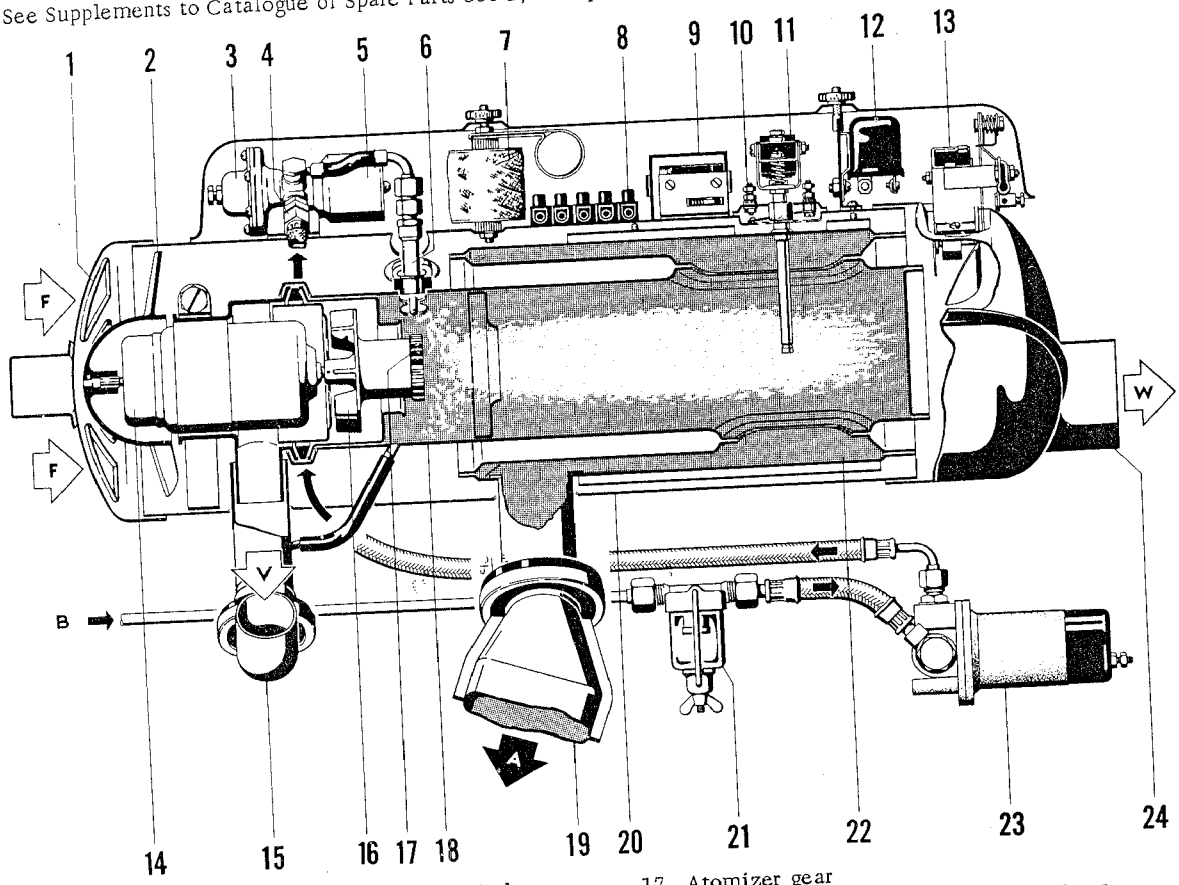
HEATING AGGREGATE, MODEL BN 4

The Eberspächer BN 4 Heater will be installed either in the 6 or the 12 volt execution, according to the car's electrical system. Please pay the necessary attention when ordering spare parts.

See Supplements to Catalogue of Spare Parts 356 B, Group 7/13 aA and 7/13 A.



1. Cover plate
2. Fresh air fan
3. Pressure governor
4. Fuel line connection
5. Magnetic valve
6. Injector
7. Ignition coil
8. Cable connector
9. Safety switch
10. Overheat safety switch
11. Thermo switch
12. Relay
13. Governor switch
14. Electric motor
15. Air intake
16. Fan for burner
17. Atomizer gear
18. Combustion chamber
19. Exhaust pipe
20. Outer housing
21. Fuel filter
22. Heat exchanger
23. Fuel pump
24. Hot air discharge

Fig. 1

F = fresh air
W = hot air
V = combustion air
A = exhausts

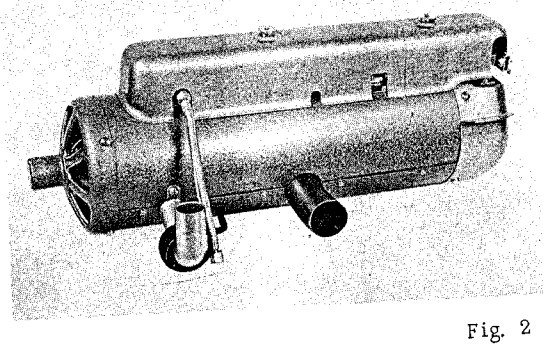


Fig. 2

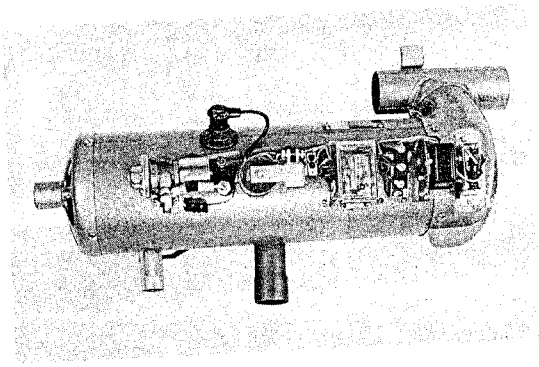


Fig. 3

Disassembly

1. Unscrew two knurled attaching nuts and remove heater cover (reference Fig. 2 and 3).
2. Detach fuel inlet line at base of pressure regulator while holding second coupling nut with another wrench, otherwise damage might occur to micro-filter insert.
3. Detach fuel outlet line on body of pressure regulator by unscrewing the banjo bolt. Loosen fuel line coupling on top of fuel nozzle (note filter screen located between fuel nozzle and fuel line, handling it with care).
4. Disconnect wire connection of fuel solenoid at No. 3 terminal, pull wire out of conduit hose.
5. Unscrew four round-head retaining screws at base of body and remove pressure regulator.

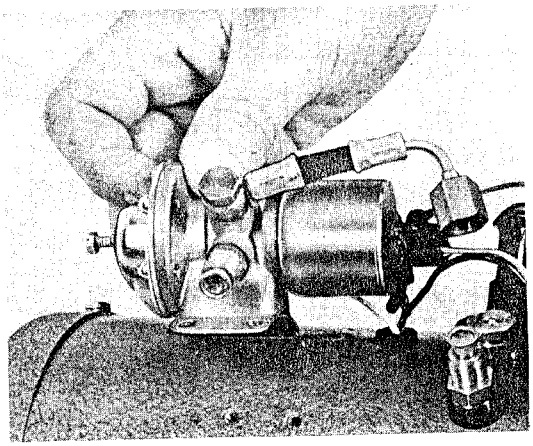


Fig. 4

6. Unscrew coupling nut and remove fuel line.
7. Unscrew intermediate piece containing filter insert.
8. While holding nozzle carrier with a wrench, unscrew nozzle and withdraw from carrier.
9. Pull spark plug cap off, remove and inspect spark plug.
10. The preheat plug, or glow plug, is of stick-type. It is located next to the nozzle and may be removed using a spark plug wrench.
11. The coil and condenser may be removed from the supporting stud after having removed the retaining hex-nut and both wire connections at the condenser.
12. Detach wire terminals at safety switch.
13. Safety switch may be removed after loosening two round-head retaining screws on the foreside of switch.
14. Detach three wire terminal connections of thermo-switch.
15. Loosen coupling nut and pull out sensor tube of safety switch, going about it without the use of force; if necessary, apply a rust solvent and withdraw switch with a slight twisting motion (reference Fig. 5 and arrow).

