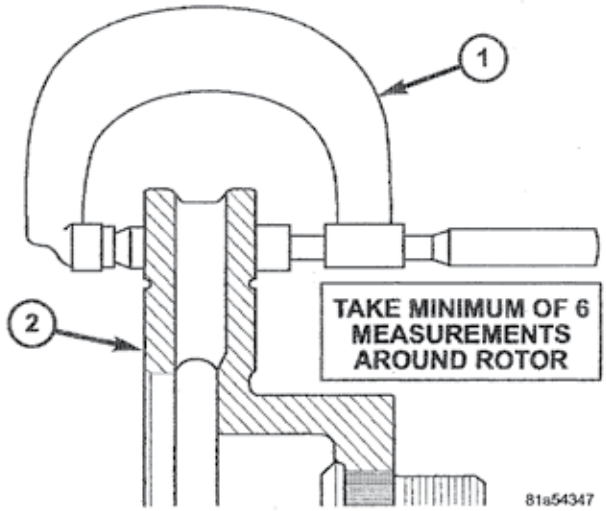



*Fig. 2 DISC THICKNESS MEASUREMENT*

1 - MICROMETER

2 - FRONT BRAKE DISC

---

9. Measure the brake disc thickness. Minimum allowable thickness is 24.5 mm (0.9646 in.).**Is there sufficient material to reface the disc(s)?**
   a. YES >> go to Step #10.
   b. NO >> go to Step #24.

**CAUTION: For vehicles equipped with the Quadra-Drive System, consisting of the NV-247 or NV-147 transfer case and a Vari-Lok differential in the front and rear axles, the following steps must be done prior to the use of a hub mounted on-vehicle brake lathe.**

10. **Is the vehicle equipped with a "Quadra-Drive system?**
    a. YES >> go to Step #11.
    b. NO >> go to Step #16.
11. Remove crossmember/skid plate as necessary to gain access to the propeller shaft.
12. Shift transmission and transfer case into Neutral.
13. Mark a line across the yoke at the transfer case, link yoke and propeller shaft yoke for installation reference.
14. Mark a line across the propeller shaft yoke and pinion shaft yoke for installation reference.
15. Remove the propeller shaft from the vehicle.

16. Install the lug nuts on the wheel studs and torque to 34 Nm (25 ft. lbs.) to keep the disc true and tight to the hub/bearing while the brake disc machining is in process.

**NOTE: A hub mounted on-vehicle lathe is required. This type of lathe trues the disc to the vehicles hub/bearing. Refer to the SPECIAL TOOLS/EQUIPMENT REQUIRED table for a list of approved lathes.**

17. Reface the front brake disc(s) with a DaimlerChrysler approved on-car brake lathe. If an on-car lathe is not available at the dealership, the disc refacing must be sublet to a facility with an approved on car lathe.
18. Install new front brake pads, p/n 05093183AB.
19. Caliper slide pins should be free from debris and lightly lubricated with brake grease, p/n J8993704.
20. Install the caliper on the adapter.

**CAUTION: Verify brake hose is not twisted or kinked.**

21. Install the caliper slide pin bolts and torque to 72 Nm (53 ft. lbs.).
22. Gently lift one end of the slide pin boot to equalize air pressure, then release the boot and verify that the boot is fully covering the slide pin.
23. Repeat Step #16 to Step #22 on the opposite side of the vehicle as necessary. When front disc(s) have been refaced/replaced, proceed to Step #35.
24. Remove and discard the old brake disc(s).
25. Thoroughly clean the surface of the wheel hub/bearing assembly where it mates to the brake disc. The hub surface must be free of corrosion and dirt so that the new brake disc rests flush against the hub. This important step will prevent excess disc lateral runout.
26. Inspect the new brake disc and its mating surface with the hub/bearing assembly. Install the new brake disc, p/n 52098672, to the hub/bearing assembly. Install the lug nuts on the wheel studs and torque to 34 Nm (25 ft. lbs.) to keep the disc true and tight to the hub/bearing.

**NOTE: Use a dial indicator to insure that minimum lateral runout is achieved for each disc.**

27. Using a dial indicator determine the brake disc lateral runout. If the runout exceeds 0.025 mm (0.001 in.), match mount the brake disc to the hub/bearing assembly until the minimum lateral runout for the new brake disc and hub/bearing assembly combination is obtained.
28. Verify that the maximum allowable lateral runout of the brake disc and hub/bearing assembly combination does not exceed 0.025 mm (0.001 in.). If the lateral runout is in excess of specification, then the cause must be determined and corrected before proceeding further with this repair.
29. Install new front brake pads, p/n 05093183AB.
30. Caliper slide pins should be free from debris and lightly lubricated with brake grease, p/n J8993704
31. Install the caliper on the adapter.

**CAUTION: Verify brake hose is not twisted or kinked.**

32. Install the caliper slide pin bolts and torque to 72 Nm (53 ft. lbs.).
33. Gently lift one end of the slide pin boot to equalize air pressure, then release the boot and verify that the boot is fully covering the slide pin.

34. Repeat Step #24 to Step #33 on the opposite side of the vehicle as necessary. When both front discs have been refaced/replaced, proceed to Step #40.
35. **Was the propeller shaft removed from the vehicle earlier?**
    a. Yes >> go to Step #36
    b. No >> go to Step #40.
36. Position front propeller shaft under vehicle with rear universal joint over the transfer case yoke.
37. Align the front of the propeller shaft to the axle pinion yoke using the reference marks made previously.
38. Align the rear of the propeller shaft to the transfer case yoke using the reference marks made previously.
39. **What style propeller shaft is the vehicle equipped with?**
    a. If propeller shaft is Universal joint style, torque the U-joint strap/clamp bolts at the axle yoke to 19 Nm (14 ft. lbs.). Tighten the universal joint to transfer case bolts to 27 Nm (20 ft. lbs.). Proceed to Step #40.
    b. If propeller shaft is CV joint style, install bolts to the front C/V joint and torque bolts to 32 Nm (24 ft. lbs.). Install the bolts to the rear C/V joint and torque bolts to 32 Nm (24 ft. lbs.). Proceed to Step #40.
40. Install both front wheel and tire assemblies. Tighten the front lug nuts to 135 Nm (100 ft. lbs.). **This important step helps to prevent warping of the brake discs.**
41. Lower the vehicle.
42. Pump the brake pedal to insure that the front caliper brake pads are seated to the brake discs. Verify correct brake fluid level. Check brake system operation.

***POLICY:***
Refer to Warranty Bulletin D-06-17, available in TechCONNECT under: efiles>Service>Warranty>CDJ Bulletins, for instructions detailing administration of this service action.

***TIME ALLOWANCE:***

| Labor Operation No: | Description | Amount |
|---|---|---|
| 05-21-10-93 | Procedure A - Test Drive and Visually Inspect Front Brakes (B) | 0.7 Hrs. |
| 05-21-10-99 | Test Drive and Measure Front Discs-Replace Pads, Discs and Match Mount to Vehicle (B) | 1.8 Hrs. |
| 05-21-11-95 | Test Drive and Measure Front Discs-Replace Pads, Reface Discs with On-car Brake Lathe (B) | 1.8 Hrs. |
| 05-21-11-98 | Test Drive and Measure Front Discs-Replace Pads, Reface One Disc with On-car Brake Lathe and Replace One Disc and Match Mount to Vehicle (B) | 1.8 Hrs. |
| **Related Operation:** | | |
| 05-21-11-66 | Related Operation for Reface Discs-With Quadra-Drive System | 0.2 Hrs. |

***FAILURE CODE:***

| | |
|---|---|
| ZZ | Service Action |

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

Ford Motor Company

Mr. M.D. Jordan
Executive Director
Ford Customer Service Division

January 5, 1998

**To: All Ford and Lincoln-Mercury Dealers**

Subject: Distribution of the Pro-Cut On-Vehicle Brake Lathes

**Background**

Ford Customer Service Division and Ford Advanced Vehicle Technology, Brake Engineering, have completed development of a program that will significantly improve the brake and rotor machining process. The improvement will result from distribution of the Rotunda Pro-Cut lathe, a hub mounted lathe, that allows rotor machining directly on the vehicle. The equipment is capable of machining all front and rear brake rotors on Ford, Lincoln-Mercury and Light Truck vehicle lines (this does not include Super Duty Trucks). The new equipment will accurately machine brake rotors to meet all Ford dimensional specifications. Unlike caliper mount lathes with many adapters, the new Rotunda Pro-Cut lathe has only five adapters. All of our in-house and dealer pilot testing, at Ford and Lincoln-Mercury dealers, shows that this equipment is quick and easy to use.

**Distribution**

The Company will provide each dealer (U.S. and Canada) and selected fleet locaions a Rotunda Pro-Cut lathe, at no charge. Rotunda will begin shipping lathes to dealers in mid January 1998, on the basis of brake rotor warranty repail volumes. Based on Pro-Cut's production capacity, it will take approximately 10-12 months to ship all lathes.

Before accepting shipment of the Rotunda Pro-Cut lathe, note any obvious damage on the Bill of Landing. If damage is excessive, refuse delivery and contact Rotunda toll free at 1-800-ROTUNDA (press 1). Upon opening and assembling the lathe, not any missing parts and contact Pro-Cut toll free at 1-800-543-6618. Missing parts should be reported within two days following delivery.

**Previously Purchased Rotunda Pro-Cut Lathes**

Dealers that have previously purchased a Rotunda Pro-Cut lathe (Rotunda item number 201-00001), may choose to receive a second lathe, at no charge, or a 100% refund of their original purchase price. Rotunda Pro-Cut lathes purchased prior to the program, will be updated with a new cutting head, at no charge. All lathes shipped through the program will be equipped with this latest level cutting head. The new cutting head enable the lathes to machine Ford's larger diameter rotors.

**Previously Purchased Rotunda Caliper Mount Lathes**

Dealers that have previously purchased a Rotunda Accu-Turn or AMMCO On-Vehicle lathes, through the Rotunda Equipment Program, will be provided with an additional Rotunda Pro-Cut lathe, to replace these units, at no charge.

**Rotunda Pro-Cut Support**

The Rotunda Pro-Cut lathe will be shipped with an equipment video, CD-ROM and an owners manual. These materials detail the specific steps required to operate the lathe.

**Ford Customer Service Division Training**

In mid January 1998, interactive training through FordStar will be available. In late April 1998, rotor machining with the Pro-Cut lathe will be integrated into the "Hands On" STST Brake Curriculum.

**Technical Service Bulletin (TSB)**

Concurrent with the initial distribution of Rotunda Pro-Cut lathes, a TSB will be published detailing the specific service procedures to be performed when machining brake rotors. Applicable labor operations will be included in the TSB article. A re-print of this TSB article will be shipped with every Rotunda Pro-Cut lathe.

**Service Labor Time Standards (SLTS)**

SLTS will be modified to reflect the new TSB service procedures, therefore, actual time will no longer be authorized for use with brake motor machining. Three weeks after shipment of the Rotunda Pro-Cut lathe, Warranty Analysis and Administration will activate the new SLTS on a dealer-by-dealer basis. The three week window is provided to ensure that each dealer has ample time to become familiar with the Rotunda Pro-Cut lathe and the new service procedures.

**Recovery of Caliper Mount Lathes**

The Accu-Turn and AMMCO caliper mount lathes, distributed in 1994, will be recovered. Dealers will be provided return shipping instructions 30 days after receipt of their Rotunda Pro-Cut lathe. All return shipping expenses will be paid by Ford. Dealers failing to return lathes will be invoiced for the Rotunda Pro-Cut lathe. This action will only be initiated after four documented attempts to recover the old equipment.

**Program Administration**

Rotunda will use the toll free number 1-800-ROTUNDA (press 1), to respond to dealer inquiries. Technical issues related to the lathe should be directed to Pro-Cut as their tooll free number 1-800-543-6618.

Ford Motor Company

# WARRANTY & POLICY MANUAL

## Coverage — Cars and Light Trucks

| CATEGORY | COVERAGE & OTHER REMARKS |
|---|---|
| Brake Rotor Resurfacing (Machining) | Bumper-to-Bumper Coverage<br><br>**NOTE**: Dealers are required to resurface brake rotors using the Pro-Cut On-Car Brake Lathe during the Bumper-to-Bumper Coverage period.<br><br>**Warrantable Rotor Resurfacing or Replacement Conditions**<br>Rotor Resurfacing is warrantable if:<br>• Service diagnosis confirms that the rotor is the root cause for vibration in the steering wheel, seat or brake pedal when the brakes are applied.<br>• Heavily rusted and/or pitted rotor brake pad contact surface area creates a vibration concern.<br>**NOTE:** Exceptions to the previous requirements are REAR rotors on E and F-Series trucks with dual rear wheels. When a rotor defect is noted on these units, replacement is the only acceptable repair.<br>Rotor Replacement is warrantable if:<br>• Rotor is cracked.<br>• Rotor does not have enough material to allow turning as defined in the workshop manual and/or the specification stamped on the rotor. Service Management must authorize the replacement of brake rotors, and initial the service (hard) copy of the claim on the same line as the labor operation to replace rotors.<br><br>**Non-Warrantable Conditions**<br>• Surface rust<br>• Scoring/grooves as a result of normal use<br>• Resurfacing/replacement associated with brake pad service due to normal wear/maintenance<br><br>**Claim Requirements**<br>The following information MUST be noted on the warranty claim and entered in the DTC (chassis) field during the ACES II claim submission.<br>• Pre-turn rotor thickness (Required when rotors are machined or replaced)<br>• Post-turn rotor thickness (Required when rotors are machined) |
| Brake System Cleaning | Reimbursable only when required due to foreign material entering the system at the assembly plant. |
| Brake System Fluid | Fluid only is not reimbursable. Brake fluid is only reimbursable when added as part of a repair. |
| Brake Wheel Cylinder | • Replace the complete wheel cylinder (drum brakes only).<br>• Repair the cylinder only when a complete assembly is not available and the cylinder is repairable. |

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

# Service Bulletin

File In Section: 05 - Brakes
Bulletin No.: 03-05-23-005
Date: November, 2003

CHEVROLET GMC

## INFORMATION

**Subject:** New Essential Tool CH-47661 — On-Car Brake Lathe for Colorado and Canyon Trucks

**Models:** 2004 Chevrolet Colorado
2004 GMC Canyon

Effective November 1, 2003, the Pro-Cut PFM 9.2 Auto-Compensating On-Car brake lathe will be essential for U.S. General Motors Chevrolet and GMC Light Duty Truck Dealers, tiers 1-4 (franchise sales greater than 100).

The Colorado/Canyon features a captured front rotor design that does not allow for lateral run-out correction after machining other than use of on-car lathe technology. Bench lathe machining may induce lateral run-out and require replacement of the brake rotor. This design does not allow for use of Brake Align™ Correction Plates.

For this reason, GM requires that all brake rotor refinishing on these models be performed using essential tool CH-47661 (Pro-Cut PFM 9.2 auto compensating) on-car lathe. Tier 5 dealers that do not have on-car brake rotor turning capabilities for this vehicle will be required to sublet this repair to a facility having a Pro-Cut PFM 9.2, Pro-Cut PFM 900 or Hunter OCL 360A auto compensating lathe.

**Brake Pads:**

- Consideration should be given for covering brake pads up to 39,000 km (24,000 mi) (excluding owner abuse, excessive trailering, or the situations that would not be considered normal use).
- Installation of new rotors does not require pad replacement. Do not replace pads unless their condition requires it – excessively worn, damage or contaminated.

