PORSCHE

MOTORSPORT

911 GT3 Cup

Technical Handbook, 2009 MY

Foreword

This technical information will give you the possibility to reference data, adjustment values and working procedures and make the maintenance and repair work on the vehicle easier.

We wish you every success with your 911 GT3 Cup

Dr. Ing. h.c. F. Porsche
Aktiengesellschaft
Vertrieb Sonder- und
Rennfahrzeuge

911 GT3 Cup 2009 Model competition car

This car is specifically designed for participation in one-make cup competitions.

For obvious reasons, measurements referring to bodywork dimensions of the production cars cannot be used as reference. Porsche accepts no guarantee that the vehicle conforms to the regulations.

The car can not be registered for road use and does not comply with German road traffic regulations.

Illustrations, descriptions and schematic drawings serve exclusively as presentation for the text. Porsche Motorsport accepts no liability for the completeness and conformity of the contents of this brochure with respect to the legality of the current regulations.

For guarantee refer to sales contract

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The delivery of parts is made only against payment in cash or cash in advance.

Contents

Safety instructions

Only for Service CD:

To jump directly to a specific chapter click on the appropriate line.

By using the arrow keys on the keyboard it is possible to page through the chapter.

By pressing the “BACK” button at the bottom of every page it is possible to return to the contents page.

General Technical Data

Chassis number: from	WPO ZZZ 99 Z9S 7 98001
Car model:	997 830
Engine model:	M 97/75
Gearbox model:	G 97/ 63
Number of gears:	6

Weight

Dry weight:	approx. 1170 kg
Dry weight Supercup (PCCB)	approx. 1130 kg

Dimensions

Overall length (mm)	4450
Maximum width (mm)	1815
Wheelbase (mm)	2355
Front track width (mm)	1516
Rear track width (mm)	1561

Engine Technical Data

Engine model	M97/75
Construction	Six-cylinder boxer
Type of cooling	water cooled
Number of cylinders	6
Cylinder bore (mm)	99.98
Stroke (mm)	76.4
Actual cubic capacity	3598 cm^3
Compression ratio	12.0 (- 0.4):1
Maximum power	309 kW / 420 PS
Maximum power at	7500 r.p.m.
Maximum torque	410 Nm
Maximum torque at	6500 r.p.m.
Maximum engine revs in 1^{st} to 6^{th} gears	8400 r.p.m.

Fuel:

98 octane unleaded

Engine oil:

8.3 l Mobil 1 (0W - 40)

In case the oil filter is not replaced during an oil change the engine should be filled with 8.1 l oil.

Valve timing

Inlet valve diameter (mm)	41
Inlet valve lift (mm)	12.5
Exhaust valve diameter (mm)	35.5
Exhaust valve lift (mm)	11.1
Maximum inlet valve lift	105° after TDC
Maximum exhaust valve lift	115° before TDC

Camshaft adjustment:

Set the camshaft timing with the camshaft timing and adjustment tools.

Camshafts:

Inlet valve camshaft:Engine M 97/75 race component
Exhaust valve camshaft 911 GT3 RS

Camshaft housing:

Engine M 97/75 modified 911 GT3 RS production component

Piston/cylinder:

Piston clearance 0.02 – 0.05 mm

Crankcase:

Crankshaft: The two-piece aluminium alloy crankcase is a production 911 GT3 RS component. The forged crankshaft has 8 bearings.

Crankshaft bearings:

The crankshaft bearings are the same as those used in the 911GT3 RS engine.

Notice:
The term 911 GT 3 RS refers to the production car version.

Connecting rod:

Because the connecting rods have a shot peened surface care must be taken that no visible damage occurs when removing or fitting. The connecting rod must not be polished.

Connecting rod bolts:

Attention: The connecting rod bolts must always be renewed when the engine is completely overhauled. The surface of the mating faces must not be damaged.

Tightening procedure:

Attention: The threads and mating faces must be lubricated with engine oil.

Initial torque:	30 Nm +/- 10 % (mating torque)
Final torque:	1 x 60° +/- 2° torque angle

Piston:

The light-alloy pistons are 99.95 mm in diameter. The position of the inlet valve pocket should be noted when fitting the piston. The underside of the piston crown is cooled by sprayed oil. The weight difference between all the piston/connecting rod assemblies must not be greater than 5 grams.

Cylinder:

The cylinders are manufactured from a high-strength light-alloy with Nicasil coating and have a bore of 99.98 mm.

Cylinder head:

The cylinder head is a GT3 RS production component.

Engine lubrication:

The 911 GT3 Cup engine is fitted with a dry sump lubrication system. The oil tank is mounted to the engine.
An oil/water heat-exchanger is mounted to the engine (production GT3 RS).

Oil level check

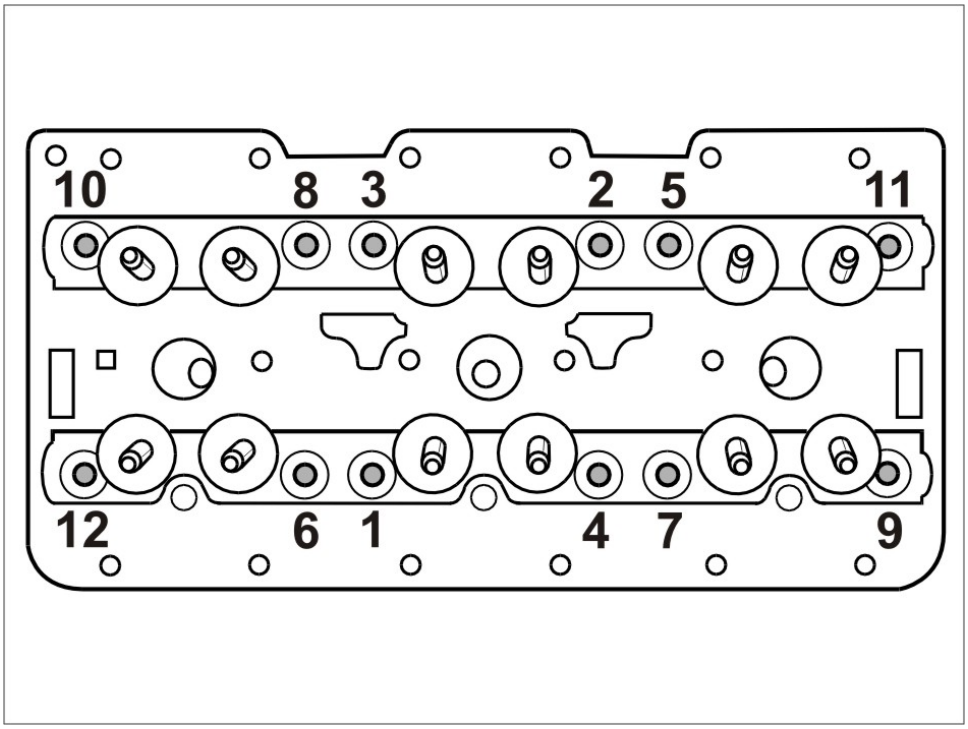
engine runnig on idle 1900+-100 RPM
operating temperature 90°C +-5°C
the ball at the end of the dipstick must be wetted

Cylinder head mounting:

The following procedure must be adhered to when fitting the cylinder head. The nut mounting faces and threads must be lightly oiled when tightening.

1. Initial tightening to 30 Nm in accordance with tightening sequence given below. Wait fifteen minutes before step 2.
2. Completely loosen all the nuts in reverse sequence.
3. Final tightening to 20Nm + 120° torque angle in the tightening sequence given below.

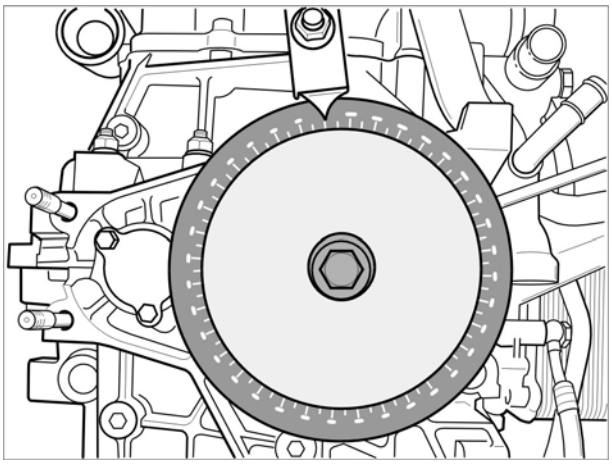
Tightening sequence:



Valve timing

Inlet valve diameter	41 mm
Inlet valve lift	12.5 mm
Exhaust valve	35.5 mm
Exhaust valve lift	11.1mm
Maximum inlet valve lift	105° after TDC
Maximum exhaust valve lift	115° before TDC

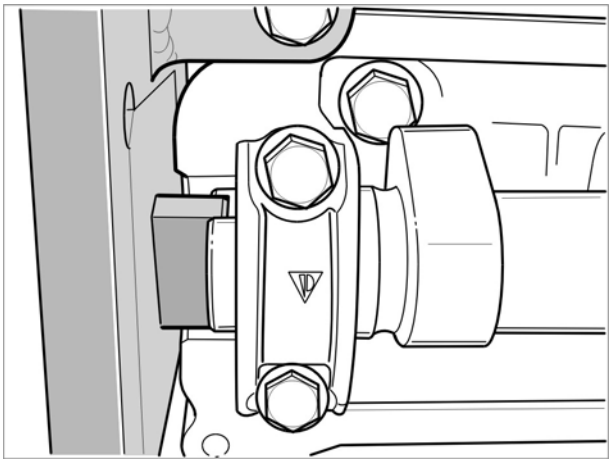
Adjusting the valve timing on the GT3 Cup engine model 2009. Camshaft opening lead/closing lag (105° / 115°) with special tool 000 721 996 10 and accessories.



Description:

Set cylinder number 1 to TDC using a dial gauge indicator

Fit degree wheel 996 450 131 00



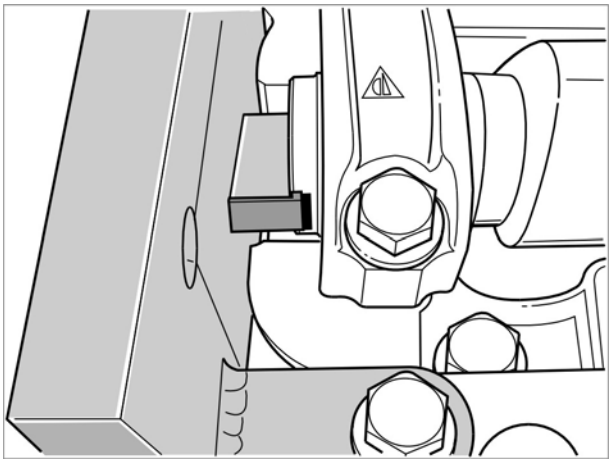
Fit the camshaft 1 - 3 at the TDC exhaust / inlet valve overlap and fix the inlet and exhaust valves with the special tool 000.721.966.10 with inlet special tool 996.450.*****, and exhaust special tool 000.721.*****.

Mount the chain tensioning tool 000.721.940.10.

Tighten camshaft wheels to approximately **30 Nm** torque.

Remove the special tool from the camshaft slits.

Rotate the crankshaft 360°



Fit the camshaft 4 - 6 at TDC exhaust / inlet valve overlap and fix the inlet and exhaust valves with the special tool 000.721.966.10 with inlet special tool 996.450.1*****, and exhaust special tool 000.721.*****.

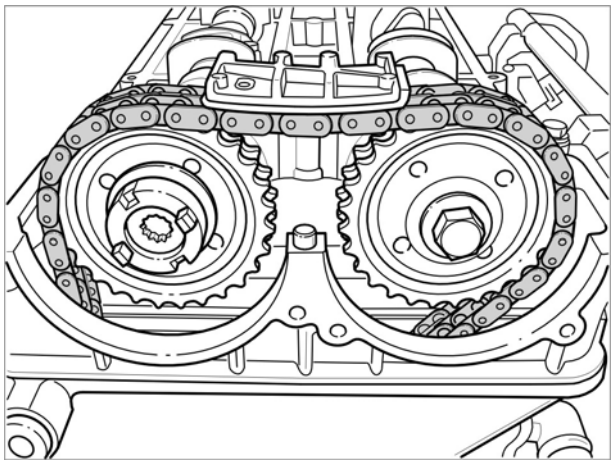
Tighten camshaft wheel to approximately **30 Nm**.

Remove the special tool from the camshaft slits.

Set engine to Cyl 1 TDC exhaust / inlet valve overlap

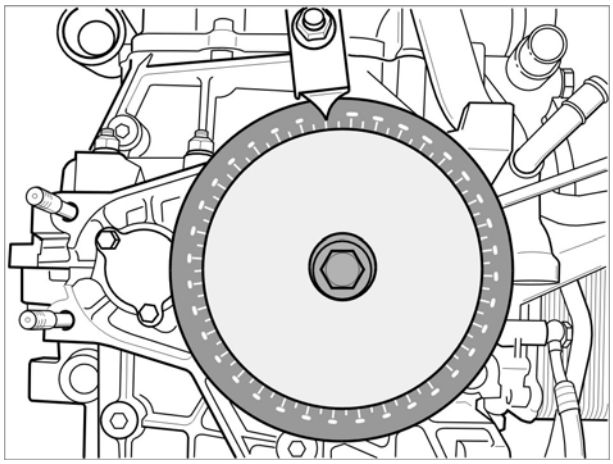
Rotate the engine three turns, and then pretension the chain tension tool to the marks.

Set the cylinder 1 to exhaust / inlet valve overlap TDC.
Fit the special tool and, if necessary, correct the camshaft position.
After tighten the timing chain sprockets as instructed
30 Nm + 90° torque angle.



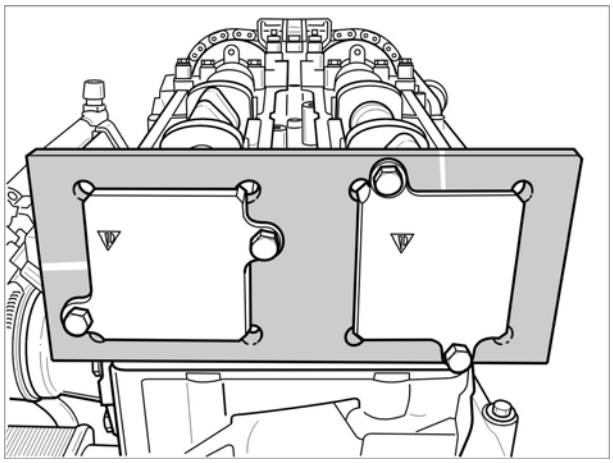
Rotate the crankshaft 360°

Set the cylinder 4 to exhaust / inlet valve overlap TDC.
Fit the special tool and, if necessary, correct the camshaft position.
After tighten the timing chain sprockets as instructed
30 Nm + 90° torque angle.



Attention:

Remove camshaft block before tightening.
When tightening hold the camshaft pulleys with special tool 00072196531.



Setting jig	000.721.966.10
Retaining spring, exhaust side	000.721.966.12
Retaining spring inlet side cylinder 1 – 3	996.450.*****
Retaining spring inlet side cylinder 4 – 6	996.450.*****

Valves:

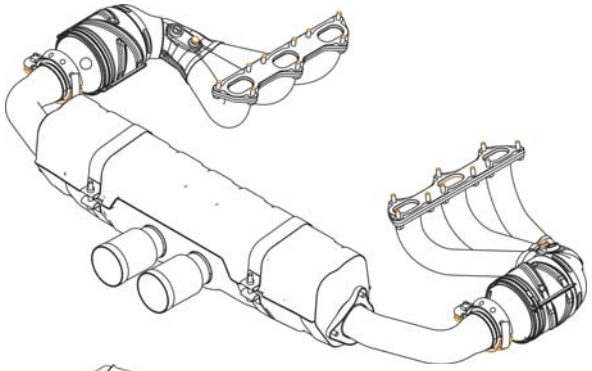
The exhaust valves are sodium filled standard GT3 production specification.

Exhaust system:

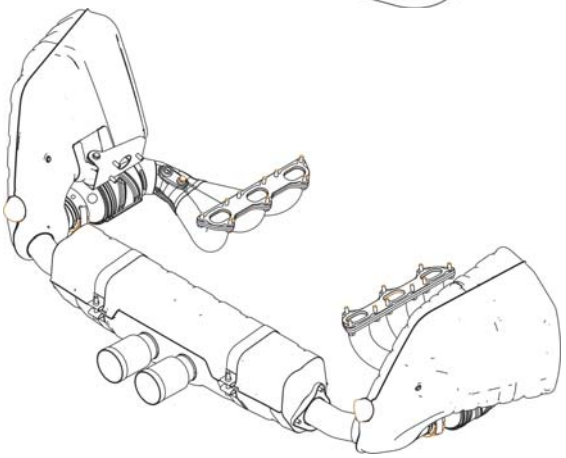
Exhaust system with cat-manifold (integrated catalytic converte) and silencer.

Noise emissions are subject to country specific regulations.

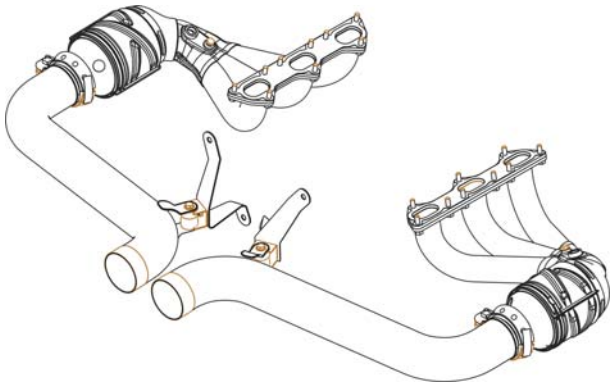
Delivery version without presilencer



Delivery version including presilencer



Supercup version



Engine cooling:

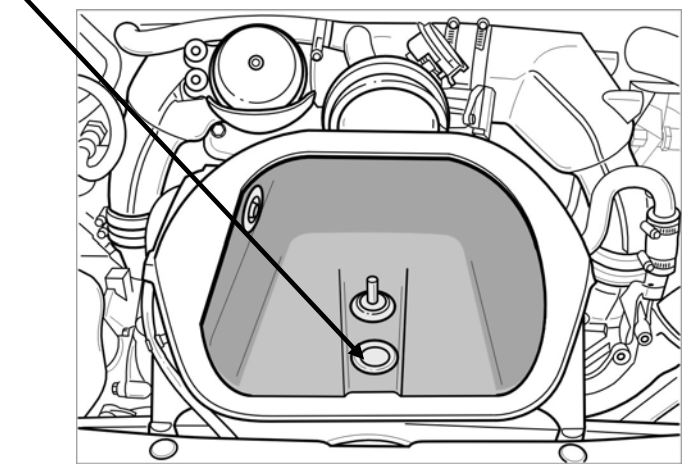
The engine cooling is made by a water/oil heat-exchanger fitted to the water cooling system.

Induction system:

Multi-stage – resonance – induction channel
Central air intake plenum
Replaceable air filter in boot lid

Attention:

The rubber sleeve in the connecting part must be removed when racing in the rain.



Air filter element:

Attention:

Do not clean the air filter element with high-pressure.

Carefully remove the air filter element

Place the filter in a suitable water filled container.

Allow the filter to dry (without air pressure or hot air gun)

Afterwards impregnate the filter with filter oil spray.