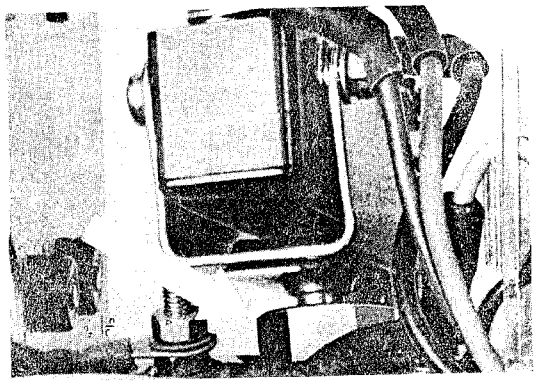


Fig. 5

16. Having removed the thermoswitch and detached wire terminals of overheat switch, the latter can be removed by unscrewing four round-head retaining screws.

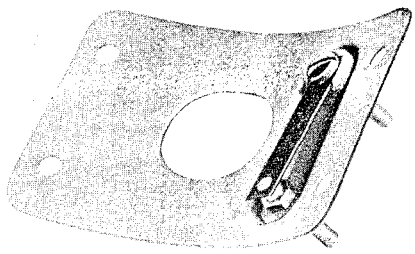


Fig. 6

Reassembling Heater Unit

A defective air blower assembly or heat exchanger are to be replaced as whole units, repairs being not permissible (ref. page S TRA 36, Heat Exchanger).

Reassembly

Reassembly is accomplished in reversed order of the above, devoting attention to the following points:

1. When mounting blower unit in heat exchanger, make certain that the ventilating air intake duct lines up with the exhaust duct.
2. Slide the outside shell over blower and heat exchanger, pull electric wire for blower through the orifice provided, and insert rubber grommet.
3. Install and connect remaining components in appropriate order.
4. Contact spring in overheat switch should have a preload pressure of 70 grams, and should open at a discharge air temperature of 150 to 200°C. The contact spring cannot be readjusted and must be replaced when defective.
5. When installing the thermoswitch, care should be taken not to allow the coupling nut to rest against the outside case of the heater when tightened.
6. Before installing the safety switch, check if both coil terminals (small cylindrical case), as well as the contact surfaces are in good condition.
7. Safety switch should be adjusted after the heater has been reassembled (reference page S TRA 34, Description of Safety Switch). Repairs are not permissible.
8. Install coil and condenser. The coil may be tested in the same way as engine coils are (testing at the rate of 5000 interruptions, with spark crossing a 6 mm gap).
9. Before installing fuel nozzle, clear the permanently seated micro-filter with a blast of clean compressed air, blowing only in the direction of fuel flow.
10. Check filter insert in intermediate piece for defects in filter screen, replace if necessary.
11. When tightening couplings, it is always necessary to hold the counterpart with another wrench.
12. Nozzle spray pattern should be checked when reassembly is completed. This visual inspection is made possible by removing the spark plug and glow plug, and illuminating the diffuser wheel through the glow plug orifice. The spray pattern must fall 1 mm off center of diffuser wheel in the direction of the ventilating air blower.

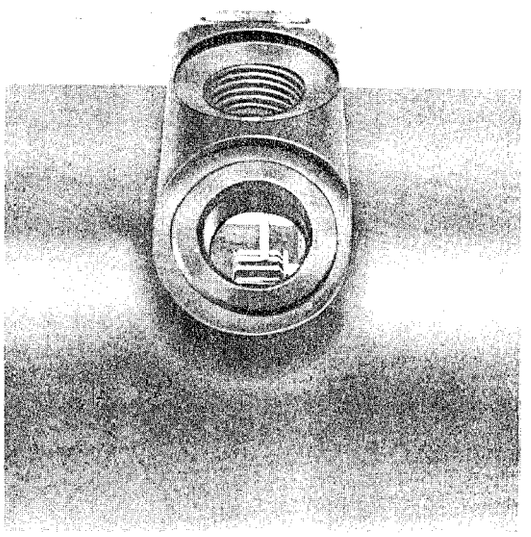


Fig. 12

13. Inspect spark plug prior to installation. Spark plug gap should be 2.5 mm. Carbon deposits must be removed from the electrode insulator by means of a brass brush or sand blasting.
14. The glow plug may be cleaned in the same way as the spark plug.
15. Install pressure regulator and fuel solenoid assembly, connect fuel lines.

F U E L P U M P

Description

The electric fuel pump is capable of drawing fuel to the height of 1 meter; it develops a pumping pressure of 0.1 atmospheres.

When the pump is at rest, the points are in contact. The current passes through the coil so that the armature plate - and with it the entire diaphragm system - is pulled towards the breaker mechanism, thus sucking fuel into the combustion chamber through the suction valve. At the end of the stroke, the circuit is broken by the breaker mechanism and a spring brings the diaphragm system back to its original position, thus forcing fuel from the pumping chamber through the delivery valve into the supply line.

Inspection and adjustments

The pump should be mounted in horizontal position with the fuel outlet pointing up (see arrow). Contact gap, with blade against the stop, should be 1 mm (gently press the lower contact blade against housing). An adjustment is possible by means of an adjustment screw. It is recommended to lightly lubricate the rocker pivot points once per year.