**Brake Wear:**

Several factors impact brake lining wear and should be taken into account when reviewing related issues:

- heavy loads / high temperatures / towing / mountainous driving / city driving / aggressive driving / driver braking characteristics (left foot or two feet)

The following are conditions that may extend brake lining wear:

- light loads / highway driving / conservative driving / level terrain

## TOOL INFORMATION

| Tool Description | Tool Number |
|---|---|
| Brake Rotor Micrometer — English | J 45021 |
| Brake Rotor Micrometer — Metric | J 44279 |
| Wheel Hub Cleaning Kit | J 42450A |
| Whiz Wheel® | J 41013 |
| Torque Stick | J 39544 Kit |
| Dial Indicator Kit (.001 Increments) | J 45101 |
| Conical Washers | J 45101–100 |

## CORRECTION PLATE PART INFORMATION

| Correction Plate |
|---|
| Correction Plate — 0.0762 mm (0.003 in) |
| Correction Plate — 0.1524 mm (0.006 in) |
| Correction Plate — 0.2286 mm (0.009 in) |

For vehicles repaired under warranty, Brake Align® Run-Out Correction Plates should be submitted in the Net Amount at cost plus 40%. Brake Align® Run-Out Correction Plates are available through the following suppliers:

- Dealer Equipment and Services at 1–800–GM TOOLS
- Brake Align® LLC at 1–888–447–1872 (US Dealers Only)

* We believe this source and their products to be reliable. There may be additional manufacturers of such products. General Motors does not endorse, indicate any preference for or assume any responsibility for the products from this firm or for any such items, which may be available from other sources.

## WARRANTY INFORMATION

For vehicles repaired under warranty, use:

| Labor Operation | Description | Labor Time |
|---|---|---|
| H0042 | Pads, Front Disc Brake — Replace | Use published labor operation Time |
| H0043 | Pads, Disc Brake — Rear R&R or Replace | Use published labor operation time |
| H0120 | Rotor Asm — Front Right R&R or Replace | Use published labor operation time |
| H0121 | Rotor Asm — Front Left R&R or Replace | Use published labor operation time |
| H0127 | Rotor Asm — Front Both R&R or Replace | Use published labor operation time |
| H0130 | Rotor Asm — Rear Right R&R or Replace | Use published labor operation time |
| H0131 | Rotor Asm — Rear Left R&R or Replace | Use published labor operation time |
| H0137 | Rotor Asm — Rear Both R&R or Replace | Use published labor operation time |

All above Labor Times include time to check run-out and road test vehicle after repair.

If correcting for LRO, claim the use of correction plates as OLH. The times for using correction plates are not to exceed 0.3 hr for one side and 0.5 hr for both sides. Guidelines for submitting OLH per General Motors Policy & Procedures should be followed.

4. Clean all of the mating surfaces between the hub, the rotor and the wheel using the J 42450A — Wheel Hub Cleaning Kit and J 41013 — Whiz Wheel®.

   If rotors are not to be refinished – Go To Step 8.

**Important:** Cleaning all mating surfaces and making them free of corrosion, burrs and other debris (which includes removal of Hubless rotors) is critical and MUST be performed whether using an On-Car or Bench Lathe Refinish Procedure.

5. Be sure to follow the appropriate refinishing procedure listed below for the type of lathe you are using.

**Important:** Only replace the rotors if they do not meet the Minimum Thickness specification.

**Important:** DO NOT REFINISH NEW ROTORS.

**Important:** Only remove the necessary amount of material from each side of the rotor and note that equal amounts of material do not have to be removed from both sides on any brake system using a floating caliper.

**Important:** Prior to making the cut, install the recommended clip-on style disc silencer supplied with the lathe. Use of this silencer is critical to prevent chatter from occurring during the cut.

**Bench Type Lathe**

5.1. Refinish the existing rotor on an approved, well-maintained lathe to guarantee smooth, flat and parallel surfaces.

5.2. Check for clean and true lathe adapters and make sure the arbor shoulder is clean and free of debris or burrs. For more information, see the "Brake Lathe Calibration Procedure (Bench-Type)" section in this bulletin.

5.3. On the outboard area of the rotor, position the cutting tools one eighth of an inch into the brake pad area of the rotor. Feed the cutting tools into the rotor until they cut the rotor to new metal, a full 360 degrees. Zero each dial and back off a full turn.

5.4. Move the cutting bits to the middle of the rotor and do the same procedure. If zero is passed during the process, reset zero. Back off a full turn.

5.5. Position the cutting bits one eighth of an inch inside the inboard (closest to the hub) edge of the brake pad contact area. Do the same procedure. If zero is passed during the process, reset zero.

5.6. Back off a full turn and position the cutting bits all the way inboard in preparation to refinish the full rotor surface. Advance both tool cutters to the zero setting plus just enough to clean up the entire rotor surface.

5.7. After completing the refinish, sand both sides of the rotor for approximately one minute per side using a sanding block and 130–150 grit sandpaper to obtain a non-directional finish.

**On-Car Type Lathe**

5.1. Reinstall the rotor(s).

**Important:** When using the On-Car lathe on vehicles equipped with limited slip (or posi-trac) rear system, it is critical that the rear drive shaft is disconnected/disengaged prior to operation of the On-Car lathe. Remember to mark and re-index the drive shaft correctly on re-assembly to prevent creating driveline vibration. Whenever the lathe drive motor is being switched on, the operator MUST keep their body out of the wheel well area until the machine has reached its normal operating RPM.

5.2. Refinish the existing rotor on an approved, well-maintained lathe to guarantee smooth, flat and parallel surfaces.

**Important:** When raising the vehicle on the lift, be sure to have it at a good working height (waist high is average) to accommodate mounting the On-Car lathe. Optimally, the center piston on the lathe trolley will be mid-travel. If the lathe trolley center piston is completely compressed (bottoming out) or inversely fully extended and hanging off the vehicle hub, this could affect the calibration time of the lathe.

5.3. Select the correct adapter for the vehicle you're working on and mount it to the hub with the vehicle lug nuts. Hand tighten 34–41 N·m (25–30 lb ft) the nuts using equal torque. DO NOT use impact wrenches, excessive torque will damage the adapter.

**Important:** Ensure the adapter sits flush on the rotor hat surface. Be sure to remove any rust, rotor retaining clips, etc. that may preclude the adapter from sitting flat on the mounting surface.

5.4. Connect the lathe to the adapter, turn on the lathe and activate the computer to compensate for run-out in the hub.

5.5. Once the computer indicates the compensation process was successful, on the outboard area of the rotor, position the cutting tools one eighth of an inch into the brake pad area of the rotor. Feed the cutting tools into the rotor until they cut the rotor to new metal, a full 360 degrees. Zero each dial and back off a full turn.

5.6. Move the cutting bits to the middle of the rotor and do the same procedure. If zero is passed during the process, reset zero. Back off a full turn.

5.7. Position the cutting bits one eighth of an inch inside the inboard (closest to the hub) edge of the brake pad contact area. Do the same procedure. If zero is passed during the process, reset zero.

5.8. Back off a full turn and position the cutting bits all the way inboard in preparation to refinish the full rotor surface. Advance both tool cutters to the zero setting plus just enough to clean up the entire rotor surface.

# Service Bulletin

File In Section: 05 - Brakes
Bulletin No.: 00-05-22-002C
Date: February, 2004

BUICK Cadillac CHEVROLET GMC HUMMER Oldsmobile PONTIAC

# WARRANTY ADMINISTRATION

**Subject:** Brake Warranty Service and Procedures

**Models:** 1999–2004 All GM Passenger Cars and Trucks
2003–2004 HUMMER H2

**This bulletin is being revised to update GM's Standard Brake Service Procedures and Policy Guidelines for Brake Rotor and Brake Pad Service and Wear.**

This bulletin cancels and supersedes Corporate Bulletin Numbers 01-05-23-001A and 00-05-23-002B.

Please discard Corporate Bulletin Numbers 00-05-22-002B, 01-05-23-001A and 00-05-23-002B (Section 05 — Brakes).

For your convenience, this bulletin updates and centralizes all GM's Standard Brake Service Procedures and Policy Guidelines for brake rotor and brake pad service and wear. For additional information, reference Service Know-How Courses #10280.13D and #15040.01V.

**Important:** PLEASE FAMILIARIZE YOURSELF WITH THESE UPDATES BEFORE PERFORMING YOUR NEXT GM BRAKE SERVICE.

There are five (5) key steps that must be performed to complete a successful brake service:

1. Measure and Document Rotor Thickness* – determine rotor refinish/replace
2. Clean Mating Surfaces – hub, rotor and wheel
3. Proper Rotor Refinish and Documentation
4. Measure, Document and Correct Lateral Run Out (LRO)** – Maximum 0.050 mm (0.002 in)
5. Reassemble with Proper Torque — wheel lug nuts

*The bulletin refers to Minimum Thickness specification (stamped on the back of the rotor) as the minimum allowable thickness after refinish. Refer to SI to verify specifications.

**The bulletin will refer to LRO maximum specification as 0.002 in. However, some trucks may slightly differ — refer to SI to verify specifications.

**Bulletin Format / Key Page Number Reference:**

## ***REPAIR ORDER / WARRANTY CLAIM REQUIRED DOCUMENTATION

**Important:** The following are required measurements that MUST be written/documented on the repair order, or for your convenience, complete the form (GM Brake Service Repair Order Documentation for Required Measurements) found on the last page of this bulletin and attach it to the repair order. If the Warranty Parts Center generates a request, this Documentation/Form must be attached to the repair order that is sent back.

### Repair Order Documentation — Rotor Original And Refinished Thickness — REQUIRED

When resurfacing a brake rotor or drum, the ORIGINAL thickness (measured thickness before refinish) and REFINISHED thickness (measured thickness after refinish) MUST be written/documented on the repair order hard copy for each rotor serviced. If a rotor replacement is necessary, only the Original thickness measurement needs to be recorded.

### Repair Order Documentation — Lateral Run Out (LRO) and Correctional Plate Part Number — REQUIRED

Anytime a new or refinished brake rotor is installed or machined on a vehicle, the rotor assembly MUST be measured for Lateral Run Out (LRO). If the LRO measurement is greater than 0.050 mm (0.002 in), correct it by using the proper Brake Align® Correctional Plate (DO NOT refinish new rotors or newly refinished rotors to correct LRO). This LRO measurement, and the Correctional Plate part number used to correct the LRO, MUST be written/documented on the repair order hard copy. If no correction is necessary, only the LRO measurement for each rotor serviced needs to be recorded.

**Important:** Correction plates can only be used on Hubless rotor design. A correction plate part number can not be used with Hubbed, Trapped or Captured type designed rotors.

### Warranty System Documentation — Lateral Run Out (LRO) — REQUIRED

When a Labor Operation pertaining to a rotor service is used, the Lateral Run Out (LRO) measurement (as measured in the "Repair Order Documentation — Lateral Run Out" section above) MUST be documented in the Warranty System (WINS) in the Failure Code field of the claim submission (refer to the Claims Processing Manual, Section IV, Warranty Claim Data, page 6, Item G) and correspond to the Labor Operation used.

**Important:** The left side (drivers side) is recorded first, then an R for right side (passenger side), then record the right side measurement.

Example: If the Labor Operation H0042 (both front) is used and the left front rotor LRO measurement is 0.050 mm (0.002 in) and the right front rotor measurement is 0.089 mm (0.0035 in), it should be recorded as 02R03. If the Labor Operation H0043 (both rear) is used and the left rear rotor LRO measurement is 0.050 mm (0.002 in) and the right rear rotor measurement is 0.089 mm (0.0035 in), it should be recorded as 02R03. If a single side labor operation for the front or rear is used, use the following documentation format. If the left side is 0.050 mm (0.002 in), then record as 02RNA. If the right is 0.089 mm (0.0035 in), then record as NAR03 (NA = Not Applicable).

### Repair Order Documentation — Explanation of Part Replacement — REQUIRED

If replacement of a brake component is necessary, proper documentation on the repair order is required. See the following examples:

- Brake rotor replacement — Customer comment was brake pulsation. Rotor was refinished on a prior brake service. After rotor measurement, it was determined that refinishing the rotor again would take it under the Minimum Thickness specification.
- Brake pad replacement — Customer comment was brake squeak noise. On inspection, found pads contaminated by fluid leak at caliper.

## NEW GM BRAKE SERVICE PROCEDURE

### Brake Service Procedure

1. Remove the wheel and caliper.
2. Measure rotor thickness.

**Important:** If performing routine Brake Service for worn pads only, and the rotors are not damaged and measure within specification – DO NOT REFINISH ROTORS.

In order to determine if the rotor can be refinished, do the following steps:

2.1. Remove the rotor(s).

2.2. Measure the rotor for original thickness using a brake micrometer.

2.3. Reference the Minimum Thickness specification stamped on the backside of the rotor or SI for Minimum Thickness specification/other. In most cases, the rotor should be refinished unless the measurement taken makes it obvious that refinishing the rotor would take the measurement under the Minimum Thickness specification (then replacement is necessary). DO NOT use any other manufacturers rotor specifications.

3. ***Record the ORIGINAL rotor thickness measurement on the repair order hard copy as noted in the "Repair Order Documentation — Rotor Refinish" section of this bulletin.

4. Clean all of the mating surfaces between the hub, the rotor and the wheel using the J 42450A — Wheel Hub Cleaning Kit and J 41013 — Whiz Wheel®.

   If rotors are not to be refinished – Go To Step 8.

**Important:** Cleaning all mating surfaces and making them free of corrosion, burrs and other debris (which includes removal of Hubless rotors) is critical and MUST be performed whether using an On-Car or Bench Lathe Refinish Procedure.

5. Be sure to follow the appropriate refinishing procedure listed below for the type of lathe you are using.

**Important:** Only replace the rotors if they do not meet the Minimum Thickness specification.

**Important:** DO NOT REFINISH NEW ROTORS.

**Important:** Only remove the necessary amount of material from each side of the rotor and note that equal amounts of material do not have to be removed from both sides on any brake system using a floating caliper.

**Important:** Prior to making the cut, install the recommended clip-on style disc silencer supplied with the lathe. Use of this silencer is critical to prevent chatter from occurring during the cut.

**Bench Type Lathe**

5.1. Refinish the existing rotor on an approved, well-maintained lathe to guarantee smooth, flat and parallel surfaces.

5.2. Check for clean and true lathe adapters and make sure the arbor shoulder is clean and free of debris or burrs. For more information, see the "Brake Lathe Calibration Procedure (Bench-Type)" section in this bulletin.

5.3. On the outboard area of the rotor, position the cutting tools one eighth of an inch into the brake pad area of the rotor. Feed the cutting tools into the rotor until they cut the rotor to new metal, a full 360 degrees. Zero each dial and back off a full turn.

5.4. Move the cutting bits to the middle of the rotor and do the same procedure. If zero is passed during the process, reset zero. Back off a full turn.

5.5. Position the cutting bits one eighth of an inch inside the inboard (closest to the hub) edge of the brake pad contact area. Do the same procedure. If zero is passed during the process, reset zero.

5.6. Back off a full turn and position the cutting bits all the way inboard in preparation to refinish the full rotor surface. Advance both tool cutters to the zero setting plus just enough to clean up the entire rotor surface.

5.7. After completing the refinish, sand both sides of the rotor for approximately one minute per side using a sanding block and 130–150 grit sandpaper to obtain a non-directional finish.

**On-Car Type Lathe**

5.1. Reinstall the rotor(s).

**Important:** When using the On-Car lathe on vehicles equipped with limited slip (or posi-trac) rear system, it is critical that the rear drive shaft is disconnected/disengaged prior to operation of the On-Car lathe. Remember to mark and re-index the drive shaft correctly on re-assembly to prevent creating driveline vibration. Whenever the lathe drive motor is being switched on, the operator MUST keep their body out of the wheel well area until the machine has reached its normal operating RPM.

