39-73

Driveshaft, servicing

Important notes

A distinction is made between two driveshafts:

- Driveshaft made of steel
- Driveshaft made of carbon fiber

Only carbon fiber driveshafts were installed up to November 1997.

Only steel driveshafts were installed from November 1997.

If the driveshaft is replaced, make sure a driveshaft with the same part number is installed. A carbon fiber driveshaft must not be replaced by a steel driveshaft and vice versa !

39-74

Specific notes for carbon fiber driveshafts:

WARNING!

Driveshaft made of carbon fiber

- ***do not impact / do not hit***
- ***do not drop***

If the surface is damaged, driveshaft must be replaced

Do not bend the driveshaft, maximum permissible bending angle is 25 °. Otherwise the universal joint may be damaged.

Only store and move driveshaft fully extended.

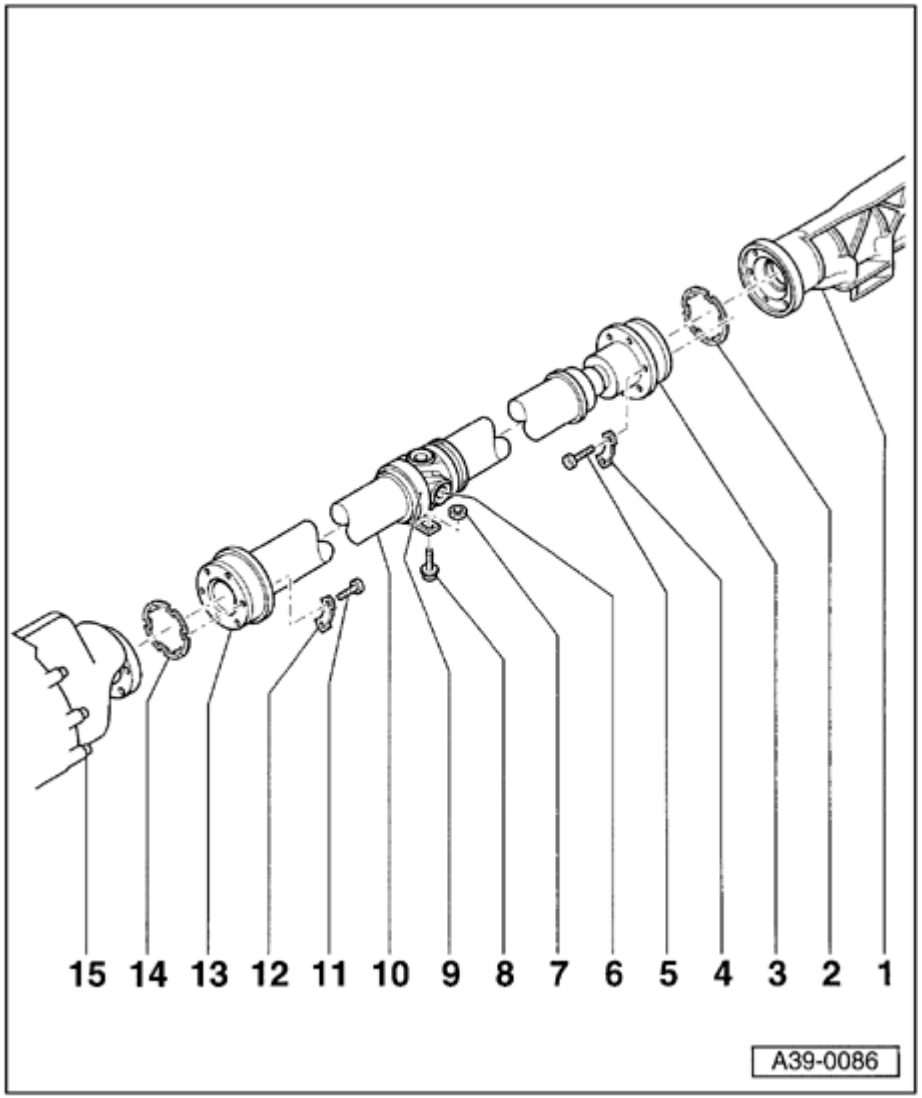
39-75

Notes for all driveshafts:

- *General repair notes ⇒ page 00-27 .*
- *Do not bend the driveshaft, maximum permissible bending angle is 25 °. Otherwise the universal joint may be damaged.*
- *Only store and move driveshaft fully extended.*
- *No repair work can be performed on the driveshaft with the exception of removing and installing and adjustment work.*
- *If the driveshaft is only detached at the transmission or from rear final drive, it must be tied up or supported at the constant velocity joints.*
- *Before removing, mark position from joint to flange. Reinstall in identical position otherwise imbalance will be too high which could result in damage to the bearing or in vibration noises.*
- *If there are complaints (noises, vibrations) it is essential to check whether correct adjustment of the driveshaft eliminates the symptoms before the driveshaft is replaced.*

- *After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and bolt head may not be reinstalled.*

39-76



1 - Rear final drive

2 - Gasket

- Always replace
- Remove protective film and attach self-locking side of gasket to drive flange.
- Degrease drive flange

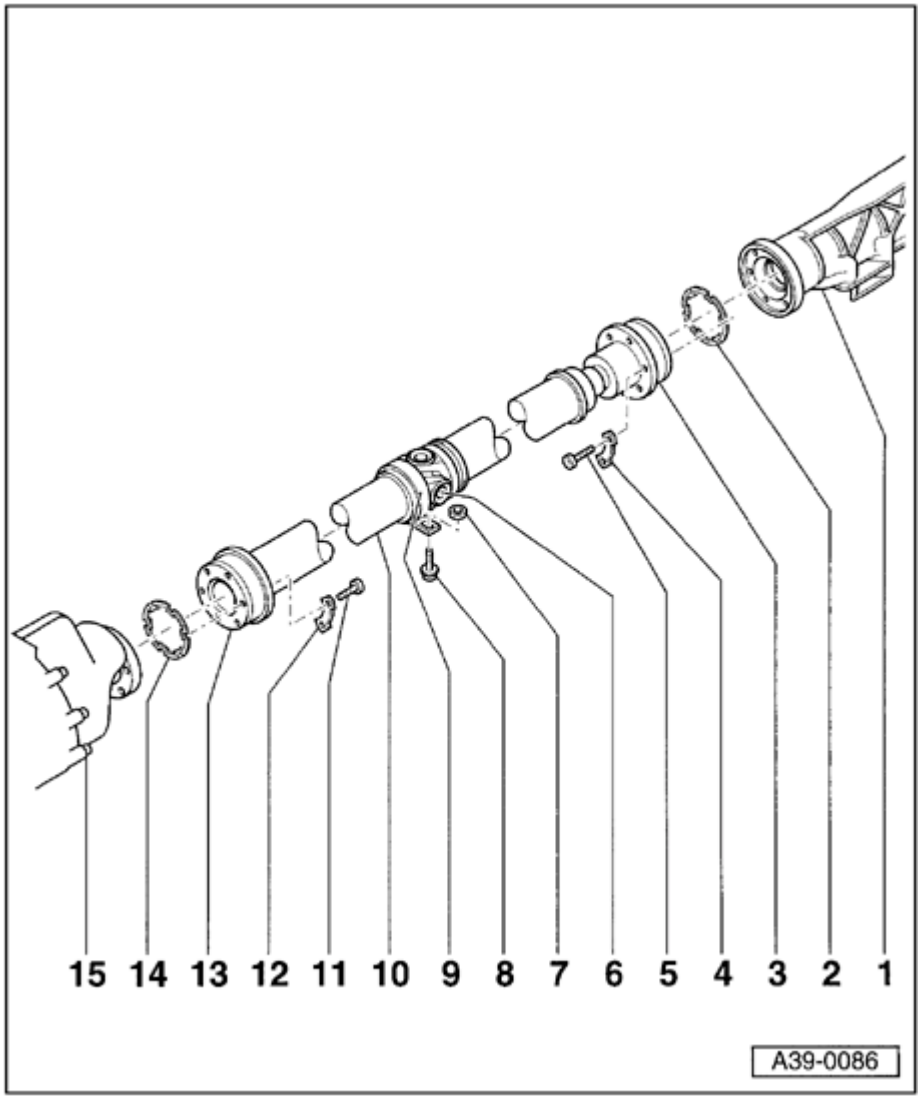
3 - Constant velocity joint

- Maximum permissible bending angle 8 °

4 - Backing plate

5 - Socket head bolt - 55 Nm

- Self-locking
- Always replace
- Always clean threaded holes for drive flange bolts (e.g. with thread cutter)



6 - Universal joint

- Maximum permissible bending angle 25 °

7 - Adjustment shim

- Determine thickness ⇒ page 39-90

8 - Hex-bolt - 23 Nm

9 - Center driveshaft bearing

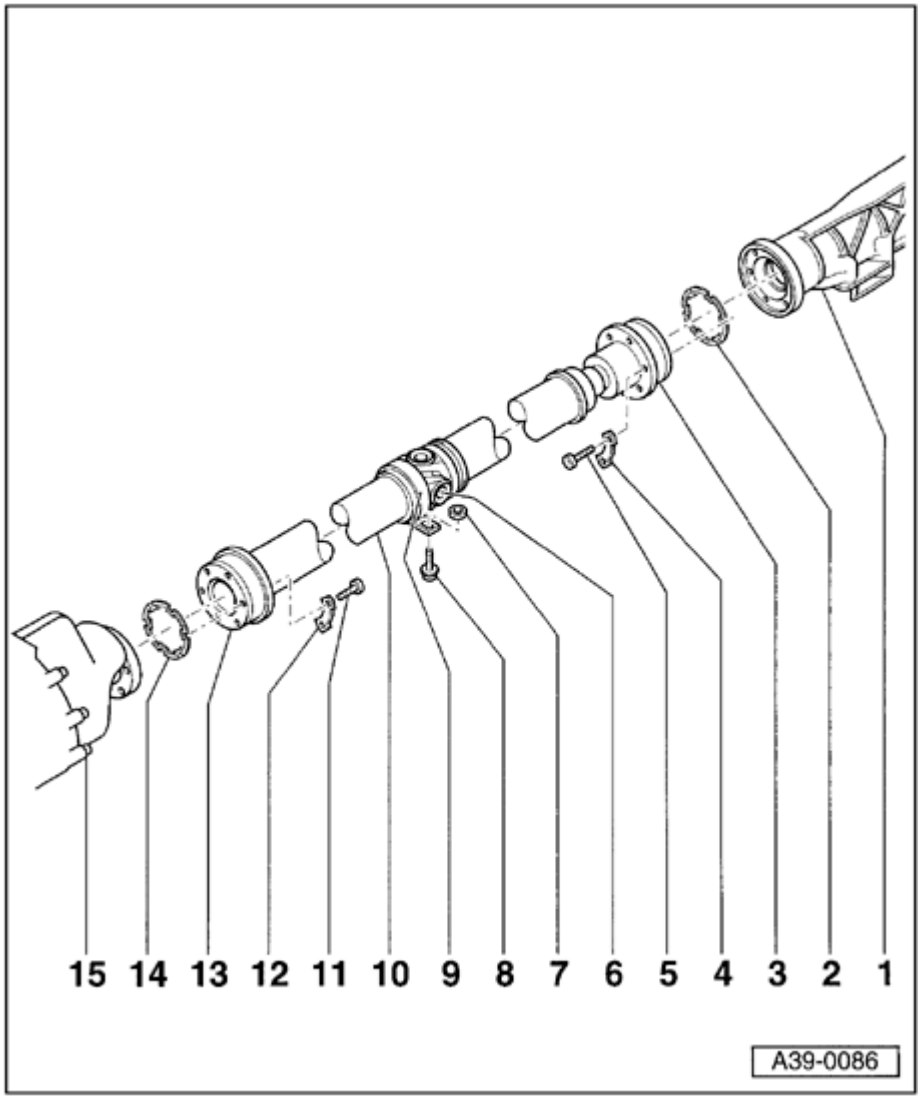
10 - Driveshaft

- Adjusting ⇒ page 39-88

11 - Socket head bolt - 55 Nm

- Self-locking
- Always replace
- Always clean threaded holes for drive flange bolts (e.g. with thread cutter)