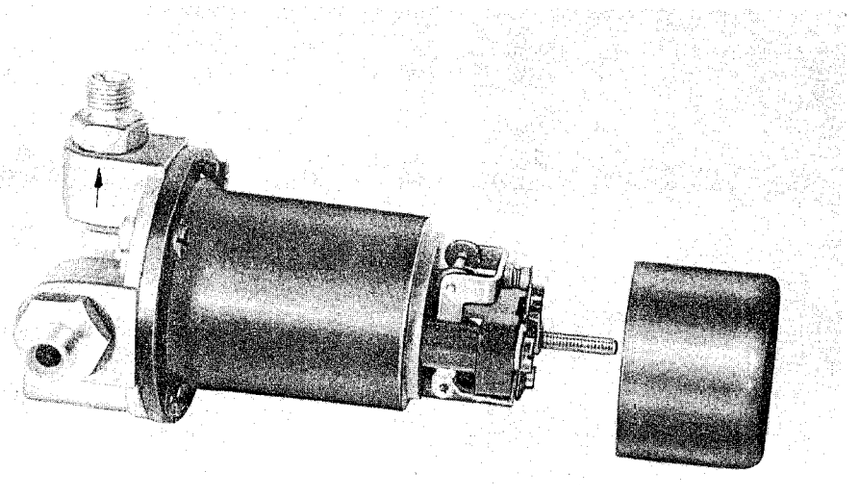


Fig. 13

PRESSURE REGULATOR AND FUEL SOLENOID ASSEMBLY

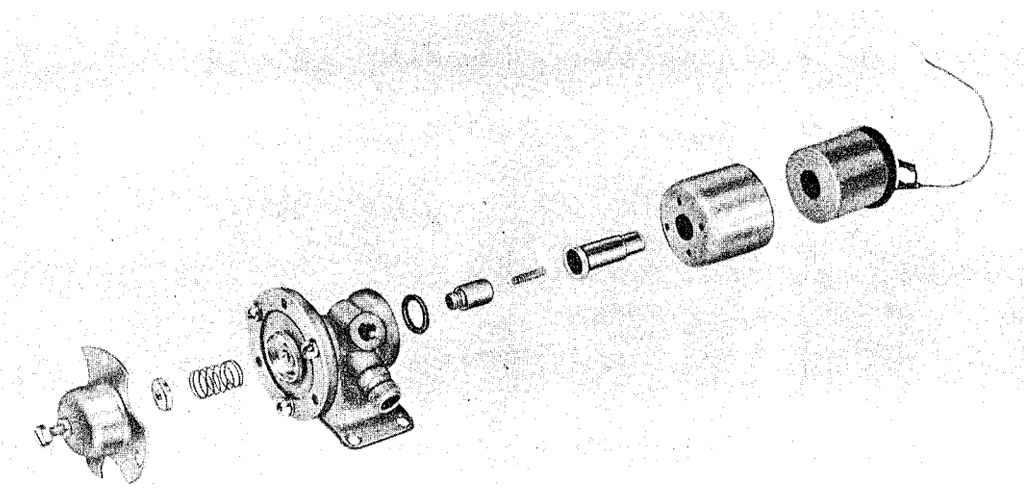


Fig. 14

Description

The pressure regulator governs the rate of fuel flow according to preset diaphragm settings. An exact adjustment to the rated output of . 65 liter/hour can be accomplished only when the assembly is installed in the heater unit.

Inspection and Adjustments

With heater unit installed, it is necessary to first remove the cover and detach the fuel supply line. Next, the fuel nozzle has to be removed, its fuel supply line reconnected, and the nozzle held at the same level as in the installed position. The fuel emitted from the nozzle should then be trapped in a graduated measuring glass; the collected amount of fuel, after an elapsed time of two minutes, should be 20 to 21 cc. When necessary, the pressure regulator can be readjusted by turning the fourfold sealed adjustment screw on the forside of the unit (the seal is by means of paint): by turning the screw clockwise, the emission of fuel is increased; by turning it counter-clockwise, the emission is decreased. At time of this service operation attention should be devoted to the safety switch which should cut off the flow of current after a maximum elapsed time of 3 1/2 minutes.

Disassembly

Disassembling is permissible but only when complete exchange assemblies are not available.

1. Located in the cover on the foreside of the pressure regulator is a red, paint-sealed adjustment screw with a lock nut. The cover may be removed after unscrewing three round-head retaining screws (spaced 120° apart); this will expose the pressure plate, spring, and diaphragm.

2. The diaphragm may be withdrawn after removing the retaining collar which is secured by three round-head screws. The parts may not be repaired and if found defective, must be replaced.

3. The housing which accomodates the pressure rod, spring, and shut-off valve may now be removed with the help of a socket wrench.

Reassembly

Reassembly is accomplished in reversed order of the above, devoting attention to the following points:

1. It should be ascertained that the pressure rod moves freely in its guide after the parts have been thoroughly cleaned.

2. The diaphragm must be placed in such way that the brass disc faces towards the pressure rod.

3. When installing the housing cover, first insert the pressure spring into the sheetmetal receptacle of the diaphragm, and then place the pressure plate in appropriate position making certain that the adjustment screw rests in the cavity in the plate.

4. Adjustment of the rate of fuel flow is accomplished on ready assembled heater unit; refer to Description, Inspection and Adjustment of Pressure Regulator.

F U E L S O L E N O I D V A L V E

Description:

The fuel solenoid shuts off the fuel supply as soon as the combustion process is interrupted by the heater control switch. The flow of fuel is stopped by a synthetic-rubber valve which is pressed against the valve seat.

Inspection

The proper functioning of the fuel solenoid may be audibly verified by a clicking noise which is released by the slamming action of the valve in valve guide when it is energized. If the valve sticks, functioning only when jarred, it will be necessary to completely disassemble the fuel solenoid. However, it is recommended that in such case the complete pressure regulator and fuel solenoid assembly is removed from the heater unit.

Disassembly

1. Remove round-head screw located on foreside of fuel solenoid, remove cover, detach ground wire connection, and withdraw solenoid coil from housing.

2. Remove four lens-head screws in base of housing and carefully withdraw housing with valve guide. Note that the valve may jump out if under spring pressure (reference Fig. 4).

Reassembly

Reassembly is accomplished in reversed order of the above, devoting attention to the following points:

1. The valve should not show any trace of corrosion on the cylindrical shaft; if corroded, it must be replaced.

2. The sealing side of the synthetic-rubber valve should be visually inspected for proper seating, that is, the seating impression must be round and in the center. If the impression is imperfect, it will be necessary to replace the pressure regulator housing and valve seat.

3. In no case may the pressure spring be lengthened or shortened.

S A F E T Y S W I T C H

Description

This switch prevents that the heat exchanger is flooded with fuel if combustion should fail for any reason. The switch consists of a coil, wired parallel to the glow plug, which heats a bi-metal contact strip which interrupts the flow of current to the fuel pump and fuel solenoid after having been energized for 2 to 3 1/2 minutes (this cannot be determined by the position of the red lever).

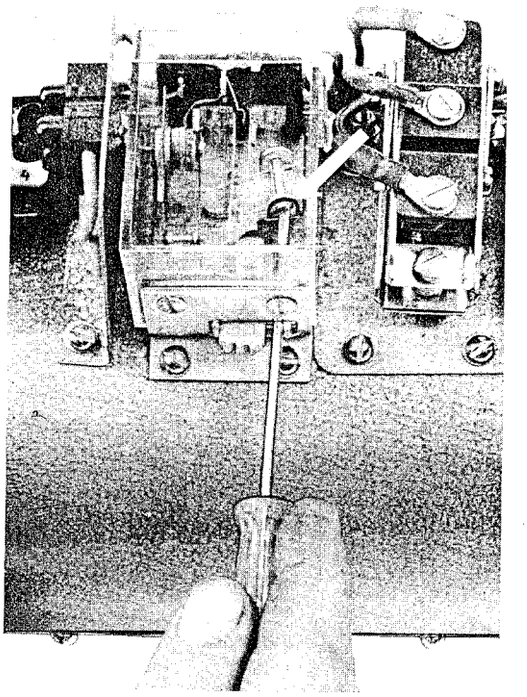


Fig. 15

Inspection and Adjustments

The inspection and adjustment procedure can be undertaken only in a closed, draft-free room. The rated activation time, at nominal voltage, is 2 to 3 1/2 minutes after energizing the coil. Is a corrective adjustment necessary, the paint-sealed adjustment screw located on the right side of the base plate (reference Fig. 15 and arrow) should be turned clockwise to shorten the activation period, and counter-clockwise to extend it (allow 15 minutes for cooling prior to each test). If found defective, the complete switch assembly will have to be replaced.