5.2. Refinish the existing rotor on an approved, well-maintained lathe to guarantee smooth, flat and parallel surfaces.

**Important:** When raising the vehicle on the lift, be sure to have it at a good working height (waist high is average) to accommodate mounting the On-Car lathe. Optimally, the center piston on the lathe trolley will be mid-travel. If the lathe trolley center piston is completely compressed (bottoming out) or inversely fully extended and hanging off the vehicle hub, this could affect the calibration time of the lathe.

5.3. Select the correct adapter for the vehicle you're working on and mount it to the hub with the vehicle lug nuts. Hand tighten 34–41 N·m (25–30 lb ft) the nuts using equal torque. DO NOT use impact wrenches, excessive torque will damage the adapter.

**Important:** Ensure the adapter sits flush on the rotor hat surface. Be sure to remove any rust, rotor retaining clips, etc. that may preclude the adapter from sitting flat on the mounting surface.

5.4. Connect the lathe to the adapter, turn on the lathe and activate the computer to compensate for run-out in the hub.

5.5. Once the computer indicates the compensation process was successful, on the outboard area of the rotor, position the cutting tools one eighth of an inch into the brake pad area of the rotor. Feed the cutting tools into the rotor until they cut the rotor to new metal, a full 360 degrees. Zero each dial and back off a full turn.

5.6. Move the cutting bits to the middle of the rotor and do the same procedure. If zero is passed during the process, reset zero. Back off a full turn.

5.7. Position the cutting bits one eighth of an inch inside the inboard (closest to the hub) edge of the brake pad contact area. Do the same procedure. If zero is passed during the process, reset zero.

5.8. Back off a full turn and position the cutting bits all the way inboard in preparation to refinish the full rotor surface. Advance both tool cutters to the zero setting plus just enough to clean up the entire rotor surface.

5.9. After completing the refinish, sand both sides of the rotor for approximately one minute per side using a sanding block and 130–150 grit sandpaper to obtain a non-directional finish.

5.10. Dismount the lathe, but leave the lathe adapter attached to the vehicle.

6. Once the rotor has been properly machined, wash the rotor with soap and water (use a mild dish washing soap) or wipe it clean with GM approved brake cleaner, P/N 12378392 (Canadian P/N 88901247).

**Important:** Thoroughly cleaning the rotor will prevent the possible transfer of finite metal dust left as a by-product of machining to the pad material during the seating process, thus reducing the opportunity for squeaks or other noises to occur.

7. ***Record the REFINISHED rotor thickness measurement on the repair order hard copy. Refer to the "Repair Order Documentation — Rotor Refinish" section of this bulletin.

8. Setting up to measure for Lateral Run Out (LRO):

**Bench-Type Lathe**

8.1. Ensure that the mating surfaces of the rotor hat section and the hub mating surface are clean and free of debris.

8.2. Mount the new, original or refinished rotor onto the vehicle hub.

**Important:** Always hold the rotor on the bottom half so any debris that may be dislodged from the vents will fall out instead of falling into the mounting area. Any movement or jarring from the rotor falling over on the studs can release rust from the vents on the rotor.

8.3. Tilt the top of the rotor in towards the vehicle so you can see the studs and ease the rotor onto the studs.

8.4. Slide the rotor all the way to the hub and hold it in place until you have placed one of the conical washers (with the tapered hole side facing out) and run the first lug nut up tight by hand so the rotor doesn't move when you release it.

8.5. Place the conical washers on the rest of the studs (with the tapered hole side facing out), start and snug the lug nuts by hand.

8.6. Using the one half inch drive impact wrench and a torque stick (J 39544) or equivalent, start with the lug nut opposite of the one you first tightened by hand and tighten the lug nuts using a star pattern until they touch the hub but do not completely torque. Then again, starting with the first lug nut you tightened by hand, tighten all the lug nuts in a star pattern to the specific vehicle torque specification.

8.7. DO NOT reinstall the caliper or the wheel at this time.

**On-Car Type Lathe**

8.1. Leave the On-Car adapter on the wheel.

8.2. Proceed to Step 9.

9. Fasten the dial indicator to the steering knuckle so that the indicator needle contacts the rotor outboard friction surface approximately 6.35 mm (0.25 in) from the rotor's outer edge. The stylus should be perpendicular to the friction surface of the rotor.

**Important:** Make sure the dial indicator needle tip is screwed tight, a loose tip could cause false readings.

10. Measure for LRO. Follow the procedure below to determine if the LRO is within specification (0.050 mm (0.002 in) or LESS).

10.1. Rotate the rotor and locate the point on the rotor where the lowest dial indicator reading is indicated and set the dial indicator to zero.

10.2. Rotate the rotor from the low point and locate the point with the highest dial indicator reading (rotor "high spot"). Note the amount and mark the location of the "high spot" on the rotor and mark the closest wheel stud relative to this location. If the high point falls between two studs, mark both studs. In instances where the vehicle has "capped lug nuts" you should mark the hub.

11. ***Record the rotor Lateral Run Out measurement on the repair order hard copy. Refer to the "Repair Order Documentation — Lateral Run Out" section of this bulletin. Measuring for LRO is critical and MUST be performed whether using an On-Car or Bench Lathe Refinish Procedure.

**Important:** ***This measurement must also be documented in the Warranty System (WINS) in the Failure Code field of the claim submission. Refer to the "Warranty System Documentation — Lateral Run Out" section of this bulletin.

12. If the Lateral Run Out (LRO) measurement is 0.050 mm (0.002 in) or LESS, no correction is necessary. Go to Step 16 if this is the first rotor completed. Go to Step 17 if this is the second rotor completed. If the LRO is GREATER than 0.050 mm (0.002 in), go to Step 13.

13. If the LRO measurement is greater than 0.050 mm (0.002 in), use the following procedure to correct for LRO:

**Important:** If the LRO measurement is over 0.279 mm (0.011 in), determine the source or cause of the LRO and correct it (i.e. refinished rotor is source of LRO due to a lathe qualification issue – see "Brake Lathe Calibration Procedure").

**Hubless Rotor**

13.1. Remove the rotor and using the Brake Align® application chart, choose the correct plate to bring the rotor LRO to 0.050 mm (0.002 in) or less. The plates come in 0.0762 mm (0.003 in), 0.1524 mm (0.006 in) and 0.2286 (0.009 in) compensation. For more information on proper plate selection, see the instruction video/DVD included in the "Brake Align®" kit.

13.2. Align the V-notch of the selected Brake Align® correction plate to the marked wheel stud ("high spot") or between the two points marked (if the "high spot" is between two wheel studs).

**Important:** IF Brake Align® Correction Plates are not available for the vehicle being serviced, refer to SI Document ID #836495 for correcting LRO.

**Important:** Per Brake Align® manufacturer, NEVER attempt to stack two or more Correction Plates together on one hub. NEVER attempt to reuse a previously installed Correction Plate.

13.3. Reinstall the rotor using the same method and precautions as the first time – found in Step 8. Make sure to index the rotor correctly to the marks made in Step 10, otherwise LRO will be comprised.

**Hubbed / Captured / Trapped Rotor**

13.1. Measure the rotor thickness.

13.2. Refinish or replace the rotor (see Service Information for further details).

14. Use a Dial Indicator to measure the rotor to verify the LRO is within specification.

15. If using,

    BENCH LATHE — DO NOT remove conical washers and lug nuts at this time.

    ON–CAR LATHE — You must remove adapter and install conical washers and lug nuts to retain rotor position.

**Important:** For Hubless rotor design, while removing the adapter, you must hold the rotor tight to the hub and install the top conical washer and lug nut first to ensure no debris falls between the surface while removing the adapter. Then, install the remaining conical washers and lug nuts. Otherwise, LRO will be comprised.

16. Perform Steps 1 – 12 on the opposite side of the vehicle.

17. After both sides of the vehicle have LRO measurements within specification, perform the following steps:

    17.1. Reinstall the calipers and pads.

    17.2. Pump the brakes to pressurize the calipers.

    17.3. Remove the lug nuts/conical washers.

    17.4. Install and properly torque the wheels.

**Important:** It is critical to follow the star pattern wheel torque procedure and use the proper tools (torque stick or torque wrench) as referenced in SI.

18. Road test the vehicle to verify the repairs.

***Indicates measurements must be written/documented on the repair order and/or in the warranty system.

## BRAKE LATHE CALIBRATION PROCEDURE

### BENCH-TYPE LATHE

Use the following procedure to calibrate a Bench-type brake lathe:

1. After refinishing a rotor, loosen the arbor nut and while holding the inside bell clamp to keep it from rotating, rotate the rotor 180 degrees.
2. Retighten the arbor nut and set the dial indicator on the rotor using the same instructions as checking the run out on the vehicle.
3. Rotate the arbor and read the runout.
4. Divide the reading by two and this will give you the amount of runout the lathe is cutting into the rotor.

**Important:** If there is any runout, you will need to machine the inside bell clamp in place on the lathe (this procedure is for a Bench type lathe ONLY, DO NOT machine inside the bell clamp on an On-Car type lathe).

**Machining the Inside Bell Clamp (Bench Type Lathe Only)**

Any nicks or burrs on the shoulder of the arbor must be removed. An 80–grit stone can be used to accomplish this. Spray WD-40® on the shoulder and with the lathe running, hold the stone flat against the shoulder surface using slight pressure. When the burrs are gone, clean the surface. Burrs must also be removed from the hub of the inside bell clamp. This can be accomplished with the stone and WD-40®. Keep the stone flat on the hub while removing the burrs. After removing the burrs, clean the hub.

Place the bell clamp on the arbor of the lathe and use the small radius adapters first and then spacers to allow you to tighten the arbor nut to secure the bell clamp to the lathe. Position the tool bit in the left hand of the rotor truer so you can machine the face of the bell clamp. Machine the face of the bell clamp taking just enough off of it to cut the full face of the clamp the full 360 degrees. Before you loosen the arbor nut, match mark the hub of the bell clamp to the arbor and line up these marks before machining a rotor. A magic marker can be used to make the match marks. Machine a rotor and recheck the calibration. Repeat this procedure on all Inside Bell Clamps used.

**Important:** If runout is still present, contact the brake lathe supplier.

## ON-CAR TYPE LATHE

Use the following procedure to calibrate an On-Car brake lathe:

1. Connect the lathe to a vehicle using the appropriate adapter.
2. Attach a vise-grip dial indicator to a fixed point in the wheel well and bring the dial indicator to a flat surface on the cutting head.
3. Turn on the lathe and press the "start" button so the lathe begins to compensate.
4. Once compensation is complete, note the runout as measured by the dial indicator. Measured runout at this point is overstated given that it is outside the rotor diameter.
5. If runout is in excess of 0.1016 mm (0.004 in) (0.050 mm (0.002 in)) as measured within the rotor diameter), calibration must be tightened. Follow manufacturer's instructions for tightening the calibration of the lathe. This information is found in the manual supplied with the lathe.

**Important:** If the machine is taking a long time to compensate during normal use, prior to checking the lathe calibration, it is recommended that the machine be disconnected from the adapter and the adapter (still connected to the vehicle) is rotated 180 degrees and the machine reattached. This will accomplish two things:

- It will re-verify the machine is properly attached to the adapter.

- It will change the location of the runout (phase) relative to the machine and thus possibly allow for quick compensation as a result of the position change.

The following information has been added as a reference to ensure your Pro–Cut PFM lathe provides a consistent smooth surface finish over long term usage.

### Cutting Tips / Depth of Cut

The cutting tips must be right side up. Reference marks always face up. The cutting tips may not have chips or dings in the surface of the points. Cuts of 0.1016 – 0.381 mm (0.004 – 0.015 in) will provide the best surface finish and the optimal tip life. When cleaning or rotating the cutting bits, make sure that the seat area for the tip on the tool is free and clear of debris.

### Cutting Head

On each brake job, the technician must center the cutting head for that particular vehicle using one of the mounting bolt holes on the slide plate. Once the head is centered, it is vital that the technician use one hand to push the head firmly and squarely back into the dovetail on the slide plate while using the other hand to tighten the Allen-Hex bolt that secures the head. Failure to do this could result in chatter occurring during the cut.

### Tool Holder Plate (Cutting Head)

The tool holder plate is the plate that the cutting arms are attached to. It can bend or break if a technician accidently runs the cutting arms into the hub of the rotor while the rotor is turning. (Cuts of more than 0.508 mm (0.020 in) can also bend this plate). Once bent, the lathe will most likely not cut properly until the tool holder plate is replaced. In order to verify the condition of the tool holder plate on a machine that will not cut right, remove the mounting bolt and remove the cutting head from the slide plate. With the cutting head titled at an angle, lay the long edge of the tool holder plate down on the flat part of the slide plate. If any gap can be seen between the edge and the slide plate, the tool holder plate is bent and the source of vibration. Also check to ensure that the cutting arms are lying flat on the upper side of the tool holder plate. If the mounting arm post is bent, it will show itself by having the back of the cutting arm lifting off the surface of the tool holder.

### Gib Adjustment / Loose Gib

As wear occurs between the slide plate and the box it rides on, you must take up the slack. You do this by way of a moveable wedge, which we call the gib. Your lathe manual details adjustment process, which you should perform when required after monthly checks or whenever surface finish is inconsistent.

## BRAKE PULSATION

Brake pulsation is caused by brake rotor thickness variation. Brake rotor thickness variation causes the piston in the brake caliper, when applied, to "pump" in and out of the caliper housing. The "pumping" effect is transmitted hydraulically to the brake pedal. Brake pulsation concerns may result from two basic conditions:

1. Thickness Variation Caused by Lateral Run Out (LRO). — LRO on a brake corner assembly is virtually undetectable unless measured. If the brake corner is assembled with excessive LRO (greater than 0.050 mm (0.002 in), thickness variation will develop over time and miles. Excessive LRO will cause the brake pads to wear the brake rotors unevenly, which causes rotor thickness variation. Pulsation that is the result of excessive Lateral Run Out usually develops in 4,800 – 16,000 km (3,000 – 10,000 mi). LRO can be induced when uneven torque is applied to wheel nuts (lug nuts). Improper wheel tightening after tire rotation, spare tire usage, brake inspection, etc. can be the cause of pulsation. Again, it usually takes 4,800 – 16,000 km (3,000 – 10,000 mi) AFTER an event for the condition to surface. The owner or driver does not usually make the connection between the service event and the awareness of the pulsation.

The proper usage of torque wrenches and/or torque sticks (torque limiting sockets) will greatly reduce or eliminate the pulsation conditions after wheel service events. The improper use of impact wrenches on wheel nuts greatly increases the likelihood of pulsation after wheel service.

The following are examples of pulsation conditions and reimbursement recommendations:

- If the customer noticed the condition between 4,800 – 16,000 km (3,000 – 10,000 mi) and it gradually got worse, normally the repair would be covered. The customer may tolerate the condition until it becomes very apparent.
- If a customer indicated they had wheel service, ask who performed the service. Then;
  - If a GM dealer performed the service, consider paying for the repair and then strongly reinforce the use of torque sticks at the dealer. Two common size torque sticks cover 90% of all GM products. Each technician needs to use torque sticks properly every time the wheel nuts are tightened.
  - If the customer had the wheel service done outside of a GM dealership, normally GM would not offer any assistance.