39-78



12 - Backing plate

13 - Constant velocity joint

- Maximum permissible bending angle 8 °

14 - Gasket

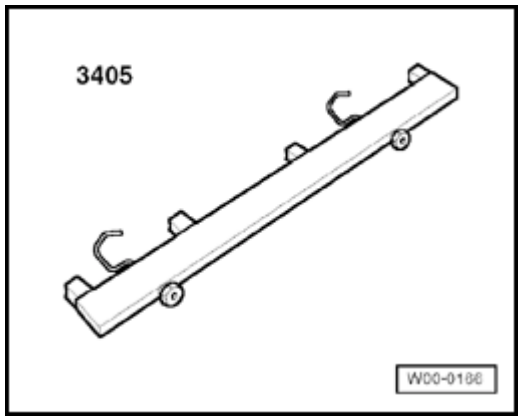
- Always replace
- Remove protective film and attach self-locking side of gasket to drive flange.
- Degrease drive flange

15 - Transmission

39-79

Driveshaft, removing and installing

Special tools and equipment



- 3405 alignment fixture

Removing

- Observe important notes ⇒ page 39-73
- Remove crossmember below exhaust system if installed.
- Remove front exhaust pipes:

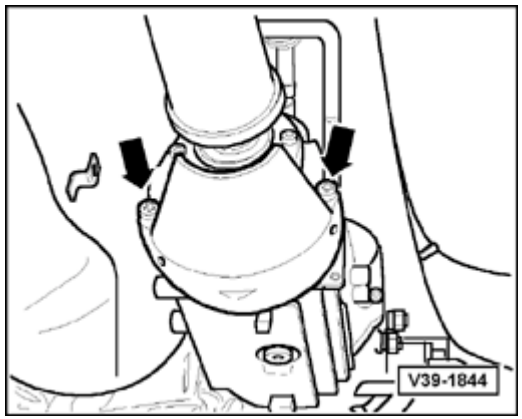
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove rear part of exhaust system starting at clamp to gain access to the driveshaft:

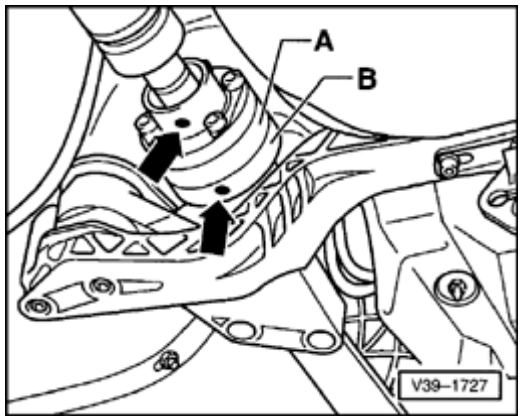
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

39-80

- Remove heat shields above driveshaft.



- Unbolt heat shield for driveshaft from cover for Torsen differential (arrows).



- Check whether there is a factory marking (colored dot -arrows-) on driveshaft and at flange/driveshaft at rear final drive. If not, mark location of driveshaft flange -A- to rear final drive -B- with color.

Note:

Only mark location, if same driveshaft is going to be reinstalled.

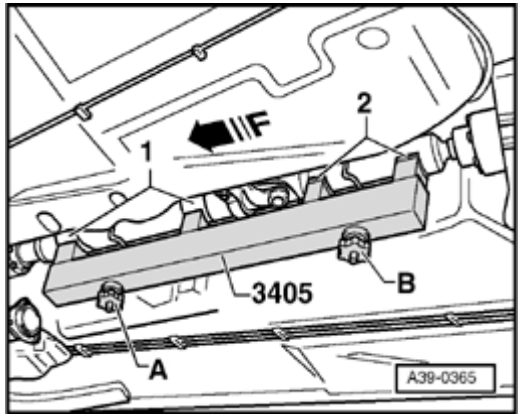
39-81

- Remove mounting bolts for both driveshaft flanges.