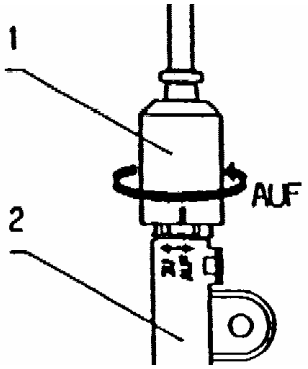
Throttle cable adjustment:

The throttle cable adjustment is made on the connecting part

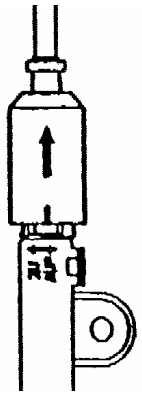
The two throttle cables are joined with the connecting piece in the cockpit behind the drivers' seat. This connection part removes the play from the cables by means of a spring. The adjustment of the connection part is carried out as described in step 1.

The throttle cable adjustment is made in 3 steps:

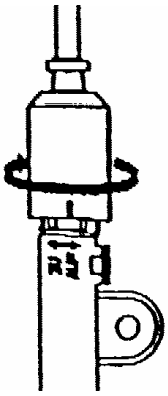
Tension free setting of throttle cable:
Unscrew the quick adjustment cap (1) to the thread stop.



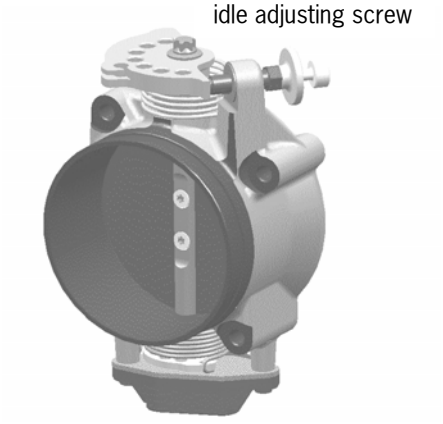
The spring force automatically removes the play from both cables.



Tighten the screw cap (1) until it clicks clearly into place. In the closed position, the marking on the screw cap must cover the marking 'Zu' on the connection piece (2).

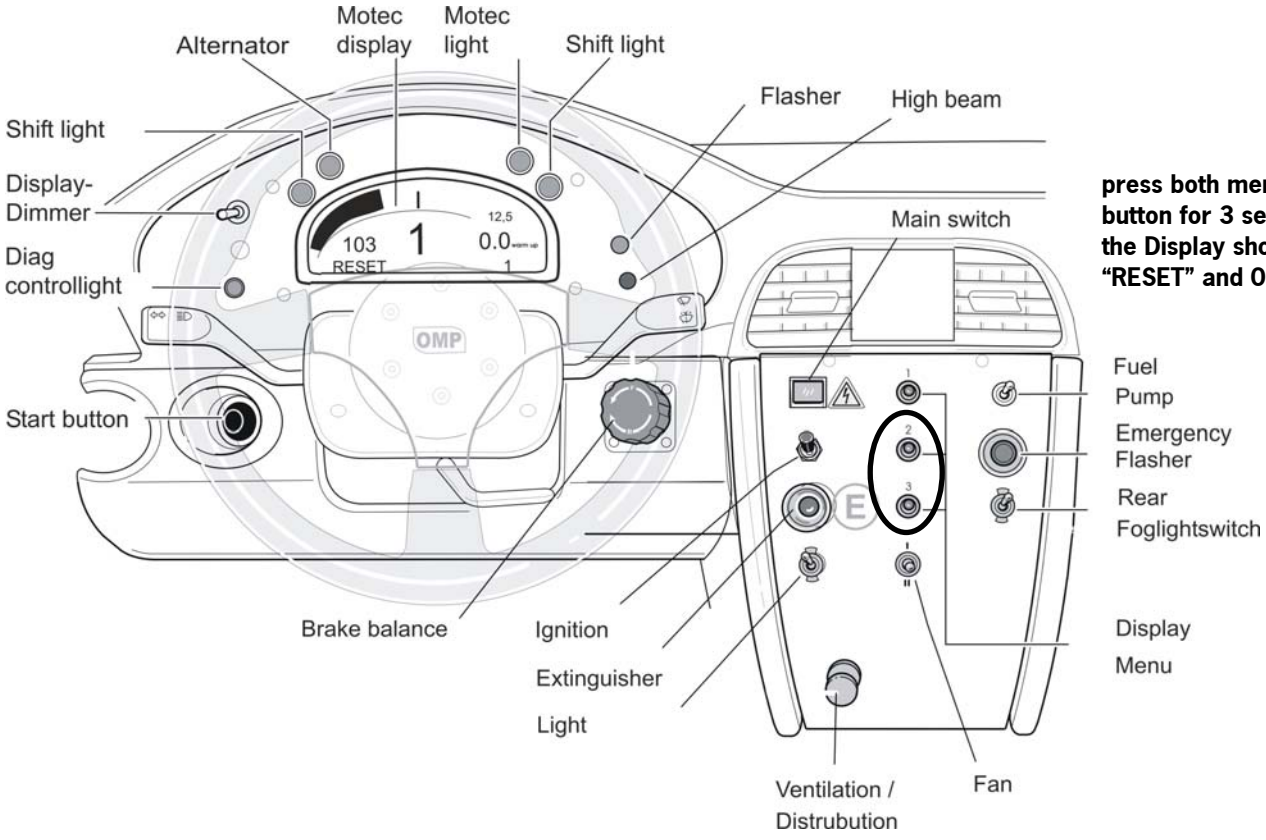


Re-setting the throttle



Re-setting the throttle is always necessary if the ECU or the throttle sensor were changed or replaced.

- Disconnect throttle cable
- Rotate the knurled screw (idle adjustment screw) anti-clockwise till a gap is visible between the cam-disc and the idle adjustment screw (throttle completely closed).
- select warm up mode in MoTeC display
- press both menu button for 3 sec
- the Display show you “RESET” and 0,0
- Open throttle 6,5% with the idle adjustment screw (refer to MoTeC display).
- Lock idle adjustment screw
- Connect throttle cable
- heck full throttle (refer to MoTeC display 100%



press both menu button for 3 sec. the Display show you “RESET” and 0.0

Engine component tightening torques

All component tightening torques listed are given in Newton metres. Please ensure that your torque wrench is calibrated correctly!

Crankshaft and crankcase:

Connecting rod			
(see section connecting rod)	M10 x 1.25	30Nm	+60°
Oil pump	M8	23	
Crankcase studs	M10 x 1.25	50	
Crankcase nuts & bolts	M8	23	

Flywheel to crankshaft

By a running flywheel:

Release screws

Exchange through new screws ET Nr. 930.102.206.00

Tighten new screws over cross with 30 Nm

Retighten screw with 30 Nm and tighten with 45° swing angle over cross

By a new flywheel:

Erect Flywheel with used screws as above described

Exchange old screws through new screws ET Nr. 930.102.206.00

Tighten new screws over cross with 30 Nm

Retighten screw with 30 Nm and tighten with 45° swing angle over cross

V-belt pulley to crankshaft	M14 x 1.5	170
Plug screw for pressure release valve	M18 x 1.5	40
Crankcase oil drain screw	M20 x 1.5	50

Cylinder head and valve train:

The exact procedure for tightening the cylinder head bolts is described in the section 'Cylinder head'.

Camshaft housing on cylinder head

Initial torque	M8	23
Final torque	M8	28
Knock sensor on cylinder casting	M8	23
Spark plugs	M12 x 1.25	20

Attention: The spark plugs should be tightened a maximum of 5 times.

Camshaft pulley to camshaft	M12 x 1.5	30 +90°
Timing chain case to crankcase		23
Valve cover to camshaft housing	M 6	9.7
Camshaft bearing cap		13

Ancillary components:

Alternator belt pulley		55
Exhaust manifold to cylinder head		23
Lambda sensor	M18 x 1.5	50
Clutch to flywheel	M8 x 45	33

Cooling system maintenance

General information:

The cooling system can be filled, bleed and emptied from a quick release coupling fitted in the bleed line leading from the front mounted side coolers, rearwards to the expansion tank in the engine bay.
The valve in the expansion tank allows the exhaust of steam at a pressure of 1.4 bar (+/- 0.1 bar), and the release of water at a pressure of 1.8 – 2.0 bars.
The bleed valve on the expansion tank fitted to the race car is permanently open.

An electronic cooling system filler specifically suited to the 997 GT3 Cup can be purchased directly from Sobek.

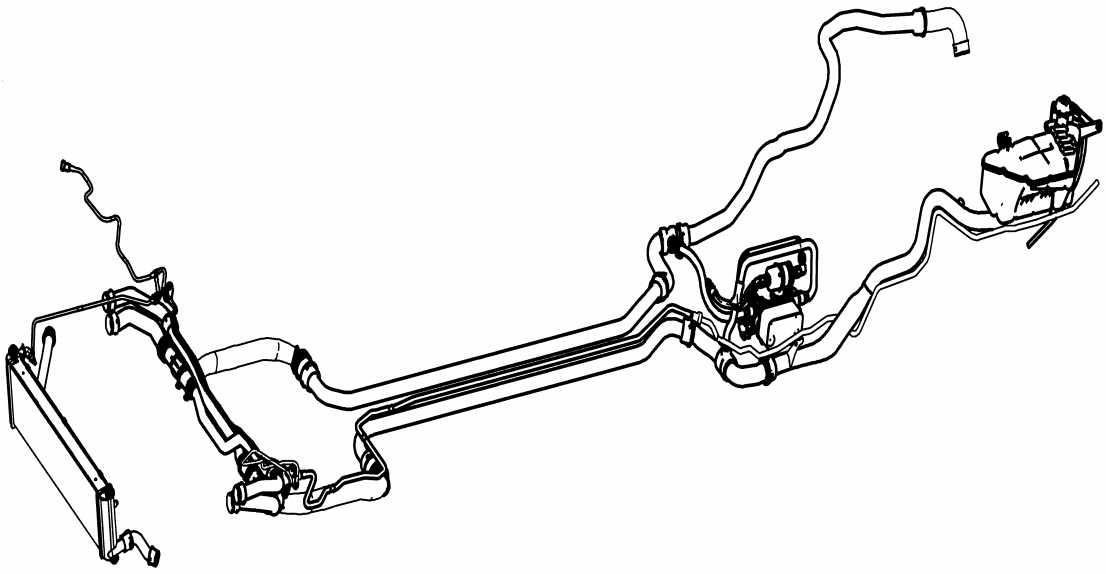
Bernd Sobek - Mattern
Fliederstrasse 10
D - 69517 Gorxheimertal
Tel +49 (0) 6201 2051
Fax +49 (0) 6201 21834
e - mail info@sobek-mattern.de

Filling the cooling system (engine cold) with an electronic filling system

To fill the cooling system when the engine is cold, open the quick release coupling and connect the electronic filling system.

- Switch on the pump and fill the cooling system with the cooling fluid valve open.
- Leave the filling system connected and allow the cooling fluid to circulate through the system to ensure that the cooling system is pre-bled sufficiently.
- Afterwards disconnect the filling system and warm the engine up. If the system level drops, top up the system to the 'max' mark on the expansion tank by connecting the pressure bottle to the closed system.
- Additional information about the electric filling system can be found in the Sobek Technical Information.

911 GT3 Cup (Type 997) cooling system



System volume:

Appr. 22 l.

Mixture delievery state: appr. 11 l of coolant plus appr. 11 l of water

Achtung:

For Formula 1 support races the mixture must be changed as follows:

Appr. 20 l of water plus 2 l corrosion-preventive additive (997.106.907.90)

Clutch

5 ½" 3-plate sintered bronze clutch with central release mechanism

Mounting instructions:

With multi-plate clutches care should be taken that the splined hub is as well aligned as possible with the sintered plates.
(Special alignment tool, Porsche Nr. 996.450.335.90)
Smear the splines lightly with grease and slide the clutch plates along the splined input shaft till the hub moves easily on the shaft. Remove excess grease.
Make sure no grease is smeared on the clutch plates.

Wear:

Sintered clutch plate, new thickness	2.6 mm
Replace clutch plates when minimum thickness is:	2.2 mm

The diaphragm spring clamping force remains constant to this minimum thickness, reduces when minimum thickness exceeded.

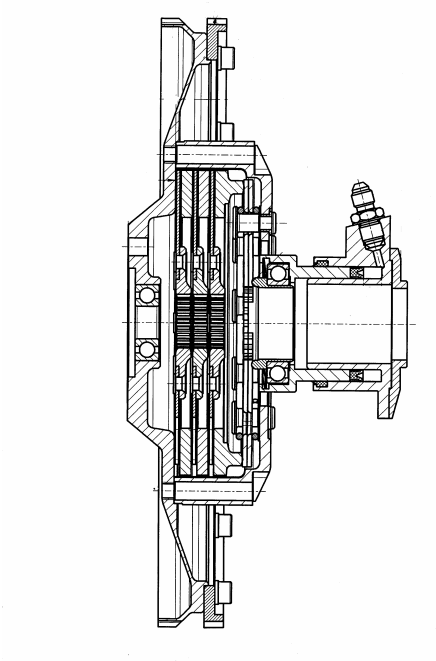
Fluid:

Endless RF - 650 ET No 996.355.960.90

Caution:

If there are several trial starts in one lap, ti can cause a thermal overload and thus the failure of the clutch lead

Assembly diagram:



Gearbox G 97 / 63

The Porsche six-speed sequential gearbox is fitted with a limited slip differential, and oil filter and a water / oil heat-exchanger for cooling purposes. All gear ratio pairs can be changed individually to suit driver preference, engine and the circuit characteristics. The gear pairs are uniquely matched and should never be mixed. If one gear is damaged the gear pair should be discarded.

Only one gear ratio set is allowed in the one-make cup races.

When filling the gearbox with oil for the first time, i.e. when the complete system, including cooler, filter and oil lines are dry, the system capacity is 3.6 litres. Following a gear ratio change only 3.0 litres of oil should be added. The use of Mobil 'Mobilube' SHC gearbox oil is recommended.

Production gear ratio set:

Crown wheel and pinion		8/32
1st gear	12/38	997.302.961.6E
2nd gear	15/32	997.302.962.6C
3rd gear	18/31	997.302.963.7E
4th gear	20/28	997.302.964.7J
5th gear	23/26	997.302.966.7N
6th gear	29/27	997.302.966.7L

Limited slip differential:

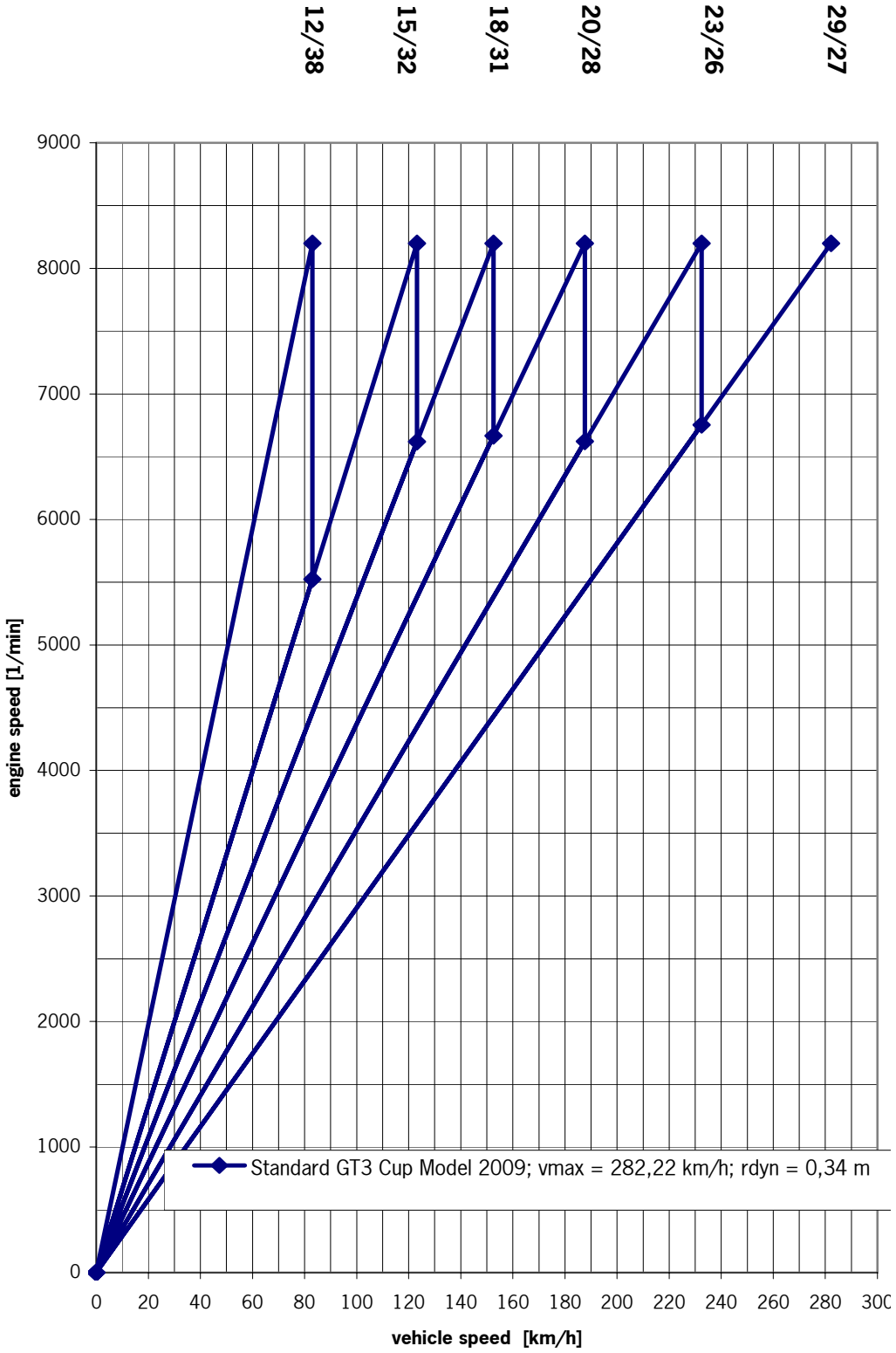
The locking torque of the differential is 40 % (drive) and 60 % (coast) (Dynamic locking value).
The differential lock is checked by means of friction force measurement in which the preload and wear of the clutch plates is checked.

See page 23

Gearbox mounting:

A solid gearbox mount reduces the relative movement of the complete drive train. The result is improved handling particularly during weight transfer due to on/off throttle application. Using the solid gearbox mounting increases the noise level in the cockpit.

Gear ratio chart 911 GT3 Cup Type 997 model 2009



Changing gear:

The car is equipped with a six-speed sequential gearbox, which means that all gears are selected in sequence. Up shifting is made by pulling the gear lever rearwards and down shifting by pushing the gear lever forwards. The shift mechanism is connected to the gearbox by a push/pull shift cable.
A gear lever force sensor is integrated in the gear knob, which activates an ignition cut, and therefore a cut in propulsion, when pulled. This allows full power up shifts to be made.
Attention: It is absolutely necessary to change gear as quickly as possible. Shifting gear too slowly can cause an increase in wear or damage to the dog teeth.
Due to wear, always blip the throttle and use the clutch when down shifting.