2. Thickness Variation Caused by Brake Rotor Corrosion — Rotor corrosion is another form of thickness variation, which can cause a pulsation concern and can be addressed as follows:
   - **Cosmetic Corrosion:**

     In most instances rotor corrosion is cosmetic and refinishing the rotor is unnecessary. Cleaning up of braking surfaces can be accomplished by 10 – 15 moderate stops from 56– 64 km/h (35 – 40 mph) with cooling time between stops.
   - **Corrosion — Pulsation Caused by Thickness Variation (Lot Rot / Low Miles — 0–321 km (0–200 mi):**

     At times more extensive corrosion can cause pulsation due to thickness variation. This usually happens when the vehicle is parked for long periods of time in humid type conditions and the braking surface area under the pads corrodes at a different rate compared to the rest of the braking surface area. If multiple moderate braking stops (as explained above) do not correct this condition, follow the "Brake Rotor Clean-Up Procedure" below.
   - **Corrosion — Pulsation Caused by Thickness Variation (without rotor flaking / higher mileage — 3,200–8,000 km (2,000–5,000 mi):**

     In some cases, more extensive corrosion that is not cleaned up by the brake pad over time and miles can cause the same type of pulsation complaint due to thickness variation. In these cases, the rotor surface is usually darker instead of shinny and a brake pad foot print can be seen against the darker surface. This darker surface is usually due to build-up, on the rotor material surface, caused by a combination of corrosion, pad material and heat. To correct this condition, follow the "Brake Rotor Clean-up Procedure" below.
   - **Corrosion — Pulsation Caused by Thickness Variation (with rotor flaking / higher mileage — 3,200 + km (5,000 + miles):**

     At times, more extensive corrosion over time and miles can cause pulsation due to thickness variation (flaking). This flaking is usually a build up, mostly on the rotor material surface, caused by a combination of corrosion, pad material and heat. When rotor measurements are taken, the low areas are usually close to the original rotor thickness (new rotor) measurement and the high areas usually measure more than the original rotor thickness (new rotor) measurement (depending on mileage and normal wear). To correct this condition, follow the "Brake Rotor Clean-up Procedure" described below.

**Important:** In some flaking instances, cleaning-up this type of corrosion may require more rotor material to be removed then desired. Customer consideration should be taken in these situations and handled on a case by case basis, depending on the amount/percentage of rotor life remaining and the vehicle's warranty time and miles.

## BRAKE ROTOR CLEAN-UP PROCEDURE

Clean-up the rotors on an approved, well-maintained brake lathe to guarantee smooth, flat and parallel surfaces. Check for clean and true lathe adapters and make sure the arbor shoulder is clean and free of debris or burrs. For more information see the "Brake Lathe Calibration Procedure" section in this bulletin.

1. On the outboard area of the rotor, position the cutting tools one eighth of an inch into the brake pad area of the rotor. Feed the cutting tools into the rotor until they cut the rotor to new metal, a full 360 degrees. Zero each dial and back off a full turn.
2. Move the cutting bits to the middle of the rotor and do the same procedure. If zero is passed during the process, reset zero. Back off a full turn.
3. Position the cutting bits one eighth of an inch inside the inboard (closest to the hub) edge of the brake pad contact area. Do the same procedure. If zero is passed during the process, reset zero.
4. Back off a full turn and position the cutting bits all the way inboard in preparation to refinish the full rotor surface. Advance both tool cutters to the zero setting plus just enough to clean up the entire rotor surface.
5. After completing the refinish, sand both sides of the rotor for approximately one minute per side using a sanding block and 130–150 grit sandpaper to obtain a non-directional finish.

**Important:** Only remove the necessary amount of material from each side of the rotor and note that equal amounts of material do not have to be removed from both sides on any brake system using a floating caliper.

**Important:** In many of these instances, such a minimal amount of material is removed from the rotor that customer satisfaction is not a concern for future brake services. This procedure is intended to "Clean-up" the rotor surface and should be conveyed to the customer as such – not as "cut", "refinish" or "machine", which tends to be terms understood as a substantial reduction of rotor material/life. If the brake lathe equipment being used is not capable of removing minor amounts of material while holding tolerances, further lathe maintenance, repair, updates or equipment replacement may be necessary.

## BRAKE NOISE

Some brake noise is normal and differences in loading, type of driving, or driving style can make a difference in brake wear on the same make and model. Depending on weather conditions, driving patterns and the local environment, brake noise may become more or less apparent. Verify all metal-to-metal contact areas between pads, pad guides, caliper and knuckles are clean and lubricated with a thin layer of high temperature silicone grease. Brake noise is caused by a "slip-stick" vibration of brake components. While intermittent brake noise may be normal, performing 3 – 4 aggressive stops may temporarily reduce or eliminate most brake squeal. If the noise persists, a brake dampening compound may be applied to the back of each pad. This allows parts to slide freely and not vibrate when moving relative to each other. Use AC Delco Silicone Brake Lubricant, P/N 89021537 (Canadian P/N 89021538) or equivalent.

The following noises are characteristics of all braking systems and are unavoidable. They may not indicate improper operation of the brake system.

**Squeak / Squeal Noise:**

- Occurs with front semi-metallic brake pads at medium speeds when light to medium pressure is applied to the brake pedal.
- Occasionally a noise may occur on rear brakes during the first few stops or with cold brakes and/or high humidity.

**Grinding Noise:**

- Common to rear brakes and some front disc brakes during initial stops after the vehicle has been parked overnight.
- Caused by corrosion on the metal surfaces during vehicle non-use. Usually disappears after a few stops.

**Groan Noise:**

A groan type noise may be heard when stopping quickly or moving forward slowly from a complete stop. This is normal. On vehicles equipped with ABS, a groan or moan type noise during hard braking applications or loose gravel, wet or icy road conditions is a normal function of the ABS activation.

## BRAKE WARRANTY

Brake Rotors:

- Brake rotor warranty is covered for 3 years / 60,000 km (36,000 mi), whichever comes first. Reference the vehicle's warranty guide for verification.
- Rotors should not be refinished or replaced during normal/routine pad replacement.
- Rotors should not be refinished or replaced and is ineffective in correcting brake squeal type noises and/or premature lining wear out.
- Rotors should not be refinished or replaced for cosmetic corrosion. Clean up of braking surfaces can be accomplished by 10–15 moderate stops from 56–64 km/h (35–40 mph) with cooling time between stops.
- Rotors should not be refinished or replaced for rotor discoloration/hard spots.
- Rotors should be refinished NOT replaced for Customer Pulsation complaints. This condition is a result of rotor thickness variation, usually caused by LRO (wear induced over time and miles) or corrosion (Lot Rot).
- When rotor refinishing, only remove the necessary amount of material from each side of the rotor and note that equal amounts of material do not have to be removed from both sides on any brake system using a floating caliper.
- Rotors should be refinished for severe scoring — depth in excess of 1.5 mm (0.060 in).

**Important:** If the scoring depth is more than 1.5 mm (0.060 in) after the rotor is refinished, it should be replaced.

- It is not necessary to replace rotors in pairs. Rotors may be replaced individually. However, caution should be exercised, as a variance in surface finish may cause a brake pull condition.
- New rotors should not be refinished before installation. Original equipment rotor surfaces are ground to ensure smooth finish and parallelism between mounting and friction surfaces. If a new rotor has more than 0.050 mm (0.002 in) Lateral Run Out (LRO) when properly mounted on the hub, correct it using one of the following methods:
  1. For hubless rotor designs, use the correction plate procedure found in the "GM Brake Service Procedure for Hubless Rotors" outlined in this bulletin.
  2. For hubbed/trapped/captured rotor designs, refinish the rotor using an On-Car lathe and the procedure outlined in this bulletin.
- Never reuse rotors that measure under the Minimum Thickness specification. In this instance, the rotor should be replaced.

**Important:** If the Minimum Thickness specification is not visible on the rotor, reference Service Information (SI) for the specific vehicle application. DO NOT use any other manufacturers rotor specifications.

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

**BULLETIN D'OUTILS**
**HONDA**
**TOOLS BULLETIN**

| YEAR/MODEL<br>ANNÉE/MODÈLE | DATE OF ISSUE<br>DATE EN VIGUEUR | BULLETIN NUMBER<br>NUMÉRO DU BULLETIN |
|---|---|---|
| ALL | SEPT. 14, 2007 | II-3-07 |

## *ON-CAR BRAKE LATHES*

In order to ensure that the new run-out tolerances for brake disc refinishing could be met reliably in the field Honda Canada undertook to evaluate brake lathe equipment requirements. You may noticed from the service manuals that the tolerance has been moved from .1 mm to .04 mm. Repair and refinishing procedures have also been reviewed with new policies and procedures published in **Service Letter VI-1-07.** Many dealers have also been calling in asking for direction regarding on-car brake lathes. From our investigation it is clear that the new run-out tolerances require on-car lathes. Off-car brake lathes cannot meet these tolerances and brake refinishing using off-car equipment is not acceptable.

Honda Canada **requires** the use of an approved hub-mounted on-car brake lathe or a previously approved knuckle mounted lathe, listed in the service manuals, when resurfacing both front and rear brake discs. Honda Canada reserves the right to auto ship and charge your parts account for an approved lathe if it determines that your dealership does not have and/or is not using an approved on-car brake lathe in your workshop, or if there are an insufficient number of approved units available for technicians to meet the repair and service demand. Bench lathes should be used **only** for drum machining.

The newly approved hub-mounted on-car brake lathes introduced in this bulletin mount directly on the car hub with the use of the appropriate adapter and resurface the rotor on the vehicle, a process adopted by most auto manufacturers and mandatory for Honda dealers to correct rotor thickness variation and lateral runout. These hub mounted on-car brake lathes require less time to set up and are easier to use resulting in a significantly reduced labour time and increased profitability.

The following hub mounted on-car lathes are now approved by Honda Canada:

**1) Hunter Engineering:**
- **HUN-OCL410HON (Honda specific package)**
- **HUN-OCL400**

**2) PRO-CUT:**
- **PFM-9.02HA (Honda specific package)**
- **PFM-9.22HA (Honda specific package)**
- **PFM-9.02 & 9.22**

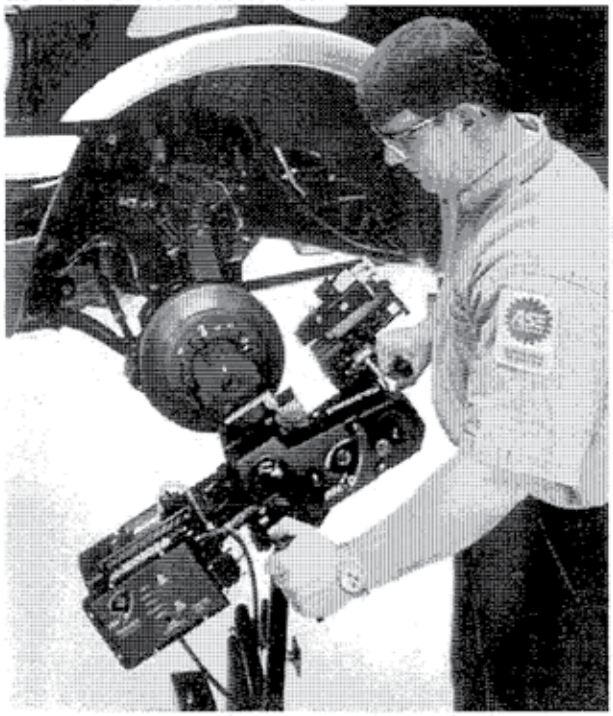
The Honda specific equipment is being offered to all dealers at an introductory discounted price. Pricing is guaranteed **until December 31, 2007**. Each Honda package includes lathe and adaptors to service all Honda models.

For technical information please contact Honda Canada's Technical Tools department by email request at **ch_technicaltools@ch.honda.com** or **DES-Canada at: 1-866-868-3372**.

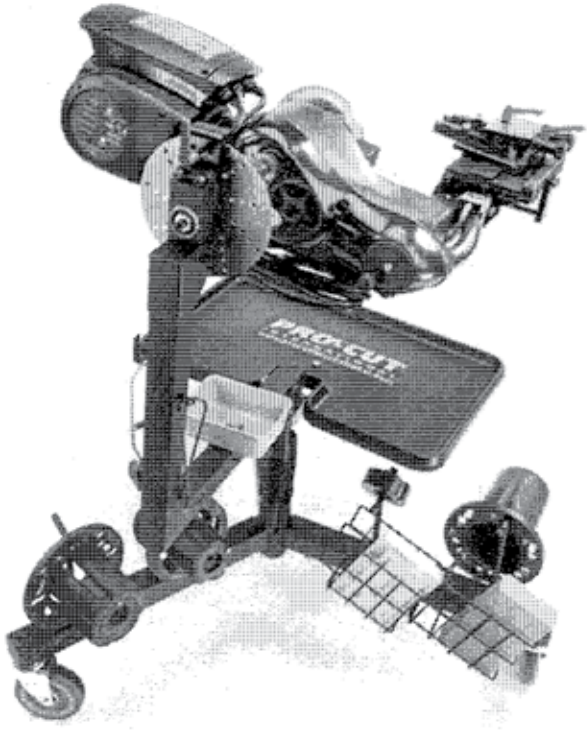
To place an order contact DES-Canada at: 1-866-868-3372.

Refer to the **PURCHASE INFORMATION** at the end of this bulletin when ordering or seeking further information regarding the equipment or information mentioned in this Tool Bulletin.

2. PRO-CUT PFM-9.02HA



3. PRO-CUT PFM-9.22HA




**Features of the PRO-CUT PFM-9.02HA & PFM-9.22HA:**

**Computerized**
The on-board computer delivers a precise alignment between the lathe axis and the hub axis, thereby ensuring that a Pro-Cut machined rotor will have less than 0.04 mm lateral run-out every time.

**Automatic runout compensation**
Hold the start button for 2 seconds to initiate the measurement/adjustment process.
The adjuster solenoid will then change the angle (at the adjustment flange).This procedure will take between 10 to 60 seconds.

**Minimal set up required for second side**
No difficult adjustments are required when you flip the lathe to machine the opposite side of the vehicle, since adjustments were made in the right-side up position.

**Pre-set speed**
The Pro-Cut was designed to cut at high spindle speed eliminating the need to make speed adjustments. Everything is pre-set to guaranty speed and quality.

**Automatic shut off**
The unit will shut off once the cutting tips clear the rotor allowing for unattended operation.

**Motor power**
**PFM-9.02HA:** 1 hp
**PFM-9.22HA:** .95 hp

**Adapters included in Honda package**
4 Hole Direct Fit Adapter #50-687
5 Hole Direct Fit Adapter #50-688

**Warranty**
One year on manufacturers defect. An extended warranty tailored to the dealers needs is available. Repairs and warranty services provided by DES-Canada.

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

| TECHNICAL SERVICE BULLETIN | Group |
|---|---|
| | 50 - CHASSIS |
| | Number |
| | 97-50-007 |
| Subject | Date |
| | 12-1997 |
| | Model |
| FRONT BRAKE DISC MACHINING RECOMMENDATIONS | *Accent* 1995-1998, *Elantra* 1992-1998, *Excel* 1986-1994, *Scoupe* 1991-1995, *Sonata* 1989-1998 and *Tiburon* 1997-1998 |

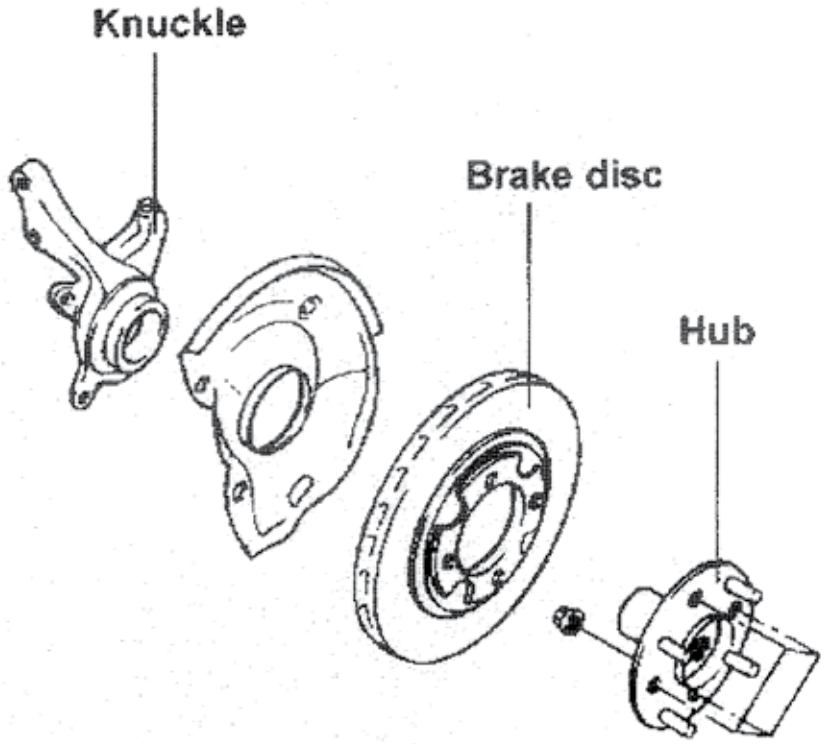
**PURPOSE:**

This service bulletin provides front brake disc machining recommendations and procedures to reduce the disc thickness variation that may cause brake pedal pulsation.

