SUPPLEMENT TO 911 WORKSHOP MANUAL
(XIII)

This supplement contains the following pages:

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E 93a - E 93b

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SW 1

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Please insert the pages of this supplement into the appropriate groups in the 911 Workshop Manual, removing superseded pages where applicable.

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Individual size groups can be found from the pairing table.

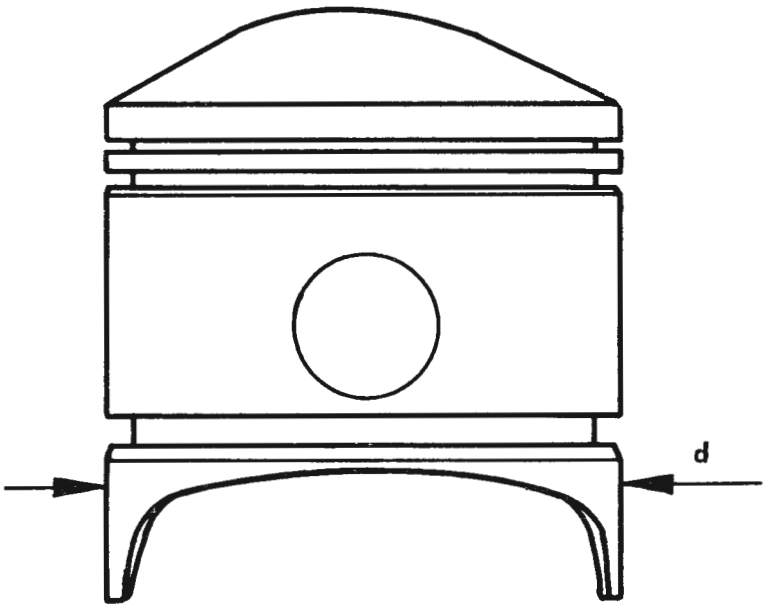
Standard size pistons can only be obtained in complete sets with the matching cylinders.

Oversize pistons can be purchased individually from a spares stockist or obtained by exchange of a complete set of cylinders and pistons.

Cylinders may be rebored by any workshop in accordance with the following table.

In order that measurement may be as accurate as possible, we recommend use of a dial gauge with end measurements.

Pistons exhibiting traces of scoring or wear should not be refitted.



Ill. 193

Cylinder marking	Cylinder diameter	Piston marking	Piston diameter	Clearance between cylinder and piston
Normal		Normal		
- 1	79.990 - 80.000 (3.1492 - 3.1496")	- 1	79.925 - 79.935 (3.1466 - 3.1470")	0.055 to
0	80.000 - 80.010 (3.1496 - 3.1500")	0	79.935 - 79.945 (3.1470 - 3.1474)	0.075 (.0022
+ 1	80.010 - 80.020 (3.1500 - 3.1504")	+ 1	79.945 - 79.955 (3.1474 - 3.1478")	to .0029")
Oversize				
- 1 KD 1	80.490 - 80.500 (3.1689 - 3.1692")	- 1 KD 1	80.425 - 80.435 (3.1663 - 3.1667")	0.055 to
0 KD 1	80.500 - 80.510 (3.1692 - 3.1696")	0 KD 1	80.435 - 80.445 (3.1667 - 3.1671")	0.075 (.0022
+ 1 KD 1	80.510 - 80.520 (3.1696 - 3.1700")	+ 1 KD 1	80.445 - 80.455 (3.1671 - 3.1675")	to .0029")

The piston is too worn for further use if diameter at the point of measurement is 0.05 mm (.00196") below size when fitted.

The cylinder is too worn for further use if diameter at the point of measurement is 0.05 mm (.00196") below size when fitted.

Piston Type 911 S (901/02)

Fig. 193a

Cylinder Size	Cylinder Bore Dia	Piston Dia D 1
Standard		Tol. ± 0.005
0	80.00-80.01	79.950
1	80.01-80.02	79.960
2	80.02-80.03	79.970
Oversize		
0 KD 1	80.50-80.51	80.450
1 KD 1	80.51-80.52	80.460
2 KD 1	80.52-80.53	80.470

Cylinder/piston clearance: 0.045 - 0.065
Forged light alloy (box-form)
Piston weight: 364 ± 3 g, 0.8 mm off-center

Piston Type 911 L (901/01/05/06)

Fig. 193b

Standard		Tol. ± 0.005
0	80.00-80.01	79.960
1	80.01-80.02	79.970
2	80.02-80.03	79.980
Oversize		
0 KD 1	80.50-80.51	80.460
1 KD 1	80.51-80.52	80.470
2 KD 1	80.52-80.53	80.480

Cylinder/piston clearance: 0.035 - 0.055
Light alloy pressure die casting
Piston weight: 371 ± 3 g

Piston Type 911 T (901/03)

Fig. 193c

Standard (Mahle)		Tol. ± 0.005
0	80.00-80.01	79.970
1	80.01-80.02	79.980
2	80.02-80.03	79.990
Oversize		
0 KD 1	80.50-80.51	80.470
1 KD 1	80.51-80.52	80.480
2 KD 1	80.52-80.53	80.490

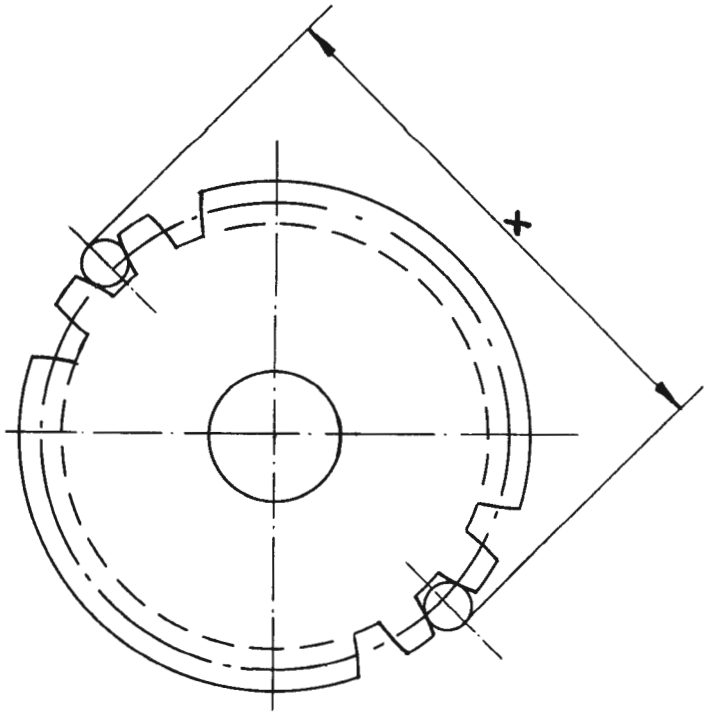
Cylinder/piston clearance: 0.025 - 0.045
Piston weight: 356 ± 3 g

Standard (Schmidt)		Tol. + 0.006 - 0.007
0	80.00-80.01	79.960
1	80.01-80.02	79.970
2	80.02-80.03	79.980
Oversize		
0 KD 1	80.50-80.51	80.460
1 KD 1	80.51-80.52	80.470
2 KD 2	80.52-80.53	80.480

Cylinder/piston clearance: 0.035 - 0.055
Piston weight: 366 ± 3 g

The best way to determine the exact extent of wear in the gear of the intermediate shaft is as follows:

Measure the gear with the aid of steel rollers of 4.5 mm diameter (see sketch).



If dimension X = 136.5 mm is of a lesser value, the intermediate gear and the drive gear will have to be replaced.

If the intermediate gear is marked with the number 1, dimension X must not be less than 136.55 mm.

In addition to the above, the visual inspection for traces of wear is, of course, of great importance.

REMOVING AND INSTALLING INTERMEDIATE SHAFT

(Pressure die-cast crankcase)

General

A lapped bearing insert is used in the pressure die-cast crankcase to support the rear journal of the intermediate shaft. As a result, journal diameter of the intermediate shaft has been changed at this point. This type of intermediate shaft cannot be installed in crankcases of the older version.

Installation

When installing the bearing inserts, make sure that the insert alignment tab is seated in the corresponding notch in the insert cradle (see Fig. 1). Intermediate shaft end play adjustment is no longer necessary in the pressure die-cast crankcases; the end play is determined by the lapped bearing insert.

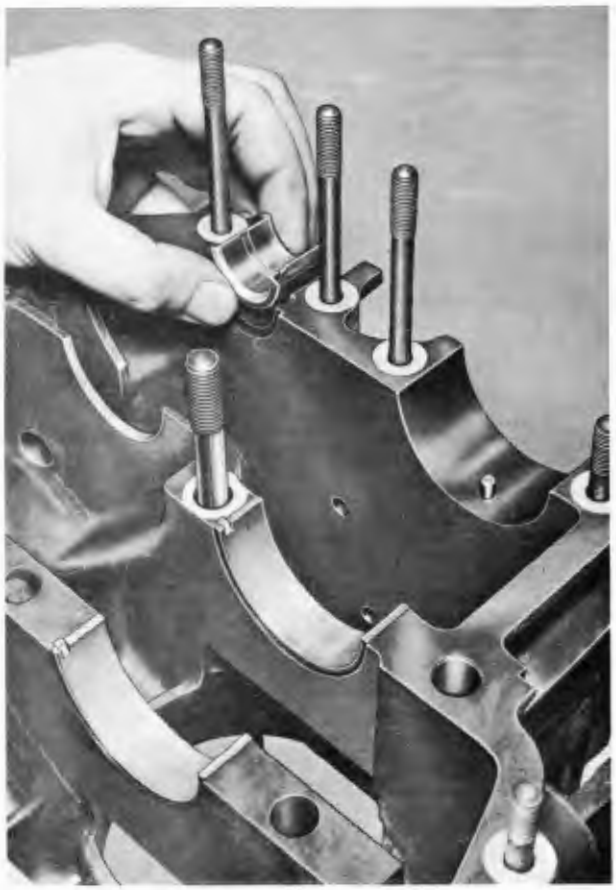


Fig. 1

Work procedure pertaining to the installation of the intermediate shaft remains unchanged, with the outline given in section 38 En, page E 93, still applying.

HEATER AND HAND THROTTLE CONTROLS

(from 1968 model on)

General

From 1968 models on, the heater control lever is incorporated in the handbrake support housing. In vehicles 911 S, 911 L, and 911 T-Sportomatic, a hand throttle also is installed in the handbrake support housing.