T H E R M O S W I T C H

Inspection and adjustments

The thermoswitch is correctly adjusted when the blower motor continues to run for approximately 3 minutes during the purging cycle, when the heater has been turned off after reaching normal operating temperature. If the purging cycle is too long, the thermoswitch adjusting screw should be turned clockwise; if it is too short, the screw must be turned counter-clockwise. Refer to paragraph 4, Reassembly, for basic settings of the switch.

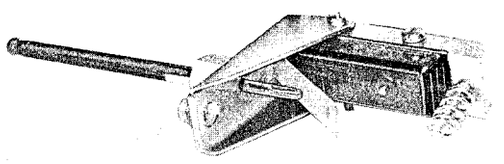


Fig. 16

Disassembly

1. Remove the red or green paint-sealed adjusting screw, and pull out helical spring.
2. Raise the now hinging switch, together with arm, remove leaf spring, and withdraw the quartz bar by slanting the switch on its pivot (see illustration).

Reassembly

Reassembly is accomplished in reversed order of the above, devoting attention to the following points:

1. It should be noted that the switch guide fixture can be easily turned; if necessary, slightly loosen the retaining screw (CM 3. 5 x 30).
2. The inside part of the thermoswitch sensor tube must be clean.
3. The quartz bar ends should not show any sign of damage and should be freely movable inside the sensor tube.
4. Following reassembly, the thermoswitch should be readjusted. The basic adjustment at time of reassembly is made as follows: the red paint-sealed adjusting screw is tightened during reassembly until the switching throw takes place within the switch (audibly noticeable click), then the screw is turned another 1/3 turn (120°).
5. The exact adjustment is accomplished in manner outlined at the beginning of this chapter.

HEATER CONTROL SWITCH

Description

Depending upon the discharge air temperature, the current supply for the fuel pump and fuel solenoid is opened or shut by a bi-metal spiral which is a part of the microswitch (heat thermostat). The switch response temperatures should be 45 to 55° C at the lowest heat output settings, and 80 to 90° C at high settings (readings taken in hot air duct).

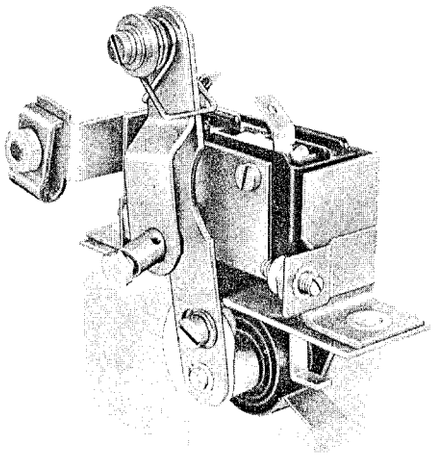


Fig. 17

Inspection and Adjustment

If the prescribed temperatures can not be realized, it is possible to rectify this trouble by readjusting the terminal stop screws of the control lever. If the microswitch had to be replaced for any reason, it will be necessary to completely readjust the new switch. Should it happen that the adjustment range of the terminal stop screws turns out to be insufficient it will be necessary to change the basic setting by loosening one round-head screw and changing the position of the lever in relation to the bi-metal spiral (oval orifice in the lever).

Disassembly

1. Remove two cylindric-head screws seated in switch body (at the level of Bowden-cable terminal) and withdraw the switch with the contact finger up.
2. To take out the Thermoflex spiral, it is necessary to remove the retaining ring on the pivot shaft, loosening the set screw in the control lever, and removing the control lever.

Reassembly

Reassembly is accomplished in reversed order of the above, devoting attention to the following points:

1. Make certain that the retaining screws on both contact lugs are firmly tightened.
2. The heater control switch must respond to a temperature of 45 to 50° C at lowest heat output setting, and to 90 to 100° C at the highest setting.
3. A subsequent adjustment of the heater control switch can be accomplished as outlined at the beginning of this chapter.

H E A T E X C H A N G E R

If the heater has been subjected to a prolonged operation under conditions involving an insufficient air supply (improper combustion resulting in soot deposits), it will be necessary to burn clean the heat exchanger and exhaust tube. This is accomplished in a shop, by a mechanic, without removing or disassembling the heater unit. By short-wiring (by-passing) the heater control switch, the heat exchanger is brought to a glowing, dark-red temperature (may be seen through intake opening), causing the carbon deposits to burn off under emission of sharp-smelling, grey-green fumes (the heat-cleaning procedure must be performed in an open area for obvious reasons). As soon as the smoke emission ceases, the ashlike deposits can be loosened by light tapping on the exhaust tube; the ash will then be blown out by the combustion blower. It is not permissible to repair the heat exchanger, and when found to be defective, it must be replaced as a unit.

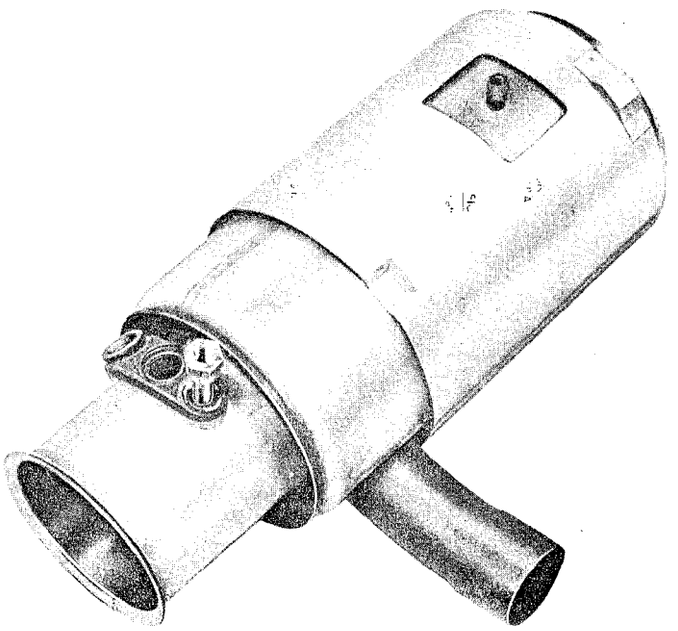
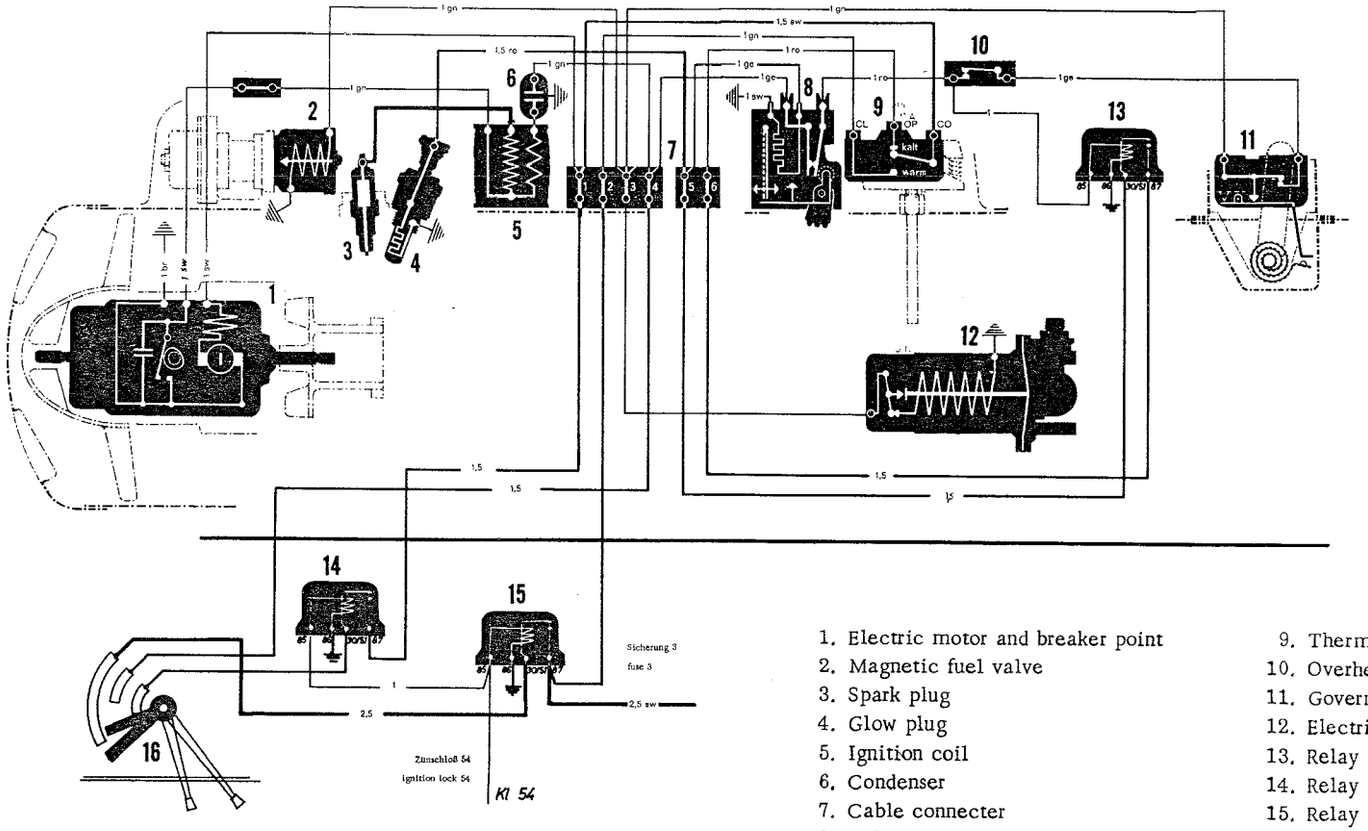