- Remove upper three mounting bolts for each driveshaft constant velocity joint.

- Back off mounting bolts for center support slightly.

Only for carbon fiber driveshafts:



- Place spacer pieces -2- onto 3405 alignment fixture (distance dimension = 10 mm).

Spacer pieces are attached to 3405 alignment fixture via a chain.

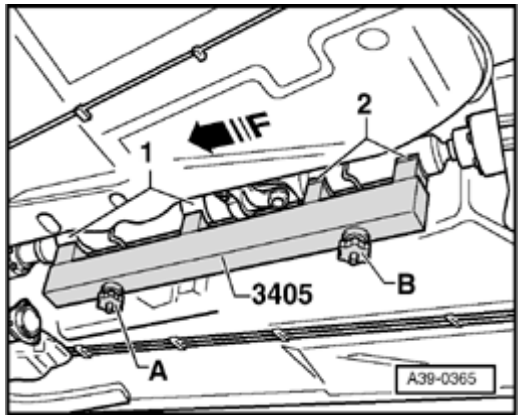
Arrow -A- points in direction of travel.

- Using spacer pieces -2-, hook in 3405 alignment fixture according to illustration.

WARNING!

Assembly tool must rest on both steel rings -1- before tightening plastic nut -A-. If that is not the case, the surface of the carbon fiber driveshaft can be damaged and must be replaced see Important notes ⇒ ***Page 39-74***

39-82

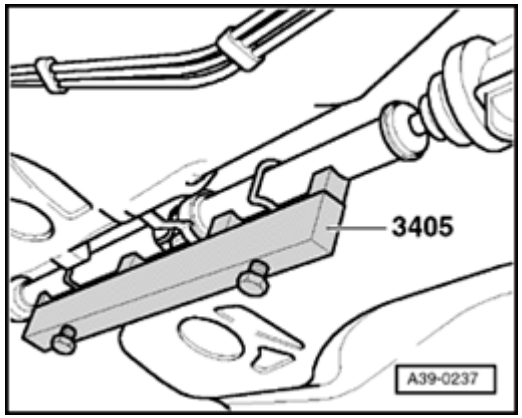


- Carefully tighten plastic nuts -A- and -B-.

Note:

Never set alignment fixture on balance plates.

For all driveshafts except for carbon fiber driveshafts:



- Attach 3405 alignment fixture and tighten plastic nuts.

Note:

Never set alignment fixture on balance plates.

For all driveshafts, also for carbon fiber driveshafts:

- Remove mounting bolts for flanges to transmission and to rear final drive as well as mounting bolts of center support.
- Push driveshaft to rear final drive together. The constant velocity joints can be adjusted axially.
- Guide driveshaft out of transmission flange using assembly tool.

Note:

Only store and move driveshaft fully extended.

39-83

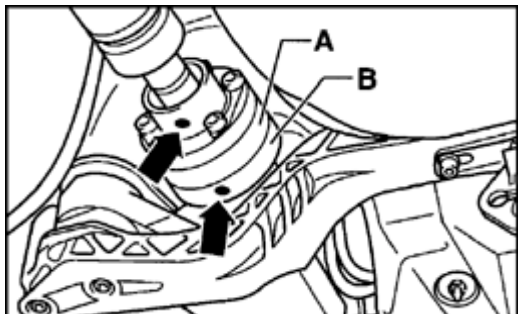
Installing

Installation is reverse of removal, noting the following:

- Observe important notes ⇒ page 39-73

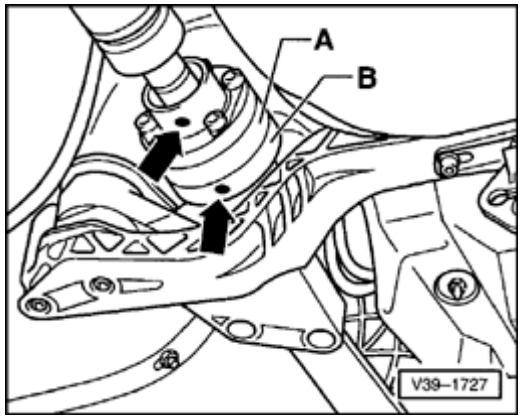
Notes:

- *After removing driveshaft, always remove any remaining locking fluid from thread holes in the transmission drive flanges and the rear final drive. Otherwise there is a possibility that the new bolts may get jammed when installed and shear when removed.*
- *Cleaning can be performed with a tap.*
- *Replace gaskets on drive flanges (remove protective film and attach gasket to drive flanges). Adhesive surface must be free of grease.*



- *To prevent imbalance, driveshaft flanges -A- and rear final drive flanges -B- must be installed so that the factory color markings or markings which were made afterward are aligned (arrows).*

39-84



- *If a new driveshaft is installed and the factory color marking on the rear final drive flange is no longer visible, check radial run out at flange/driveshaft ⇒ page 39-86 and adjust color marking at driveshaft to new marking at flange.*
- *After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and bolt head may not be reinstalled.*
- *Replace driveshaft bolts (self-locking).*

- Adjust driveshaft after installing ⇒ page 39-88 .
- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

39-85

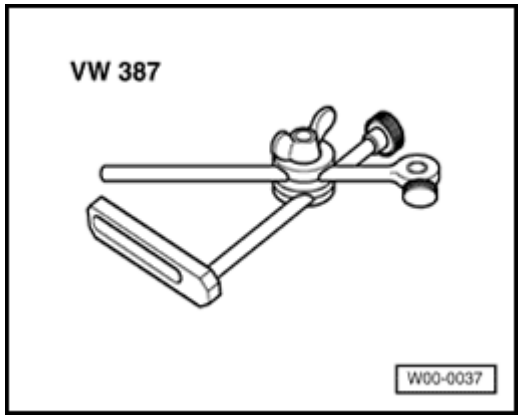
Tightening torques

Component	Nm
Driveshaft to transmission (Output flange)	55
Driveshaft to final drive (Input flange)	55
Center driveshaft support to body	23
Heat shield for driveshaft to transmission	23
Crossmember to body	25
Nuts for clamping sleeve	40

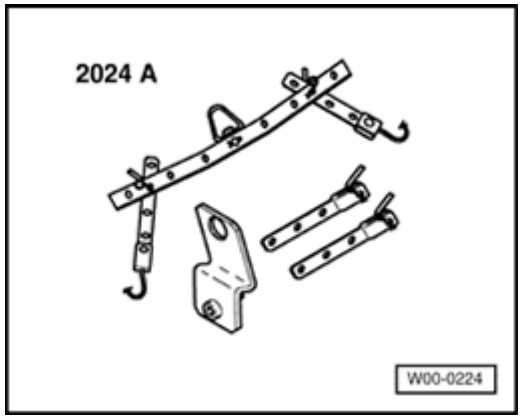
39-86

Radial play at driveshaft flange, measuring and marking

Special tools and equipment



- VW387 dial gauge holder



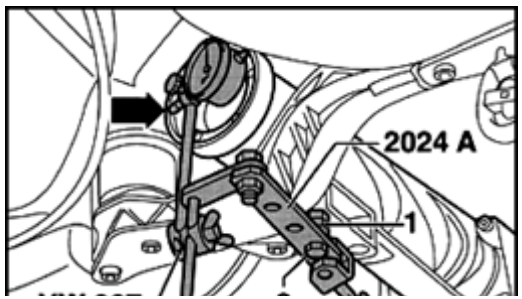
- 2024A Engine Sling
- Dial gage
- Bolt M10 x 85

39-87

Notes:

- *Always measure radial run-out if torque tube has been removed. Make new color marking and remove old color marking.*
- *If a new driveshaft is installed and the color marking on the drive flange of the rear final drive is no longer visible, location of largest radial run-out must be determined and marked with a color marking.*
- *Align this colored dot with colored dot on driveshaft* ⇒ *page 39-83* .
- *Radial run-out can also be measured with the rear final drive installed, for this the driveshaft must be disconnected from the rear final drive. Observe notes* ⇒ *page 39-73* .