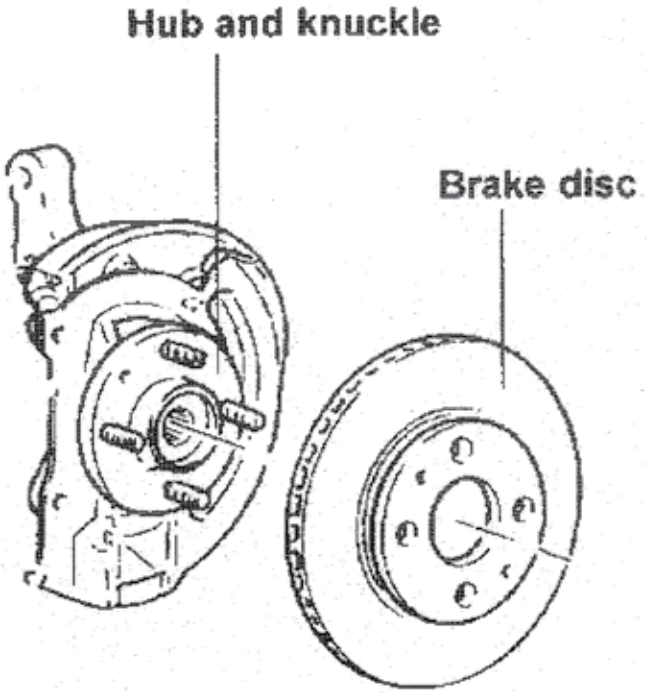
**DESCRIPTION:**

Hyundai vehicles use two methods of attaching front brake discs. On Excel, Scoupe, Accent, Elantra and Tiburon models, the disc is attached on the inside of the hub assembly making it less efficient to remove for machining (see illustration below). On Sonata models, the disc is attached on the outside of the hub assembly making it very easy to remove for machining (see illustration below).

The following Service Procedures contain front brake disc machining recommendations and procedures for both types of disc attachment methods.



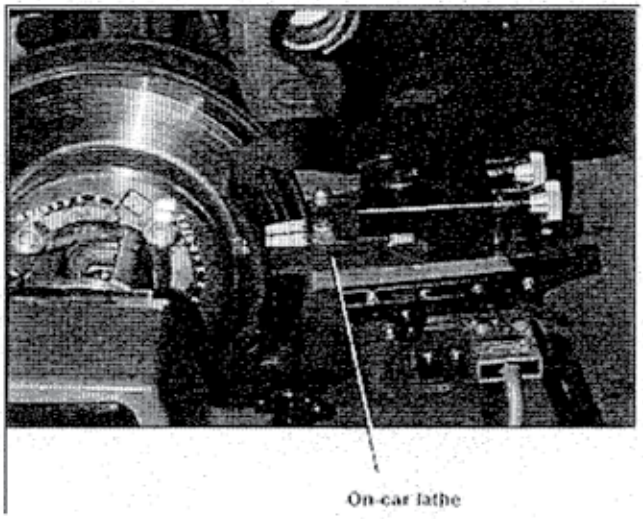

"Inside of Hub" Disc (Excel, Scoupe, Accent, Elantra, & Tiburon)




## "Outside of Hub" Disc (Sonata)

**SERVICE PROCEDURE 1 (ALL MODELS):**

Machining of brake discs using an "on-car lathe" is recommended for ALL Hyundai models. An "on-car lathe" provides efficiency and accuracy as it machines the disc true to the hub's center of rotation. Use an "on-car lathe" made by PRO-CUT (models CROS 700 or PFM 900) or equivalent, and always follow the lathe manufacturer's instructions for properly machining the brake disc.



On-car lathe

**SERVICE PROCEDURE 2:**

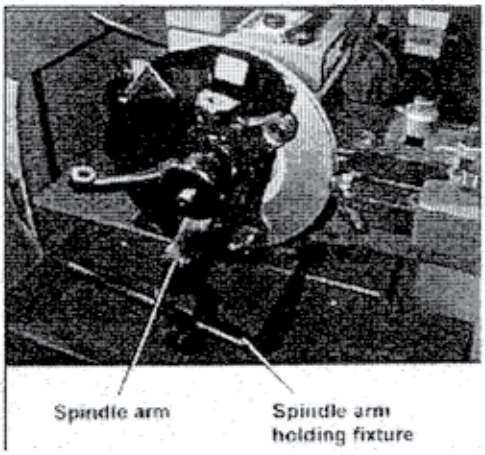
Service Procedure 2 is recommended only if Service Procedure 1 is not available.

- For the "Inside of Hub" disc attachment design (used on Excel, Scoupe, Accent, Elantra & Tiburon models), follow the steps outlined in Service Procedure 2A.
- For the "Outside of Hub" disc attachment design (used on Sonata model only), follow the steps outlined in Service Procedure 2B.

**SERVICE PROCEDURE 2A (EXCEL, SCOUPE, ACCENT, ELANTRA & TIBURON):**

Use the following steps to machine an "Inside of Hub" disc attachment design:

1. Confirm that the "off-car lathe" has a spindle arm holding fixture similar to the one shown in the picture below.




**NOTE**

**If your "off-car lathe" doesn't have the spindle arm fixture, use Service Procedure 3 for machining the disc.**

2. Remove hub and knuckle assembly from the vehicle per procedure outlined in the appropriate Shop Manual.

   **NOTE**

   **Do not use a "slide hammer" to remove the hub assembly. This may damage the wheel bearings.**

3. Mount the knuckle assembly with the disc on the "off-car lathe" (see illustration above).
4. Machine the disc on the "off-car lathe" following the lathe manufacturer's (See appropriate Shop Manual for service limit specification.)
5. Reinstall the hub and knuckle assembly on the vehicle.
6. Repeat procedure for other side.

**SERVICE PROCEDURE 2B (SONATA MODEL):**

Use the following steps to machine an "Outside of Hub" disc attachment design.

7. Remove the disc from the vehicle per procedure outlined in the appropriate Shop Manual.
8. Mount the disc on the "off-car lathe".
9. Machine the disc on the "off-car lathe" following the lathe manufacturer's (See appropriate Shop Manual for service limit specification.)
10. Reinstall the disc on the vehicle.
11. Repeat procedure for other side.

**SERVICE PROCEDURE 3 (EXCEL, SCOUPE, ACCENT, ELANTRA & TIBURON):**

NOTE

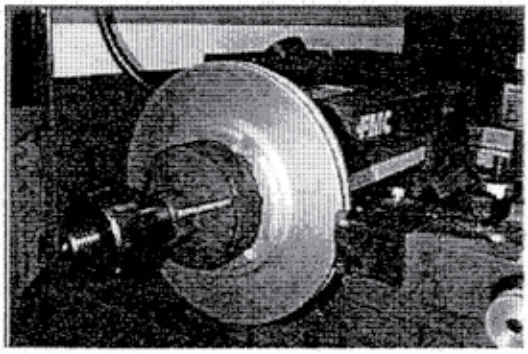
**Use Service Procedure 3 ONLY if Service Procedures 1 & 2A are not available.**

1. Remove hub and knuckle assembly from the vehicle per procedure outlined in the appropriate Shop Manual.
2. Separate disc from knuckle and hub assembly per procedure outlined in the appropriate Shop Manual.

   NOTE

   **Do not use a "slide hammer" to remove the hub assembly from the knuckle assembly. This procedure may damage the wheel bearings.**

3. Machine the disc on the "off-car lathe" following the lathe manufacturer's instructions.



4. Reinstall the disc on the hub and knuckle assembly.
5. Reinstall the hub and knuckle assembly on the vehicle.
6. Repeat procedure for other side.

**WARRANTY INFORMATION:**

Normal warranty operation codes and times apply.

PRO-CUT™
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

# Service Bulletin

Mazda North American Operations
Irvine, CA 92618-2922



| Subject: | Bulletin No: ST-001/11 |
|---|---|
| ON-CAR BRAKE LATHE | Last Issued: 06/23/2011 |

## APPLICABLE MODEL(S)/VINS

| | | | |
|---|---|---|---|
| 1995-2009 B-Series | 1997-2002 Millenia | 2004-2011 Mazda3 | 2007-2011 Mazda CX-7 |
| 1997-2003 Protege | 1997-2006 MPV | 2006-2010 Mazda5 | 2007-2011 Mazda CX-9 |
| 1997-2005 Miata | 2001-2011 Tribute | 2012 Mazda5 | 2006-2011 Mazda MX-5 |
| 1997-2002 626 | 2011 Mazda2 | 2003-2011 Mazda6 | 2004-2011 Mazda RX-8 |

## DESCRIPTION/PRICING

Mazda North American Operations received many requests from our dealers asking us to approve additional on-car brake lathes as an option for MNAO authorized equipment.

Due to your feedback and after evaluating a few on-car brake lathes, we are pleased to announce that we have added the Pro Cut On-Car Brake Lathe to MNAO authorized equipment program.

The Accu-turn is still an approved brake lathe but it is no longer available for purchase from our vendor.

**Important reminder** – Rotors must be machined using a Mazda approved on-car brake lathe or warranty claims are subject to denial or debit.

| Tool Number | Description | |
|---|---|---|
| 50-PFM92.5 | Pro-Cut On-Car Brake Lathe | call for current pricing |

## OBTAINING TOOLS

This tool can be ordered through M-Store. You can log on to MStore at:

http://dealers.mazdausa.com

## CUSTOMER SERVICE INFORMATION

For warranty or product information call America Kowa Seiki at 877-768-6657. Customer service representatives are available from 7:30 AM until 7:00 PM CST, Monday through Friday.

| **Bulletin No:** ST-001/11 | **Last Issued:** 06/23/2011 |
|---|---|
|  | |

## SPECIAL SERVICE TOOL (SST)

**PART NAME**:
Pro-Cut On-Car Brake Lathe

**PART NUMBER**:
50-PFM92.5

**APPLICABLE MODELS**:
All models

**USAGE**:
To machine brake rotors on the car

**OVERVIEW**

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

PRO-CUT
ROTOR MATCHING SYSTEMS

MITSUBISHI MOTORS

DEALER EQUIPMENT

Important Notice to Dealers:

RE: Change of Supplier for On-Car Brake Lathes Reference: Tech Talk 179

Attention Dealer Service Departments: MMNA announced in Tech Talk 179, selection of the Pro-Cut **38-PFM92-4MIT** On-Car Lathe as the new on-car brake lathe in their Dealer Equipment program. The Pro-Cut was selected after an in-depth test and comparison process amongst several different lathe manufacturers.

While the Pro-Cut will be a standard item with each new dealer kit, existing dealers have the option to upgrade to the newer technology. As such, MMNA has negotiated a **one-time special trade-in offer** that allows dealers to upgrade to the newer equipment at a significant savings.

From now until the end of First Quarter 2011 (March 31st), your dealership can trade-in your current on-car lathe (regardless of age or condition) and receive a combined SPX/Pro-Cut discount trade allowance that brings the already low negotiated standard price of , down to just .

This is a one-time only special offer. We would strongly encourage your dealership to consider upgrading. During testing, we found the Pro-Cut to be significantly faster and easier to use than the previously recommended caliper-mount unit originally required. If you'd like to see the unit and decide for yourself, contact Pro-Cut's National Office **(800) 543-6618 Option #5** and request a Mitsubishi no obligation product demonstration. They will bring a unit out to your service department and run through setup and use with your entire technical staff.

## New Pro-Cut Part Number for Mitsubishi (38-PFM92-4MIT)

**Contact your local Mitsubishi Dealer Equipment Representative at 888-727-6672 for further details.**

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

Technical Bulletin



# SERVICE BULLETIN

| Classification: | Reference: | Date: |
|---|---|---|
| BR04-003 | NTB04-066 | May 28, 2004 |

## 2004 TITAN AND ARMADA; BRAKE JUDDER FROM FRONT BRAKES

**APPLIED VEHICLES:** 2004 Titan (A60)
2004 Armada (TA60)

**IF YOU CONFIRM:**

While braking, especially when braking at highway speeds:

- A steering wheel shake,
- Body vibration, or
- Brake pedal pulsation (also known as "brake judder").

**ACTIONS:**

- Use an on-car brake lathe to "turn" (resurface) the front brake rotors.
- Install new front brake pads.
- Apply "special" grease to the brake pad retainers.
- "Burnish" the brake pads.

**PARTS INFORMATION**

| DESCRIPTION | PART NUMBER | QUANTITY |
|---|---|---|
| Brake Pad Kit, Front | 41060-7S026 | 1 |
| Torque Member Anchor Bolts | 41005-7S000 | 4 |
| Molykote® M-77 Grease* Molykote® is a registered trademark of Dow Corning Corporation. | 44003-7S000CM | As needed |

* Order Molykote® M-77 grease from your PDC.

**IMPORTANT:** The purpose of "ACTIONS" (above) is to give you a quick idea of the work you will be performing. You MUST closely follow the entire Service Procedure (starting on page 2) as it contains information that is essential to successfully completing this repair.

Nissan Bulletins are intended for use by qualified technicians, not 'do-it-yourselfers'. Qualified technicians are properly trained individuals who have the equipment, tools, safety instruction, and know-how to do a job properly and safely. NOTE: If you believe that a described condition may apply to a particular vehicle, DO NOT assume that it does. See your Nissan dealer to determine if this applies to your vehicle.

## CLAIMS INFORMATION

Submit a Primary Failed Part (PP) line using the following claims coding:

| DESCRIPTION | PFP | OP CODE | SYM | DIA | FRT |
|---|---|---|---|---|---|
| Turn both **FRONT** brake rotors on the vehicle (1) | (2) | PB25AA | EA | 32 | (3) |

1. Includes time allowance to install the new pads and hardware and burnish the pads.
2. Reference the indicated Titan or Armada Parts Catalog and use the front brake rotor P/N as the PFP.
3. Reference the current Nissan Warranty Flat Rate Manual and use the indicated FRT.

## SERVICE PROCEDURE

### Turn the Front Brake Rotors

1. Remove both front brake caliper assemblies.
   - Refer to the Electronic Service Manual (ESM), section BR for brake caliper assembly removal.

2. Inspect / measure the rotors to make sure they are serviceable (they can be reused / resurfacing is possible).
   - Refer to the ESM, section BR, for brake rotor inspection.
   - Minimum Thickness:
     24.5 mm (0.965 in.)
     Any thickness under that: Replace both rotors.