Gearbox maintenance:

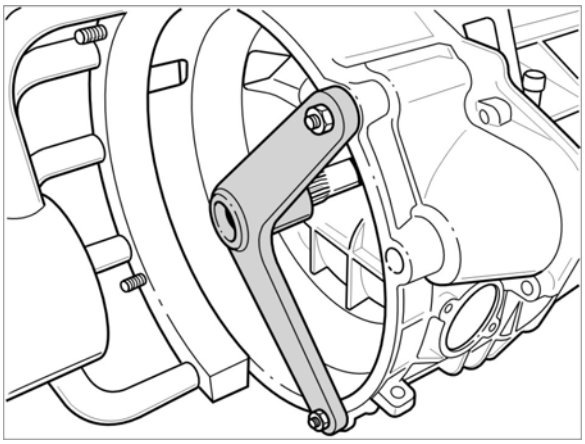
The following work should be carried out after a total running time of **20 hrs sprint races or 30 hrs long distance races:**

- Check four point bearing
- Check bevel gear
- Check dog rings as well as gear sets
- Check gearshift sleeves
- Check shifting drum
- Replace first gear
  (Or even at an earlier date in the case of additional stress like frequent standing starts)

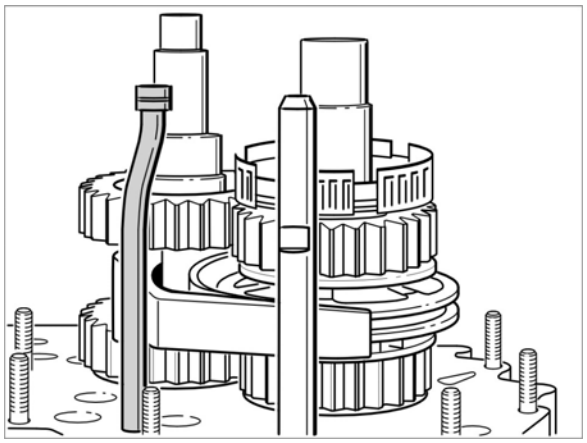
Note: The gearbox disassembly and assembly instructions are described in this brochure. These give you the possibility to replace damaged or worn parts. In the event of more comprehensive damage, which requires the replacement of castings, we recommend that this work is carried out by Porsche Motorsport. Intricate measurement and adjustment work, which is not described in these instructions, is required to ensure that the gearbox works perfectly.

Dismantling the gearbox:

Clamp the input shaft using the special tool

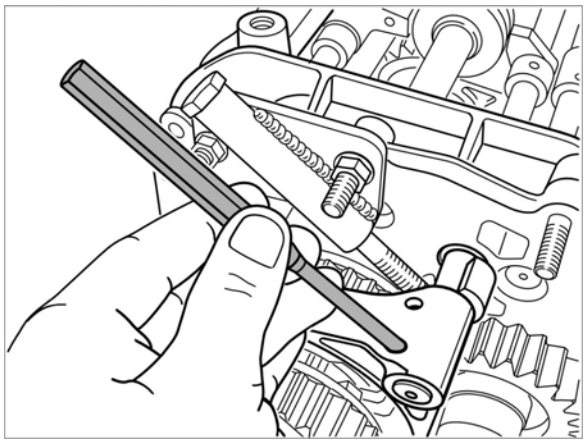


Remove the gearbox cover nuts and then slide off the cover.
Remove the oil pipe retaining screws before pulling out the oil pipe.
Engage 1st gear

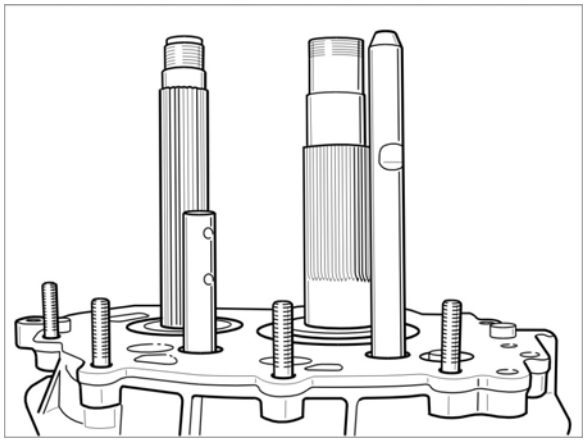


Drive out the 5th / 6th gear selector fork roll-pins with a suitable drift.

Attention: When removing the roll-pins always support the selector fork with special tool 996.450.315.9A.



Remove the collared-nuts from the input and pinion gear shafts.
Remove the reverse gears and rollers bearings.
Remove the 5th and 6th gear ratio wheels, hubs, dog rings and the 5th /6th gear selector fork etc.



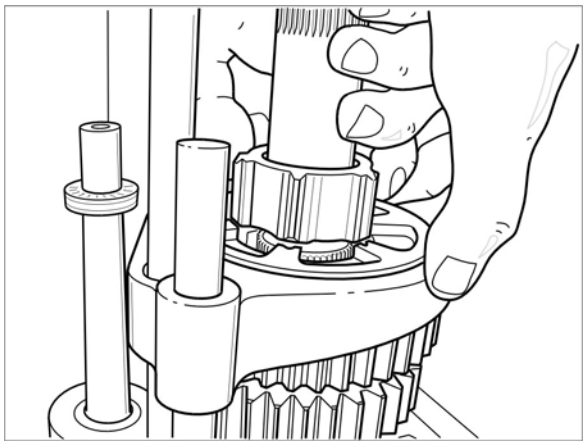
Remove the gear housing nuts and take off the housing.

Remove roller bearing.

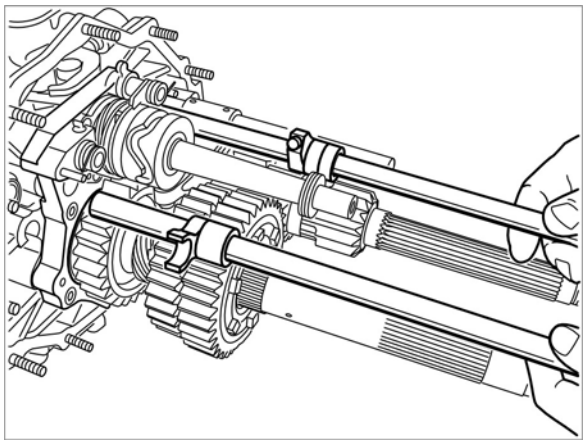
Remove the 1st gear ratio wheel.

Remove the 1st / 2nd gear dog-ring hub.

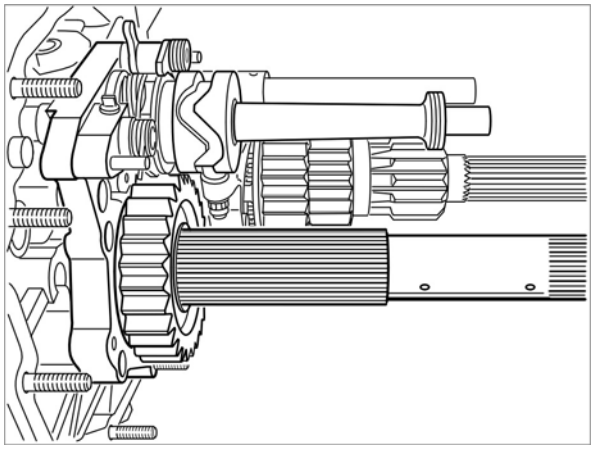
Remove the selector rod including the 1st / 2nd gear selector fork.



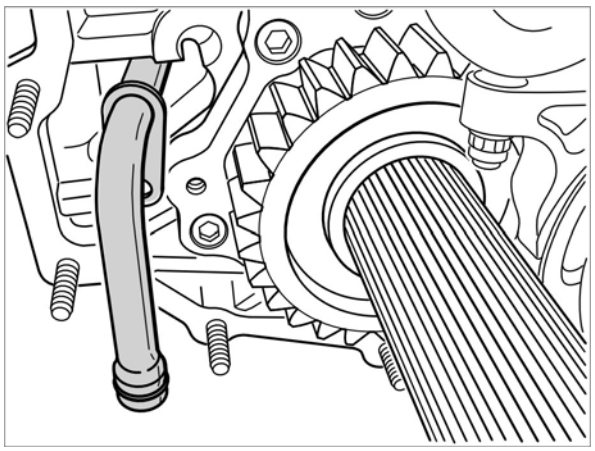
Remove the 5th / 6th gear selector rod and reverse gear.



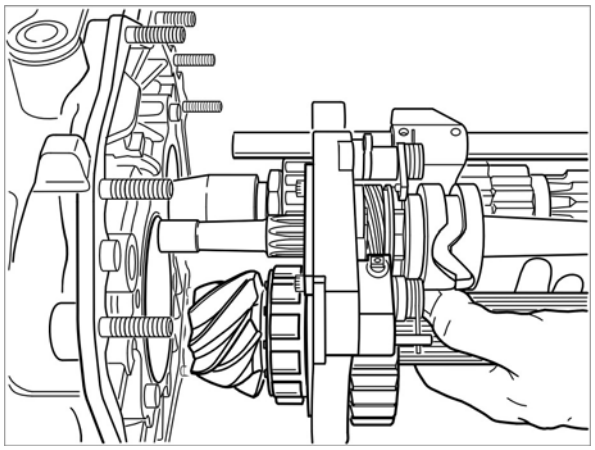
Remove all gear ratios, hubs etc from the pinion gear shaft.



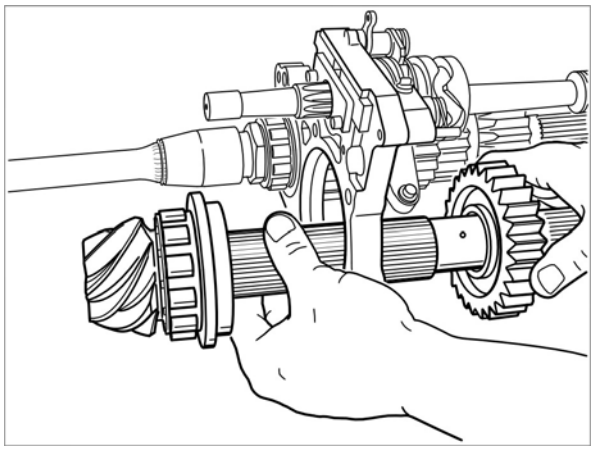
Loosen the oil scavenge pipe and twist to the side.



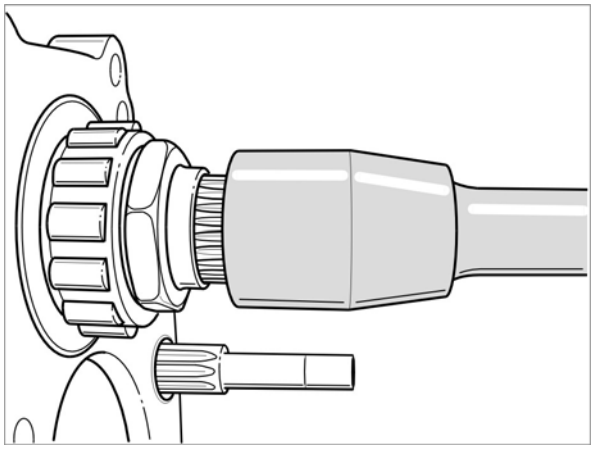
Loosen the mounting plate (7x M8 cap head socket screws) and remove completely.



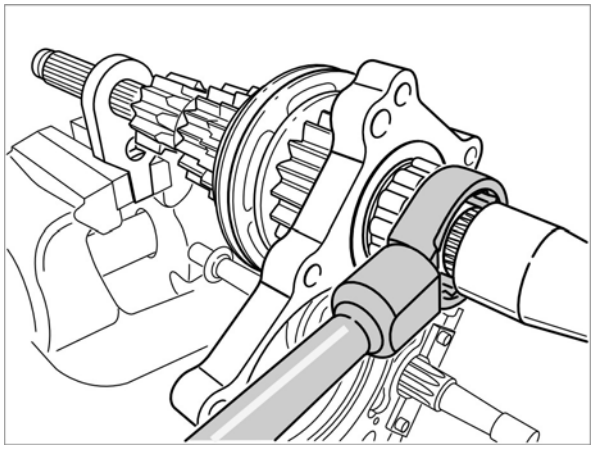
Pull the pinion gear shaft out of the mounting plate.
After the removing the mounting plate, remove the selector rod with the 3rd / 4th gear selector fork.



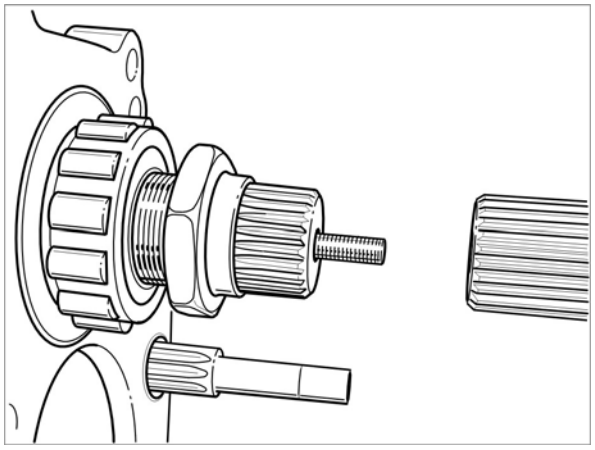
Remove the circlip and sliding sleeve from the input shaft.



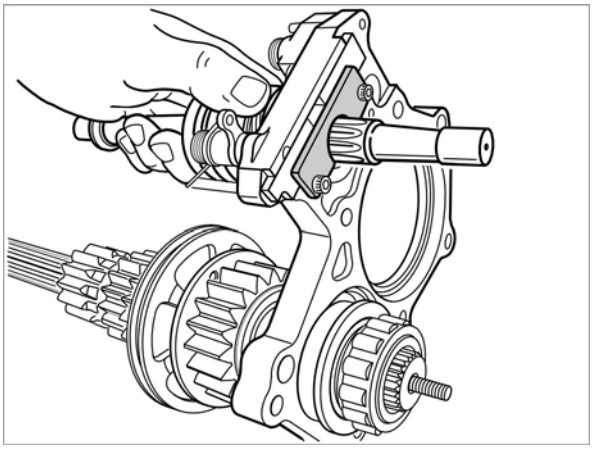
Clamp the input shaft with the special tool and loosen the collared nuts.



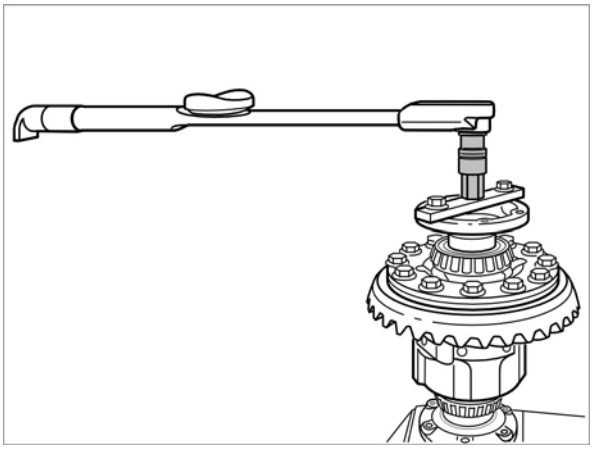
Separate input shaft



Pull the input shaft out of the mounting plate.



Limited slip differential:



The limited slip differential has a basic locking torque of 40% (power) and 60% (braking). (Locking rate dynamic).

Notice:

In the event of repair work being carried out always replace the complete clutch pack.

Change individual plate's is not permitted.

When reassembling the differential smear all the friction faces, pressure plates and the axles with gearbox oil.

To check the basic locking torque, a flange with two bolts should be mounted in a vice; the second flange with the connection piece should be fitted to the differential.

Turn the diff with a torque wrench. A basic torque of between

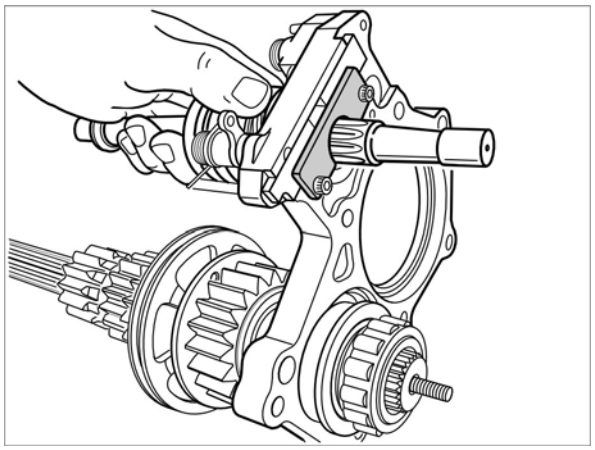
100 Nm and 180 Nm should be achieved.

Gearbox assembly:

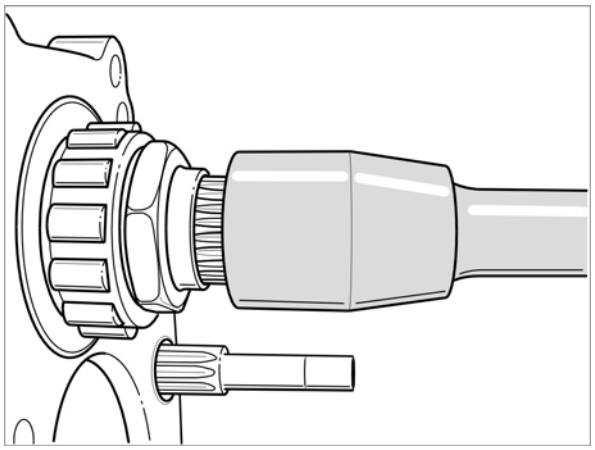
Fit the splined 2nd gear and the 3rd and 4th idler gear wheels etc to the input shaft before pushing the complete shaft through the mounting plate.

Clamp the input shaft using the special tool.

Tighten the collared input shaft nut to 220 Nm.



Bolt together the split input shaft and fit the sliding sleeve and circlip.

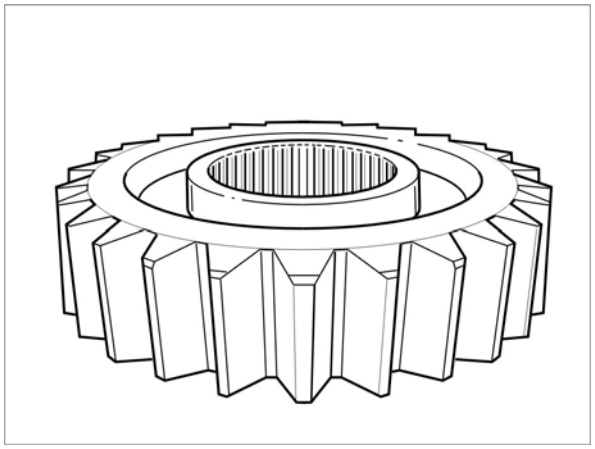


Fit the selector rod with the 3rd / 4th selector fork and push the cam follower into selector barrel track.

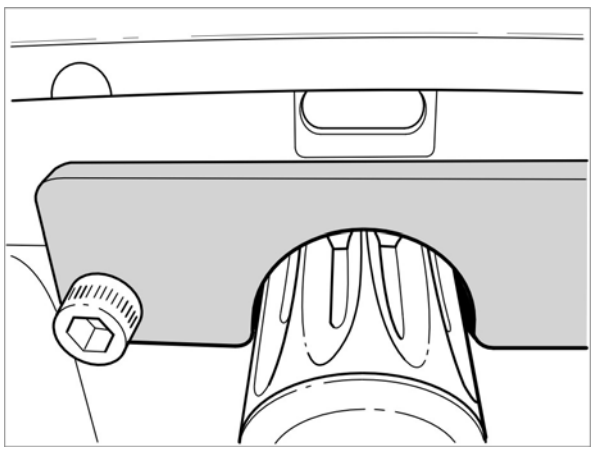
Push the pinion gear shaft into the mounting plate.

Fit the splined 4th gear wheel to the pinion gear shaft.

Attention: The 3rd/4th fixed gear wheel is not symmetrical and must be mounted with the raised surface facing the mounting plate.

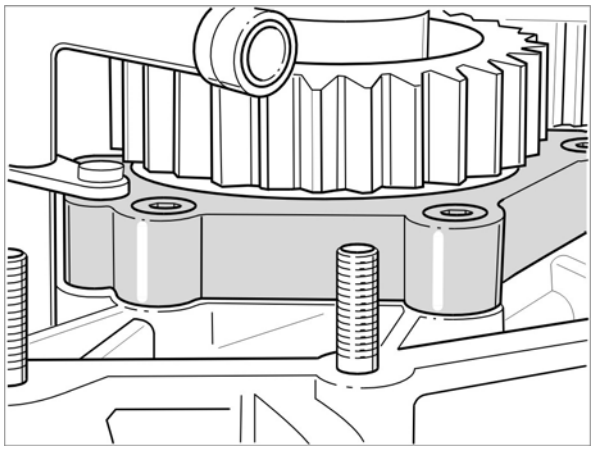


Mount the gear selector barrel-drive in position before fitting the mounting plate.