Fig. 18

WIRING DIAGRAM



bl = blue
br = brown
ge = yellow
gr = green
ro = red
sw = black
we= white

1. Electric motor and breaker point
2. Magnetic fuel valve
3. Spark plug
4. Glow plug
5. Ignition coil
6. Condenser
7. Cable connecter
8. Safety switch
9. Thermo switch
10. Overheat safety switch
11. Governor switch
12. Electric fuel pump
13. Relay
14. Relay
15. Relay
16. Operating switch

HOW TO FIND FAILURES AT THE HEATER BN 4

The functional test can be carried out with the aggregate installed in the car.

Deficiency	Cause	Corrective Measures
Fan does not operate	Electric current interrupted	Check main fuses and relays
No fuel supplied	Safety switch has interrupted the fuel supply after 2-3.5 minutes of preheating	Press red lever to reset safety switch. If necessary wait 2 minutes for cooling down of heater resistor, so that switch can be reingaged
	Safety switch improperly adjusted	Check safety switches and adjust (see S TRA 34)
	Magnetic valve at the pressure governor does not open, coil faulty	Remove coil and replace by new one, see S TRA 33
	Fuel pump sticks	Clean breaker points and readjust, see S TRA 31
Fuel supply interrupted	Fuel line or filter leaking, fuel pump receives air	Check connections of fuel lines, especially gasket of filter inspection glass
	Filter clogged	Clean, arrow must correspond to flow direction to prevent internal clogging
	Hair filter at pressure control clogged	Remove pump pressure tube at the pressure control and clean hair filter with compressed air
	Control switch damaged	Check connections and function, see S TRA 35
	Safety switch damaged	Check contacts, see S TRA 35
	Pump has no output supply, noisy	Open fuel cock, pump receives air, relief valve on the pressure side of the pump is dry and sticks - remove pump pressure line and moisten with a few drops of fuel

Deficiency	Cause	Corrective Measures
Fuel feed stopped	Fuel pump does not operate	Check breaker points, oil the spring plates and bearings (see S TRA 31)
	Pressure governor and magnetic valve not operating	Clean pressure governor and adjust (see S TRA 32)
	Magnetic valve jammed	Remove pressure governor with magnetic valve. Dismantle magnetic valve, clean or replace valve, if necessary (see S TRA 33)
	Fuel jet clogged or damaged	Fuel jet is damaged, does not inject fuel correctly to the gearing of the diffuser gear (observe through spark plug hole). See S TRA 30/12
		Remove fuel line, clean jet, using dry compressed air (sealed-in hair sieve)
Ignition does not occur	Spark plug damaged or incorrect gap	Exchange spark plug, or adjust (spark gap: 2. 5 mm)
	Ignition coil faulty, cable to spark plug interrupted, spark too weak	Exchange ignition coil, repair ignition cable
	Breaker point damaged	Exchange complete burner chamber
No air being supplied	Electric contacts for fan damaged or not connected	Tighten connection clamp No. 1 (see wiring diagram), check operating mechanism
	Electric motor faulty	Exchange complete combustion fan unit
Fan does not supply enough air	Intake combustion air is clogged through road dirt	Clean intake
	Exhaust back pressure too high, because of dirt or improper modifications	Clean, remove modification
Heater does not switch off	Incorrect wiring	Electric contact must be made on clamp 3, together with fuel pump and control switch (see wiring diagram)

Deficiency	Cause	Corrective Measures
Fan runs continuously	Improper adjustment of thermoswitch causes fan to run after heater shuts off	Adjust thermoswitch, see S TRA 34
	Fan runs continuously after heater shuts off	Quartz-element of thermoswitch broken, remove thermoswitch, replace quartz-element (see S TRA 34)
Heater aggregate soots, smokes, or works irregularly		
1. Excessive fuel	Fuel jet damaged	Exchange; clean only with compressed air in flow direction. Do not damage sealed-in hair sieve
	Pressure control not properly adjusted	Adjust pressure control. See S TRA 32
2. Lack of combustion air	Battery voltage below prescribed value of 5.8, 5.9 or 11.5 volts	Tighten cable connections, check battery, charge, if necessary
	Intake tube for combustion air clogged	Clean intake
	Fan does not reach prescribed speed of 5000 r.p.m. at correct voltage	Exchange combustion fan unit
	Guide vane housing damaged	Replace heat exchanger
3. Ignition misfires	Spark plug fouled through combustion products, insolation damaged	Clean spark plug, check gap of middle electrode (mean value 2.5 mm), replace, if necessary
	Ignition coil damaged or internal arcing	Replace ignition coil
	Relay jammed (see wiring diagramm relay No. 13)	Replace
Heater fails to start	Fan motor has damaged bearings or windings	Replace complete combustion fan unit, do not attempt disassembly, since the unit has matched on balanced parts
	Diffuser gear is damaged or jammed in the guide vane housing	Replace complete combustion fan
	Breaker point worn or damaged	Replace complete combustion fan, both breaker points are not adjustable (riveted)

Installing Fresh-Air Blower

The Behr fresh-air blower can be installed as special order item in the below listed types of cars:

Coupe	from	Serial No.	117 601
Cabriolet	from	Serial No.	155 601
Karmann Hardtop	in	Serial No.	201 601 - 202 299
Karmann Coupe	from	Serial No.	210 001