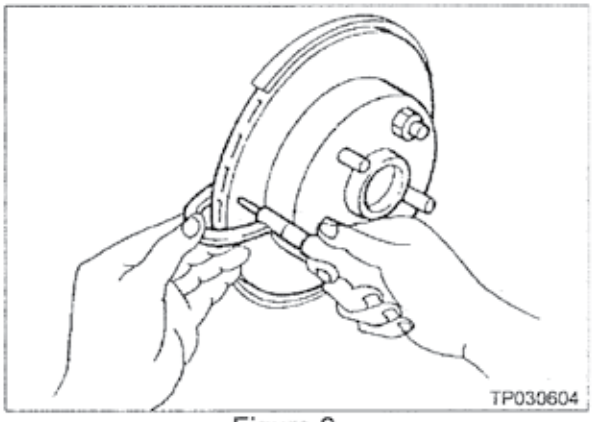


Figure 2

**IMPORTANT**: If new rotors are required, "index" them to the hub (see "Rotor Indexing" on page 6).



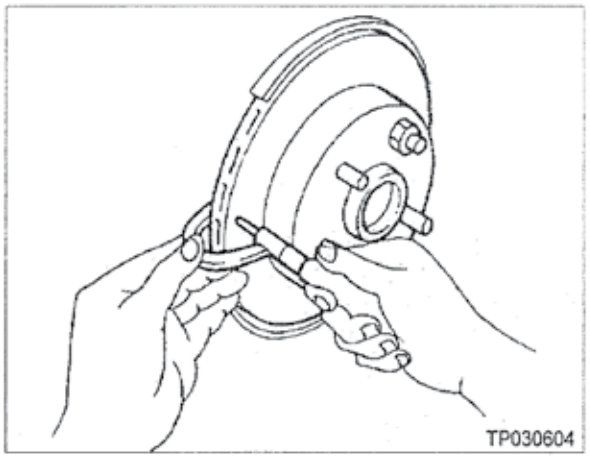
 

3. Resurface both front rotors using an **On-Car Brake Lathe**.

**IMPORTANT NOTES:**

- You must use an on-car brake lathe (such as the ProCut™ PFM9.0 or equivalent). An on-car brake lathe is a required essential tool and must be used to perform warranty brake rotor surfacing.
- The ProCut™ PFM9.0 can be ordered from Nissan TECH-MATE at 1-800-662-2001.
- The on-car brake lathe is more effective in reducing brake rotor runout than the conventional off-car lathe method.
- When using the on-car brake lathe, prevent metal shavings from contacting or collecting on the ABS speed sensors.
- Remove any shavings that stick to the ABS speed sensor's magnet. It is best to clean the ABS sensor with the rotor removed.
- If the rotor must be removed for any reason, mark the exact location (rotor to axle hub) before removing the rotor (see Figure 6 on page 6). This will make sure you reinstall the rotor back to the same location.
- Do not tighten the wheel lug nuts with an air impact driver.
- Tighten the wheel lug nuts to the proper torque specification. Uneven or high torque applied to the lugs may distort the brake rotor and hub. This may result in increased rotor runout and excessive rotor thickness variation as the rotor wears.

4. After the rotors have been resurfaced:
   - Recheck the rotor thickness. Specification: 24.5 mm (0.965 in.) minimum thickness.
   - Check the rotor runout. Specification: 0.04 mm (0.0016 in) maximum runout.



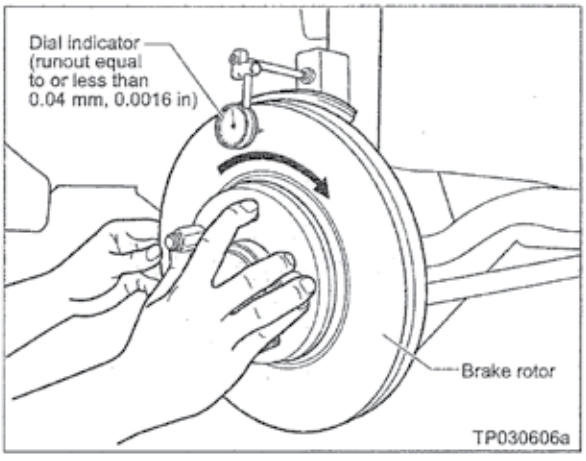




Figure 3

5. Reinstall the brake caliper assemblies.
   - Refer to the ESM for brake caliper installation instructions
   - **IMPORTANT:** Make sure to use **new** torque member anchor bolts. **Do not** reuse the old ones (see Figure 4).

**Apply Special Grease to the Brake Pad Retainers**

6. Clean the caliper assemblies.
   - Remove any adhesive from the caliper and caliper pistons. Be careful not to damage the pistons or boots.
   - Completely clean any dirt, brake dust, metal filings, or any other debris from the brake pad retainers.

7. Apply special grease to the brake pad retainers (see Figure 4 below and Figure 5 on the next page).
   - Use Molykote® M-77, P/N 44003-7S000CM. This special grease is listed in the Parts Information.

   Molykote® is a registered trademark of Dow Corning Corporation.

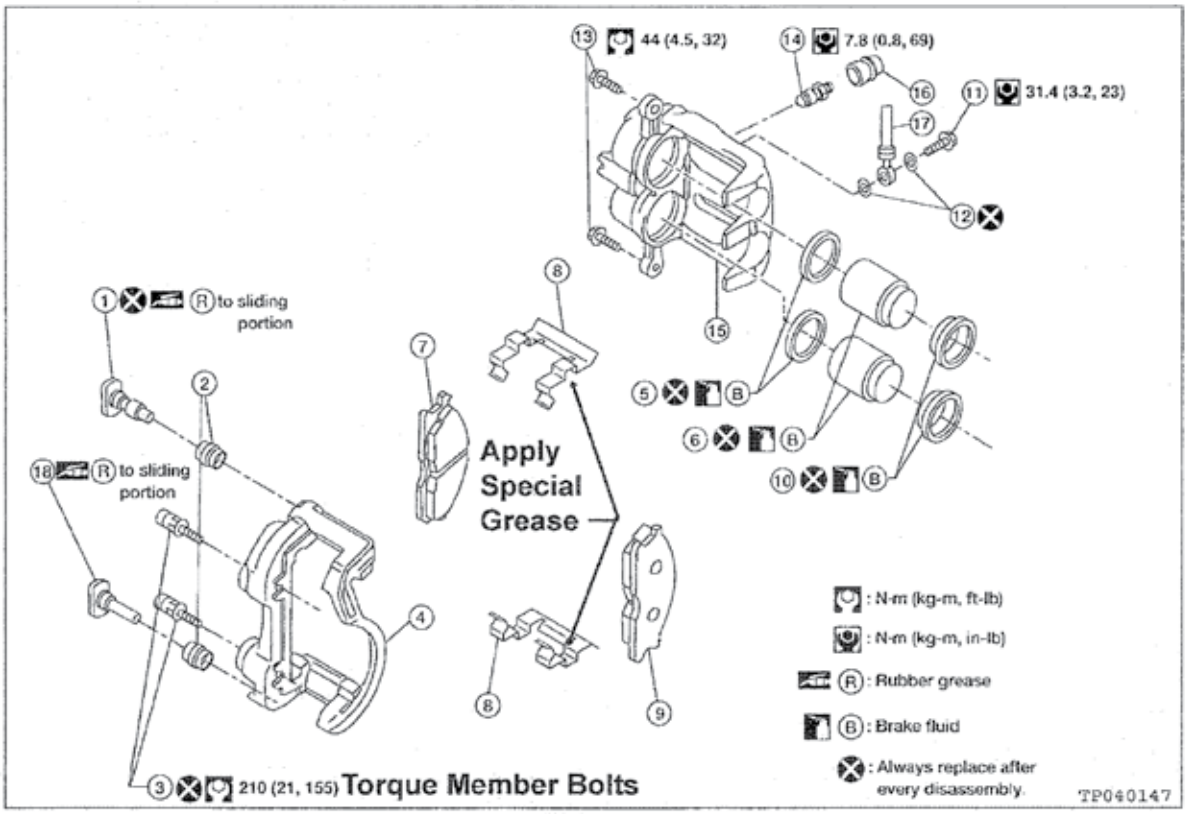



Figure 4

1. Upper sliding pin
2. Sliding pin boot
3. Torque member bolt
4. Torque member
5. Piston seal
6. Piston
7. Inner pad
8. Pad retainer
9. Outer pad
10. Piston boot
11. Union bolt
12. Copper washer
13. Sliding pin bolt
14. Bleed valve
15. Cylinder body
16. Cap
17. Brake hose
18. Lower sliding pin



**IMPORTANT:** Make sure to apply the special grease only to the brake pad retainers.

- Don't get grease on the brake pad surface or the rotor surface.

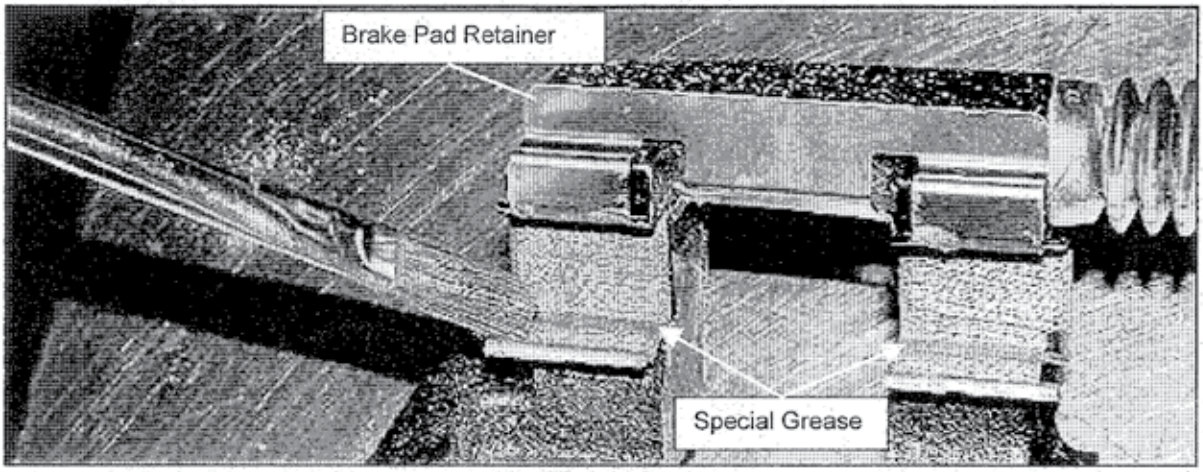



Figure 5

8. Replace the brake pads with new ones (see Parts Information and Figure 4 on the previous page).
   - Remove protective film from the brake pad backing insulators before installation.
   - Refer to the ESM for brake pad replacement instructions.

9. Reinstall the wheels and lug nuts. Tighten lug nuts to **133 N·m (14 kg-m, 98 ft-lb)** with a Torque Wrench.
   - Do Not tighten the wheel lug nuts with an air impact wrench.
   - If you apply uneven or high torque to the lugs it may "distort" the brake rotor and hub. This could cause increased rotor runout and excessive rotor thickness variation as the rotor wears.

**Burnish The Brake Pads**

10. Burnish the brake pads as follow:
    A. Drive the vehicle on a straight smooth road at about 30 mph (50 kph).
    B. Use medium brake pedal/foot effort to bring the vehicle to a complete stop from about 30 mph (50 kph). Adjust pedal/foot pressure so that the vehicle stopping time is 3-5 seconds.
    C. Cool the brake system by driving at about 30 mph (50 kph) for approximately one minute without stopping.
    D. Repeat steps A, B and C 10 times to complete the burnishing process.



## Rotor Indexing

When installing a new rotor, use the following "indexing" procedure. This helps ensure a minimum amount of rotor runout.

1. Make sure the rotor is fully contacting the hub. Clean the rotor to hub surface if it is rusty.

   **NOTE:** For cleaning the hub surface, specifically around the wheel studs, it is recommended to use the Wheel Hub Cleaning Kit #J-42450-A, which can be ordered from Nissan TECH-MATE at 1-800-662-2001.

2. Install the rotor and all lug nuts. Tighten the lug nuts to 40 ft-lbs.

3. Place a reference mark on the rotor and hub (see Figure 6).

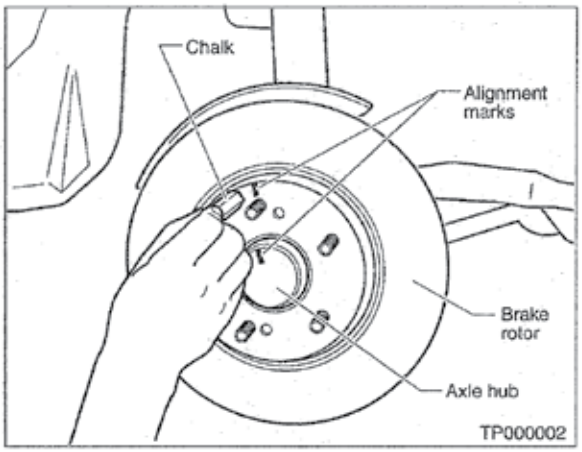



Figure 6

4. Measure rotor runout with a dial indicator (see Figure 7).

   - If the runout is above 0.04 mm (0.0016), continue with step 5.

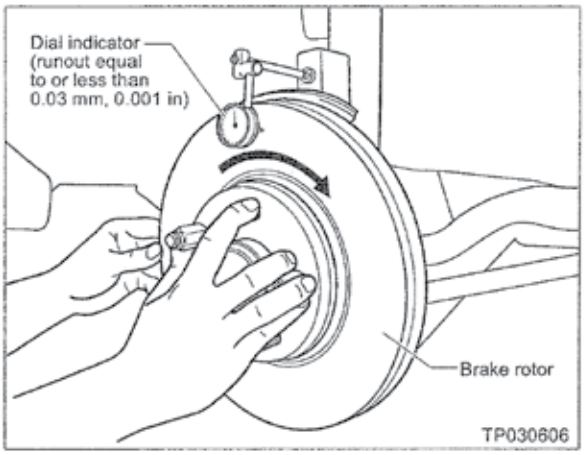



Figure 7

5. Remove the lug nuts and shift the position of the rotor one lug clockwise, then reinstall the lug nuts and torque to 40 ft-lbs.

   - Repeat step 4 and 5 until the rotor is positioned with the least amount of runout.

6. After you find the position with the least amount of runout, if the runout is still more than 0.04 mm (0.0016in), you'll need to turn (resurface) the new rotors. See step 3 in the Service Procedure.

PRO-CUT™
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE

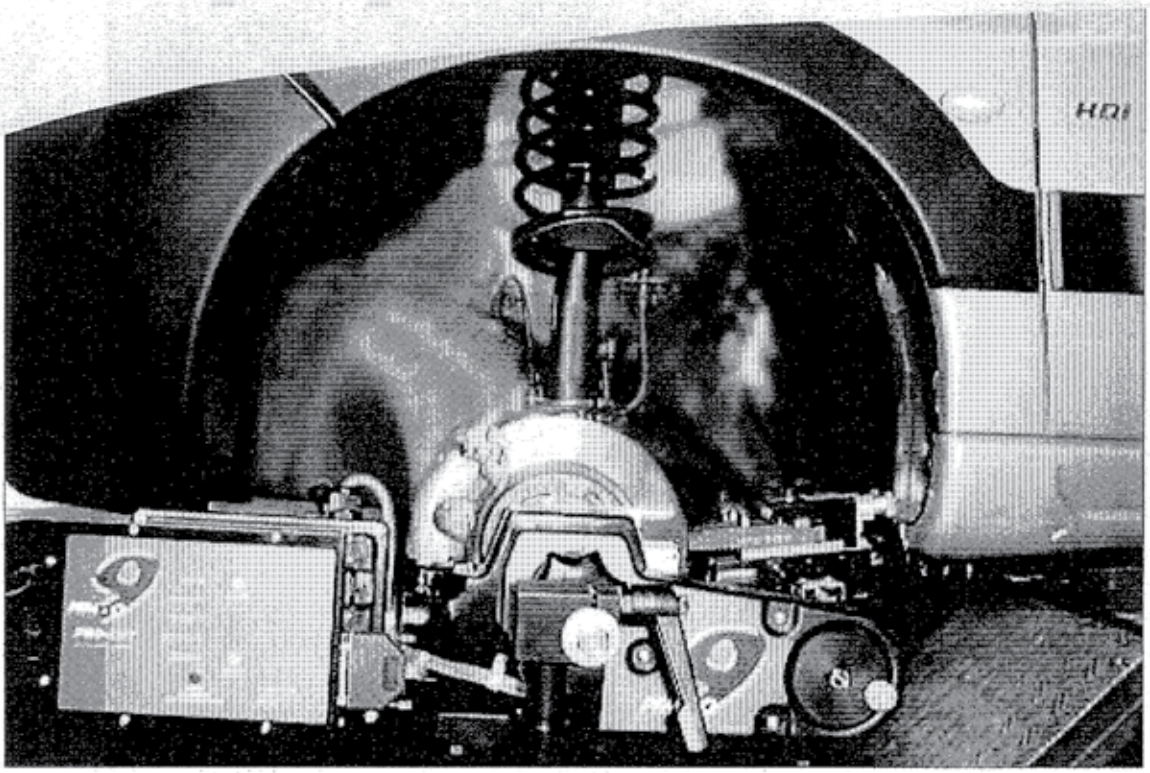



**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

info pass

MATERIELS ET EQUIPEMENTS D'ATELIER

PEUGEOT



# Super fast on-vehicle brake disc alignment machine

- Eliminates brake vibration issues (and stops them returning!).
- Fixes noisy brakes (squeaks and squeals).
- Cures brake efficiency imbalance.
- Removes rust and corrosion.
- Saves money when preparing used sales vehicles.
- Makes money when re-aligning discs and fitting new pads – Extra profit centre for the workshop.