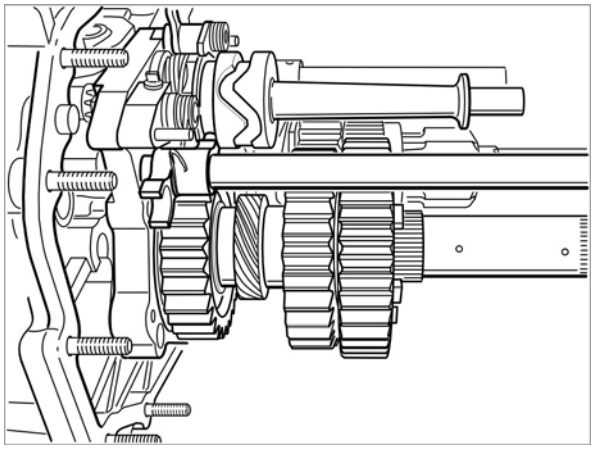


Fit the complete mounting plate to the differential housing and tighten (7x M8 cap head screws). Lightly coat the threads with Loctite 243.

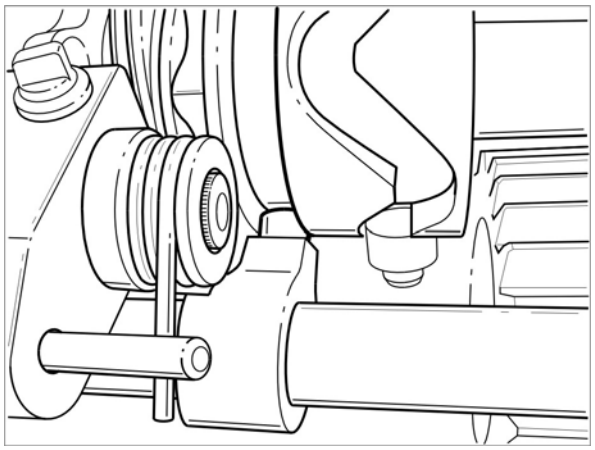
Attention: The gearbox must be positioned vertically before fitting the mounting plate.



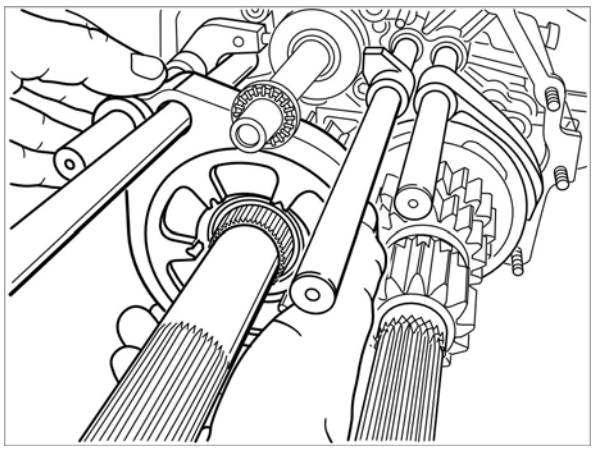
Rotate the selector barrel to the 1st gear position.
Slide the oil pump drive, spacer, 3rd gear, bearing hub, needle roller bearing and 2nd gear to the shaft.



Mount the reverse gear gear-shift rod.

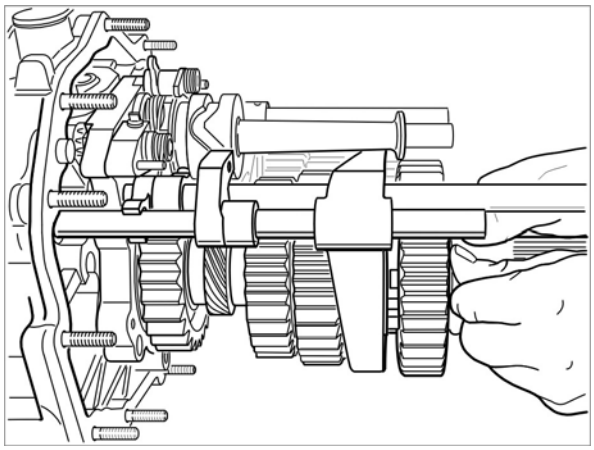


Slide on the dog-ring, 1st / 2nd selector fork and selector rod.



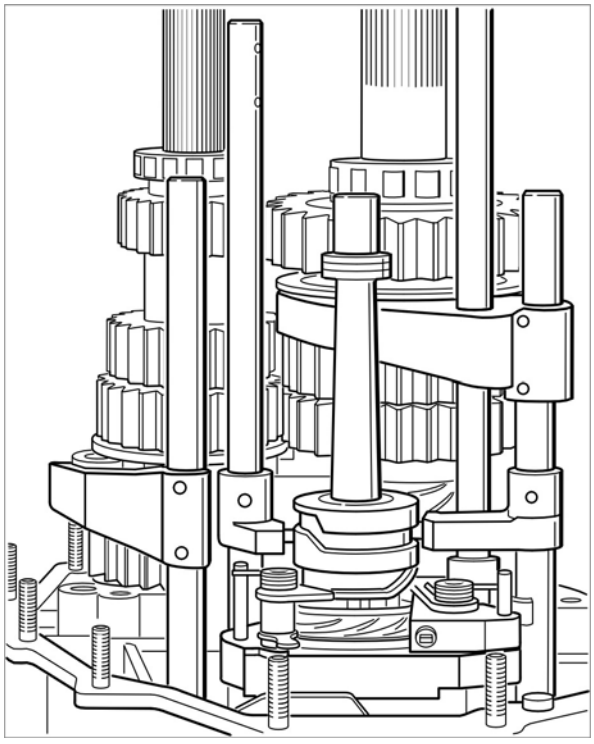
Fit 1st gear dog-ring hub.

Push the 1st gear idler wheel onto the shaft.

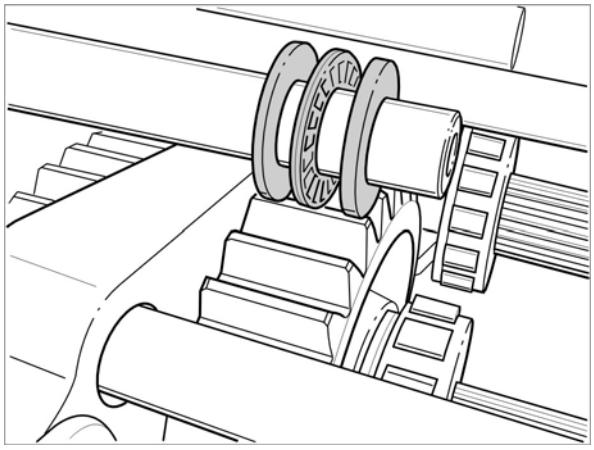


Fit the 5th / 6th gear selector rod with cam follower.

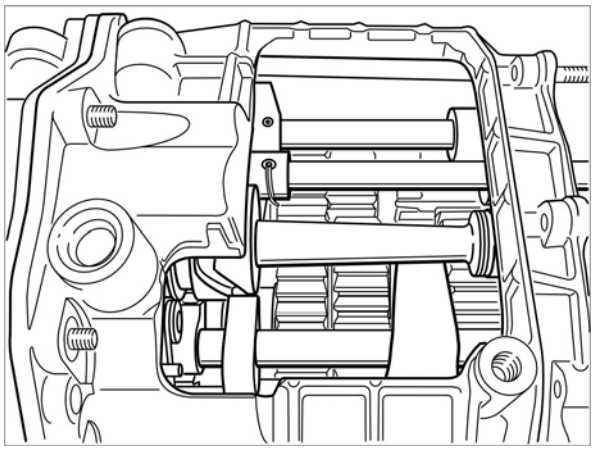
Fit the roller bearing.



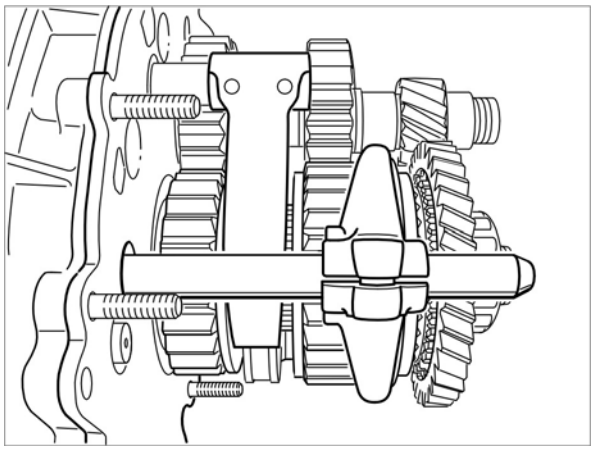
Fit the axial needle roller bearing and spacer ring to the selector barrel.



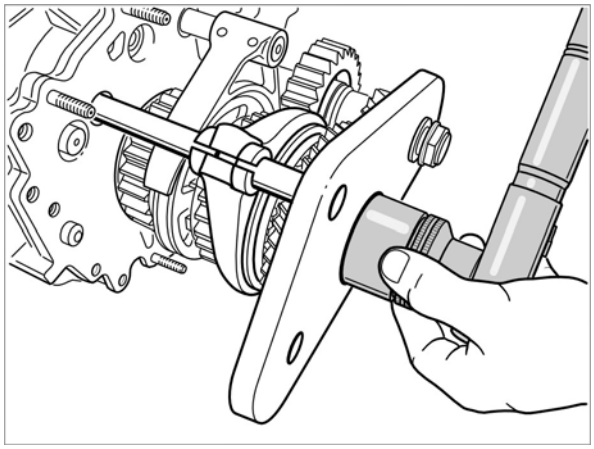
Mount the cut away gear cluster housing. Part 996.450.319.9A



Fit the splined 6th gear spacer hub and the 6th gear idler wheel, guide hub, dog-ring, selector fork and 5th gear idler wheel to the pinion gear shaft. Fit the splined 5th gear wheel to the input shaft.
Fit the reverse gear and afterwards the selector fork.

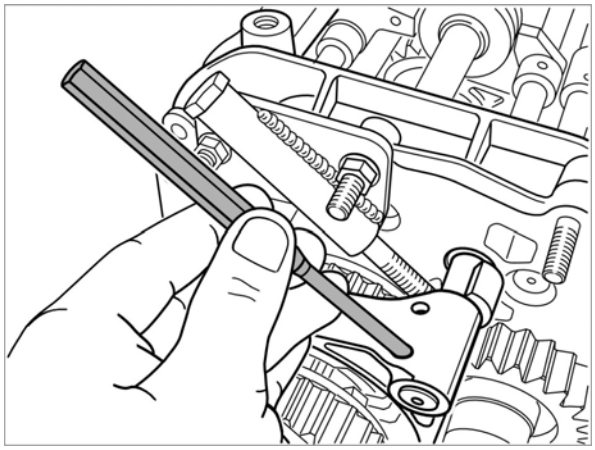


Tighten the collared input shaft nut to 220 Nm torque.
Tighten the collared pinion shaft to 330 Nm torque.



Secure the 5th / 6th gear selector fork with the roll-pin.

Attention: When pressing in the roll-pin always support the selector fork with special tool 996.450.315.9A.

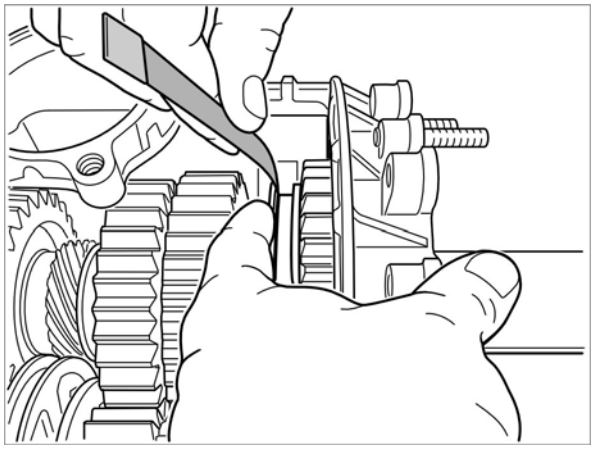


Check the free play of the $1^{st}/2^{nd}$ and $5^{th}/6^{th}$ gear dog-ring guide hubs.

Select the gears and bring the dog-ring into position by hand.

There should be 0.1mm play, on each side, between the dog-ring and selector fork.

The position of the dog ring guide hub in neutral gear must be centred. If this is not possible due to tolerance reasons the play to the gears 2, 4, 6 should be bigger than to the other gears.



Attention: If the play of the selector forks and the dog ring guide hubs is insufficient the play must be adjusted by different spacers between the gear pairings
SW1 = Position 3/4 gear
H4 = Position 1/2 gear
H5 = Position 5/6 gear

Loosen the collared input and pinion gear shaft nuts.

Remove the reverse gears, 5^{th} / 6^{th} gears etc

Remove the cut away housing and fit the gear wheel housing

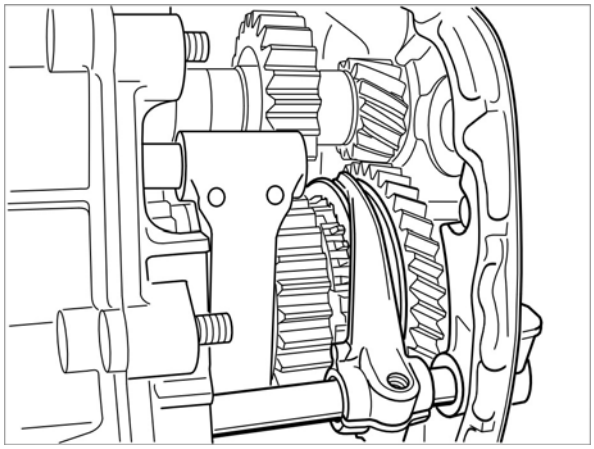
Fit the reverse gears, 5^{th} / 6^{th} gears etc

Tighten the collared input and pinion shaft nuts.

Fit the special reverse gear tool 996.450.311.9A.

Engage reverse gear by rotating the selector barrel.

Slide the selector fork and dog-ring till reverse gear is fully engaged.



Attention: There must be play on both sides between the selector fork and dog-ring.

Tighten the clamping screw in this position.

Attention: The reverse gear selector fork clamp screw must only be tightened when the cut away housing is in position

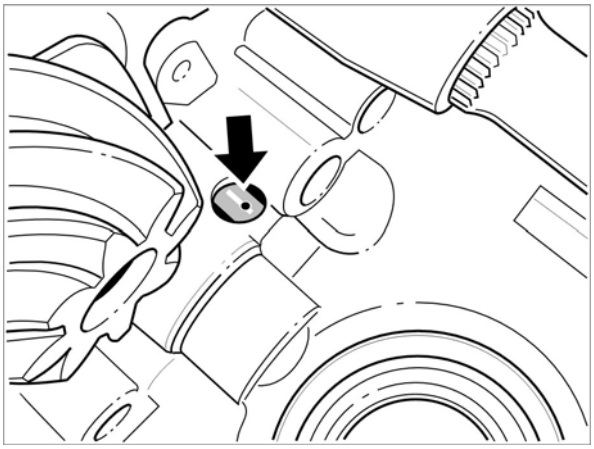
Remove the cut away gearbox cover.

Fit the oil tube, without the use of excessive force, to the casing and locate in position with the retaining screw.

Attention: If fitted incorrectly, the oil tube can collide with the gear shift forks.

When the oil tube is fitted correctly it is visible through the bore in the differential housing.

This visual check is only possible with the differential removed.



Disc H1 (996 302 163 50...72 0.5...1.6mm)
Position pinion shaft to setting bevel gear
(Setting „E" on ring gear)

Disc H2 (996 302 163 50...72 0.5...1.6mm)
Axial preload 4-point bearing (desired: 0.01...0.07mm)

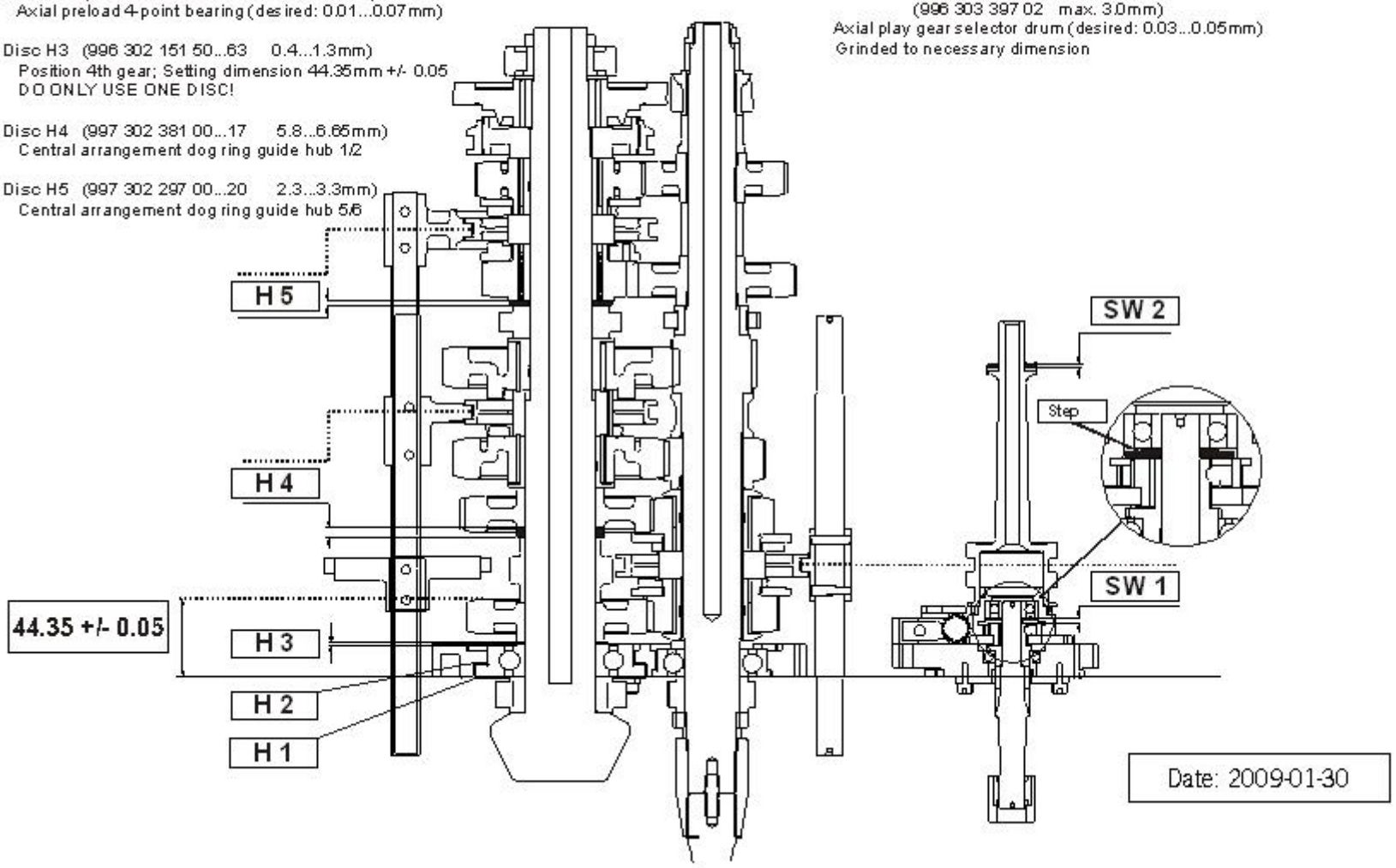
Disc H3 (996 302 151 50...63 0.4...1.3mm)
Position 4th gear; Setting dimension 44.35mm +/- 0.05
DO ONLY USE ONE DISC!