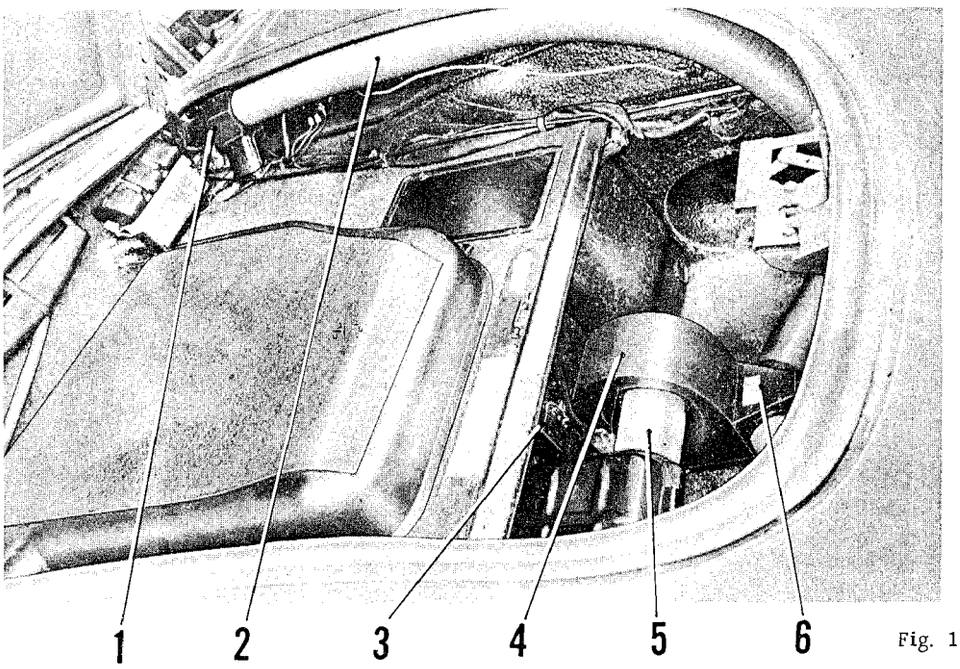


Fig. 1

1 Fresh air duct
2 Flexible hose
3 Relay
4 Blower housing
5 Blower motor
6 Distributing manifold

The radially acting fresh-air blower is being installed in the front compartment behind the spare tire. With the fresh-air blower switched on, fresh air enters through the grill in front of the windshield and is pressed through the distributing manifold into the fresh air ducts via flexible hoses at the right and left compartment side. The fresh air is then conveyed either to the windshield or to the floor by adjustment of the lower lever of the control unit.

The fresh-air blower has 2 control steps and is operated from the instrument panel. It is the same control unit as for the Eberspächer heater.

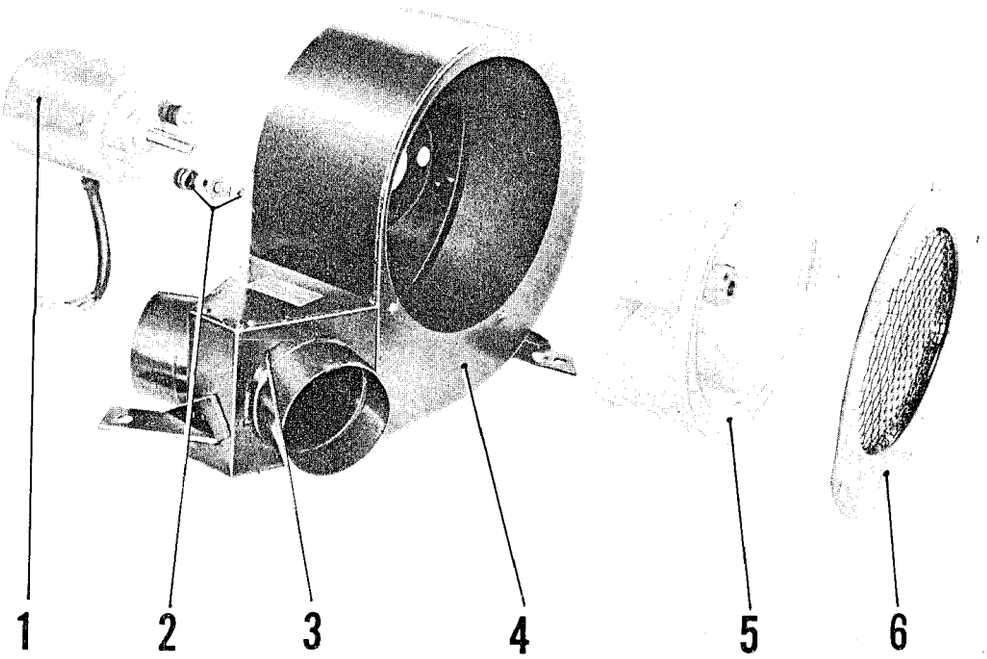


Fig. 2

1 Blower motor
2 Rubber bearing and fastening
3 Distributing manifold
4 Blower housing
5 Blower impeller
6 Cover plate

Operation:

First control step (see Fig. No. 3): Blower impeller rotates at 3000 r. p. m.

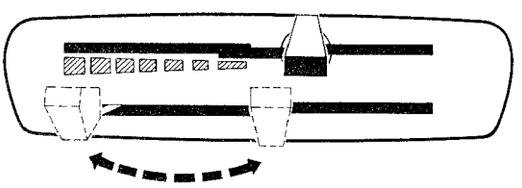


Fig. 3

Second control step: Blower impeller rotates at 4500 r.p.m., current consumption thereby approx. 70 Watt. Highest rate of air flow 2,8 m^3 per minute at 4500 r. p. m.

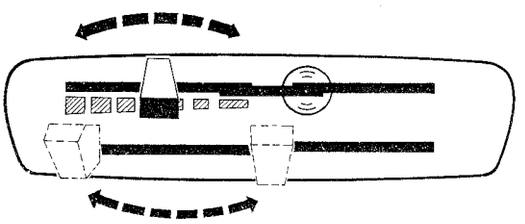


Fig. 4

Removing and installing control unit

For the removal and installation of the control unit and the Bowden control adjustment see Supplements Workshop Manual SB 11.

Attention!

The Bowden wire of the control unit, which serves to control the Eberspächer heater, is not necessary for the fresh-air blower. The Bowden wire can be removed or laid parallel to the left Bowden wire along the cable tree. In order to prevent a jamming of the Bowden wire at the envelope's end, a protective tubing must be slid on and fixed by compressing.

10 cm of a fuel pipe would offer a good protection.

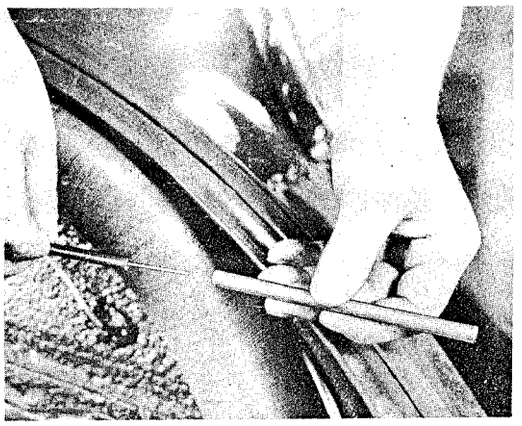


Fig. 5

Installing Fresh-Air Blower

1. Take out spare tire and remove plastic cover above fuel tank.

2. Mark holes to fix relay support on the rear wall of the front compartment (see Fig. 6) and bore with a 5.5 mm bore.

3. Working from the outside, insert relay support into these holes and mount nuts together with washers and spring rings.