**This machine has been officially tried and tested by Peugeot and can now be used under the "RTS" Time Recovery System for warranty.**

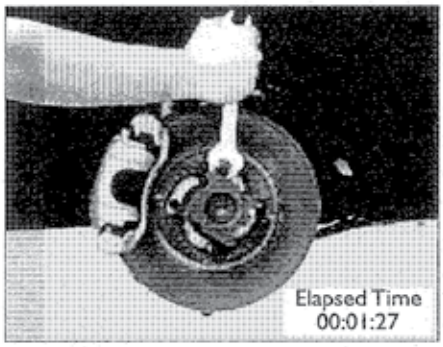
*AGREMENT PEUGEOT PRO 08 01*

INFORMATION TECHNIQUE PIÈCES ET SERVICES

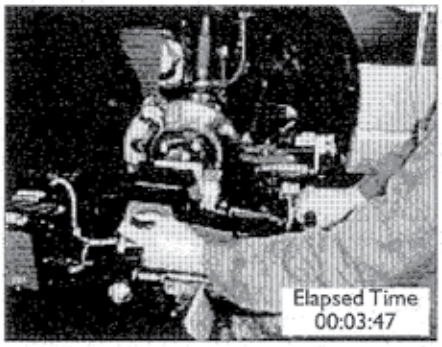
Automobiles PEUGEOT RC PARIS B 552 144 803 - Réalisation 2CCA - 52918 - MAT/006 - 06/2003 - GB

## The machine is very simple and easy to use. Just 4 steps and 9 minutes from start to finish.

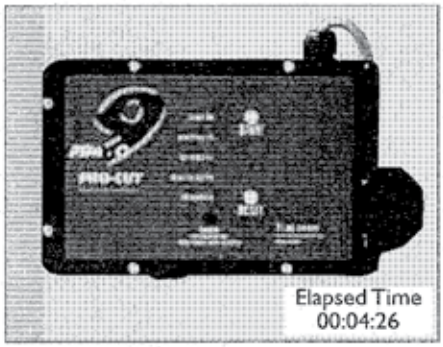
### OPERATOR MODE



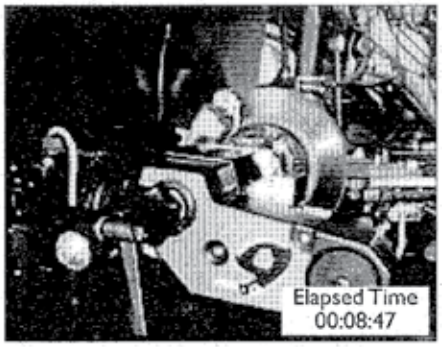

**First step**
Fit the Adaptor to the vehicle's hub.




**Second Step**
Attach machine to the Adaptor with a simple turn of a knob




**Third Step**
Press the start button and the machine automatically fully compensates for hub run-out.




**Fourth Step**
Press in the automatic feed button and the disc is re-aligned

It is as simple as that!

### PERFORMANCE SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| Maximum Rotor Thickness: | 1.75" | 44 mm | Spindle Speed: | 126 RPM | |
| Minimum Rotor Thickness: | 0.2" | 5 mm | Motor: | 1.5 HP | 0,71 Kw |
| Maximum Rotor Diameter: | 16.2" | 412 mm | Weight: | 57 lbs | 26 kgs |
| Minimum Rotor Diameter: | 4" | 102 mm | Electrical Supply: | 110v/1ph/60Hz — 240v/1ph/50Hz — 380v/3ph/50Hz | |
| Maximum Depth of Cut: | 0.020"/side | 0.51 mm | Dimensions: | 32" x 24" x 20" | |

- The "RTS" times given to you from the factory are between 0.9—1.1 hrs depending on the vehicle.
- The special Peugeot agreed package includes all tools, cutting tips and adaptors to cover 100% of Peugeot vehicles and 95% of the rest of the car parc.
- On-site training, a full instruction manual and CD-ROM are included in the package. Special Peugeot terms apply.

**For information and orders contact:**

PRO-CUT INTERNATIONAL

Unit 5 Beta, Orchard Trading Estate, Toddington, Gloucestershire, GL54 5EB, UK—England
Tel: +44 (0)1242 621011 Fax: +44 (0)1242 620558
email: guy.carter@haweka.co.uk Web: www.procutinternational.com

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

# Technische Daten/Verschleißgrenze Bremse - Turbo

## Technische Daten - Turbo mit Grauguss-Bremsscheiben

| Benennung | | Bemerkungen, Maße Verschleißgrenze |
|---|---|---|
| Betriebsbremse (Fußbremse) mit Grauguss-Bremsscheiben (Serienbremse) | | Hydraulische Zweikreis-Bremsanlage mit Vorderachs - Hinterachs - Bremskreisaufteilung. Unterdruck-Bremskraftverstärker, innenbelüftete und gelochte Grauguss-Bremsscheiben mit Vierkolben-Monobloc-Festsattel an der Vorder- und an der Hinterachse.<br>Zur optischen Differenzierung sind die Bremssättel rot lackiert.<br>PSM[1] (Porsche Stability Management) serienmäßig. |
| Bremskraftverstärker (Unterdruck) | Ø | 10 Zoll |
| Verstärkungsfaktor | | 3,85 |
| Hauptbremszylinder | Ø vorn | 25,4 mm |
| | Ø hinten | 25,4 mm |
| | Hub | 18/18 mm |
| Bremskraftregelung | | EBV [2] |
| Bremsscheiben | Ø vorn | 330 mm |
| | Ø hinten | 330 mm |
| Wirksame Bremsscheiben | Ø vorn | 267,8 mm |
| | Ø hinten | 271,2 mm |
| Kolben-Ø in Bremssattel | vorn | 2 x 44 + 2 x 36 mm |
| | hinten | 2 x 30 + 2 x 28 mm |
| Bremsbelagfläche | vorn | 314 $cm^2$ |
| | hinten | 254 $cm^2$ |
| Gesamtbremsbelagfläche | | 568 $cm^2$ |

[1] Porsche Stability Management (PSM) serienmäßig mit den Funktionen ABS, Traction Control (TC), ABD, MSR (Motorschleppmoment Regelung), FZR (Fahrzeugregler) und EBV (Elektronische Bremskraftverteilung). Passivschaltmöglichkeit von TC, FZR und MSR.
[2] EBV = elektronische Bremskraftverteilung (Bremskraftregelung). Dadurch sind keine Einschraubregler erforderlich!

## Technische Daten Verschleißgrenze - Turbo mit Grauguss-Bremsscheiben

Zwei Zustandskriterien können den verschleißbedingten Austausch von Grauguss-Bremsscheiben erforderlich machen:

1. Rissbildung in den gelochten (perforierten) Bremsscheiben-Reibflächen im fortgeschrittenen Stadium.

2. Unterschreitung der Bremsscheiben-Mindestdicke durch Verschleiß (Materialabtragung durch Reibung).

| Benennung | | Bemerkung, Maße | Verschleißgrenze |
|---|---|---|---|
| Belagdicke | vorn | ca. 12,0 mm | 2 mm |
| | hinten | ca. 12,0 mm | 2 mm |
| Bremsscheibendicke neu | vorn | 34 mm | |
| | hinten | 28 mm | |
| Bremsscheiben-Mindestdicke nach Bearbeitung[1)] | vorn | 32,6 mm[1)] | |
| | hinten | 26,6 mm[1)] | |
| Bremsscheiben-Verschleißgrenze | vorn | | 32,0 mm |
| | hinten | | 26,0 mm |
| Rauhtiefe der Bremsscheibe nach Bearbeitung max. | | 0,006 mm | |
| Dickentoleranz der Bremsscheiben max. | | 0,02 mm | |
| Seitenschlag der Bremsscheibe max. | | 0,03 mm | |
| Seitenschlag der Radnabe max. | | 0,03 mm | |
| Seitenschlag der Bremsscheibe in eingebautem Zustand max. | | 0,06 mm | |
| Druckstangenspiel (gemessen an der Bremspedalplatte) | | ca. 1 mm | |
| Feststellbremse (Handbremse) | | mechanisch auf beide Hinterräder wirkende Trommelbremse | |
| Handbremstrommel ∅ | | 180 mm | 181 mm |
| Bremsbacken-Breite | | 25 mm | |
| Bremsbelagdicke | | 4,5 mm | 2 mm |

[1)] Nur von Porsche empfohlene Bremsscheiben-Bearbeitungsmaschinen verwenden! Die Bremsscheibe darf nur symmetrisch, das heißt von beiden Seiten gleichmäßig nachgearbeitet werden!

**Hinweise zur Bearbeitung von Grauguss-Bremsscheiben**

**Mögliche Beanstandungen**

- Standschäden (Rostansatz). Dies führt zu Lenkradvibrationen, Geräuschentwicklung und Bremspedalpulsieren.
- Verzug der Bremsscheibe durch zu hohe Beanspruchung, zum Beispiel auf der Rennstrecke.
- Zu großer Seitenschlag wenn neue Bremsscheiben auf verschmutzten- bzw. verzogenen Radnaben montiert werden.

**Vorgehensweise**

- Bremsscheibe auf Rissbildung, Mindestdicke, Seitenschlag, Dickentoleranz, Ebenheit und Oberflächenrauhigkeit überprüfen.
- Ggf. (unter Berücksichtigung der Ist-Bremsscheibendicke und der Verschleißgrenze der Bremsscheiben) die Bearbeitung mit einer von Porsche empfohlenen Bremsscheiben-Bearbeitungsmaschine durchführen. Empfohlene Bearbeitungsmaschinen sind dem Handbuch Werkstatt Ausrüstung Kapitel 3.4 zu entnehmen.
- Die Bremsscheibe darf nur symmetrisch, das heißt von beiden Seiten gleichmäßig nachgearbeitet werden! Die Bedienungsanleitung der Bremsscheiben-Bearbeitungsmaschine beachten!

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

SUBARU.

Subaru of America
Technical Services
January 3, 1994

## Brake Servicing Requirements for Subaru Dealers
### Warranty Policy Modification

When performing warranty repairs for brake judder, Subaru brake rotors must be resurfaced using an on-car lathe. If the rotors have been scored due to worn brake pads within the warranty coverage, the rotors must be resurfaced if they fall within the minimum thickness specifications listed in the respective Subaru service manuals and training materials.

The brake rotors are not to be resurfaced as a matter of course during routine brake pad replacements unless the above factors are experienced.

The machining of Subaru brake rotors requires accuracy on the part of the machine and the operator to ensure that the rotor is cut parallel to the mounting surface. A rotor that is machined not parallel to the mounting surface will result in a rotor excessive run out. Excessive rotor run out eventually leads to excessive rotor parallelism difference which is exhibited as a brake judder complaint.

Subaru of America, Inc. requires that Subaru dealers use on-car brake rotor resurfacing equipment when performing warranty related brake rotor resurfacing. The only equipment that Subaru of America, Inc. recognizes as effective for use on all Subaru vehicles is the PRO-CUT International VBG-610 on-car lathe.

Warranty claims for rotor resurfacing will be accepted using an on-car lathe. Rotors that are resurfaced properly will not require further surfacing for judder related complaints within the warranty period under normal use. If it is determined that a judder complaint exists on a Subaru vehicle after the rotors are resurfaced, the parallelism and the runout of the rotors must be measured and noted on the repair order. If the rotors are within the minimum thickness allowances, the rotors must be resurfaced again using on-car lathe. If the rotors are beyond the thickness specifications, the rotors should then be replaced and the original rotors must be retained for DTM inspection or for return to Subaru of America, Inc. if a request is issued after claim credit.

When a rotor is resurfaced using an on-car lathe, multiple repairs will virtually be eliminated.

Subaru of America, Inc. requires the use of an on-car brake lathe.

ATTENTION:
GENERAL MANAGER PARTS MANAGER
CLAIMS PERSONNEL SERVICE MANAGER
*IMPORTANT - All Service Personnel Should Read and Initial*

SUBARU

# SERVICE BULLETIN

**APPLICABILITY:** All Models; All Years
**SUBJECT:** Brake Vibration Diagnostics and Revised Flat Rate Time
**NUMBER:** 06-32-03
**DATE:** 11/01/03

## INTRODUCTION

The purpose of this bulletin is twofold:

Studies confirm that rarely is it necessary to resurface Brake Rotors and/or Drums on all four wheels when a confirmed brake vibration exists. With proper diagnostics, front or rear brake vibrations can be isolated eliminating the need to resurface all four rotors and/or rear brake drums.

Warranty policy states that only the actual source of the issue is warrantable and preventative repairs for what might occur in the future are not a matter for warranty. Therefore, it is required that each brake vibration complaint be narrowed to the source and only that repair be completed.

## ADJUSTMENT TO FLAT RATE TIME ALLOWANCES

With the introduction of on-car brake resurfacing equipment and even more recent advances of this equipment that reduce the times necessary for set-up / calibration, measurement and use, the flat rate time allowances will be reduced. The reductions in flat rate time allowances will become effective January 1, 2004.

**Please provide the following information to the appropriate personnel at your dealership.**

The labor operation numbers for brake rotor resurfacing on vehicles has not changed. Listed below is the new time allowance.

| Labor Operation | Time |
|---|---|
| A511-111 | 0.5 hour |
| A511-114 | 1.0 hour |
| A521-111 | 0.5 hour |
| A521-114 | 1.0 hour |

SUBARU QUALITY DRIVEN® SERVICE

**CAUTION: VEHICLE SERVICING PERFORMED BY UNTRAINED PERSONS COULD RESULT IN SERIOUS INJURY TO THOSE PERSONS OR TO OTHERS.**

Subaru Service Bulletins are intended for use by professional technicians ONLY. They are written to inform those technicians of conditions that may occur in some vehicles, or to provide information that could assist in the proper servicing of the vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do the job correctly and safely. If a condition is described, DO NOT assume that this Service Bulletin applies to your vehicle, or that your vehicle will have that condition.

Youth Educational Systems PROUD PARTNER

## REPAIR PROCEDURE

Use the following procedure along with the troubleshooting chart shown on the next page.