Disc H4 (997 302 381 00...17 5.8...6.65mm)
Central arrangement dog ring guide hub 1/2

Disc H5 (997 302 297 00...20 2.3...3.3mm)
Central arrangement dog ring guide hub 5/6

Disc SW1 (996 303 563 00 max. 3.18mm)
Central arrangement dog ring guide hub 3/4
Grinded to necessary dimension on non stepped side

Disc SW2 (996 303 397 01 max. 2.7mm)
(996 303 397 02 max. 3.0mm)
Axial play gear selector drum (desired: 0.03...0.05mm)
Grinded to necessary dimension



Date: 2009-01-30

Preload 4-point bearing

Insert previously dismantled disc H1 (if not damaged) in transmission case

Position pinion shaft including 4-point bearing but **without** disc H2 in transmission case

Position and tighten pre-assembled tensioning plate (gear-selector drum with SW1, drive shaft) on transmission case

Determine axial play 4-point bearing
The 4-point bearing needs an axial preload of
0.01 - 0.07 mm (desired value: 0.04 mm)
The thickness of H2 can now be determined:

H2 = axial play 4-point bearing + 0.04 mm

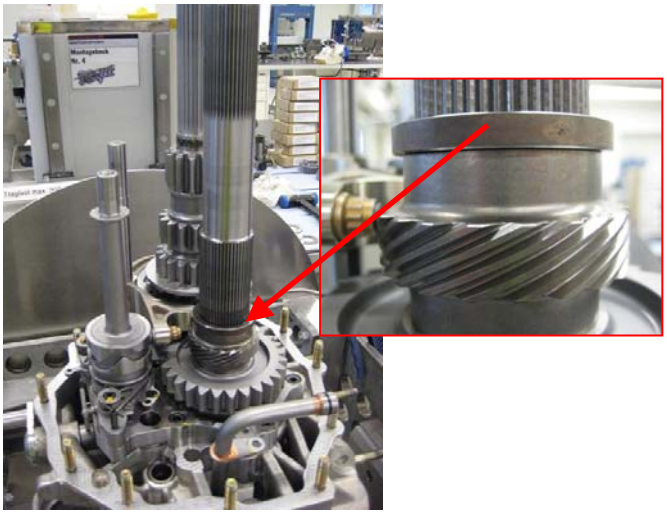
Example: Measured axial play: 1.06 mm
H2 = 1.06 mm + 0.04 mm = 1.10 mm

Position disc H3 on 4-point bearing

Attention: Do only use one disc! To realise the measurement 44.35 mm it is not allowed to use two discs.

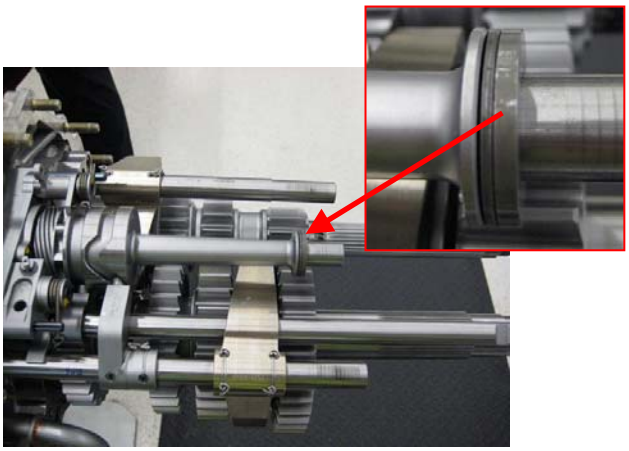
Setup - Ring and pinion gear

Position tensioning plate including the calculated disc H2 on transmission case and tighten it
Mount drive gear oil-pump
Place previously dismantled disc H4 (if not damaged) on oil-pump drive gear

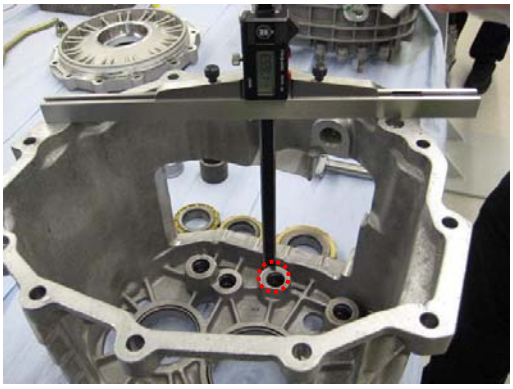


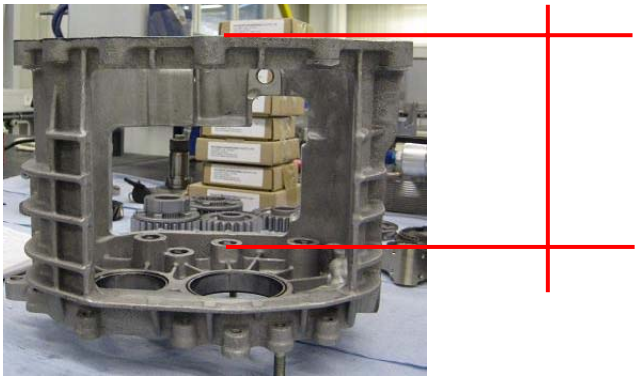
Mount gearsets 1,2 and 3,4 including shift rods and forks

Place needle bearing as well as previously dismantled disc SW2 (if not damaged) on gear selector drum

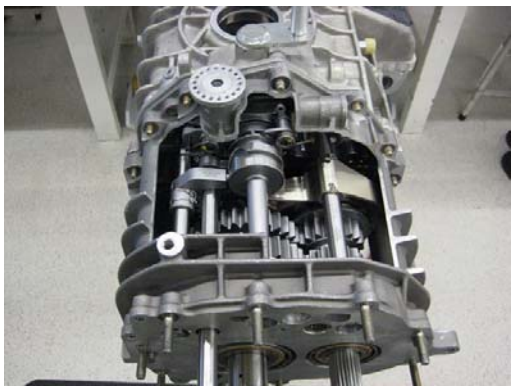


Before mounting the cut away gear housing the depth of the housing has to be determined





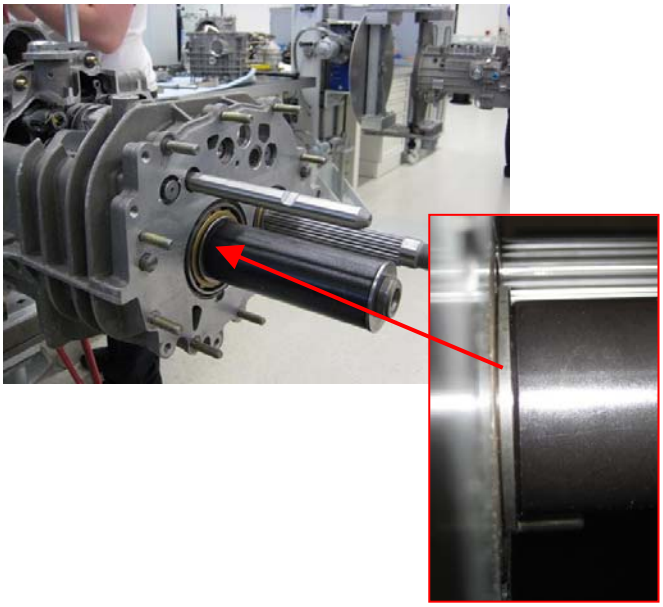
Place and tighten cut away gear housing on transmission case



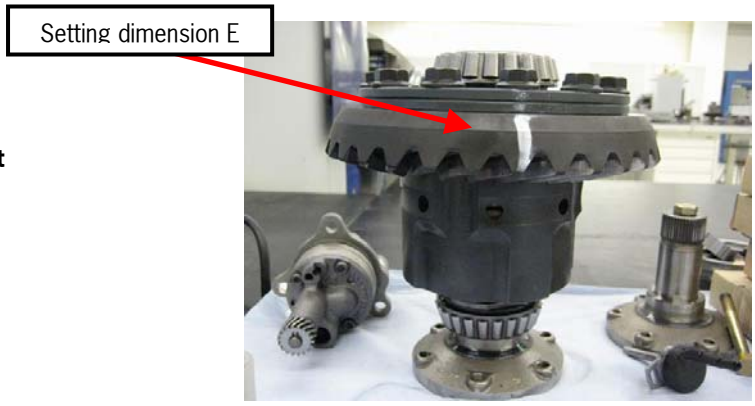
Place previously dismantled disc H5 (if not damaged) on pinion shaft

Place special tool 996.450.327.90 (assembling sleeve) on pinion shaft

Tighten assembling sleeve with nut (M30x1.25, 330 Nm) on pinion shaft

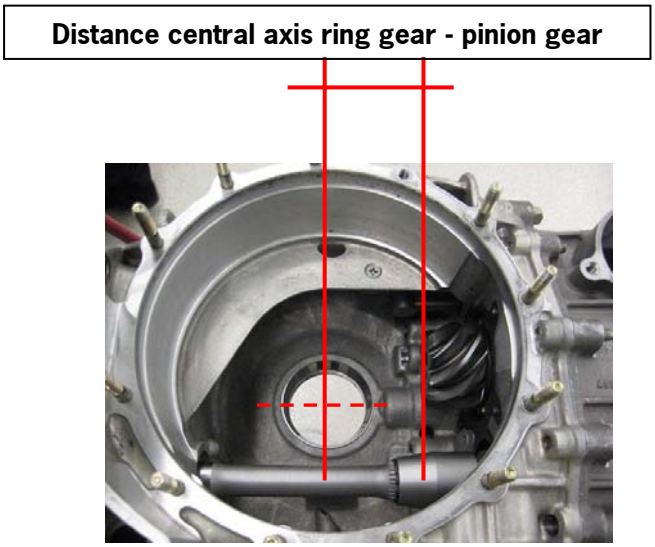


The setting dimension E of the used ring gear specifies the distance between **central axis ring gear - pinion gear pinion shaft**



The actual gap ring gear - pinion gear has to match with the setting dimension E given on the ring gear

The distance between ring and pinion gear is set by the disc H1



Mount proper measuring equipment to determine the distance between ring and pinion gear, mount and tighten transmission cover

Determine distance ring gear - pinion gear
The thickness of the required disc H1 can be determined as follows:

Thickness H1 = Setting dimension E - measured distance + thickness of mounted disc H1

If the measured distance is bigger than the setting dimension, a thinner disc as the already mounted one has to be used

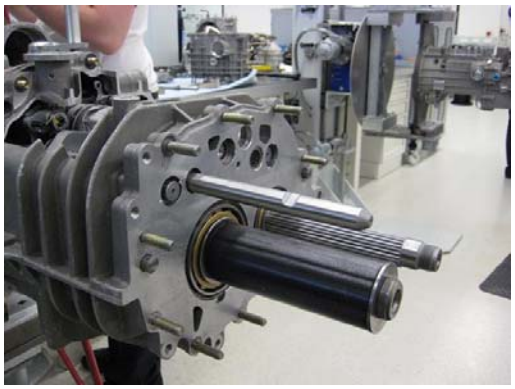
Example: Setting dimension E = 70.30 mm, H1 already mounted = 1.0 mm
measured distance = 70.50 mm

Thickness H1 = 70.30 mm - 70.50 mm + 1.0 mm = **0.8 mm**

→The correct disc H1 needs to show a thickness of 0.8 mm

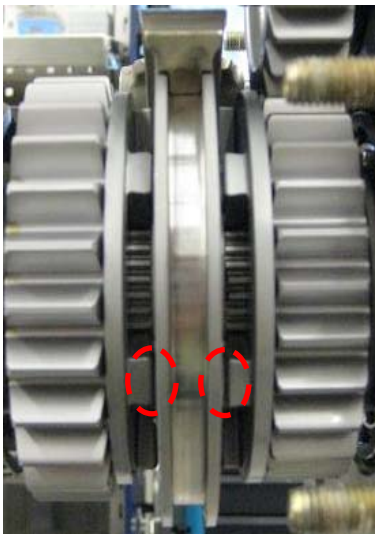
ATTENTION: If H1 is changed H2 has to be changed accordingly

Disassemble gearbox and mount calculated disc H1



Assemble gearbox with cut away gear housing and assembling sleeve
Tighten assembling sleeve on pinion shaft with nut M30 (330 Nm)

Central arrangement claw collar 3/4



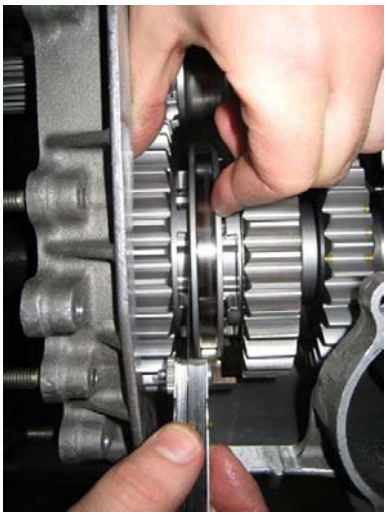
Check centre position claw collar 3/4 in neutral
Place dog idler gear 3 and dog idler gear 4 on dog claw collar centred between the two fork ends, push claw collar towards idler gear 3 and determine gap between dog claw collar and dog idler gear 3 with a feeler gauge, repeat same procedure with idler gear 4 to determine the gap between idler gear 4 and claw collar

As the claw carriers are axial movable on the idler gear, the claw carriers should be pushed by hand either towards idler gear or claw collar while measuring the gap. It is important that the measuring method for both gears is identical

The centre position of the claw collar 3/4 can be adjusted by the disc SW1.
If the disc SW1 has to be changed it is important that the non-stepped side of the disc is machined.

Attention: If it is not possible to centre the claw collar due to tolerance reasons the gap to gear 4 should be chosen bigger as the gap to gear 3

Central arrangement claw collar 1/2

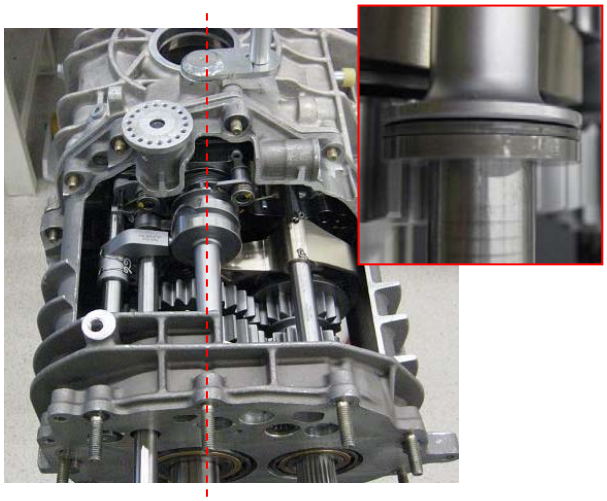


Check centre position claw collar 1/2 in neutral
Place dog idler gear 1 and dog idler gear 2 on dog claw collar centred between the two fork ends, push claw collar towards idler gear 1 and determine gap between dog claw collar and dog idler gear 1 with a feeler gauge, repeat same procedure with idler gear 2 to determine the gap between idler gear 2 and claw collar

The centre position of the claw collar 1/2 can be adjusted by the disc H4

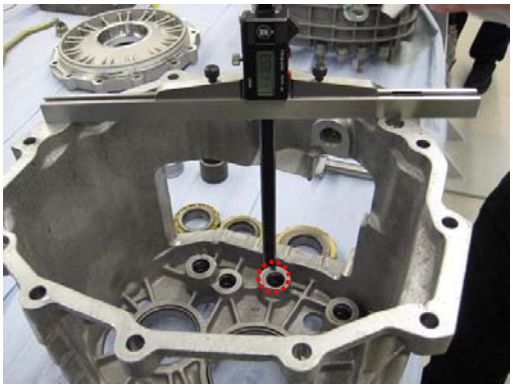
Attention: If it is not possible to centre the claw collar due to tolerance reasons the gap to gear 2 should be chosen bigger as the gap to gear 1

Axial play gear-selector drum



The axial play of the gear-selector drum can be set by the disc SW2, the play can only be determined if the cut away gear housing is mounted

Therefore, it is necessary to measure the depth of the cut away housing and of the closed housing which will be mounted finally. The two depths have to be compared, the difference has to be taken into account when choosing the desired disc SW2



Furthermore, one has to consider that if the disc SW1 is replaced by a different one the axial play of the gear-selector drum changes

Axial play gear-selector drum: 0.03 - 0.05 mm

Central arrangement claw collar 5/6

Dismount cut away gear housing and change adjust discs (H4, H5, SW1, SW2) if necessary

Complete Gearbox:

Mount gear sets 1, 2, 3, 4, gear-selector drum, gear shift forks, gear shift rods, etc.
Mount gear housing
Position disc H5 on pinion shaft
Mount gear sets 5, 6 and reverse gear
Tighten gear sets on pinion shaft with nut (M30x1.25) with 330 Nm

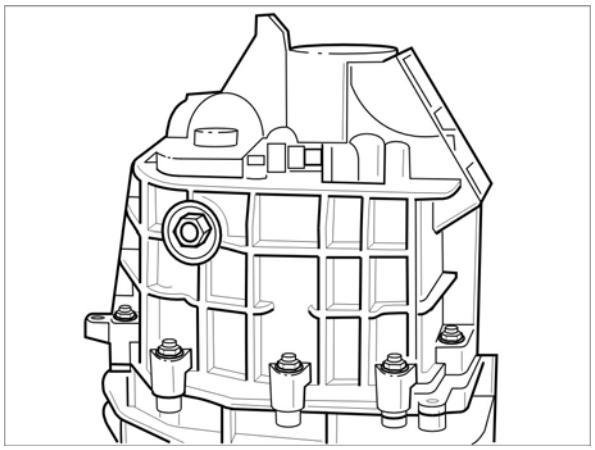
Check centre position claw collar 5/6 in neutral

analogue to procedure for claw collar 3/4 and 1/2

The centre position of the claw collar 5/6 can be adjusted by the disc H5

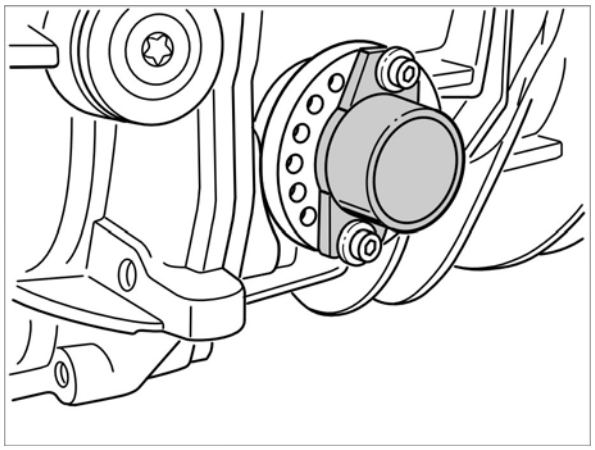
Attention: If it is not possible to centre the claw collar due to tolerance reasons the gap to gear 6 should be chosen bigger as the gap to gear 5

Smear the gearbox cover mounting faces lightly with sealing compound.
Tighten the gearbox cover (M8 spring washers and nuts).