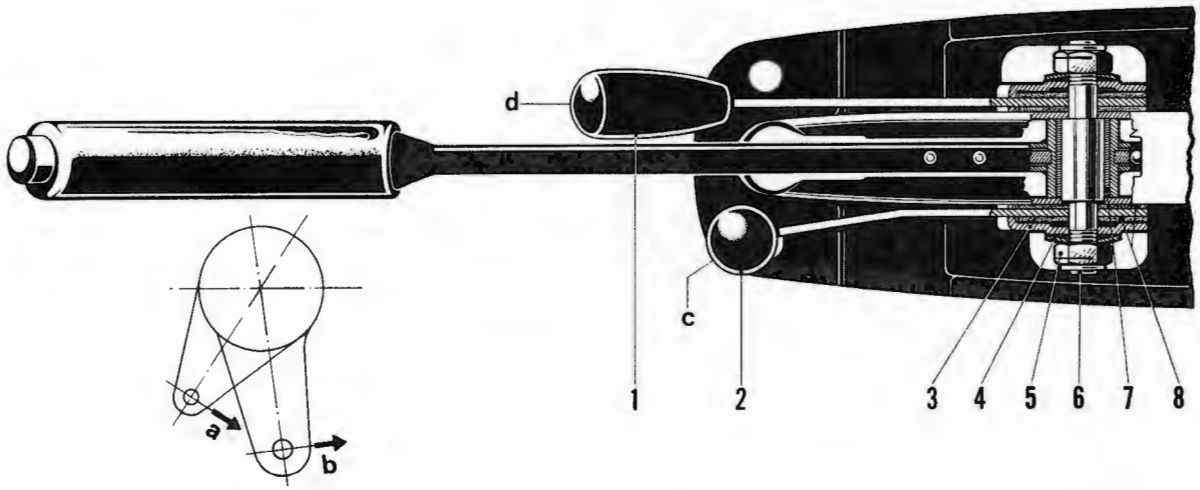


Fig. 1

1 Heater control lever
2 Hand throttle lever
3 Pressure disc
4 Cup spring
5 Self-locking hex nut
6 Pivot shaft
7 Distance sleeve
8 Friction disc

a Limiting friction of heater lever clutch is 10 kp (22 lbs)
b Limiting friction of hand throttle clutch is 6 kp (13 lbs)
c Hand throttle lever knob is pressed on (avoid damaging the knob)
d Heater lever knob is screwed on

DISASSEMBLING AND REASSEMBLING HEATER AND HAND THROTTLE CONTROLS

Disassembly

1. Remove tunnel cover and handbrake lever dust boot.

2. Remove knob from heater control lever.

3. Remove retaining hex bolts from handbrake support housing.

Fig. 2

4. Remove self-locking hex nut which secures heater control lever. Withdraw cup spring, pressure disc, friction disc, and heater control lever.

Fig. 3

5. Lift handbrake support housing a little, unsnap and pull out cable equalizer retaining stud.

Fig. 4

6. Pull out handbrake control lamp wire from switch assembly and remove handbrake support housing.

7. Remove lock ring which secures hand throttle drag link, withdraw washer and drag link.

8. Remove self-locking nut which secures hand throttle lever. Withdraw cup spring, pressure disc, friction disc, lever, and second friction disc.

9. Withdraw pivot shaft.

10. Remove heater control lever (see R+R Heater Control Cable).

Reassembly

Note the following points at reassembly:

1. Grease pivot shaft with multipurpose Lithium grease prior to installation.

2. Insert heater control lever into the handbrake support housing, install and secure cable equalizer stud.
   Note: Check handbrake cables for proper seating.

3. Torque handbrake support housing bolts to 2.5 mkp (18 lb-ft).

4. Install friction discs dry and make sure that the mating friction surfaces are also dry and free of grease.

5. Tighten self-locking hex nuts so that the stud is about flush with the nut and the lever does not slip back when the heater is fully on. On the other hand, however, the lever should not be too tight.

6. Check adjustment of heat control flaps (see R+R Heater Control Cable).

7. Check adjustment of hand throttle control (see page SE 31).

8. Check handbrake adjustment (see page T 22).

REMOVE AND REINSTALL HEATER CONTROL CABLE

Removal

1. Disconnect heater control cables at the flaps in heat control boxes.

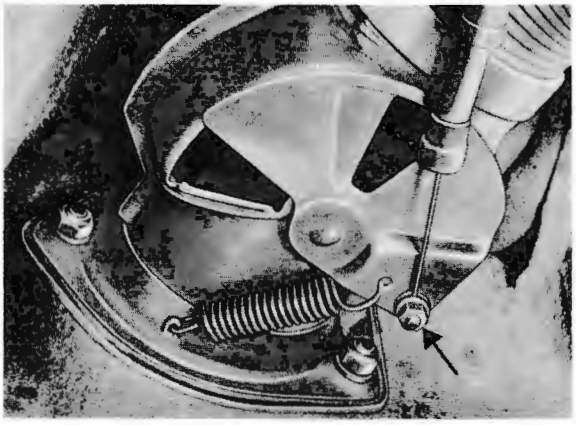


Fig. 5

2. Remove tunnel cover and handbrake lever dust boot.

3. Remove retaining hex bolts from handbrake support housing.

Fig. 6

4. Slightly raise handbrake support housing, unsnap and pull out cable equalizer retaining stud.

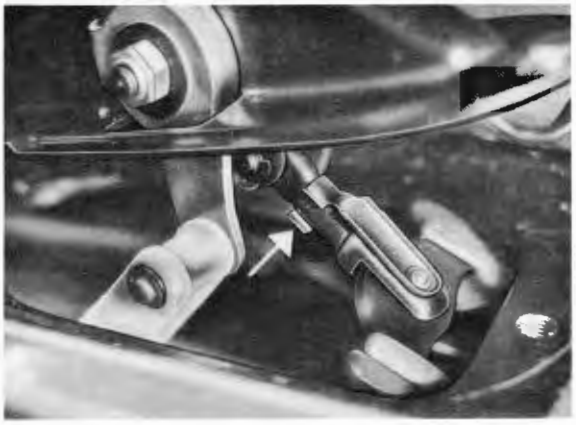


Fig. 7

5. Pull heater control cable out of the heater control lever and conduit tubes in center tunnel.

Installation

Note the following points during installation:

1. Feed the longer end of the heater control cable into the left conduit tube, greasing the cable as it is being inserted (use multipurpose Lithium grease). Make sure that the cables are not crossed.

2. Install and secure the cable equalizer attaching stud.
   Note: Check handbrake cables for proper seating.

3. Torque handbrake support housing to 2.5 mkp (18 lb-ft).

4. Push heater control lever forward to stop in "off" ("zu") position, reconnect heater control cables to the flaps in heat control boxes.

   Note: Do not fail to install cable dust caps in guide tubes in heat control box clamps.

5. Check heat control flaps for proper functioning. The flaps must move in unison, opening and closing fully.

6. Check adjustment of the hand throttle control (see page SE 31).

7. Check handbrake adjustment (see page T 22).

ADJUSTING HAND THROTTLE CONTROL LEVER

1. Fold forward the center tunnel cover at hand-brake support housing.

2. With engine warm, it must be possible to raise engine speed to 4000 rpm when the hand throttle lever is fully opened.
   Caution: Do not overspeed the engine.

3. Hand throttle adjustment can be made by re-setting the clamping collar on the throttle control rod in the center tunnel.

Fig. 8

General

The Hardi electric fuel pump is of the pulsating-diaphragm type. The breaker points are mounted on the magnet housing beneath a transparent plastic cap. The pump diaphragm and its spring are located between the magnet housing and valve housing which contains the inlet and outlet fuel valves as well as a filtering screen. When the ignition is switched on, the magnet becomes energized and pulls the armature, to which the diaphragm is attached, against the pressure of the diaphragm spring. At the end of this stroke, a pressure rod connected to the diaphragm trips the breaker point mechanism, opening the breaker points. As a result, electric current ceases to flow through the magnet and diaphragm spring tension takes over, pushing the diaphragm back and forcing the fuel out of the pump. Since the spring tension determines the fuel delivery pressure, it must not be changed or altered. At the end of the delivery stroke, the contacts close, energizing the magnet and repeating the pumping cycle again.

Pump Specifications

Fuel delivery rate, with suction and discharge points on same level	= 900 cc/min (30 fl. oz./min)
Fuel pressure with float needle valve closed	= 0.25-0.30 atm (3.6-4.3 psi)
Max. current draw	= 1.6 amps

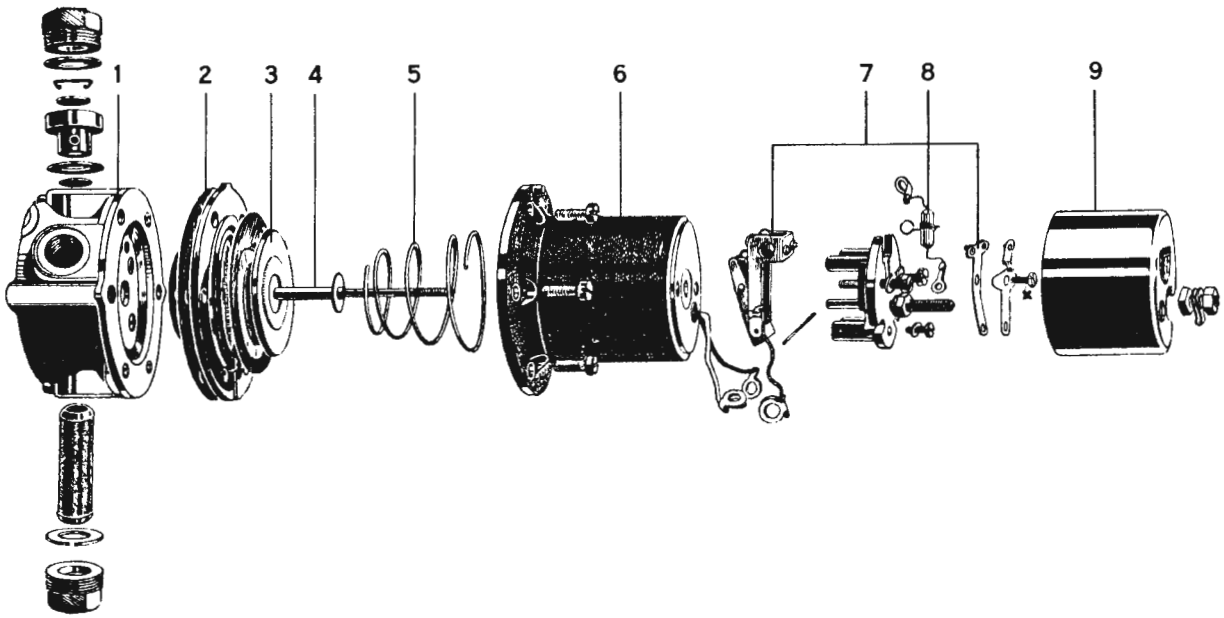


Fig. 1

1 Valve housing
2 Diaphragm
3 Armature
4 Pressure rod
5 Diaphragm spring
6 Magnet housing
7 Breaker points
8 Condenser
9 Plastic cap

REMOVING AND INSTALLING FUEL PUMP

Removal

1. Disconnect fuel line banjos from pump.
2. Remove pump retaining bolts and detach ground wire at the support.
3. Detach positive (+) lead from terminal in pump.

Installation

Note the following points during installation:

1. Check support grommets, replace if necessary.
2. Use only good gasket rings when reattaching fuel line banjo connections.

REMOVING AND INSTALLING DIAPHRAGM

Removal

1. Remove the 6 valve housing retaining screws and withdraw housing.
2. Unscrew diaphragm by turning counter-clockwise. Withdraw diaphragm with armature and spring from the magnet housing.

Installation

1. Place spring onto pressure rod with small coil against the armature.

   Caution: Do not alter spring tension since it determines fuel delivery pressure.

2. Insert diaphragm with spring into magnet housing. Screw the pressure rod so far into the lower part of the rocker assembly until the contacts will no longer open when the diaphragm is pushed up.
3. Now the diaphragm and pressure rod should be turned counter-clockwise until the points will just begin to open (throw-over point) when the diaphragm is pushed up.
4. To ensure proper functioning of the breakers, turn the diaphragm and pressure rod 300° (5 screw holes) counter-clockwise from the point determined in Point 3, above.
5. Install valve housing and tighten slotted screws uniformly across.