- Remove left front bolt at transmission mount for rear final drive.



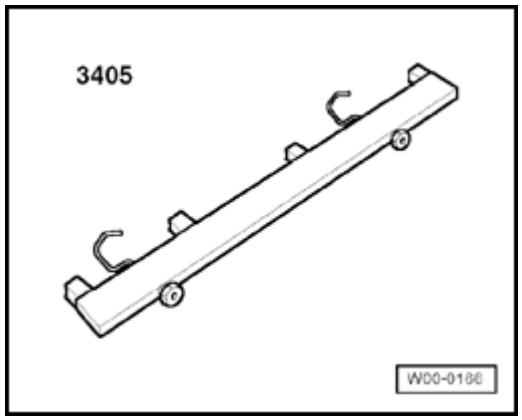
- Remove strap from 2024A engine sling and tighten at empty hole using an M10 x 85 mm -2- bolt. Place 5 M12 nuts -1- under strap.
- Bolt VW387 dial gauge holder to strap in this position.
- Set dial indicator onto ground diameter (arrow) in driveshaft flange and set to "0" with 1 mm preload.

- Turn differential gear via both rear wheels (left and right flanges) at the same time in one direction until drive flange/driveshaft flange has made on complete revolution.
- Mark largest radial run-out on outer edge of flange with colored marking (equivalent to largest distance from turning axis).
- Remove old marking on driveshaft flange.
- Installing driveshaft ⇒ page 39-83 .

39-88

Driveshaft, adjusting

Special tools and equipment



♦ 3405 alignment fixture

- Observe notes ⇒ page 39-73 .

Adjustments must be made very carefully as a poorly adjusted driveshaft is usually the cause of vibrations and humming noises.

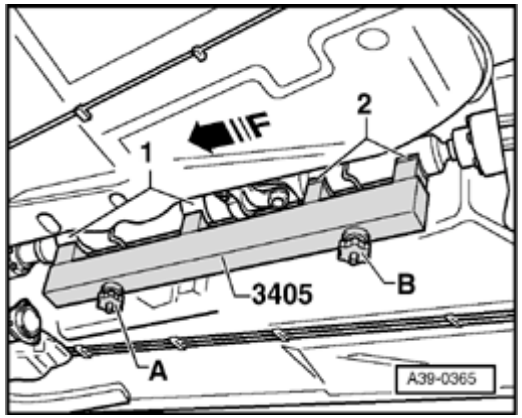
- Remove crossmember below exhaust system if installed.
- Remove rear part of exhaust system starting at clamp to gain access to the driveshaft:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove heat shields above driveshaft.
- Release mounting bolts for center support slightly.

39-89

Only for carbon fiber driveshafts:



- Place spacer pieces -2- onto 3405 alignment fixture (distance dimension = 10 mm).

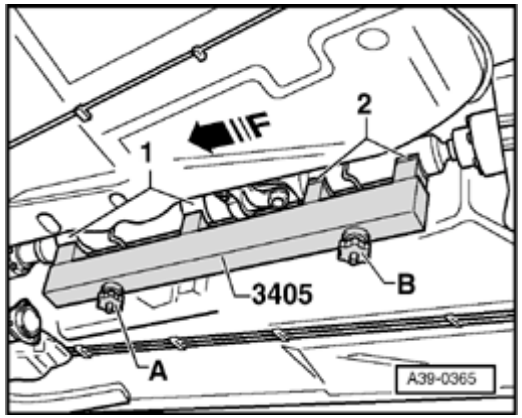
Spacer pieces are attached to 3405 alignment fixture via a chain.

Arrow -A- points in direction of travel.

- Using spacer pieces -2-, hook in 3405 alignment fixture according to illustration.