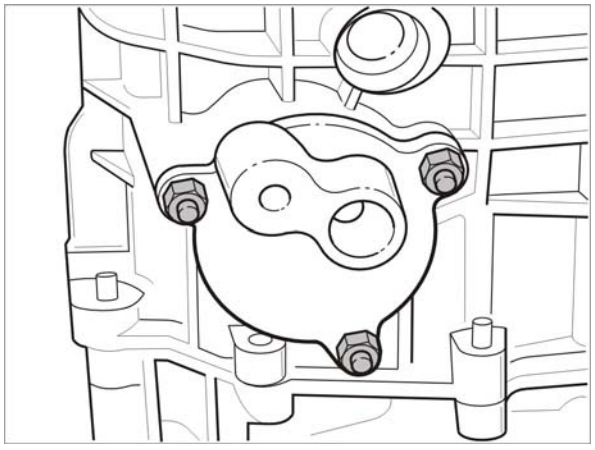


Fit the drive shaft and gear recognition potentiometer as marked during removal.

Attention: The potentiometer MUST be adjusted after the gearbox has been fitted to the car (refer to Potentiometer Adjustment page 39).

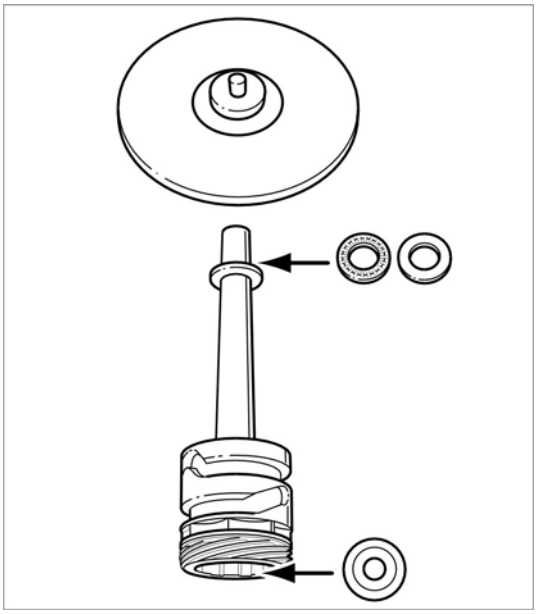


Mount the oil pump.



Changing the selector barrel:

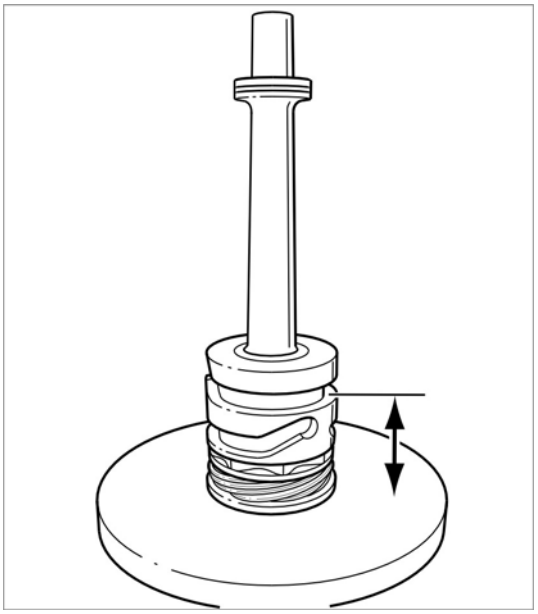
To remove the locking pawl neutral latch and alignment pawl, unscrew the selector barrel and lock.
Raise the selector barrel.
Attention: When removing the barrel, make sure that the locking pawls, springs etc do not fall out.



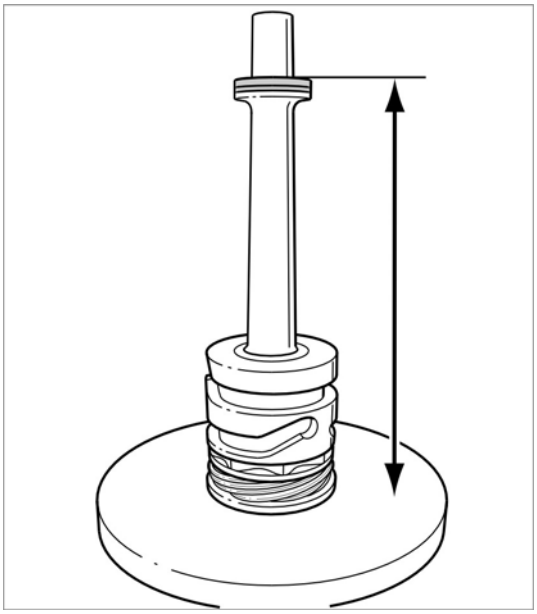
Attention: When replacing the selector barrel, the position of the barrel track must be fitted in exactly same position.

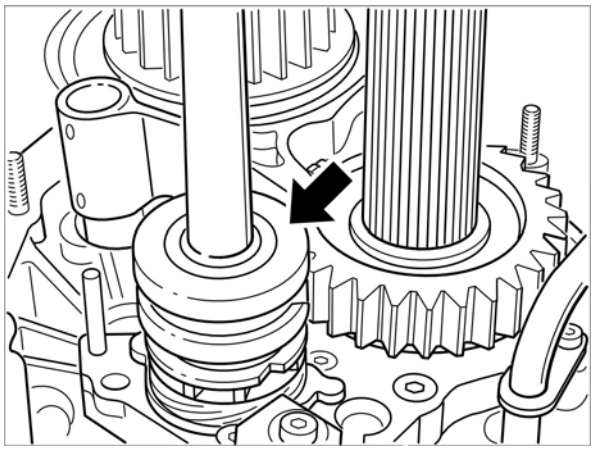
Place the old selector barrel, with spacer washers, on the special base plate. The barrel must sit correctly on the bearing spacer ring.

Determine the dimension of the old selector barrel between the $3^{rd}/4^{th}$ track.
Set the new selector barrel in position and determine the dimension as above.

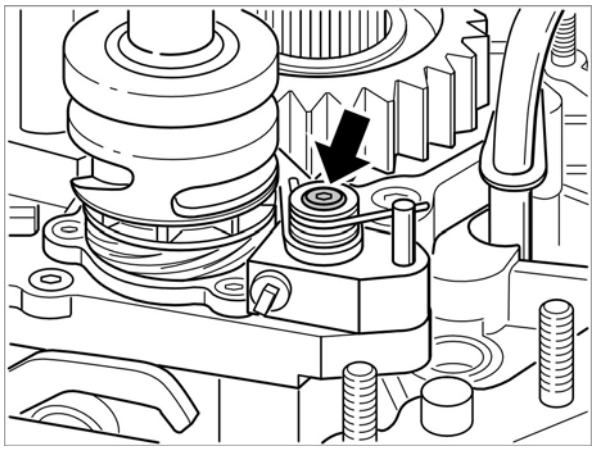


Calculate the spacers required, place in the new selector barrel and check the dimension.



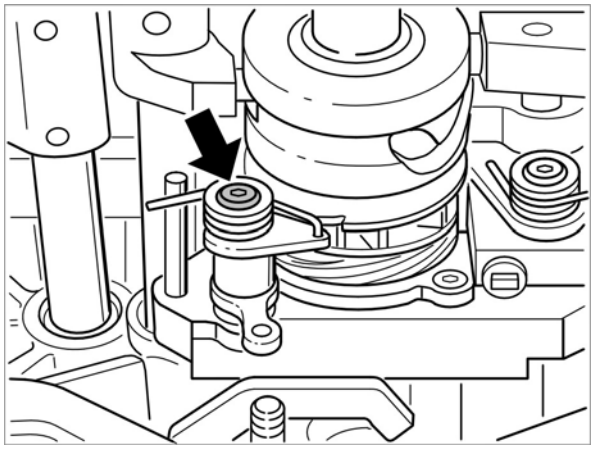


Set the new selector barrel in position and determine the dimension as above.
Calculate the spacers required, place in the new selector barrel and check the dimension.



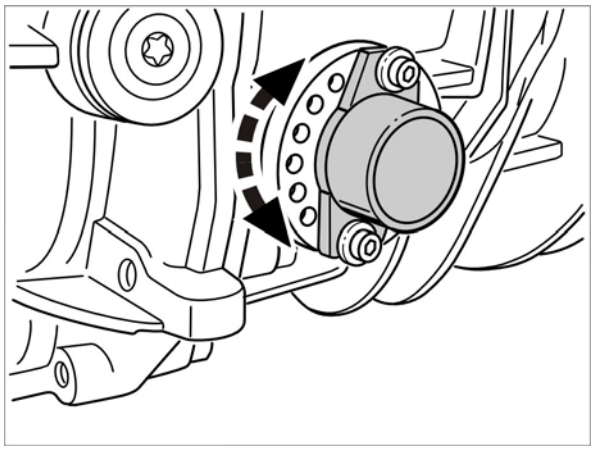
Replacing the selector barrel alignment pawl.

When replacing the selector barrel alignment pawl bolt it must be secured with Loctite 243.



Locking pawl neutral latch replacement

When replacing the locking pawl neutral latch bolt it must be secured with Loctite 243.



Adjustment of the gear recognition potentiometer
Connect the laptop to the vehicle, switch on the ignition and start MODAS. Select the “Warm up mode”.
Select 6th gear. Turn the wheels to make sure that 6th gear is correctly engaged.
The value in the display must read 3.85 Volt.
To adjust the value, rotate the potentiometer till the correct figure appears in the window.
The display must show 6th gear.

Gear shift mechanism:

Gear lever with gear shift force sensor to cut engine propulsion

Function:

The sensor is only active at engine speeds greater than 2800 rpm.

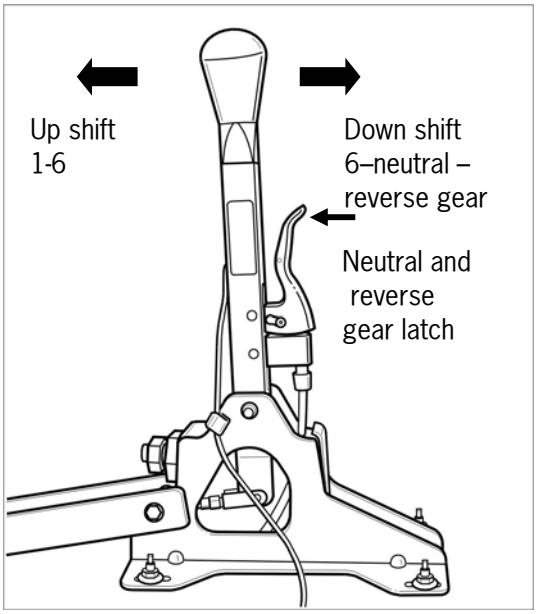
Sensor is not speed dependent.

Ignition cut only occurs under power.

Selecting neutral and reverse gear:

The release lever must me moved to change from 1st gear to neutral.

Sequence: 1st gear – neutral – reverse gear.



Gear shift push/pull cable:

The gear shift cable should be changed after 30 hours running.

A regular visual inspection is recommended.

'Selected gear' display:

The 'selected gear' sensor must be adjusted with the BOSCH MODAS System after repair or after changing gear ratios

Gearbox component tightening torques

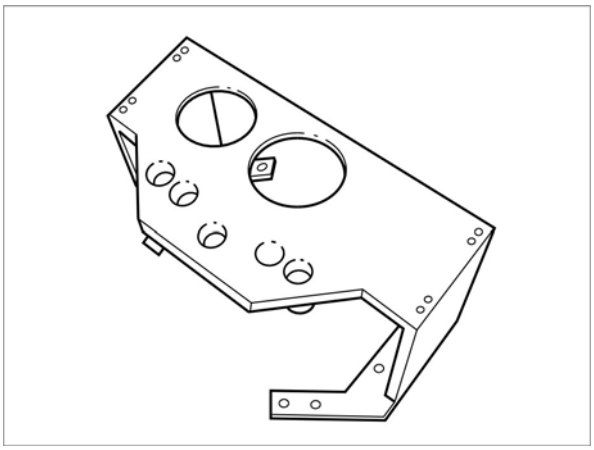
All component tightening torques listed are given in Newton metres. Please ensure that your torque wrench is calibrated correctly!

Oil fill plug	M22 x 1.5	40
Oil drain plug	M22 x 1.5	40
Gearbox casing nut	M8	25
Input shaft nut	M22 x 1.5	220
Input shaft nut	M30 x 1.5	220
Pinion shaft nut	M30 x 1.25	330
Selector fork screw	M8 (10.9)	35
Drive flange bolts	M10	65
Crown wheel to diff carrier	M12 x 1.25	180
Smear threads lightly with Loctite 270 before fitting, renew bolts when replacing crown wheel		
Gearbox mount on chassis	M10 x 65	65
Gearbox mount on gearbox	M8	30
Gearbox support bracket to lateral support	M10	65

Special tools

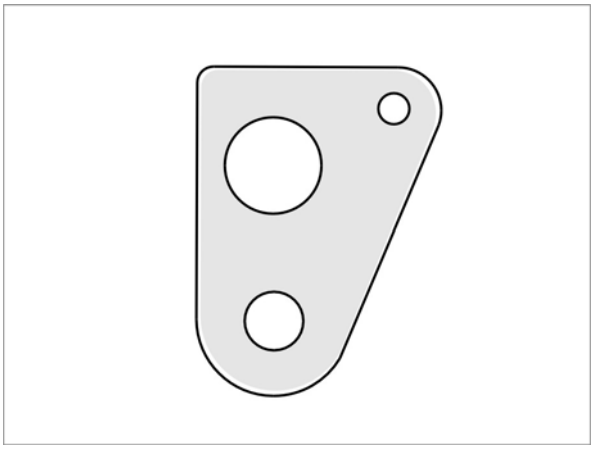
Gear ratio housing tool

Part number 996.450.310.9A



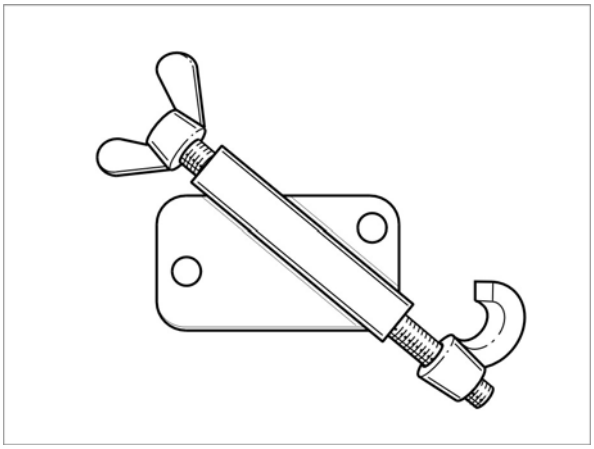
Reverse gear tool

Part number 996.450.311.9A



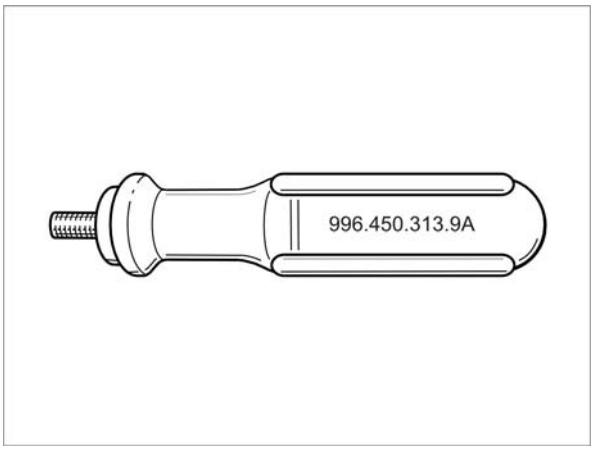
Inner shift rod tool

Part number 996.450.315.9A



Shift grip

Part number 996.450.313.9A



Suspension

Front axle

- Independent suspension
- Centre lock wheels
- McPherson strut with double clamped upright
- Multi adjustable anti-roll bar
- Non-adjustable dampers
- Rack & pinion steering with electro-hydraulic assistance.
- Main spring: 100 - 60 - 260
- Helper spring: 75 - 60 - 43

Rear axle

- Independent suspension
- Multi-link axle with spherical bearings.
- Centre lock wheels
- Multi adjustable anti-roll bar
- Non-adjustable dampers
- Main spring: 130 - 60 - 260
- Helper spring: 60 - 60 - 50

Wheels

- 3-piece BBS race wheel:
- Front 9J x 18, offset 43
- Rear 11J x 18, offset 30

Tyres

- Car delivered with Michelin rain tyres:
- Front 24/64-18
- Rear 27/68-18

Brake system

- Dual circuit hydraulic brake system
- Separate front & rear brake cylinders
- Adjustable brake balance with balance bar system
- Aluminium monobloc brake caliper
- Ventilated brake discs

General maintenance and adjustments

Work on the front or rear axles

Repair

In the event of an accident or any other damage occurring to the suspension, every component NOT directly affected MUST be inspected. In this case, inspected means measured, crack detected and replaced where necessary (e.g. steering, wishbones, wheel carrier and suspension arms, rod-end bearings and joints, mounting bolts and wheels).

Anti-roll bar adjustment:

The anti-roll bar stiffness can be infinitely adjusted by rotating the lever arm at the end of the anti-roll bar. The M6 cap head screw on the front face must be loosened to turn the lever arm. The maximum stiffness of the anti-roll bar is achieved by setting the lever arm parallel with the anti-roll bar drop link. The minimum stiffness of the anti-roll bar is achieved when the lever arm is positioned at 90° to the anti-roll bar link. The lever arms should be adjusted together and set equally on each side. When rotating the lever arm do not damage the material with unsuitable tools. Grooves or notches or any other type of damage can lead to the lever arm braking.

Changing the wheel bearings:

When replacing faulty wheel bearings please note the following points:
Press the wheel bearing out of the upright.
Heat the upright to 110°C before fitting the new wheel bearing
Drop the wheel bearing in by hand.
The wheel bearing should be seated correctly on the bearing face of the upright after fitting.
Tighten the wheel bearing cover to the given torque.
Check wheel bearing cover bolt torque after approximately 200 km.

Centre lock wheel nut:

Wheel nut tightening torque 460 Nm
The centre bolt and wheel nut must be cleaned regularly.
After cleaning the wheel nut re-grease the threads and mating face.
When remounting or fitting a new centre bolt, smear a small quantity of grease on the mounting faces and the internal threads.
Tighten the centre bolt to 470 Nm torque, continue tightening till the lugs in the safety ring lock into the grooves in the hub.
Use only ‘Optimoly HT – Paste’ to grease the centre lock components.

Working on the rear axle

Driveshafts:

It is recommended that new driveshafts are run in for 100 kilometres at a maximum speed of 200 km/h and at low torque. **Driveshafts that have already been fitted and run in a particularly direction must not be swapped from left to right or vice versa.**

Running time and maintenance:

ca. 2000 km

For the revision may only be prescribed Krytox - fat ET. No. 996.332.897.9A (100 g tube)

Quantity outboard joint: 100 g

Quantity inboard joint: 110 g

Full vehicle:

After approx. 200 km and/or first test

Visual inspection of all systems, hoses and cables etc. for leakage, damage or chafing

Check all the security relevant fasteners for the defined torque as well as:

All suspension mounting bolts

Driveshafts

Engine mountings

Gearbox mountings

After 50 hrs:

Engine overhaul

After 20 hrs sprint or 30 hrs long distance races:

Gearbox overhaul

Inspection and mounting of the servo steering

Important notice:

The rack and pinion steering and servo pump must not be repaired and/or dismantled.

Checking the hydraulic fluid level:

The fluid level of the servo steering is measured using the dip stick fitted to the servo oil reservoir cap.
The engine must be running at idle speed when checking the fluid level
Do not turn the steering when checking the fluid level.

Filling and bleeding the steering system:

The hydraulic steering oil reservoir must be filled to the 'max' mark and the engine started briefly after repair or maintenance work has been carried out in which hydraulic oil has been lost. This procedure should be repeated until the fluid level in the reservoir remains constant.
The fluid level in the hydraulic steering oil reservoir must never drop below the 'min' mark to prevent damage occurring to the servo pump.
To bleed the hydraulic system after topping up the oil, rotate the steering wheel quickly and repeatedly from one lock to the other. The bleeding process is finished when fluid level remains constant and no air bubbles surface in the reservoir when the steering wheel is turned back and forth.
When checking the hydraulic system visually for leakage, rotate and hold the steering wheel in the full lock position to ensure the greatest possible line and system pressure with the engine idling,. Check all the lines, pipes and fittings for leakage. When implementing the test this level of system pressure should be held for an absolute maximum of ten seconds.