REMOVING AND INSTALLING BREAKER POINTS

Removal

1. Remove valve housing retaining screws and withdraw housing.
2. Unscrew diaphragm.
3. Unfasten and remove plastic cap.
4. Remove adjusting screw from upper part of breaker assembly as well as condenser and breaker assembly retaining screws. Remove condenser and upper part of breaker assembly.
5. Remove hinge pin from lower part of breaker assembly and withdraw the lower part.

Installation

Note the following points when installing the lower and upper parts of the breaker assembly:

1. Lubricate breaker pivots making sure that contacts do not oil up.
2. Adjust breaker gap. Push diaphragm up so that the points are open, then adjust gap to 1.2 mm (.05") by turning the adjusting screw. The adjusting screw must engage the contact spring.
3. Secure plastic cap. Do not forget the gaskets.

General

The following changes have been made in front axles of all Type 912 and 911 vehicles effective with the 1968 models:

1. Front track widened by 14 mm to 1367 mm (53.82") through modified front wheel hubs. (New grease caps without expansion slots have to be used in the new wheel hubs to prevent loss of grease.)

2. Redesigned reinforcing support member.

3. Redesigned transverse control arms with integral rubber mounts.

4. Front axle stabilizers:

   Type 911 L (except USA) = 11 mm dia (.433")
   Type 911 L-USA and 911 S = 15 mm dia (.591")

   (Make sure during installation that rubber mounts of a size matching the stabilizer diameter are used.)

5. Other front axle modifications are shown in Fig. 1.

Work procedures which differ from those previously published are outlined herein.

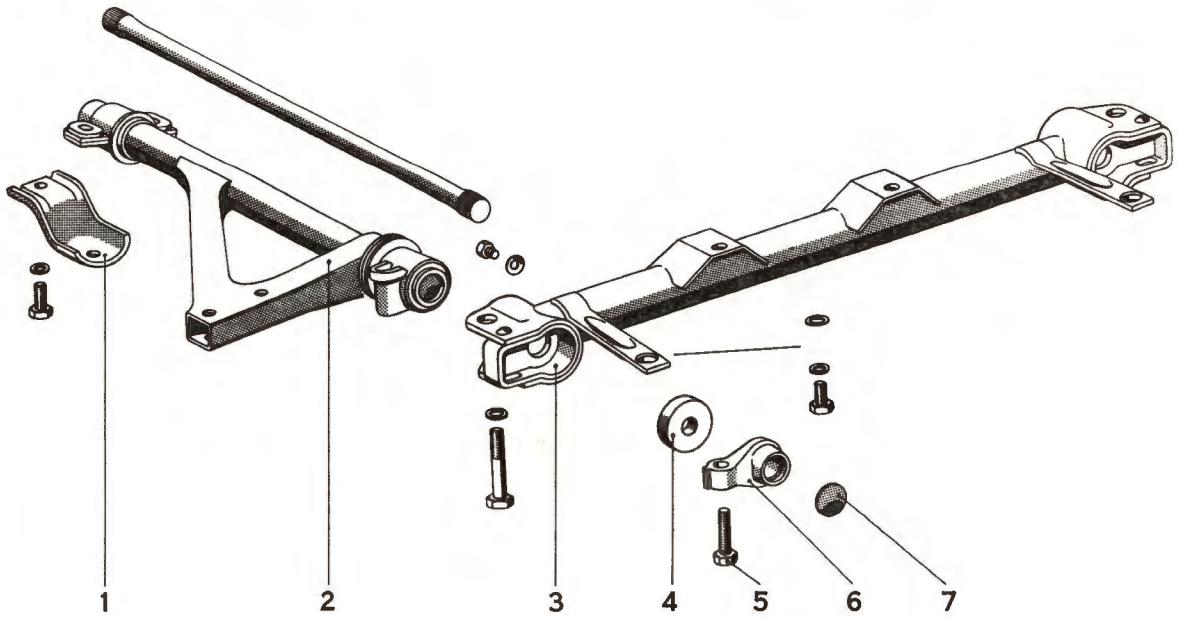
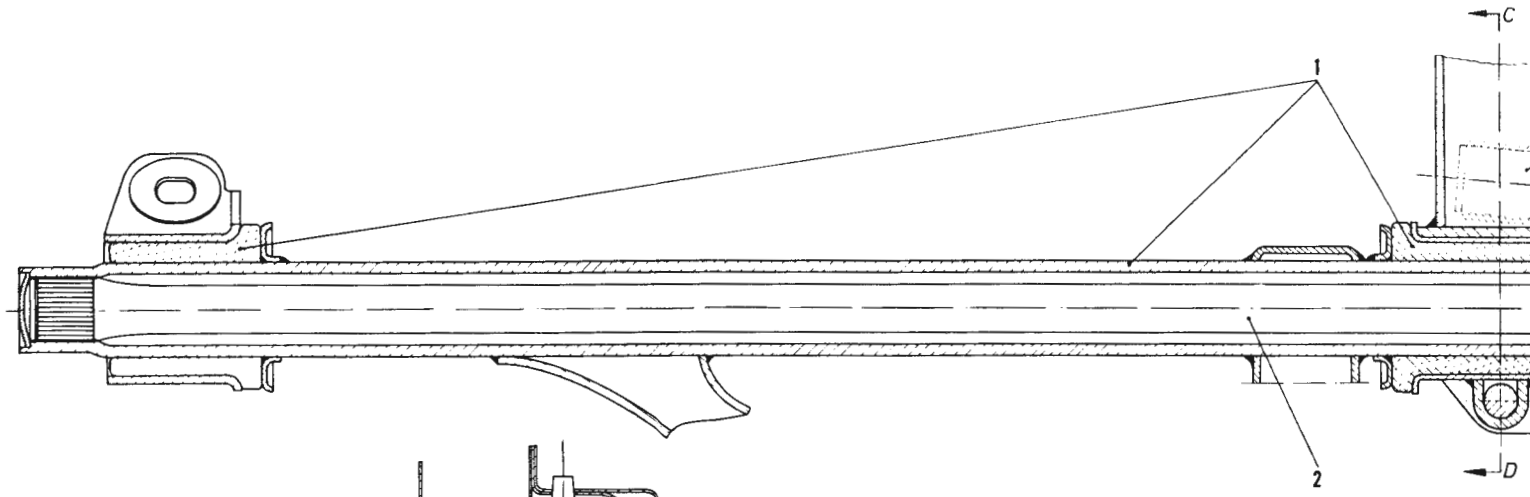
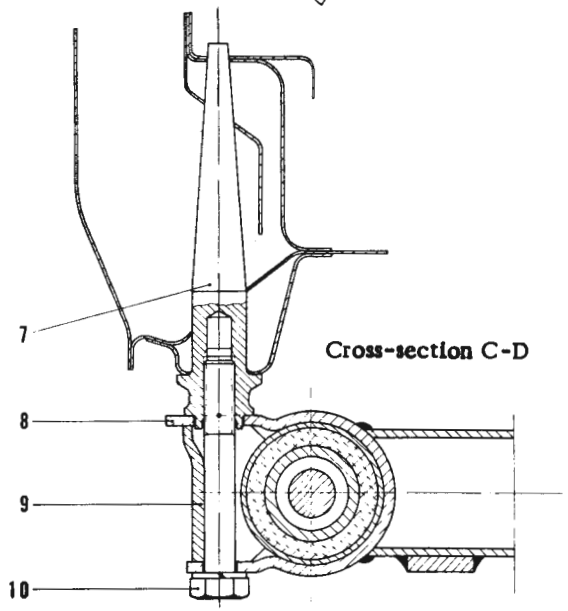


Fig. 1

1 Cover bracket
2 Transverse control arm (left)
3 Reinforcing crossmember
4 OWA-seal
5 Adjusting screw
6 Adjusting lever
7 End cap

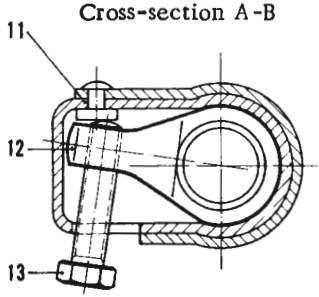
SCHEMATIC OF TRANSVERSE CONTROL ARM WITH REINFORCING CROSSMEMBER, 1968 M





Cross-section C-D

Cross-section A-B



1 Left transverse control arm, compl.
2 Torsion bar
3 Reinforcing support member
4 End cap
5 OWA-seal
6 Adjusting lever
7 Mounting point for support member, welded to body
8 Reinforcing support member
9 Transverse control arm
10 Hex bolt
11 Reinforcing sup
12 Adjusting leve
13 Adjusting screw

REMOVING AND INSTALLING TRANSVERSE CONTROL ARM

Special Tools:

P 288 Transverse control arm testing fixture

Removal

1. Unscrew torsion bar adjusting screw.

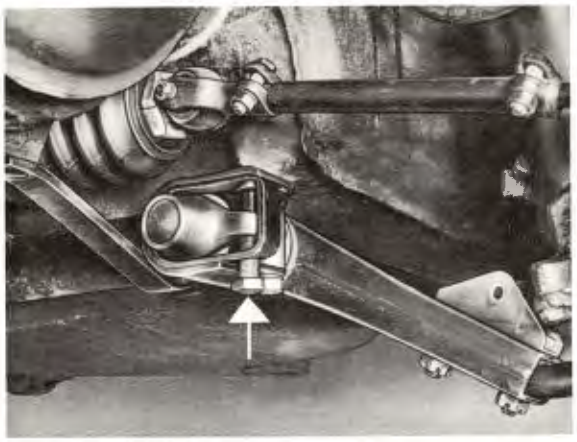


Fig. 3

2. Unlock and remove castellated nuts from transverse control arm, take bolts out, and slide the shockabsorber strut and ball joint assembly out of the control arm.

Fig. 4

3. Pull adjusting lever off torsion bar and remove OWA-seal.

4. Remove transverse control arm and reinforcing support member hex bolt.

Fig. 5

5. Remove retaining bolts from control arm rubber mount cover bracket and remove bracket.

Fig. 6

6. Press the transverse control arm and torsion bar out of the reinforcing support member and remove.
   Note: If both transverse control arms are to be removed, first remove one arm and lightly fasten the loose and of the reinforcing support member with the hex bolt to keep the member in place.

Inspecting Parts

1. Check transverse control arm with the P 288 testing fixture.

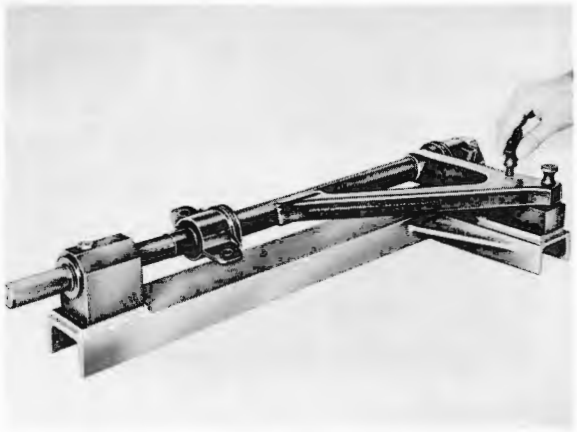


Fig. 7

   a. Using an appropriate punch, drive the spline-covering end cap out of the transverse control arm.

   b. Using a new transverse control arm, align adapter and tighten it.

   c. Place control arm in special tool P 288. If both reference pins cannot be fully inserted, or if the control arm ends do not fit into the reference journals of the special tool, the transverse control arm will have to be replaced.

   d. Insert end cap in transverse control arm, with the bulging part facing out, and drive into position with a suitable punch.