4. Mount relay at the upper supporting stud and in the center of the relay support by means of a 5 mm cheese-head screw, so that the electric relay connections point to the left in driving direction.

5. Tighten the relay.

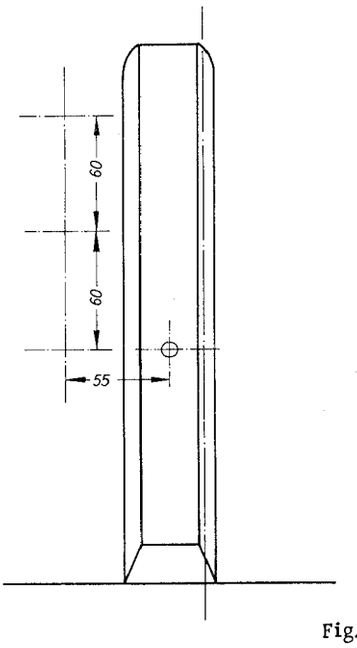


Fig. 6

6. Insert a 3 mm diam. welding wire into the cable tunnel which guides the battery cable to the rear.

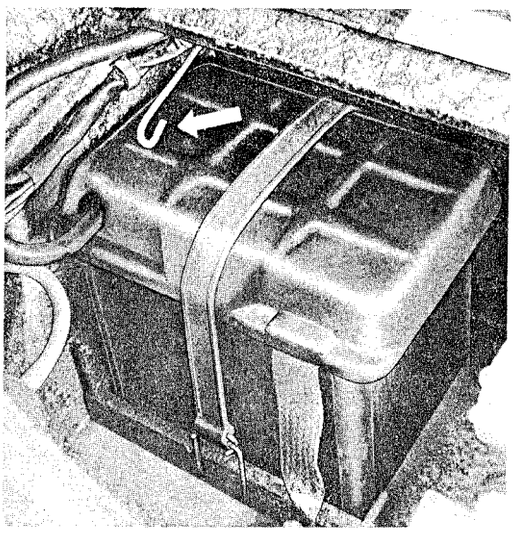


Fig. 7

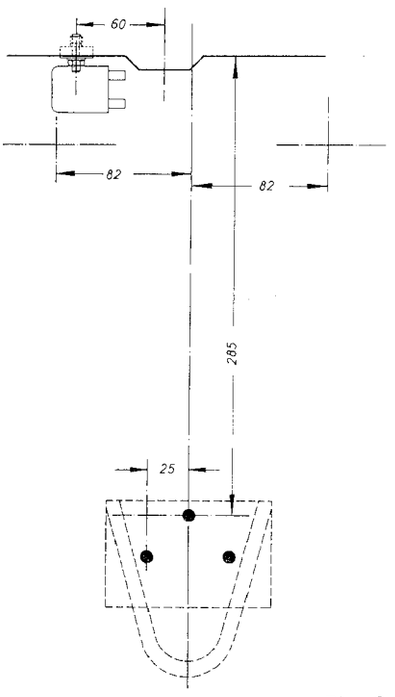


Fig. 8

7. Fasten the cable tree to the welding wire and pull it from the front compartment into the floor compartment.

8. Lay and fix cable tree behind the instrument panel. Slide cable No. 1 (see wiring diagram) into the front compartment, along the main wire loom.

9. Connect cable tree, see wiring diagrams.

10. Mark fixing points for rubber-metal bearings for fresh-air blower (see Fig. 8) and bore with a 6.5 mm bore.

11. Shorten supporting studs for the two rear rubber-metal bearings by approx. 5 mm.

12. Fix the three rubber-metal bearings with their proper screws onto the fresh-air blower.

13. Insert into bores the fresh-air blower with rubber-metal bearing studs and fix together with washer, spring ring and nut.

14. Connect plug-in connections of the cable tree with engine connection.

15. Slide onto the distributing manifold both elastic hoses and place them along the right and left front compartment side wall.

16. Slide on hose ends at air-inlet of fresh air ducts.

17. Check function of fresh-air blower and fresh air ducts.
See Supplements Workshop Manual SB 9 to SB 11.

18. Reinstall fuel tank cover and spare tire.

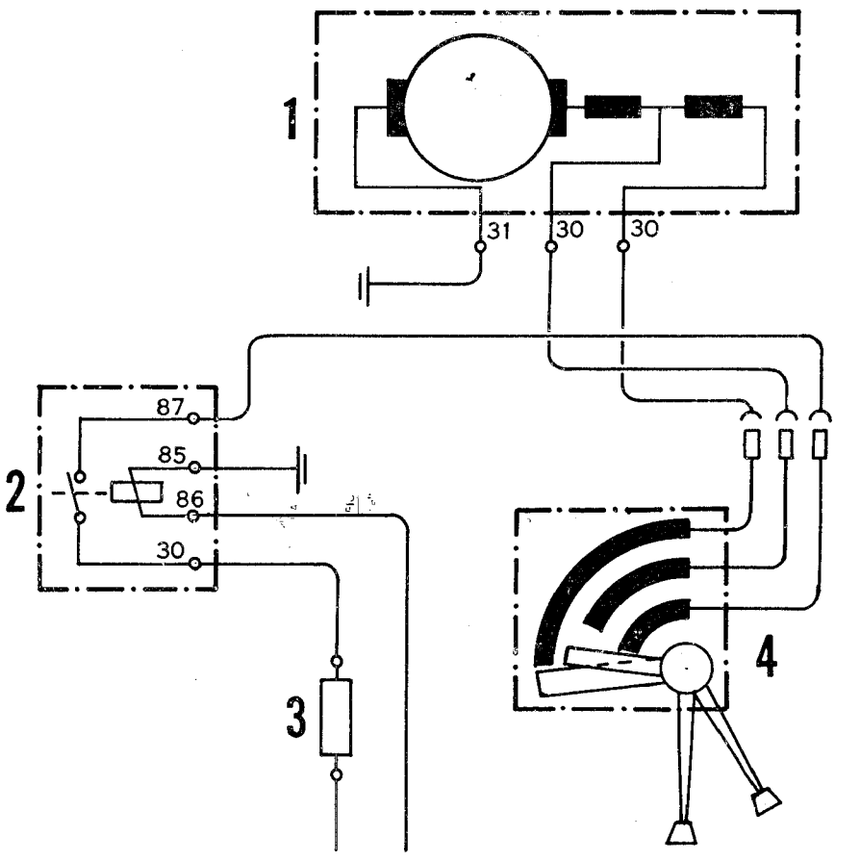


Fig. 9

1 Blower motor
2 Relay
3 Fuse 3 at fuse box
4 Control unit

Cable connections

Cable at plug-in connection of blower motor	brown	blue	black
Cable at cable tree end for blower motor	brown	blue/white	green/white

Cable at plug-in connection of control unit	green/white	blue/white	red/white
Cable at cable tree end for control unit	blue/white	green/white	red/white