WARNING!

Assembly tool must rest on both steel rings -1- before tightening plastic nut -A-. If that is not the case, the surface of the carbon fiber driveshaft can be damaged and must be replaced see Important notes ⇒ ***page 39-74***



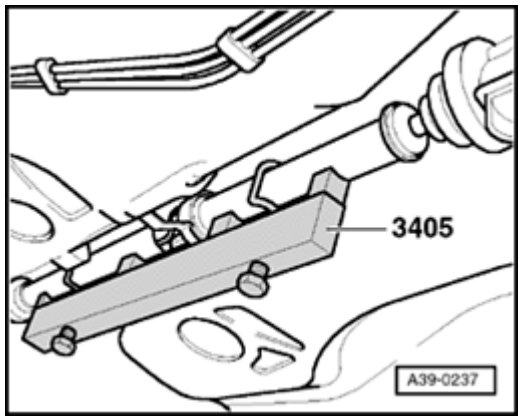
- Carefully tighten plastic nuts -A- and -B-.

Note:

Never set alignment fixture on balance plates.

39-90

For all driveshafts except for carbon fiber driveshafts:



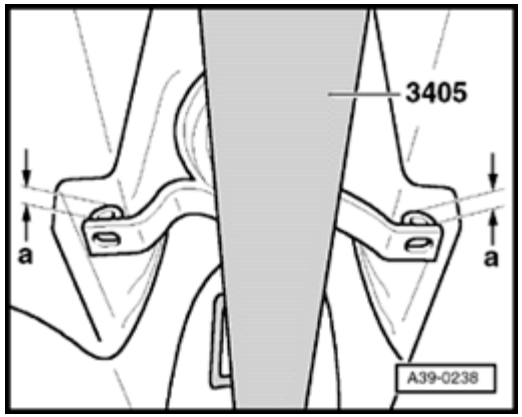
- Attach 3405 alignment fixture and tighten plastic nuts.

Note:

Never set alignment fixture on balance plates.

For all driveshafts, also for carbon fiber driveshafts:

- Remove center support mounting bolts and adjustment shims.



- Align driveshaft center support so that distance -a- (left side) is equal to distance -a- (right side).
- Measure distances -a-.
- Determine adjustment shims according to table. Part numbers

⇒ *Parts-catalog*

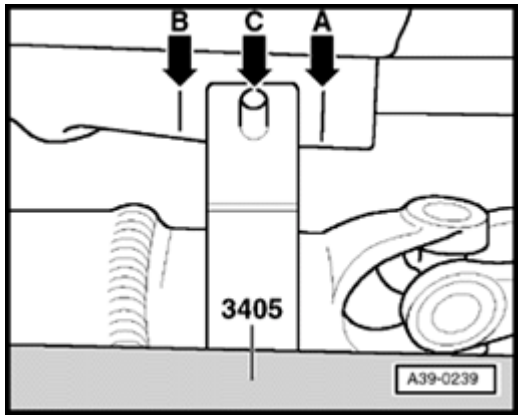
39-91

Available adjustment shims

Distance -a- (mm)	Shim thickness (mm)
0 to 3.0	-
3.1 to 5.0	2
5.1 to 7.0	4
7.1 to 9.0	6
9.1 to 11.0	8
11.1 to 13.0	10

- Install left and right shims determined from table.

39-92



Centering driveshaft lengthwise

- Slide driveshaft with alignment fixture toward rear to stop.
- Mark position of center support on body (arrow A).
- Slide driveshaft with alignment fixture toward front to stop.
- Mark position of center support on body -(arrow B).
- Center driveshaft (arrow C):
  - ♦ Center support must be centered between markings -A- and -B-.
- Install mounting bolts for driveshaft center support and the pre-determined shims and tighten.
- Remove alignment fixture.
- Install heat shield above driveshaft.

39-93

Installation is reverse of removal, noting the following:

- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

Tightening torques

Component	Nm
Center driveshaft support to body	23
Crossmember to body	25
Nuts for clamping sleeve	40