2. Visually check rubber mount in control arm for damage. Damaged rubber mounts require replacement of the entire control arm.

3. Check torsion bar for damaged splines or chipped lacquer finish, especially for traces of rust, replacing the bar if necessary.

Installation

Note the following points during installation:

1. Lightly coat the torsion bar with Lithium grease, coating the splines especially well, and insert the bar into the transverse control arm.
   (Make sure that end cap is not knocked out of the control arm.)
   Note: The torsion bars are pre-stressed in manufacture. Care must be taken that the right and left bars are not switched inadvertently. For this reason, each torsion bar has an identifying letter stamped into the flank, i.e., "L" for left and "R" for right (see illustration).

Fig. 8

2. Insert transverse control arm and torsion bar assembly into the reinforcing support member and torque hex bolts at front rubber mount to 4.7 mkp (34 lb-ft). Torque support arm and crossmember retaining hex bolt to 9.0 mkp (65 lb-ft).

3. Slide ball joint attaching end into the transverse control arm and torque castellated nuts of hex bolts to 7.5 mkp (54 lb-ft). Secure nuts with cotter pins.

Fig. 9

4. Slide the OWA-seal onto the torsion bar from the open pocket side of the reinforcing support member.

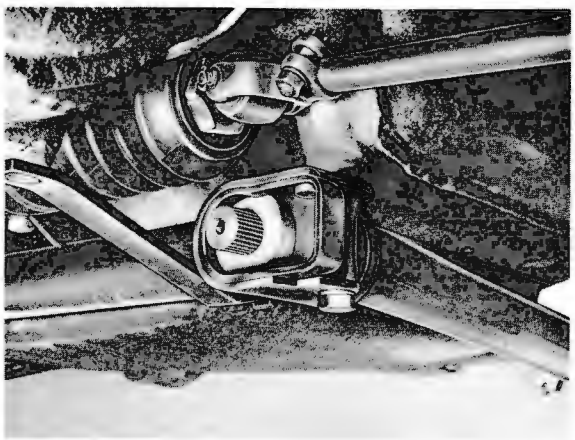


Fig. 10

5. Slide the adjusting lever onto the torsion bar as follows:

   a. Using a tire tool or similar lever, push the transverse control arm down as far as the attached shockabsorber strut will allow, then slide the torsion bar adjusting lever onto the torsion bar splines, leaving as little clearance at the lever adjusting point as possible. (The end cap must already be installed in the adjusting lever.)

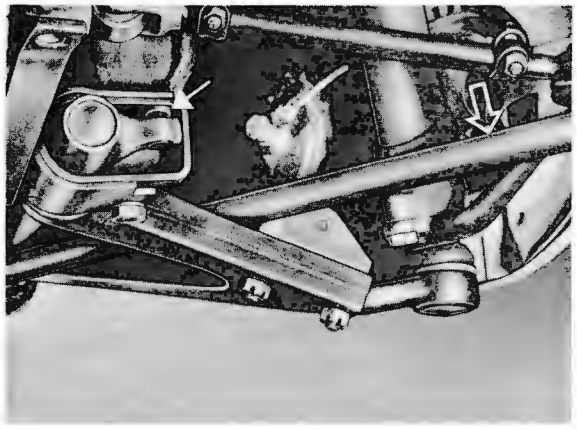


Fig. 11

   b. Coat threads of adjusting screw with MoS_2 grease and lightly tighten the screw in place.

6. Check end cap for proper seating in control arm, install rubber mount cover bracket, torque bolts to 4.7 mkp (34 lb-ft).

Fig. 12

7. Adjust front-end height and check wheel alignment on optical alignment ramp. (See Group W).

Removal

1. Remove torsion bar adjusting screw.

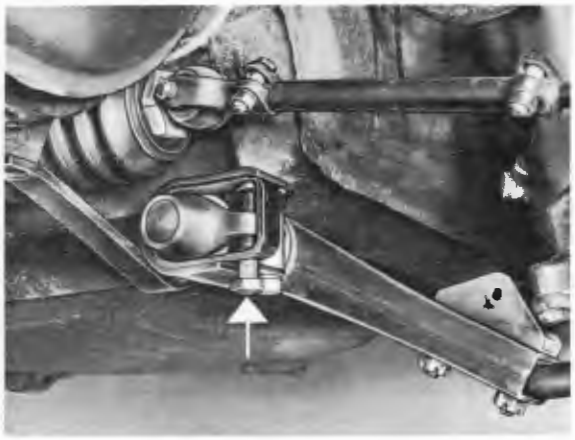


Fig. 13

2. Pull adjusting lever off torsion bar and withdraw OWA-seal.

3. Remove hex bolts from forward rubber mount cover bracket and remove bracket.

Fig. 14

4. Using an appropriate punch, drive torsion bar forward out of the transverse control arm.
   Caution: Do not damage torsion bar splines!

Inspecting Parts

Check torsion bar for damaged splines or chipped lacquer finish, especially for traces of rust, replacing the torsion bar if necessary.

Installation

Note the following points during installation:

1. Lightly coat the torsion bar with Lithium grease, coating the splines especially well, and insert the bar into the transverse control arm from the front.
   Note: The torsion bars are prestressed in manufacture. Care must be taken that the right and left bars are not switched inadvertently. For this reason, each torsion bar has an identifying letter stamped into the flank, i.e., "L" for left and "R" for right (see illustration).

Fig. 15

2. Insert end cap into the transverse control arm, with the bulging side facing out, and drive into place with an appropriate punch.

3. Torque hex bolts at forward transverse arm rubber mount bracket to 4.7 mkp (34 lb-ft).

4. Slide the OWA-seal onto the torsion bar from the open pocket side of the reinforcing support member.

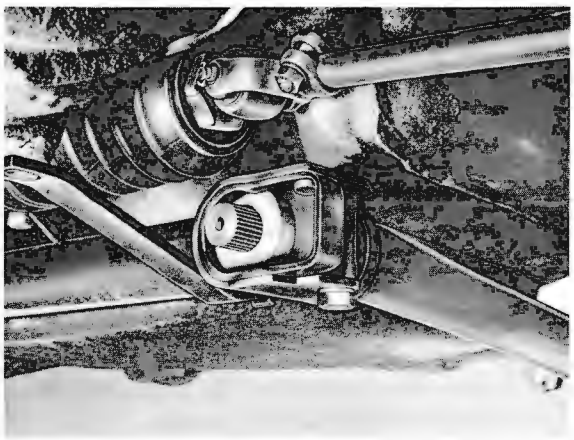


Fig. 16

5. Slide the adjusting lever onto the torsion bar as follows:

   a. Using a tire tool or similar lever, push the transverse control arm down as far as the attached shockabsorber strut will allow, then slide the torsion bar adjusting lever onto the torsion bar splines, leaving as little clearance at the lever adjusting point as possible. (The end cap must already be installed in the adjusting lever.)

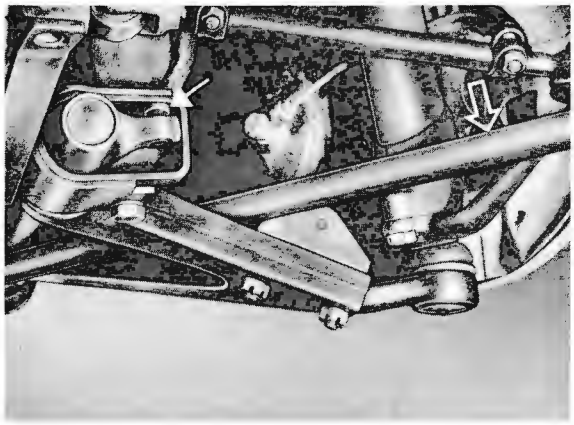


Fig. 17

   b. Coat threads of adjusting screw with MoS_2 grease and lightly tighten the screw in place.

6. Check end cap for proper seating in control arm, install rubber mount cover bracket, torque bolts to 4.7 mkp (34 lb-ft).

Fig. 18

7. Adjust front-end height and check wheel alignment on optical alignment ramp (see Group W).

Removal

1. Remove transverse control arm (see page SS 3).

2. Detach front axle undershield.

Fig. 19

3. Remove steering box attaching bolts from the reinforcing crossmember.

Fig. 20

4. Remove reinforcing crossmember attaching bolts and withdraw crossmember.

Inspecting Crossmember

1. Place the reinforcing crossmember onto a flat surface, such as a straightening plate, and check for deformation. See Figure 21 for test dimensions.
   The crossmember must be replaced whenever deformations or excessive deviations from specified values are noted.

2. Inspect the crossmember for cracks or visible damage and replace if necessary.

Installation

Note the following points during installation:

1. Make sure that the crossmember is seating properly in the aligning studs in the body.

2. Torque steering box attaching hex bolts to 4.7 mkp (34 lb-ft), use new spring washers.

3. Install transverse control arm (see page SS 4).

REINFORCING CROSSMEMBER ALIGNMENT TEST DIMENSIONS

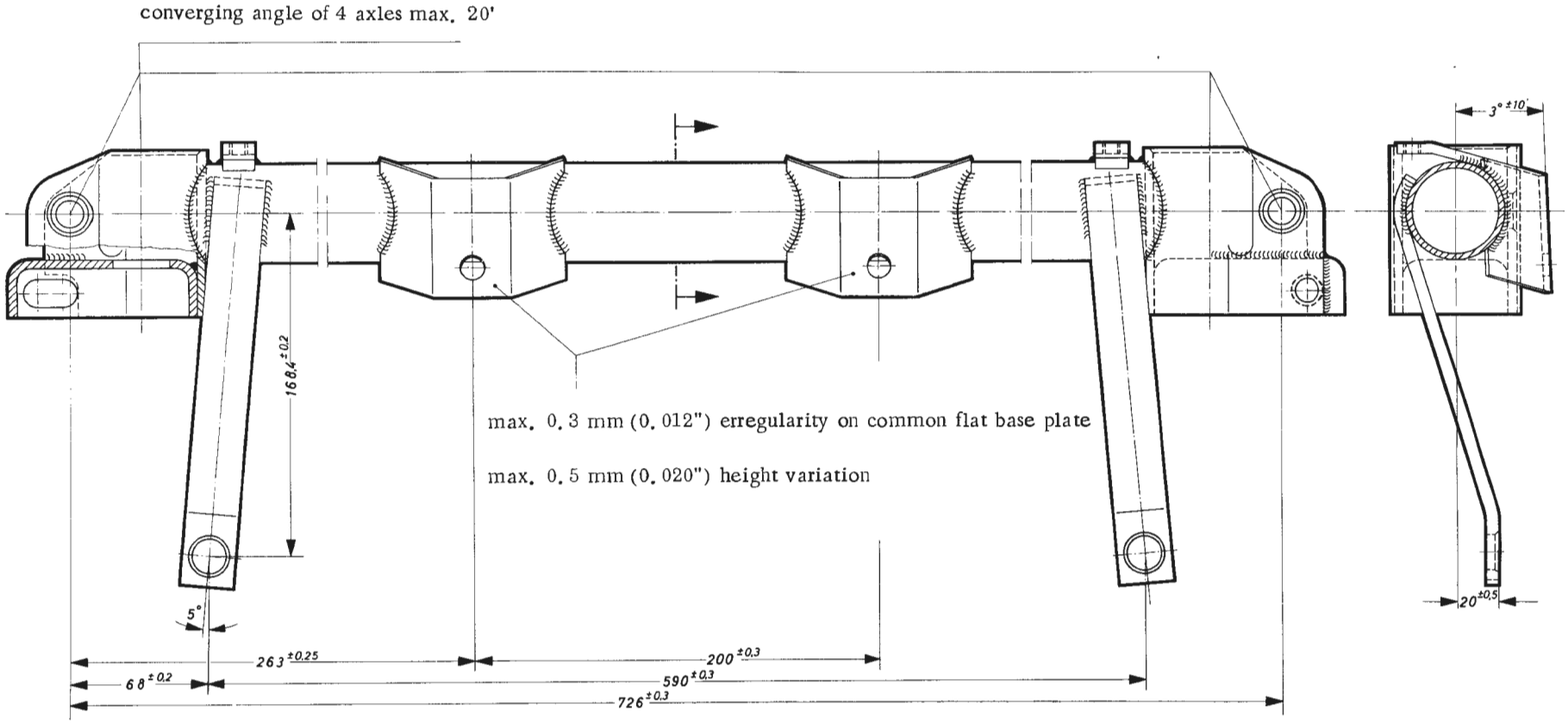


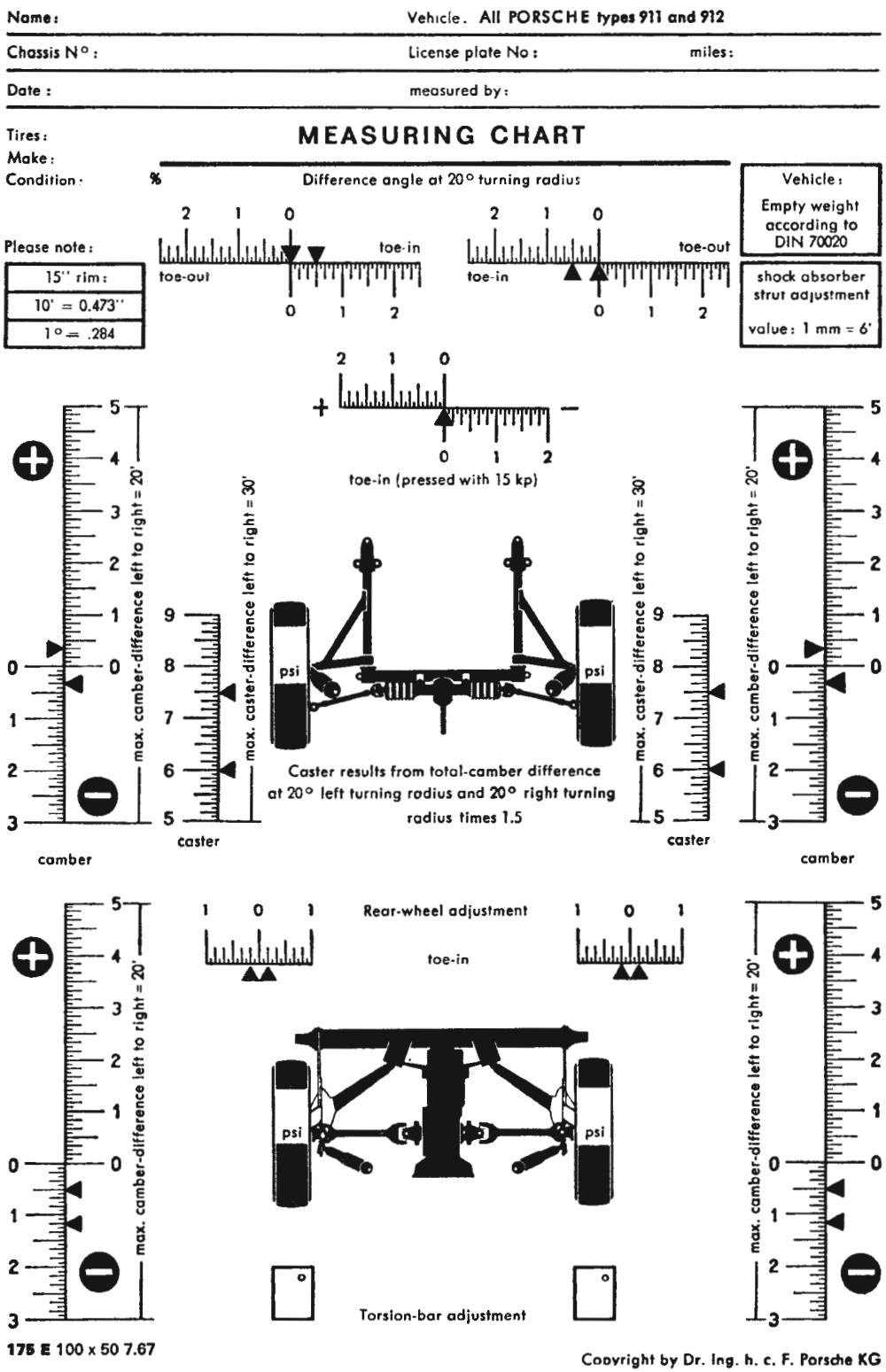
Fig. 21

WHEEL ALIGNMENT DATA CARD

(From 1968 models on)

General

The new wheel alignment data, effective with the 1968 models, may also be applied to earlier versions of Type 911 and 912 vehicles for better directional stability and a more even rear tire wear.



DUAL CIRCUIT BRAKE SYSTEM

General

Beginning with the 1968 models, Type 912, 911 (USA), 911 T, and 911 S vehicles are being equipped with the dual circuit brake system.

The main difference between the single circuit brake system and the dual circuit system is that the latter employs a tandem brake master cylinder and a twin-tank brake fluid reservoir located in the luggage compartment.

Cars destined for export to USA are additionally equipped with a brake failure indicator which is activated by the special tandem brake master cylinder; that is, the handbrake control lamp will light up if one of the two brake circuits should fail for any reason.

Mounted at the control pedal support base is a mechanical stoplight switch. The switch is actuated by a disc which is fastened to the push rod of the tandem master cylinder. The mechanical stoplight switch is adjustable.

A schematic diagram shows the layout of the dual circuit brake system.

Schematic Diagram Showing the Dual Circuit Brake System

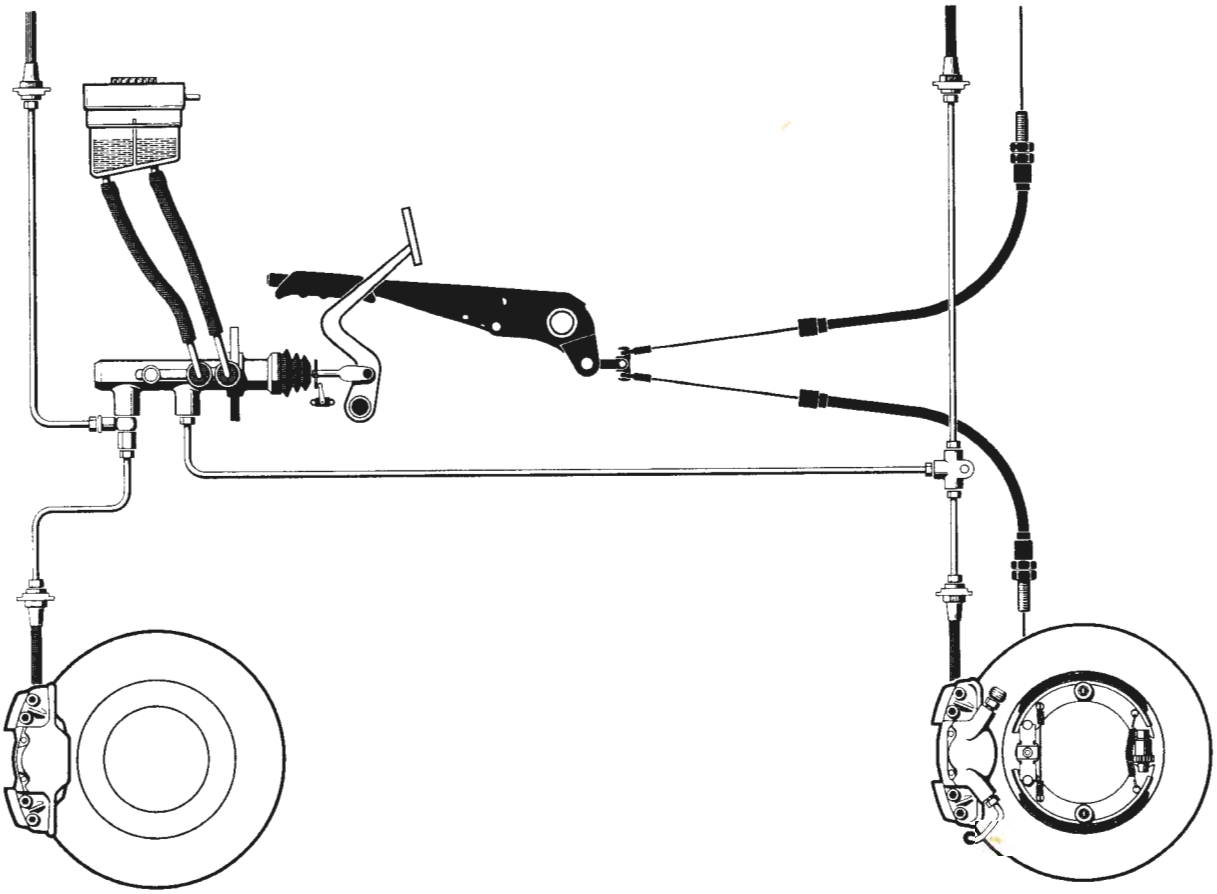


Fig. 1

Tandem Brake Master Cylinder:

Inside diameter - 19.05 mm (3/4")

European version - without failure warning system

USA version - with failure warning system

Brake Data:

Type 912 and 911 T vehicles (except Sportomatic) are equipped with solid brake discs, and wheel brake cylinders of 48 mm diameter front and 35 mm diameter rear.

Type 911 T-Sportomatic, 911 L, and 911 S vehicles are equipped with ventilated brake discs, and wheel brake cylinders of 48 mm diameter front and 38 mm diameter rear.

Work Procedures

Bleeding the Brake System:
The bleeding procedure is same as that in the single circuit system, bleeding the rear brake circuit first and front circuit last. When using a filling and bleeding pressure equipment, detach the overflow hose from the brake fluid reservoir and plug the pipe connection.

Checking Brake System for Leaks:
Follow same test procedure as that for single-circuit systems.

Work procedures differing from those applicable to the single circuit system are described below.

Removal

1. Raise car.

2. Pull throttle pedal back and out of the connecting pushrod, detach and remove left front floor covering.

3. Remove floor board retaining hex nut and withdraw floor board.

Fig. 2

4. Pull dust boot off brake master cylinder.

5. Drain brake fluid from both tanks in the reservoir.

6. Remove front axle undershield.

Fig. 3

7. Detach brake lines from brake master cylinder. (In USA-type vehicles also detach wires from circuit failure sender.)

Fig. 4

8. Remove hex nuts (SW 13) from flange of brake master cylinder.

Fig. 5

9. Detach brake fluid reservoir connecting lines from master cylinder and remove it.

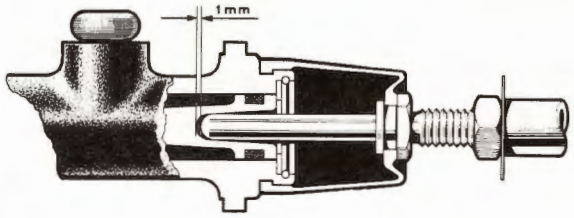


Fig. 7

Installation

Note the following points during installation:

1. When installing the brake master cylinder, properly position the piston push rod at the same time. Also, seal the flange with sealing putty to prevent entry of water into the car's interior.