Air jack system:

The air jack system is maintenance free and should not be lubricated.
Operating pressure 26 bar
Only use dry and oil free compressed air
To guarantee that the air jack pistons have returned completely the exhaust valve should be open (pulled out) when the car is in motion.
Never work under the car with the air jacks extended without proper axle stands. To prevent damage occurring to the internal cylinder end stops never pressurise the system without the car being on the ground (never without the air jack having to lift the vehicle). The air jacks can be overhauled by Porsche Motorsport when required.

Important:

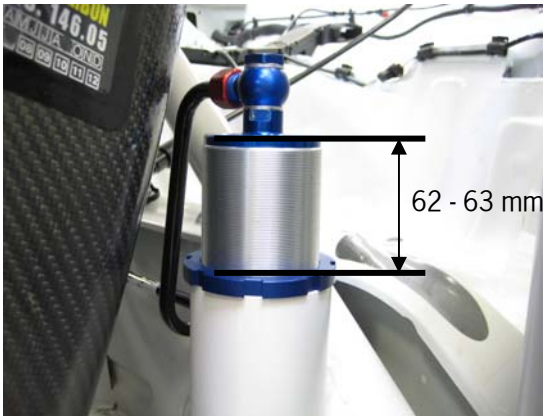
Working pressure max 35 - 38 bar
Never use mineral oil based detergents
Never unscrew the end caps of airjack: even when not operated the airjack is under pressure!
We recommend refurbishment of the airjack after 2 yaers or 2000 cycles.

Carlift systems:

Never use a third equipment of carlifter system as it will damage the bottom feet or the piston cylinder

Porsche Motorsport requests a review of the thightening torque and the position of the rear air jack in the host pipe.
The check of the tightening torque of the nut (force fit of the air jack) must be included in the regular vehicle check, such as suspension check
In case an air jack is not fastened, it must be replaced immediately.
Please find further safety regulations in the product description of KRONTEC.

Tightening torque locknut	45 ± 5 Nm
Position in the host pipe	see picture below



Suspension alignment

Miscellaneous:

Measuring and aligning the front and rear 911 GT3 Cup suspension is similar to the alignment procedure for a standard road-going Porsche. The suspension alignment can be made with any suitable optical or electronic system or the optional Porsche Motorsport alignment system (part nr. 997.450.351.90 / 997.450.561/562.90).

The following steps must be carried out to achieve the suspension alignment values given by Porsche:

- All suspension arms and bearings must be without play
- Fuel tank half-full (40 litres)
- 75 kg ballast placed on driver seat
- Inflate all four tyres to a pressure of 2 bars

The following procedure is recommended when checking the complete wheel alignment:

- Disconnect the anti-roll bars
- Adjust the ride height
- Adjust the rear axle camber first and then the toe
- Adjust the front axle camber first and then the toe
- Re-adjust ride height and set corner weights
- It is not possible to adjust the castor
- The corner weights are adjusted by changing the ride height, the smallest possible corner weight difference between the left and right hand side of each axle is recommended

Front axle:

All the front suspension alignment values should be adjusted with the steering wheel locked in the straight ahead position.

The basic camber adjustment is made by the addition or removal of the adjustment shims between the lower wishbone and the wishbone bearing.

The fine adjustment is made on the McPherson strut thrust bearing.

The McPherson strut thrust bearing must be centred before setting the basic camber value.

Rear axle:

The camber is adjusted by the addition or removal of the adjustment shims between the lower wishbone and the wishbone bearing.

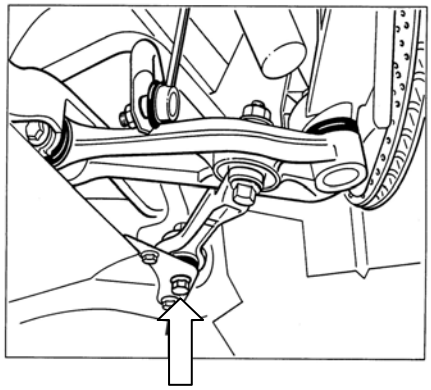
The fine adjustment is made by adjusting the eccentric camber bolt in the lower wishbone.

Suspension measurements and settings:

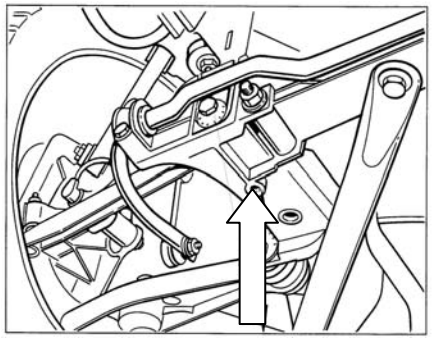
Basic settings for Michelin tyres (as delivered)		
	Front axle	Rear axle
	Left/right	Left/right
Ride height	73 mm	120 mm
Camber	- 4°	- 4°
Toe setting(total)	0´	+ 34´
Anti-roll bar	75°	45°
Main spring	100 - 60 - 260	130 - 60 - 260
Helper spring	75 - 60 - 43	60 - 60 - 50
Rear wing setting		P 10

Ride height measurement points:

Front axle



Rear axle



Suspension component tightening torques

All component tightening torques listed are given in Newton metres. Please ensure that your torque wrench is calibrated correctly!

Front suspension:

Shear plate on subframe, front	M10 x 30 65	46
Shear plate on subframe, rear	M10 x 30 65	46
Shear plate on chassis	M12 x1.5 x 25	100
Sub frame to chassis, rear	M14 x 1.5 x 50	160
Diagonal brace on chassis	M12 x 1.5 x 25	100
Diagonal brace on subframe	M12 x 1.5 x 25	100
Wishbone to subframe	M12 x 1.5 x 95	120
Wishbone on upright	M12 x 1.5	75
Side member to chassis	M14 x1.5 x 110	160
Side member to wishbone	M14 x 1.5 x 75	160
Drop link on anti-roll bar	M10	46
Thrust bearing on chassis	M8	33
Piston rod on thrust bearing		80
Spring platform lock nut		50

Front upright:

Wheel bearing cover x 4	M8 x 35	37
Brake shroud x 3	M6 x 16	9.7
Multi function coupling x 2	M6 x 30	9.7
Wheel speed sensor	M6 x 16	9.7
Brake caliper to upright	M12 x 1.5 x 77	73
Damper tube clamp x 2	M12 x 1.5 x 70	85
Centre bolt	M22 x 1.5	470
Wheel nut		460
Track rod on upright	M12 x 1.5	75
Anti-roll bar drop link on upright	M10	46

Rear suspension:

Stud on chassis, front	M12 x 1.5	46
Stud on chassis, centre	M12 x 1.5	46
Stud on chassis, rear	M12 x 1.5	46
Side part on chassis, front	M12 x 1.5	110
Side part on chassis, centre	M12 x 1.5	110
Side part on chassis, rear	M12 x 1.5	110
Side member on wishbone, lower	M14 x 1.5 x 75	160
Side member on side part	M14 x 1.5 x 100	180
Wishbone to side part	M12 x 1.5 x 100	100
Wishbone to upright	M12 x 1.5	75
Control arm 2 on side part	M12 x 1.5 x 83	100
Control arm 2 on upright	M12 x 1.5	75
Control arm 3 on side part	M12 x 1.5 x 100	110
Control arm 3 on upright	M12 x 1.5 x 80	110
Control arm 4 on side part	M12 x 1.5 x 100	110
Control arm 4 on upright	M12 x 1.5 x 80	110
Sub frame on side part	M 10 x 40	65
Sub frame on side part, upper	M12 x 1.5 x 80	110
Sub frame on side part, lower	M12 x 1.5 x 80	110
Diagonal brace on subframe	M10 x 40	65
Diagonal brace on side part	M10	23
Piston rod on thrust bearing		60
Thrust bearing on chassis	M10	46
Damper strut to upright	M12 x 1.5 x 70	110

Rear upright:

Wheel bearing cover x 4	M8 x 35	37
Multi function coupling x 2	M6 x 30	9.7
Brake caliper to upright	M12 x 1.5 x 77	73
Multi line bracket on upright	M6	9.7
Brake shroud	M6 x 16	9.7
Wheel nut		460

Steering:

Steering rack on subframe	M10 x 45	65
Track rod on steering rack	M16 x 1.5	80
Universal joint on steering rack	M8 x 35	23
Steering column to frame, upper	M10 x 100	46
Steering column to frame, lower	M14 x 1	20
Steering wheel to column	M16 x 1.5	45
Steering column lateral support	M8 x 40	23
Carrier frame lateral support	M8	23
Oil line on steering rack	M10 x 20	20

Pedal assembly:

Brake balance adjuster on chassis	M8	23

Brake balance adjuster on chassis,

Aluminium spacer	M8 x 154 x 80	23
Pedal spindle in pedal mount	M14 x 1	8
Pedal spindle on PLB	M8	10
Brake pedal to push rod, no grease	M8 x 1	23

Brake system:

Brake disc to hub	M6 x 16	12
Brake disc to disc bell	M 6	9.7
Brake pipe bracket on subframe	M6 x 16	9.7

Driveshafts:

Driveshaft to flange	M10 x 50	81
Centre bolt on driveshaft	M22 x 1.5	470

Brake system 911 GT3 Cup

The Porsche 911 Cup car has a twin-circuit hydraulic brakes system with two separate main cylinders.
The front to rear brake balance can be changed by adjusting the brake balance adjuster bar.
Vehicles which are intruded to be used at the Porsche Mobil 1 Supercup will be equipped with ceramic brake discs (PCCB).

Front brakes:

Brake discs: Ventilated, Steel, D=380mm B=32mm
Brake pad: Pagid P50 (light green)
Pad thickness: 13mm without backing plate
18mm with backing plate

Brake caliper: 6-piston aluminium monobloc
Caliper pistons with Zirkonoxide inserts

Rear brakes:

Brake discs: Ventilated, Steel, D=350 mm B= 28 mm
Brake pad: Pagid P50 (light green)
Pad thickness: 13mm without backing plate
18mm with backing plate
Brake caliper: 4-piston aluminium monobloc
Caliper pistons with Zirkonoxide inserts

Brake system notes

Brake callipers:

The dust covers can be removed form the brake calipers when driving.
It is possible to overhaul the brake calipers, the necessary spare parts can be purchased from Porsche Motorsport sales department.

Brake fluid:

Only Endless RF - 650 Racing Super Fluid brake fluid should be used.

Brake master cylinders and balance bar:

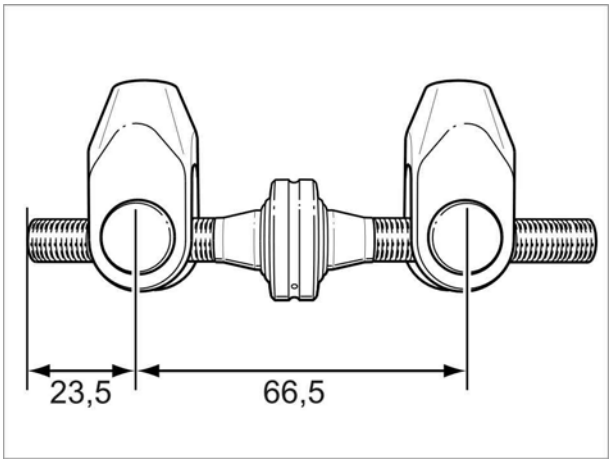
The two brake master cylinders supplying each brake circuit have different bore diameters:

- Front axle 20.6 mm (orange marking)
- Rear axle 19.05 mm (green marking)

The front to rear brake balance can be adjusted by turning the adjuster shaft.

When the car is delivered, the brake balance is set to 40 bar on the front and 38 bar on the rear axle. Rotating the adjuster wheel clockwise increases the brake pressure on the rear. Rotating the adjuster anti-clockwise increases the brake balance on the front axle.

Basicsetup adjusting spindle:



Brake balance display and brake force distribution

The brake force distribution is shown in the MoTeC – Display.

Display Setup “Practice”

The adjustment range is from - 7 to + 7

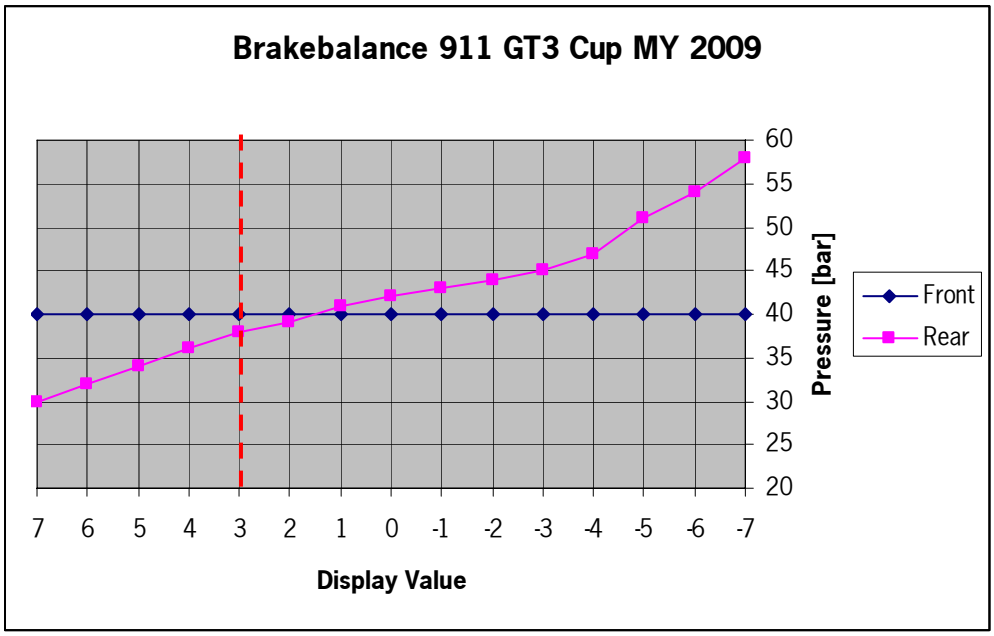
Attention:

- The potentiometer is set initially to zero.
- Only remove the transport safety lock and operate the potentiometer when the complete assembly is fitted to car and the shaft has been mounted to the balance bar. The balance bar MUST be set in the middle position before fitting the potentiometer.
- The display values must not exceed +7 or -7 when rotating the balance bar (the potentiometer will be severely damaged if rotated beyond these values).
- Potentiometers removed from the car should be set to zero with the MoTeC System before being refitted.

Direction of rotation “-“ balance to rear (- 7 = max rear pressure)

Direction of rotation “+” balance to front (+7 = max front pressure)

Basis setup **+3** = front axle 40 bar rear axle 38 bar



Brake system 911 GT3 Cup PCCB

The Porsche 911 Cup car has a twin-circuit hydraulic brakes system with two separate main cylinders.
The front to rear brake balance can be changed by adjusting the brake balance adjuster bar. The brake discs are made of Ceramic Composite (PCCB – Brake discs)

Front brakes:

Brake discs: Ventilated, PCCB floating, D=380mm B=34mm
Brake pad: Pagid P50 (light green)
Pad thickness: 13mm without backing plate
18mm with backing plate

Brake caliper: 6-piston aluminium monobloc
Caliper pistons with Zirkonoxide inserts

Rear brakes:

Brake discs: Ventilated, PCCB floating, D=350 mm B= 28 mm
Brake pad: Pagid P50 (light green)
Pad thickness: 13mm without backing plate
18mm with backing plate
Brake caliper: 4-piston aluminium monobloc
Caliper pistons with Zirkonoxide inserts

Brake system notes

PCCB Brake discs:

The PCCB brake discs should be handled very carefully. Care should be taken that no damage occurs when fitting wheels or when cleaning the cooling holes with a drill bit. Brake discs with mechanical damage must be replaced. The PCCB brake disc wear can ONLY be determined by the weight reduction and not by the reduction in the disc thickness. The wear indicators on the brake discs are irrelevant for racing purposes. Weighing scales with a fine scale are recommended to weight the discs, and documentation indicating the weight compared to mileage completed. To guarantee accurate PCCB brake disc wear records, the new weight and a consecutive number is engraved on the disc bell. The weight reduction of the brake duct may not exceed 100g, when compared with the new weight. The brake disc wear is reached when the weight reduction is more than 100g. To make a reliable wear calculation the brake disc must be free from brake dust, rubber pick-up and any other dirt. The brake disc assembly must not be disassembled. The PCCB brake disc must be bedded in carefully when new, to guarantee a long life and high brake performance. When bedding-in the disc, the disc temperature must not exceed 250°C. The surface appearance changes from matt to shiny after the bedding

process is complete. All four brake discs should be bedded in equally. To achieve this, it may be necessary to increase the brake balance to the rear.

Brake callipers:

The dust covers can be removed form the brake calipers when driving. It is possible to overhaul the brake calipers, the necessary spare parts can be purchased from Porsche Motorsport sales department.

Brake fluid:

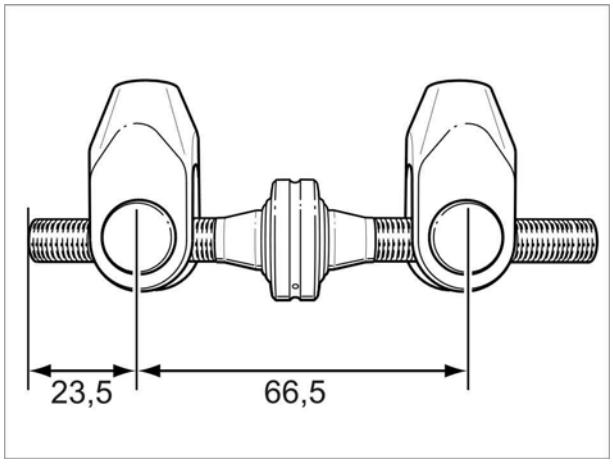
Only Endless RF - 650 Racing Super Fluid brake fluid should be used.

Brake master cylinders and balance bar:

The two brake master cylinders supplying each brake circuit have different bore diameters:
- Front axle 20.6 mm (orange marking)
- Rear axle 17.8 mm (blue marking)

The front to rear brake balance can be adjusted by turning the adjuster shaft.
When the car is delivered, the brake balance is set to 40 bar on the front and 43 bar on the rear axle. Rotating the adjuster wheel clockwise increases the brake pressure on the rear. Rotating the adjuster anti-clockwise increases the brake balance on the front axle.

Basicsetup adjusting spindle:



Brake balance display and brake force distribution

The brake force distribution is shown in the MoTeC – Display.