Road test the vehicle to confirm brake vibration. If vibration is felt while braking, verify at what speed. Typically, front rotor vibration is felt at higher speeds (above 50mph) and in the steering wheel (circumference direction and/or side to side). If this is the case, the front rotors and pads will need to be inspected.

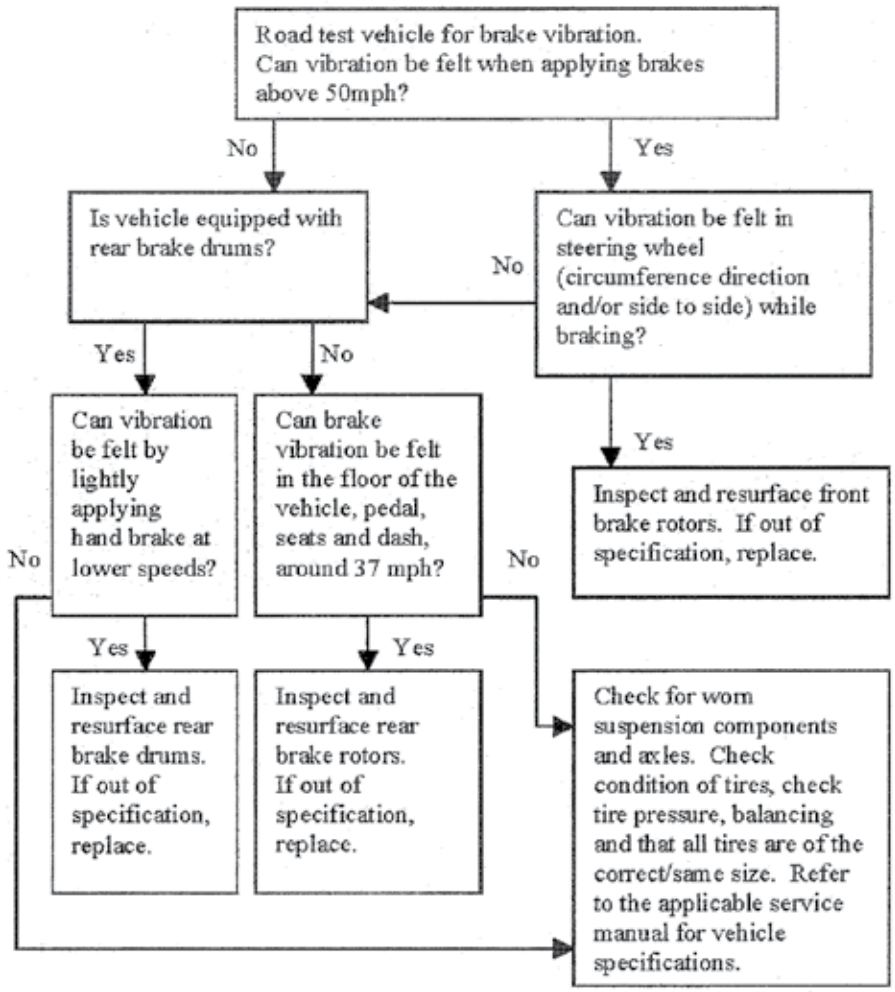
Typically, rear brake vibration is felt at lower speeds (below 50mph). Vibration will also be felt in the floor of the vehicle, pedal, seats and dash. If this is the case, the rear rotors and pads will need to be inspected.

To check for rear drum vibration, road test the vehicle at lower speeds. Be extremely careful not to lock the rear brakes. With the parking brake release button pushed in, pull the parking brake lever slowly and gently, which applies the rear parking brakes. If vibration is felt, the rear drums and shoes will need to be inspected.

Always refer to the applicable service manual for brake, brake drum, and rotor specifications. When resurfacing always check rotor/drum thickness before and after. These measurements must be noted on the repair order. If the rotor/drum is out of specification after resurfacing, it will need to be replaced.

## BRAKE VIBRATION TROUBLESHOOTING CHART

**Diagnostics:** Whenever diagnosing for vibration, the first items that should be checked are; worn and/or loose suspension components, axles, tire pressure, conditions of tires and check that all tires are of the correct/same size. In some cases tires out of balance can also cause vibration. Always refer to the applicable Service Manual for vehicle specifications.



PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

TOYOTA
Technical Service Bulletin

T-SB-0169-09 Rev1 June 4, 2009

# Brake Vibration

**Service Category** Brake

**Section** Brake (front) **Market** USA

Toyota Supports ASE Certification

## Applicability

| YEAR(S) | MODEL(S) | ADDITIONAL INFORMATION |
|---|---|---|
| 2007 – 2010 | Camry | |

**TSB REVISION NOTICE**

**July 9, 2009 Rev1:**

- **The introduction section has been revised.**

**Any previous printed versions of this service bulletin should be discarded.**

## Introduction

Some 2007 – 2010 Camry vehicles may exhibit a vibration or pulsation condition when braking. New front brake pads are available to address customer concerns. Follow the repair procedure below.

## Parts Information

| PREVIOUS PART NUMBER | CURRENT PART NUMBER | PART NAME | QTY |
|---|---|---|---|
| 04465-06100 | 04465-33470 | Pad, Kit Disc Brake, Front | 1 |
| 04466-06060<br>04466-33160 | 04466-06090 | Pad, Kit Disc Brake, Rear | As Needed |
| 04945-06130 | Same | Shim Kit, Anti Squeal, Front | * |

* Visually inspect the shims for heat discoloration. If discolored, replace the shims.

## Warranty Information

| OP CODE | DESCRIPTION | TIME | OFP | T1 | T2 |
|---|---|---|---|---|---|
| BR9003 | Machine Front Discs and Replace Pads (Both Sides). Inspect and Replace the Rear Brake Pads if required (per repair instructions below). | 3.5 | 43512-33130 (rotor) | 9B | 13 |

# Brake Vibration

**Warranty Information (Continued)**

**APPLICABLE WARRANTY**

- **This repair is covered under the Toyota Comprehensive Warranty. This warranty is in effect for 36 months or 36,000 miles, whichever occurs first, from the vehicle's in-service date.**
- **Warranty application is limited to correction of a problem based upon a customer's specific complaint.**

**Repair Procedure**

1. Machine both front rotors with an on-car lathe to minimize rotor run-out. Make sure that the rotors are within minimum thickness. After machining, the maximum allowed rotor run-out is 0.05 mm (0.002 inch). If the rotors are unserviceable or below minimum thickness, replace the rotors.

   For complete inspection procedures refer to the Technical Information System (TIS), applicable model year Repair Manual for thickness and runout specifications and measurement instructions.

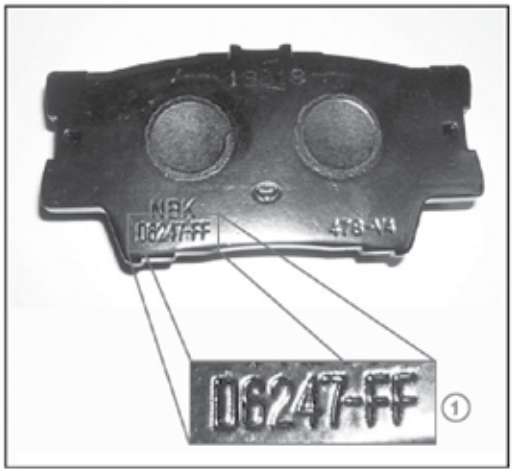
   2007 / 2008 / 2009 / 2010 model year Camry Repair Manual, *Brake – Brake (front) – "Brake: Front Brake: Inspection"*

2. Replace the front brake pads with the improved kit. Visually inspect the shims for heat discoloration. If discolored, replace the shims.

3. Remove the rear pads and check the pad material code on the lower left corner of the pad backing plate (see figure 1).

   - If the code is D6247-FF, do not replace the rear brake pads.
   - If the code is NOT D6247-FF, replace the rear brake pads.

Figure 1.




| | |
|---|---|
| 1 | Friction Material Code = D6247-FF |

4. Road test the vehicle to confirm proper operation.

PRO-CUT
ROTOR MATCHING SYSTEMS

# OEM SUMMARY GUIDE




**Pro-Cut International**
10 Technology Drive
West Lebanon, NH 03784 USA
800.543.6618
info@procutusa.com

# Technical Bulletin

| Model(s) | Year | Eng. Code | Trans. Code | VIN Range From | VIN Range To |
|---|---|---|---|---|---|
| All | 1999 - 2010 | All | All | All | All |

## Condition

**46 07 03** July 6, 2007 **2015173** Supersedes T. B. Group 46 number 07–01 dated June 11, 2007 due to updated warranty table information.

**Brake Disc, Pulsation**

When applying brakes at highway speeds the following symptoms may occur:

Brake pedal may pulsate

Vibration may be felt in vehicle body

Steering wheel may shake

## Technical Background

For brake vibration / pulsation concerns, brake disc machining is now allowed between 6 months / 6000 miles and 12 months / 12,000 miles of the warranty in service date.

**Note:**

Vehicles between 0 and 6 months / 6000 miles in service are not eligible for brake disc machining. For braking vibration complaints on these vehicles, see Technical Bulletin subject matter Customer States "Vibration When Braking", instance number 2010245.

## Production Solution

No production change required.

# Technical Bulletin

## Service

**Note:**

BEFORE machining brake discs, the technician must record the beginning thickness measurement on the back of the repair order followed by the ending thickness measurement upon completion of machining process. All policies and procedures outlined in this technical bulletin also apply to sublet brake disc machining.

Improperly machined brake discs may cause brake pulsation after several months in service.
The servicing facility will be responsible for failures described above.

**Procedure:**

• Remove wheels and separate brake calipers from carrier as outlined in Repair Manual Group 44 – Wheels, Tires, Vehicle Alignment and Group 46 – Brakes – Mechanical components in ElsaWeb.

**Brake Disc Inspection**

A detailed brake disc inspection is needed to determine if the brake disc should be machined or replaced.

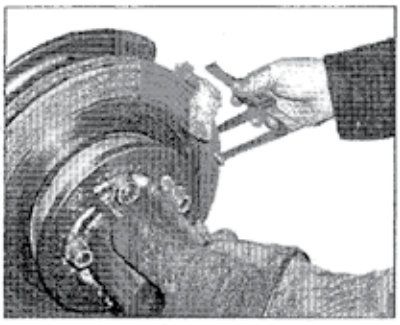
• Inspect brake disc friction surfaces on both sides of the brake disc for:

Severe discoloration (blueing)

High heat surface damage (raised hard spots)

Visible cracks

Brake discs showing any of the above described conditions **MUST** be replaced.

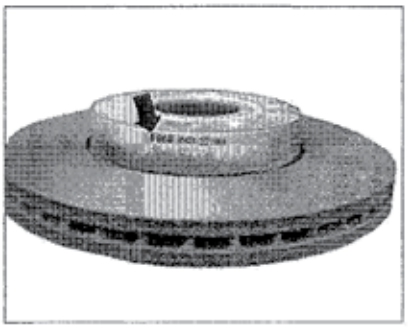


**Disc Thickness Measuring**

Each brake disc has the minimum allowed thickness cast, stamped or laser-etched into the disc hub.

• Measure the brake disc thickness in 4 locations using either the Pro Cut International™ disc thickness measuring tool Part No. 50-902 or the Hunter Engineering Company disc thickness measuring tool Part No. 25-99-2 . Measurements **MUST** be taken the same distance from the brake disc outer circumference to ensure consistency.

# Technical Bulletin



**Note:**

The brake disc must exceed the minimum thickness after the machining process is completed in order to be reused.

**Brake Disc Machining**

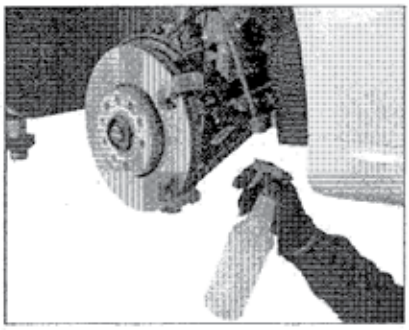
**Tip:**

Brake discs must be machined in pairs (front axle and / or rear axle).

Recommended on-car brake lathes are either the PRO-CUT International ™ PFM 9.0. or the Hunter Engineering Company model OCL 400. This design of brake lathe will produce a surface quality which will provide proper brake performance without a brake pad to brake disc break-in period.

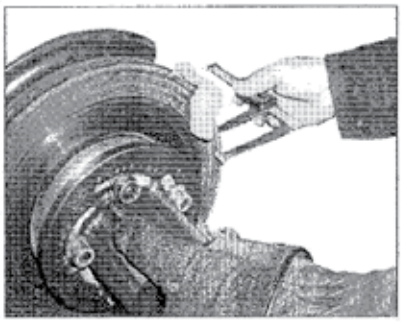
**Note:**

To ensure that a high quality brake disc finish is produced, brake lathe cutting tools must be maintained as directed by the lathe manufacturer.



- Follow the brake lathe manufacturer's instructions for set-up and machining.
- Wash the brake disc with a soap and water solution upon completion of resurfacing to remove all machining particles.

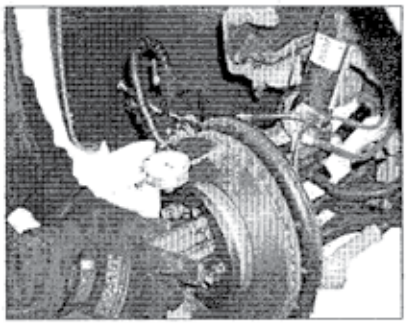
# Technical Bulletin



• Re-measure brake disc thickness in 4 locations using either the Pro Cut disc thickness measuring tool Part No. 50-902 or the Hunter disc thickness measuring tool Part No. 25-99-2, to verify that minimum thickness is still exceeded. If recorded brake disc measurement is less than the minimum thickness, the brake disc **MUST** be replaced.

**Note:**

Always replace brake discs in pairs (front axle and/or back axle).



• Measure brake disc lateral run out using Pro Cut Disc Lateral run out measuring kit Part No. 50-700FC or the Hunter Disc Lateral run out measuring kit Part No. 25-128-2 with a dial indicator.

• Run out must be below .05mm.

# Technical Bulletin

## Warranty

| To determine if this procedure is covered under Warranty, see most recent disc / rotor resurfacing policy | |
|---|---|
| Claim Type: | Use applicable Claim Type** |
| Part Identifier: Front Disc | 4650 |
| Part Identifier: Rear Disc | 4653 |
| Damage Code: Front Disc | 4650 32 _ _ _* 1 |
| Damage Code: Rear Disc | 4653 32 _ _ _* 1 |
| Labor Operation: Front Disc Resurfacing-On Vehicle | 46504699 = 120 TU |
| Labor Operation: Rear Disc Resurfacing-On Vehicle | 46534699 = 120 TU |
| Diagnostic Time: | No additional diagnostic time allowed with the exception of road test (01210002 & 01210004) |
| Claim Comment: Input "As per Technical Bulletin 2015173" in comment section of Warranty Claim. | |

* Code per warranty vendor code policy.

** Vehicle may be outside any Warranty in which case this Technical Bulletin is informational only.

## Required Parts and Tools

No Special Parts required.

| Description | Part No: | Quantity |
|---|---|---|
| Pro Cut ™ Disc Thickness Measuring Tool | 50-902 | 1 |
| Hunter Disc Thickness Measuring Tool | 25-99-2 | 1 |
| Pro Cut Disc Lateral Run out Measuring Tool | 50-700FC | 1 |
| Hunter Disc Lateral Run out Measuring Tool | 25-128-2 | 1 |
| PRO-CUT International ™PFM 9.0 | PCIPFM90VW | 1 |
| Hunter Engineering Company Model OCL 400 | HUNOCL400VW | 1 |

## Additional Information

**All part and service references provided in this Technical Bulletin are subject to change and/or removal. Always check with your Parts Dept. and Repair Manuals for the latest information.**