2. Place new spring washers under the retaining hex nuts and torque to 2.5 mkp (18 lb-ft).

3. Provide a clearance of approx. 1 mm (.04") between piston push rod and piston in master cylinder. (Loosen lock nut on piston rod and turn rod as required.)

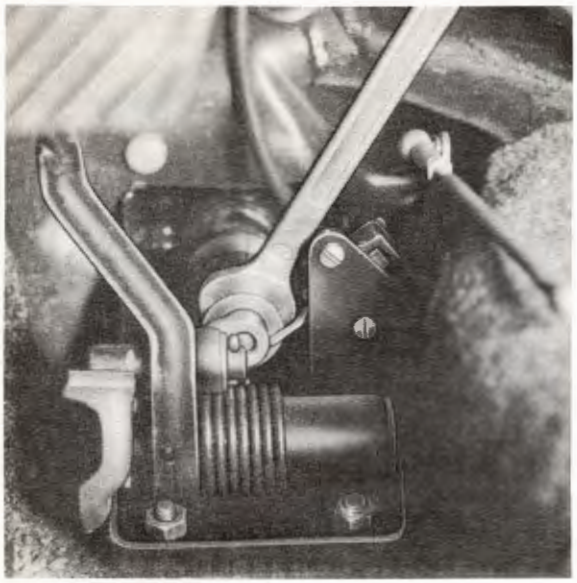


Fig. 6

4. Refill system with fresh brake fluid.

5. Bleed brake system.

6. Torque undershield retaining M10 hex bolts to 4.7 mkp (34 lb-ft), and M8 to 2.5 (18 lb-ft).

7. Check the brake circuit failure warning system (see page ST 14).
(Applies only to USA-type cars.)

Removal

1. Pull throttle pedal back and out of the connecting pushrod, detach and remove left front floor covering.

2. Remove floor board retaining hex nut and withdraw floor board.

Fig. 13

3. Remove stop light switch retaining screws, detach cable connections, and withdraw switch.

Fig. 14

Installation

Note the following during installation:

Adjust stop light switch (see page ST 16).

1. Pull throttle pedal back and out of the connecting pushrod, detach and remove left floor covering.

2. Remove floor board retaining hex nut and withdraw floor board.

Fig. 15

3. Place a 4 mm (.157") thick piece of steel between the brake pedal and its travel return stop. (This is equivalent to a pedal travel of approx. 21 mm, or .827", measured from the pedal pad center.)

Fig. 16

4. Loosen the adjusting screw lock nut (SW 7) in the stop light switch and turn the adjusting screw to the point where the stoplights will have gone on.

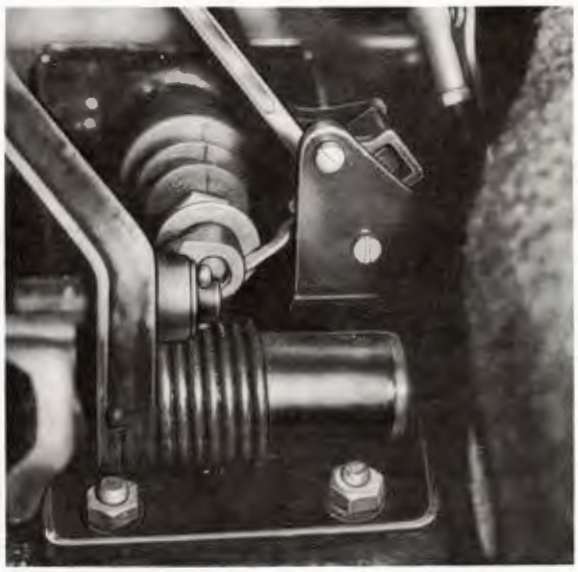


Fig. 17

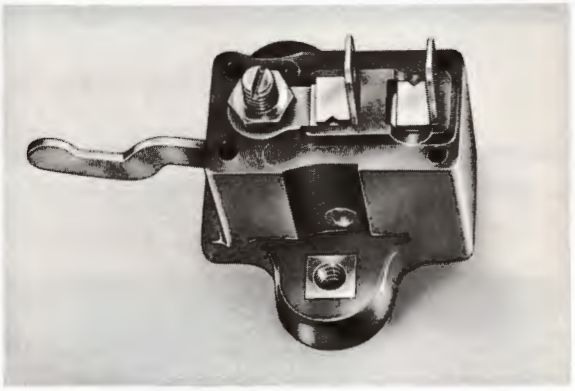


Fig. 18

5. Tighten lock nut in adjusting screw and check stop lights for proper functioning.

Removal

1. Remove tunnel cover and handbrake lever dust boot.

2. Remove knob from heater control lever.

3. Remove retaining hex bolts from handbrake support housing.

Fig. 19

4. Remove self-locking hex nut which secures heater control lever. Withdraw cup spring, pressure disc, friction disc, and heater control lever.

Fig. 20

5. Lift handbrake support housing a little, unsnap an pull out cable equalizer retaining stud.

Fig. 21

6. Pull out handbrake control lamp wire from switch assembly and remove handbrake support housing.

Installation

Note the following points during installation:

1. Reinsert cable connector into handbrake control lamp switch.

2. Insert heater control lever into the handbrake support housing, install and secure cable equalizer stud.
   Note: Check handbrake cables for proper seating.

3. Torque handbrake support housing bolts to 2.5 mkp (18 lb-ft).

4. Install friction disc, heater control lever, second friction disc, pressure disc, cup spring, and self-locking hex nut. Tighten the self-locking hex nut so that the lever does not slip back when the heater is fully on. On the other hand, the lever should not be too tight.

5. Check adjustment of heater control flaps (see page SE 30).

6. Check adjustment of hand throttle control (see page SE 31).

7. Check handbrake adjustment (see page T 22).

DISASSEMBLING AND REASSEMBLING HANDBRAKE SUPPORT HOUSING

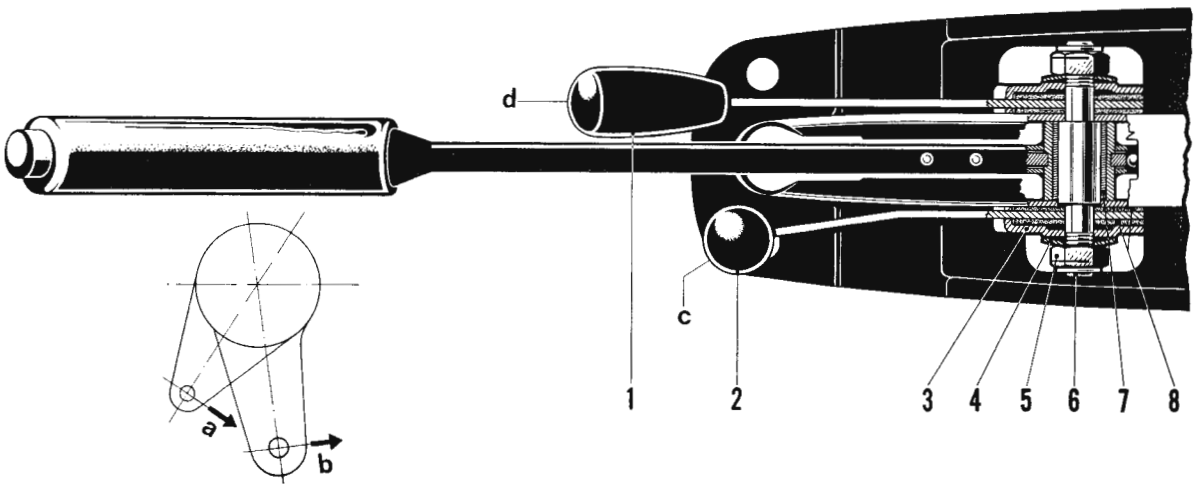


Fig. 22

1 Heater control lever
2 Hand throttle lever
3 Pressure disc
4 Cup spring
5 Self-locking hex nut
6 Pivot shaft
7 Spacer sleeve
8 Friction disc

a Limiting friction of heater lever clutch is 10 kp (22 lbs)
b Limiting friction of hand throttle clutch is 6 kp (13 lbs)
c Hand throttle lever knob is pressed on (avoid damaging the knob)
d Heater lever knob is screwd on

Disassembly

1. Remove lock ring which secures hand throttle drag link, withdraw washer and drag link.

2. Remove self-locking nut which secures heater control lever. Take off cup spring, pressure disc, lever, and second friction disc.

Fig. 23

3. Remove self-locking nut which secures hand throttle lever. Remove cup spring, pressure disc, friction disc, lever, and second friction disc.

4. Pull out pivot shaft.

5. Remove fillister screw which secures control switch and withdraw it.

6. Push handbrake lever slightly back out of the support housing and remove ratchet plate.

7. Grind off rivet head in stud of ratchet pawl, drive the stud out, and remove pawl.

8. If the handbrake lever is to be removed, first remove the hand grip which is glued on; this will permit withdrawal of the control button with rod, ring, and spring as well.

Reassembly

Note the following points at reassembly:

1. Handbrake lever grip must be glued on. (Use Lechler KC 110 S or Uhu-Plus cement, or equivalent adhesive.)
   Note: Make sure that no glue enters the space between the grip and button when the grip is being pushed on.

2. Insert ratchet plate, pawl, and pivot shaft, greasing these slightly with multipurpose Lithium grease.

3. Install friction discs dry and make sure that their mating surfaces also are dry and free of grease.

4. Tighten the self-locking hex nuts so that the stud ends are about flush with the nuts and the limiting friction of heater lever clutch is 10 kp (22 lbs), and that of the hand throttle clutch is 6 kp (13 lbs). (See Fig. 22.)

   This adjustment can also be made with the handbrake support housing in place:

   Tighten the self-locking nuts to the point where the lever does not move back when the heater is turned fully on and, on the other hand, the lever is not too difficult to move.

Removal

1. Raise car and remove rear wheels.
2. Remove handbrake support housing (see page ST 17).
3. Detach cables from cable equalizer.
4. Remove hydraulic brake line from rear wheel brake caliper. (Keep brake fluid from draining out of the fluid reservoir by slightly depressing the brake pedal with a depressor).
5. Remove caliper retaining screws and withdraw caliper.
6. Remove countersunk bolts from brake disc, withdraw disc together with spacer ring.
7. Remove cotter pin, castellated nut, and disc, then pull handbrake cable out towards the car's center.
8. Pull other end of cable out of the conduit tube in center tunnel.

Installation

Note the following points during installation:

1. Coat the cable with multipurpose Lithium grease while feeding the cable into the conduit tube.
2. Place one washer between spacer sleeve and brake expander, and one under the castellated nut. Turn the nut until a crown slot clears the cotter pin hole, then secure with a new cotter pin.
   Note: Check brake expander for proper seating.
3. Torque the caliper retaining bolts in rear to 6 mkp (43 lb-ft), use new spring washers.
4. Install handbrake support housing (see page ST 17).
5. Bleed the brake system (see page T 29 and T 31).
6. Adjust handbrake (see page T 22).

REPAIR INSTRUCTIONS FOR THE WEBASTO HEATING AND VENTILATING UNIT TYPE P-1018.02 (TRANSISTORIZED)

General

These repair instructions are confined to those parts of the Webasto auxiliary heater which have been changed as a result of the conversion of the P-1018 unit to transistorized ignition. Instructions pertaining to parts which have not been changed are contained in Group TRA, page TRA 1 thru TRA 17.
The following modified parts are being utilized as a result of conversion of the P-1018 unit to transistorized ignition (P-1018.02).