Display Setup “Practice”

The adjustment range is from - 7 to + 7

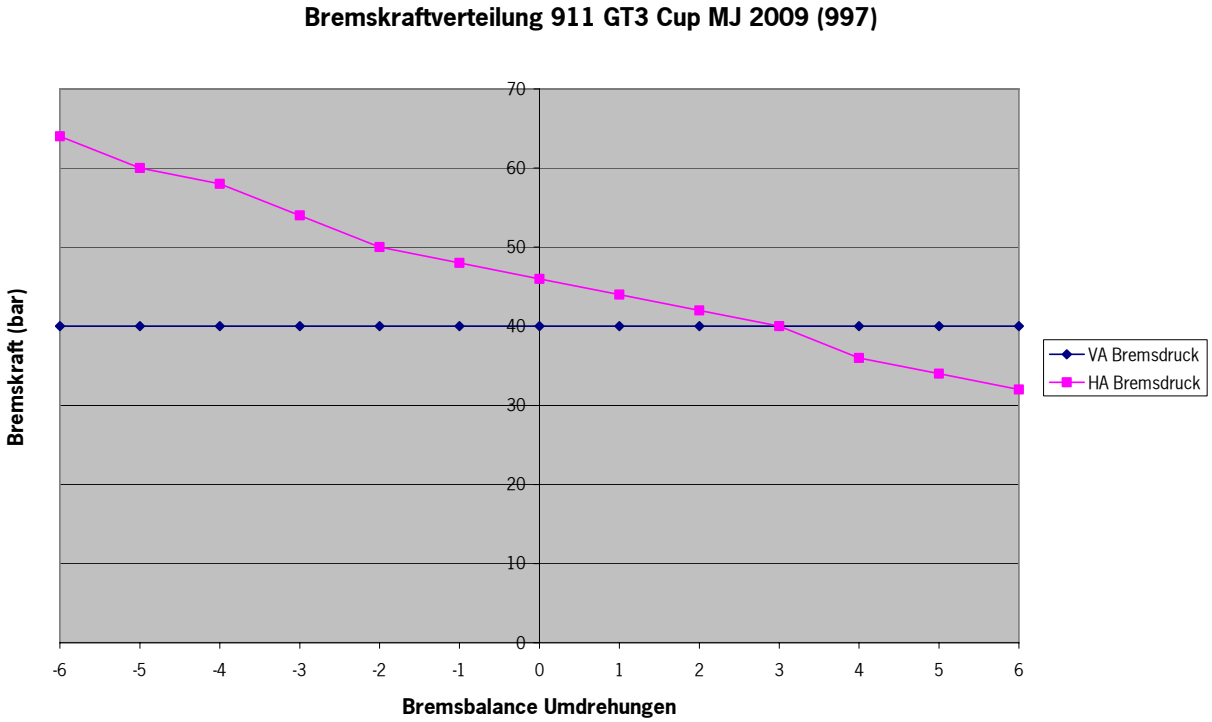
Attention:

- The potentiometer is set initially to zero.
- Only remove the transport safety block and operate the potentiometer when the complete assembly is fitted to car and the shaft has been mounted to the balance bar. The balance bar MUST be set in the middle position before fitting the potentiometer.
- The display values must not exceed +7 or -7 when rotating the balance bar (the potentiometer will be severely damaged if rotated beyond these values).
- Potentiometers removed from the car should be set to zero with the MoTeC System before being refitted.

Direction of rotation “-“ balance to rear (- 7 = max rear pressure)

Direction of rotation “+” balance to front (+7 = max front pressure)

Basis setup **+2** = front axle 40 bar rear axle 43 bar



Chassis

Construction

- Weight optimised road going 2009 911 GT3 RS shell.
- Interior without insulation.
- Integral roll-cage in accordance with DMSB guidelines
- CFC boot lid with integrated RAM – Box and engine air filter
- Adjustable CFC rear wing
- GT3 Cup front end with upper cooling air exit duct and front spoiler
- GT3 Cup rear end from CFC
- CFC doors and CFC window frame
- Polycarbonate side door windows, rear and front screens

Fuel tank

- Production 89 litre tank.

Seat

- OMP racing bucket seat (driver's side only) optimised for HANS Safety system.

Safety harness

- Schroth 3" six-point harness without ASM – adapted for HANS Safety System.

HANS system

- All cars from the 2004 model onwards are optimised for the HANS safety system.

HANS Safety System supplier:
Schroth Safety Products GMBH
Postfach 2440
59714 Arnsberg
Germany

Fire extinguisher system

- Fire extinguisher in accordance with FIA standard 4 litre AFFF

Exterior colour

- Carrara white B9A

Interior colour

- Primer (without top coat)

Dashboard:

Dashboard with MoTeC Display.

The MoTeC Display can be programmed freely and has a 1 Mb memory for data recording.

(Optional 4 Mb memory)

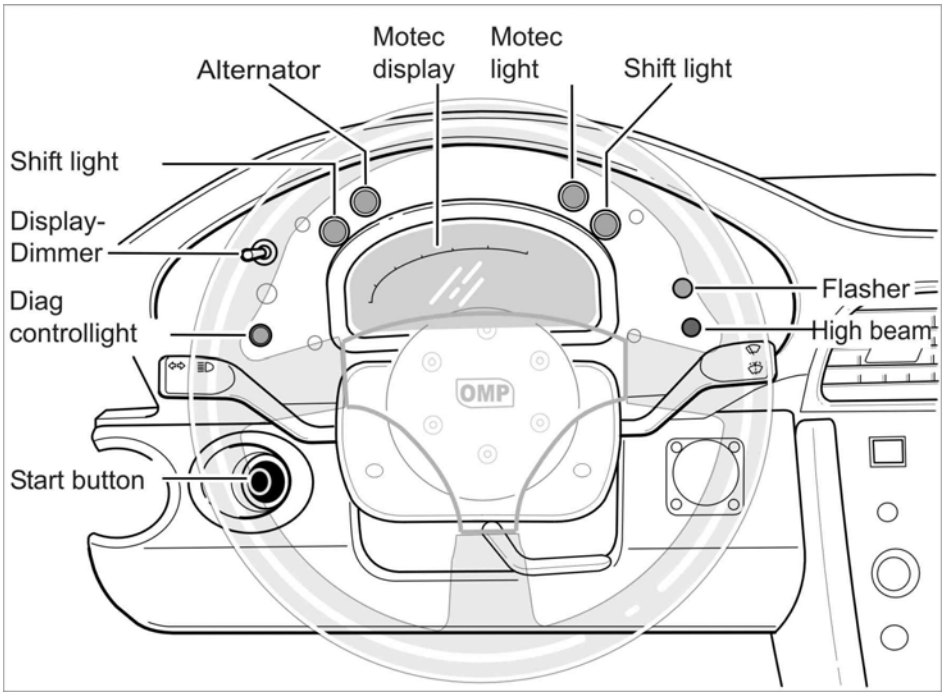
Driver cooling / windscreen ventilation:

The fan has three possible settings:

“Pushed in” position: 100% foot well, ventilation ducts and driver cooling

“Pulled out” position: 100% windscreen ventilation

The air distribution is variable in the position between “pushed in” and “pulled out”.



MoTeC – Display

Analogue freely programmable

CAN blocked

Race:

- Engine revs
- Vehicle speed
- Lap time
- Water temperature
- Oil temperature
- Oil pressure
- Fuel pressure
- Gearbox oil temperature
- Fuel consumption per lap
- Total fuel consumption
- Gear indicator
- Reverse gear indicator

Practice:

- Engine speed (bar graph)
- Engine speed (digital)
- Vehicle speed
- Brake balance
- Lap time
- Water temperature
- Oil temperature
- Oil pressure
- Fuel pressure
- Gear indicator
- Reverse gear indicator
- Battery voltage
- Time remaining for data recording

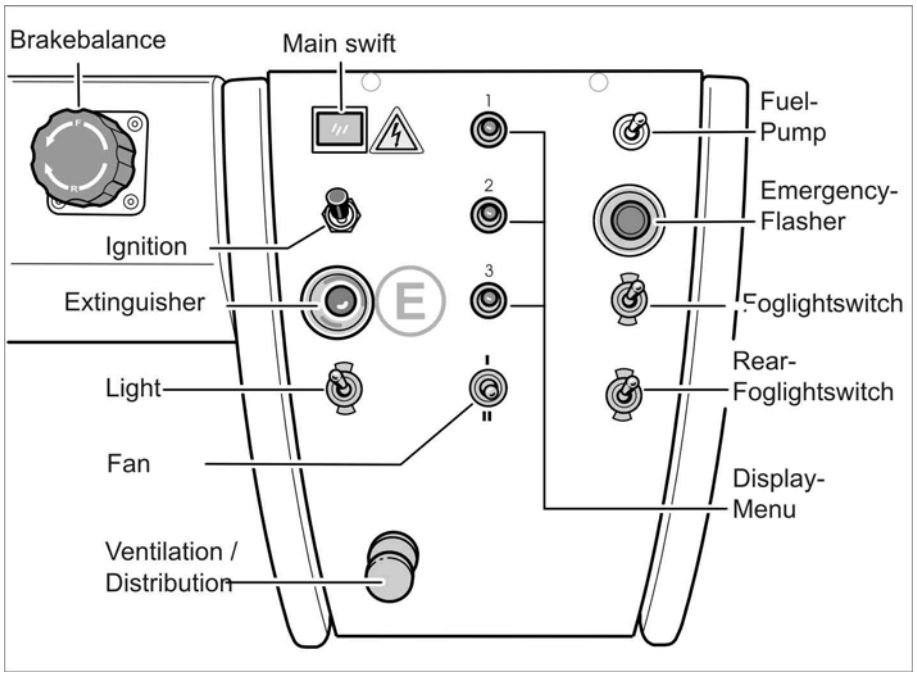
Warm-up:

- Engine revs
- Water temperature
- Battery voltage
- Oil temperature
- Gear indicator
- Reverse gear indicator
- Fuel pressure
- Throttle angle
- Gear potentiometer – voltage indicator
- Gear shift sensor voltage indicator

Standard sensors fitted in car:

- 4 x wheel speed sensors
- Clutch system pressure sensor
- Acceleration sensor
- Fuel level
- Lap Trigger
- Fuel pressure sensor
- Oil pressure sensor
- Engine speed sensor
- Water pressure sensor

Centre console:



“Diag Control Light”:

The “Diag Control Light” is controlled by electronic errors (sensors) which occur at a particular frequency, or are permanently active. The lamp indicates MS3.1 system errors.
A special software program is required to delete the errors (Bosch Modas), which must be purchased form Porsche Motorsport.

Fuel pump switch:

Position “Service”
The pump runs with the ignition (only to drain any remaining fuel in the tank).

Position “Bosch”
Pump only runs when the engine is running.

Data logging:

MoTeC Display with 1 Mb data logging memory.
Option:

- Steering angle sensor in connection with 2 Mb memory
- Brake pressure sensors
- upgrade memory 4 Mb

Interface:

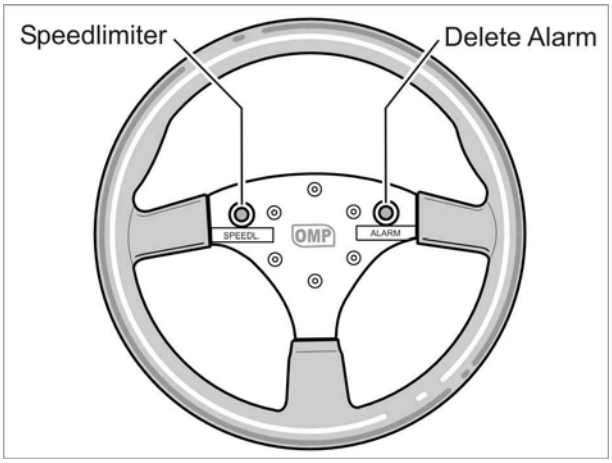
CAN: When using the CAN interface in connection with a data acquisition system (not MoTeC) the terminating resistor must be re-located.
The Cup MoTeC System is distributed exclusively worldwide by Brückle – Motorsport.
If you require information or a system please contact
Brückle – Motorsport directly.

Information directly from:

Brückle - Motorsport
Consulting GMBH
Werner Brückle
Zennerstr. 29
D 81379 München
Tel. +49 89 72308198
Fax +49 89 72308199
E – Mail : werner.brueckle@t-online.de

Steering wheel:

Steering wheel with buttons to activate pit lane speed limiter and to reset the alarm display in the MoTeC display

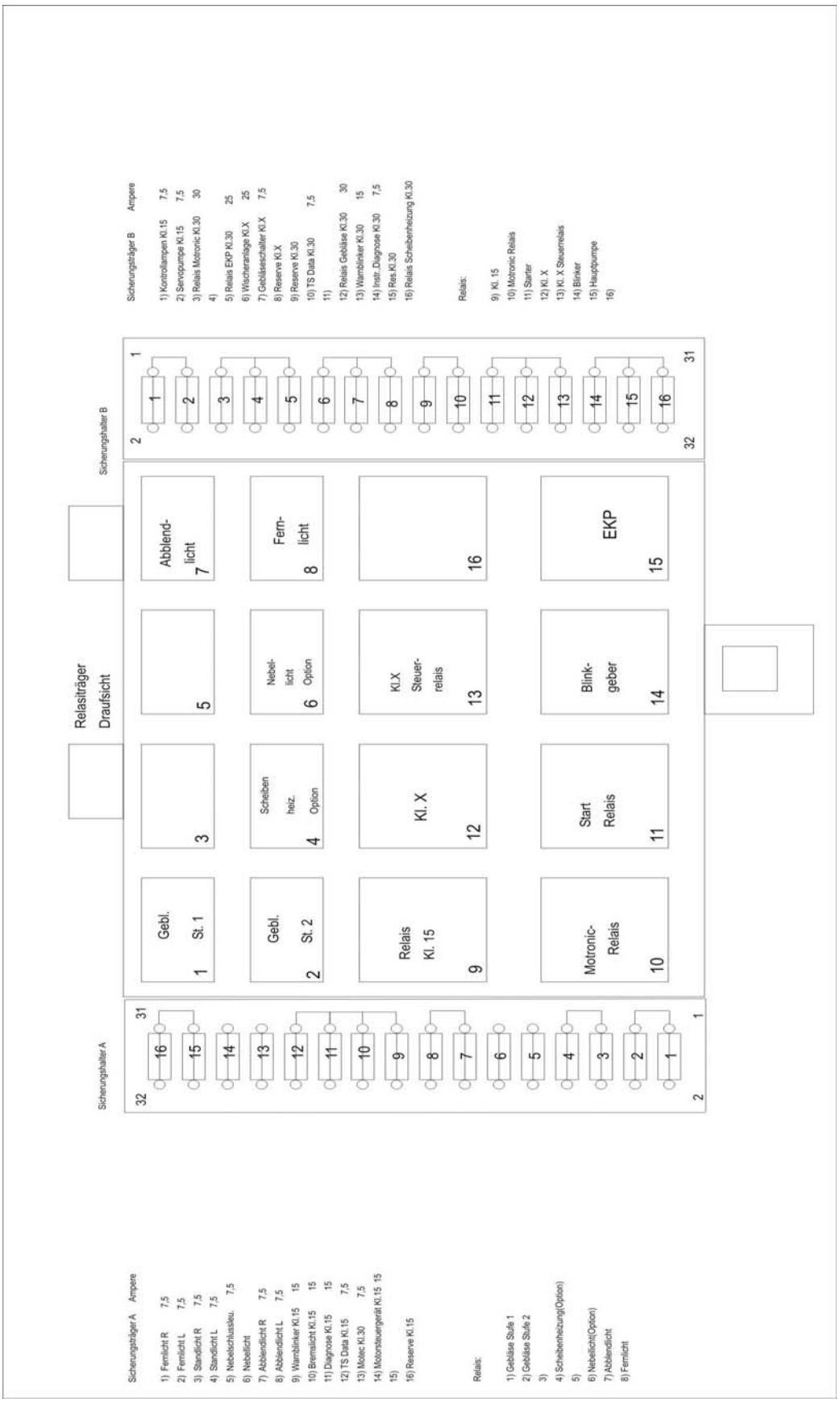


Pit lane speed limiter is programmed to 55 km/h, but can be re-programmed with the Bosch Modas system. For a proper use of the pit lane speed limiter Porsche Motorsport recommends to use 1st gear and full throttle while pit lane speed limiter is active.

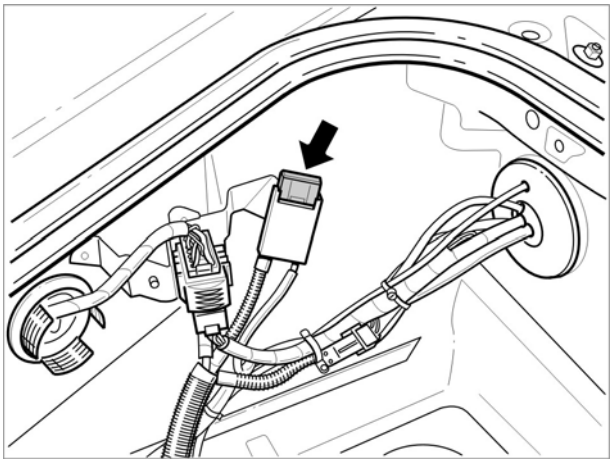
Battery main relay:

Only operate the master switch approximately 10 seconds after having switched off the engine with the ignition switch.

Relay and fuse layout



Location of main fuse for steering hydraulic



Boot, front right (80 A)

Fire extinguisher system:

The car is equipped with an FIA homologated fire extinguishing system. AFFF extinguishing agent is used. The cylinder has two separate chambers each with a capacity of two litres. The extinguishing agent is discharged through three nozzles located in the engine bay and a further three located within the cockpit.
The fire extinguisher is activated by a push button mounted on the dashboard or by the emergency switch located on the left hand side of the windscreen cowl.
The system's operating range is between -15° C and +60°C. The extinguisher cylinder must be protected from frost and should never be stored where the ambient temperature can drop below -15°C.
The operating pressure of system is 14 bars, and should be checked regularly using the manometer mounted to the extinguisher bottle.

Attention: The extinguishing agent, extinguisher cylinder and flexible pipes should be replaced after a maximum of 2 years from the date of manufacture by original new spare parts.

Fire extinguisher activation:

The extinguisher system is live when the toggle switch on the trigger box is set in the "**System Active**" position. The extinguisher is discharged by pressing the dash mounted push button and/or by pushing the button located on the windscreen cowl.

Extinguisher system error analysis:

Battery check:

Hold the toggle switch on the trigger box in the "Battery Check" position. If the battery charge state is good the trigger box warning lamp will blink.

Warning lamp does not glow:

The following points should be checked if the warning lamp does not glow:
Check battery charge state (refer to 'Battery Installation').
Check the cable connection to the buttons (refer to 'Trigger box wiring harness')
Check fire button function.

Battery installation:

Attention: The toggle switch on the trigger box must be set in the 'System Inactive' position.

Remove the trigger box cover and change the battery. Ensure that the battery poles are connected correctly. Only Alkaline batteries should be used.

Checking the firing button:

Attention: The toggle switch on the trigger box must be set in the 'System Inactive' position.

Press the button in the windscreen cowl. If the switch is functioning correctly the trigger box warning lamp will glow.

Press the push button mounted on the dashboard. If the switch is functioning correctly the trigger box warning lamp will glow.

Vehicle Sensors Nominal Values

Vehicle 997 GT3 Cup Model 2009

Measured Variable	Modas name	Nominal Value	Comment
Engine idle speed	nnmot_w	2000 +/-100 U/min	under operating temperature
Throttle angle (full throttle)	wdkba_w	80 +/- 2 deg	Bosch value => is equal to 100% in MoTeC
Lambda cyl. 1-3/4-6	lamsoni(2)_w	0.9 +/- 0.1	Throttle angle > 10 deg
Lambda correction factor	fr(2)_w	1.0 +/- 0.2	
Battery voltage	ub	13 +/- 1 V	
water pressure	pwater	> 0.2 bar	
fuel pressure	pfuel	3.8 bar +/- 0.25 bar	
clutch pressure	pclutch_w	> 30 bar	clutch completely actuated
voltage gear lever sensor	ugs_w	2.45 +/- 0.1 V	
gearbox poti	ugang_w		
6.		3.85 +/- 0.04 V	Needs to be set
5.		3.45 V	automatically if 6th gear voltage is set
4.		3.04 V	automatically if 6th gear voltage is set
3.		2.63 V	automatically if 6th gear voltage is set
2.		2.21 V	automatically if 6th gear voltage is set
1.		1.82 V	automatically if 6th gear voltage is set

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Postfach 1140
71283 Weissach

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