Heat Exchanger

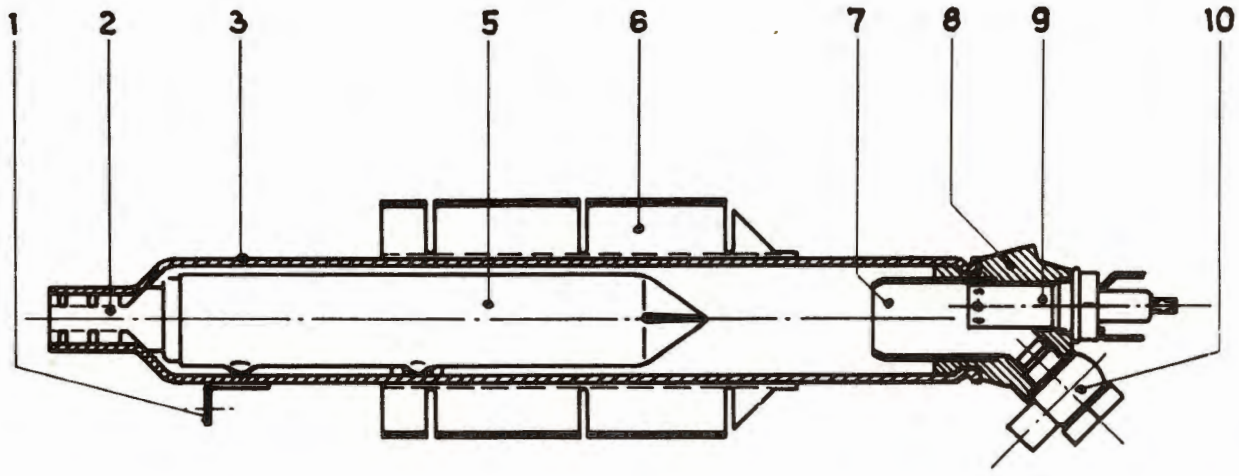


Fig. 1

1 Bracket
2 Exhaust pipe
3 Steel tube
4 (discontinued)
5 Distributor cone
6 Heat exchanger fins
7 Combustion chamber
8 Burner
9 Glow plug
10 Banjo union

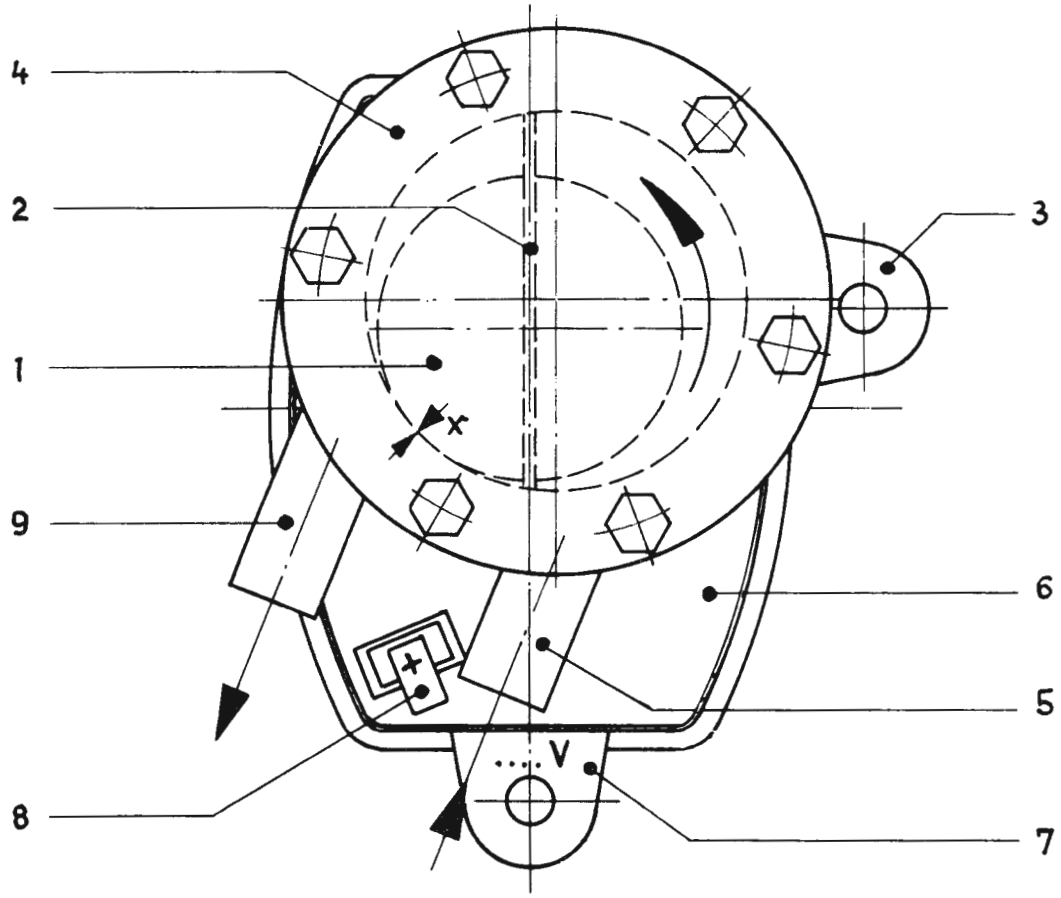


Fig. 2

1 Rotor
2 Rotor vane
3 Ground terminal
4 Housing
5 Fuel/air mixture inlet
6 Motor
7 Voltage rating
8 Positive terminal
9 Fuel/air mixture outlet

SPARK GENERATOR

Due to the conversion of the Webasto auxiliary heater to transistorized ignition, the timer has been replaced with the spark generator.

Description

The spark generator consists of a transistorized high-tension power supply which provides a voltage of approx. 6000-8000 volts. The integral twin-relay switch, which is actuated by the manual heater control, energizes the glow plug, mixture pump, and the power supply unit. Maximum current rating for the relay switch is 10 amps. The permissible environmental temperature is from -40°C to +60°C (-40°F to +140°F).

Checking Twin-Relay Switch in Spark Generator Unit:

1. Remove spark generator.

2. Energize Terminal 4 of the spark generator by connecting it to Terminal 30 in fuse box or directly to the battery positive terminal. Connect a test lamp between Terminal 3 of the spark generator and the ground. The lamp should not light up in this hookup.

3. Make the same test at Terminal 5 and 6 of the spark generator by energizing Terminal 5 of the spark generator and connecting the test lamp between Terminal 6 and the ground. The lamp should not light up in this hookup.

4. When the spark generator is switched on, that is, Terminal 2 is connected to a positive (+) terminal, and Terminal 1 to the ground (-), current should flow through Terminals 3 and 4, and 5 and 6.

Checking Power Supply Unit:

1. Check fuse.

2. Connect high-tension wire to the spark generator, attach spark plug connector to the glow plug, and place glow plug onto a ground (-) connected surface. With the spark generator switched on, i.e., by energizing Terminal 2 (+) and grounding Terminal 1 (-) of the spark generator, the glow plug should have a continuous high-tension spark.

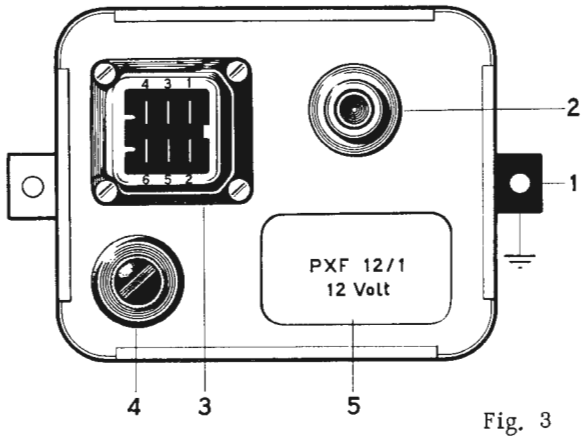


Fig. 3

1 Housing with mounting brackets
2 High tension plug
3 Connecting plug
4 Fuse
5 Voltage rating (6V or 12V)

If the test reveals that the relay switch or power supply of the spark generator is not functioning properly, or will be necessary to replace the spark generator.

GLOW PLUG

The glow plug has, in addition to the glow element, two high tension electrodes which produce a constant flow of sparks as long as the heater is switched on. When the heat exchanger has reached a predetermined temperature, the glow plug is switched off; however, the high-tension ignition system remains unaffected by the system controlling the glow plug.

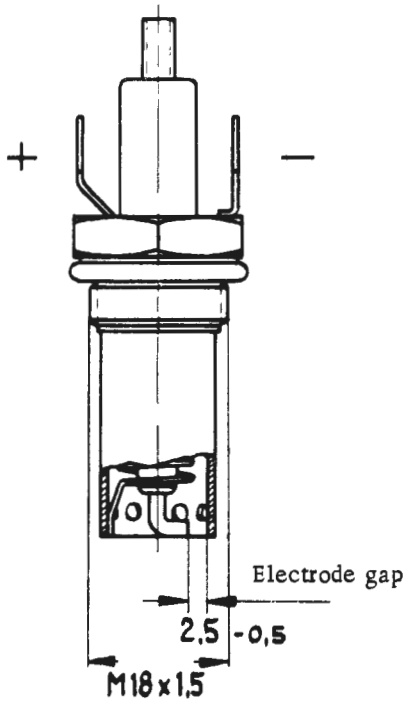


Fig. 4

Checking Glow Plug

1. Unscrew the glow plug and carefully remove any carbon deposits that may have accumulated.
2. Check electrode gap (2.0-2.5 mm or .080" to .100"), adjust if necessary.
3. Connect glow plug to a 12 volt source.
   Caution: Do not mix up positive and negative terminals. The glow plug must glow bright red within approx. 7 seconds.

Glow coil	12V $\pm$ 10 %, 5.6A
Ignition voltage	5000V
Suppressor	5kOhm $\pm$ 10 %

Heat Sentinel

The glow and overheat switch has been discontinued with the introduction of the Type P-1018.02 transistorized Webasto auxiliary heater, having been replaced by the heat sentinel.

Description

The heat sentinel consists of a housing which contains a temperature sensor and two electric circuits. The two circuits are switched in succession by means of a control cam, which is connected to the temperature sensor, when certain temperatures are reached. When the heating air temperature reaches approx. +65°C (+149°F), the contact G_2 - G_3 switch over to G_2 - B.
As a result the glow plug circuit is switched off, but the ventilating blower continues to receive current through Terminal B so that the blower stays on after the heater has been switched off. After about 3 minutes, the cooling cycle is stopped by switching the contacts G_2 - B to G_2 - G_3.
If the unit should overheat, the temperature sensor and the control cam will interrupt the circuit through contacts T - 31 at a temperature of approx. 135°C (275°F), which stops the flow of current to the mixture pump and ignition.
However, the blower will continue to run. When the temperature sensor has cooled down to about 100°C (212°F), the mixture pump and heater ignition circuit are automatically reenergized.

Checking Heat Sentinel in Cold Condition

1. Remove heat sentinel.

2. Energize Terminal G_2 by connecting it to Terminal 30 in the fuse box or directly to the positive (+) terminal of a 12V battery.

3. Connect test lamp between Terminal G_3 and ground. The lamp should light up.

4. Energize Terminal T.

5. Connect test lamp between Terminal 31 and ground. The lamp should light up.

The temperature sensor must not be turned with force. The control cam adjustment in the heat sentinel must not be changed. If the heat sentinel becomes defective, it must be replaced.

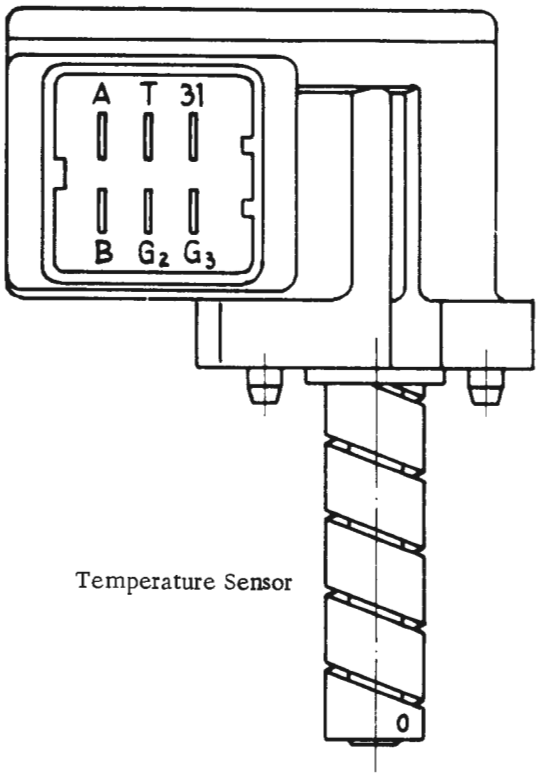


Fig. 5

Circuit Diagram

Switch position in cold temperature sensor

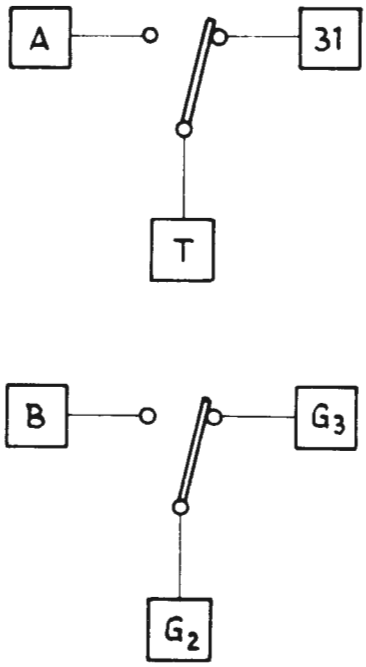
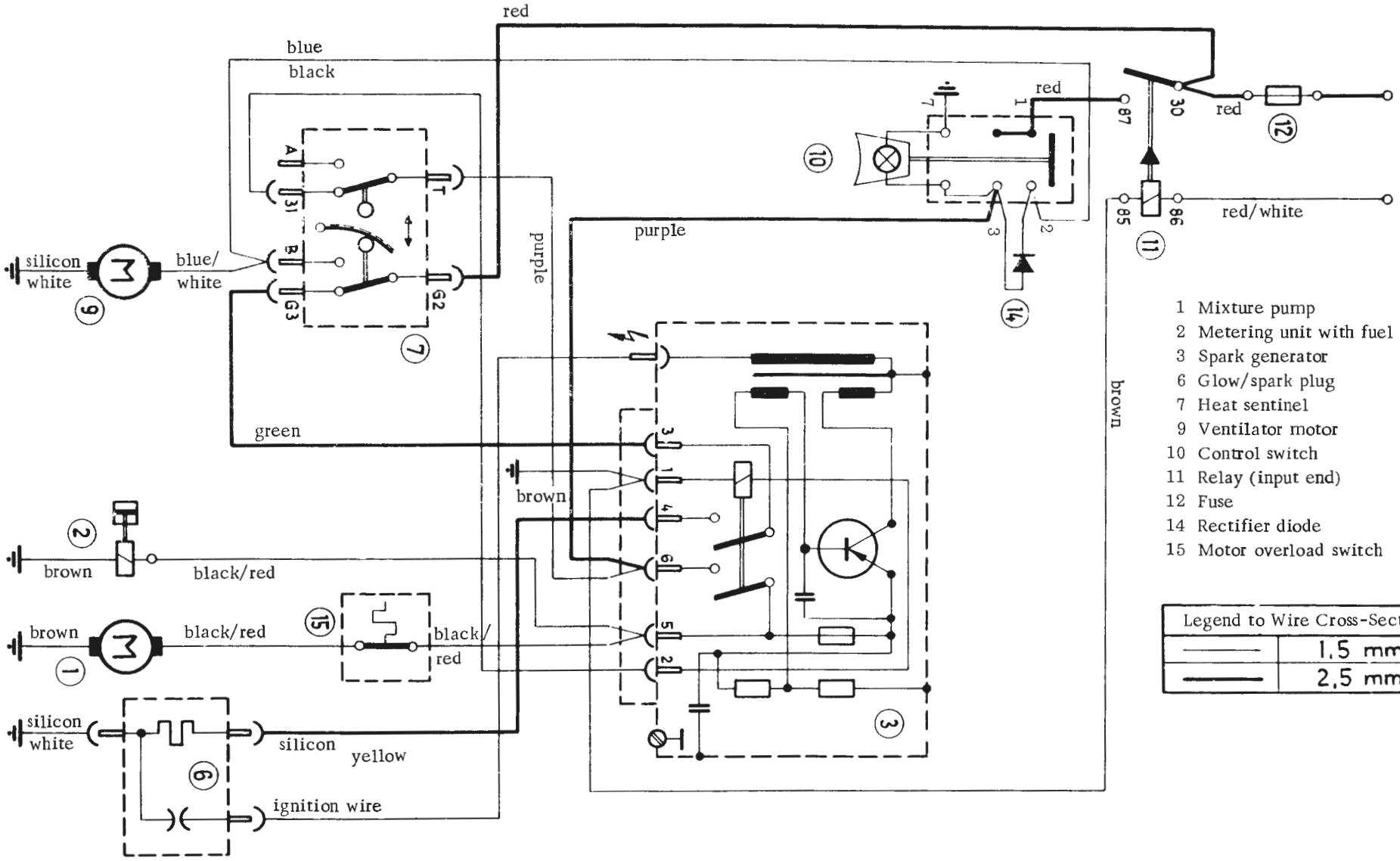
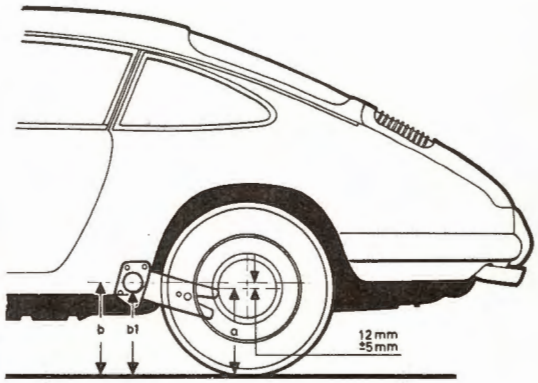


Fig. 6

WEBASTO HEATER P-1018.02 - WIRING DIAGRAM



Item	Nominal Value and Tolerances	Maximum Deviation left to right	
Rear Axle Height adjustment: Center of transverse carrier above rear wheel center	12 mm (.47 in.) ± 5 mm (.2 in.)	8 mm (.32 in.)	
Radius arm adjustment Type 911 Type 912 From model '68 on Type 911 (all) Type 912	 36° 33° 39° 36°	 -- -- --	
Toe-in, per wheel	0' ± 10'	--	
Camber	1° 15' negative ± 20' From model '68 on 50' negative ± 20'	 20' 20'	

1. Lightly lubricate the shackle mounting grommets and press into the shackles with the help of a vise.

2. Install rubber bushings dry (without lubrication).

3. Position the shackles on the stabilizer so that the grommet openings point inward, as shown in Fig. 2.

4. Lightly lubricate the upper shackle grommets with MoS_2 grease and press onto their supporting ballstuds with a large screwdriver.

Fig. 2

NOTE: Beginning with 1968 models, Type 911 S cars receive a rear axle stabilizer of 15 mm (.591") diameter as standard equipment. Care should be taken during installation that the right size rubber mounts are used.

8. To properly install the high tension lead, it is necessary to drill a .197" (5 mm) hole between both fuel hoses located in the luggage compartment floor, and then enlarging the hole to .315" (8 mm) with the aid of a starting punch. After that, lead the high tension wire behind the metering pump, along the fuel hoses, up to the glow plug.

9. Remove glow plug (6); this part is eliminated through the use of a glow/spark plug. Connect plug connector making sure that the compartment top does not touch the spark plug connector. Should this be the case, peen the compartment top upward to provide the necessary clearance.

10. Connect the green wire of Terminal G2 in the timer to Terminal 30 in the relay switch (11).

11. The resistor is eliminated; for reasons of difficulty in removal, it may be left in place. The black/red and yellow connecting wires should be detached from their connectors. The white silicon wire should be cut off.

    a. The detached black/red wire should be lengthened with the wire and connector included in the conversion kit. Using a lead wire, pull this cable through the conduit which accomodates the wire loom, on to the spark generator. Install a tab connector on the wire end and connect to Terminal 3 of the six-fold connector plug.

    b. The removed yellow wire should be cut off at the point of exit from the tube. It is to be lengthened with a white, temperature-proof, silicon wire contained in the conversion kit and then connected to the positive (+) terminal of the glow plug. Note: Do not confuse with the negative (-) terminal of the plug. Connect ground wire to the glow plug.

12. Reinstall water drain box.

13. Reconnect battery.

14. Reinstall carpeting in luggage compartment.

Check the following when testing the heater:

1. Check glow-voltage at the plug (when switching the cold unit on, it should be 12 Volts - 10 %).

2. Checking high tension after 10 minutes of heater operation: After briefly switching the heater off, it should re-ignite immediately when switched on again.

3. Check ventilator purging cycle. The cycle lasts for about 3 minutes. Should the heater not cool sufficiently during this cycle as a result of high outside air temperatures, the cycle will repeat automatically.

The spark generator consists of a transistorized high-tension power supply which provides a voltage of approx. 6000-8000 volts. The integral twin-relay switch, which is actuated by the manual heater control, energizes the glow plug, mixture pump, and the power supply unit. Maximum current rating for the relay switch is 10 amps. The permissible environmental temperature is from -40°C to +60°C (-40°F to +140°F).

Checking Spark Generator

1. Checking twin-relay switch in spark generator:

   a. Remove spark generator.

   b. Energize Terminal 4 of the spark generator by connecting it to Terminal 30 in fuse box or directly to the battery positive terminal. Connect a test lamp between Terminal 3 of the spark generator and the ground. The lamp should not light up in this hookup.

   c. Make the same test at Terminal 5 and 6 of the spark generator by energizing Terminal 5 of the spark generator and connecting the test lamp between Terminal 6 and the ground. The lamp should not light up in this hookup.

   d. When the spark generator is switched on, that is, Terminal 2 is connected to a positive (+) terminal, and Terminal 1 to the ground (-), current should flow through Terminals 3 and 4, and 5 and 6.

2. Checking Power Supply Unit:

   a. Check fuse, replace if defective.

   b. Connect high-tension wire to the spark generator, attach spark plug connector to the glow plug, and place glow plug onto a ground-connected (-) surface. With the spark generator switched on, i.e., by energizing Terminal 2 (+) and grounding Terminal 1 (-) of the spark generator, the glow plug should have a continuous high-tension spark.

If the test reveals that the relay switch or power supply of the spark generator is not functioning properly, it will be necessary to replace the spark generator.