Wiring diagram

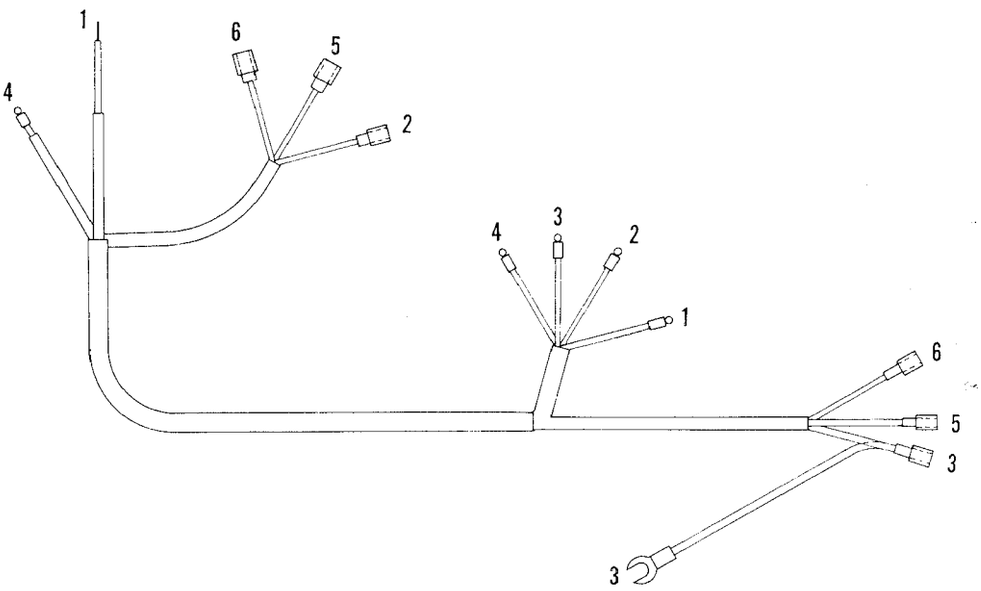


Fig. 10

No.	mm^2	Colour	from	to
1	2,5	red/black	Fuse 3	Relay 30/51
2	2,5	red/white	Control unit	Relay 87
3	2,5	brown	Ground - body	Engine relay 86
4	1	red/black	Ignition starter switch 54	Relay 85
5	1,5	blue/white	Control unit	Blower motor
6	1,5	green/white	Control unit	Blower motor

Subsequent Installation of an Outside/Inside Thermometer

Messrs VDO Tachometerwerke and Moto-Meter offer an outside/inside thermometer for installation.

Following indications are for the installation into vehicles as of

Serial No.	Coupe	117 601
	and	210 601
	Cabriolet	155 601

(On former vehicles without a clock, a 61 mm diam. orifice for the installation of the indicator can be practised in a suitable position on the dashboard.)

General:

The proper function of the outside/inside thermometer depends on the correct installation of the outside sensor. The outside sensor must be fixed in such a way that it is not exposed to the direct air stream or the sun and where it is safe from damage. The inside of the bumper is the most favourable position. The capillary tube from the outside sensor to the indicator must be carefully handled and must not get bent or pulled. Moreover, any contact with current-carrying parts must be avoided.

Installing outside/inside thermometer

(The indicator is to be installed instead of the clock and the clock on the right hand side beside the clove box.)

1. Take out spare tire and disconnect battery.

2. Mark and then practise orifice on the right hand side beside the clove box (see Fig. 1).

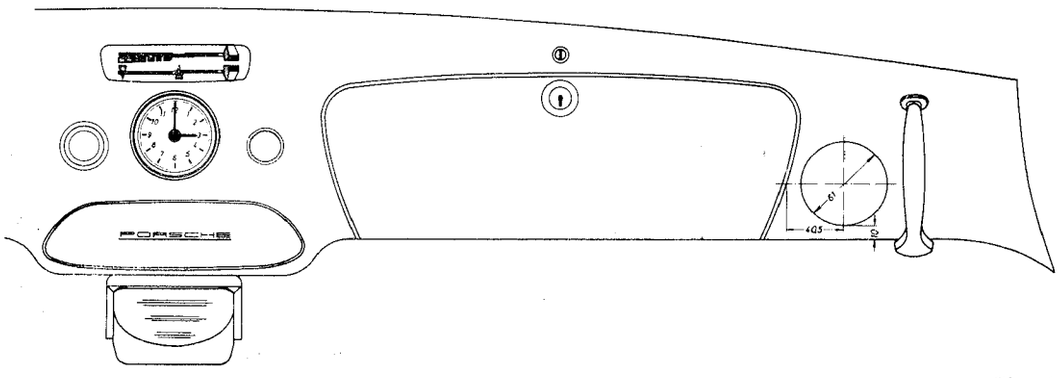


Fig. 1

3. Remove clock and reinstall into orifice beside the clove box. Reposition cables as appropriate.

4. Disconnect battery connecting terminal of cable and pull cable into driver's compartment.

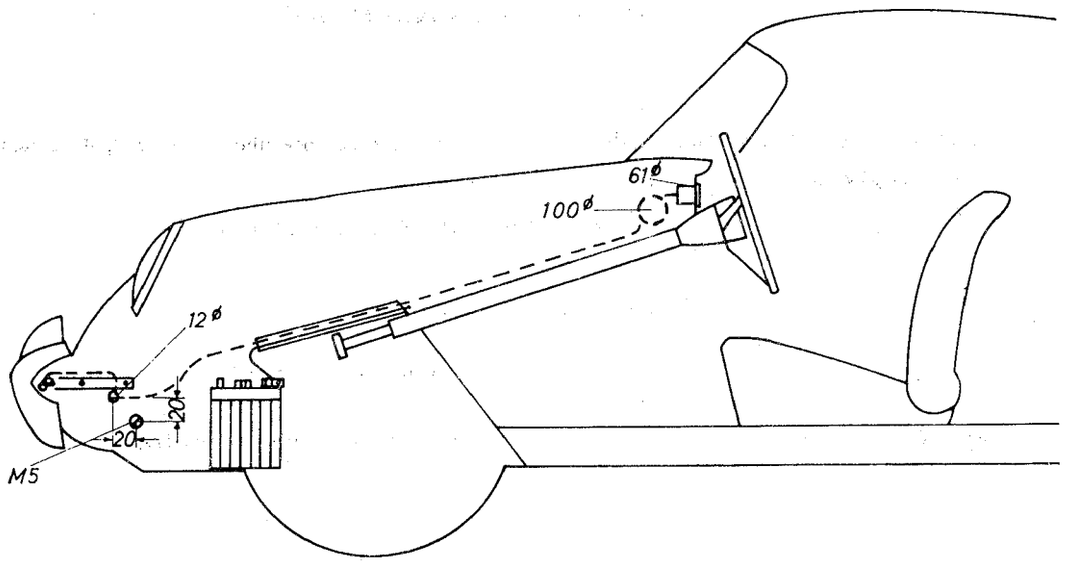


Fig. 2

5. Drill a 12 mm diam. hole into the right panel of the front compartment in front of the battery just above the earthing screw M 5 (see Fig. 2).

6. Guide the outside sensor through the orifice on the dashboard to the right hand side, then via the battery cable tube into the front compartment and through the 12 mm bore down to the bumper.

7. Fix the VDO outside sensor to the studs of the trim strip at the inside of the bumper using the screws showing to the right from the car's middle.

7a. The Moto-Meter outside sensor is best mounted by means of a clip lined with 2 mm thick rubber (see specifications for local manufacture Fig. 3). Fix the clip onto the first screw of the right bumper bracket, seen from the car's middle.

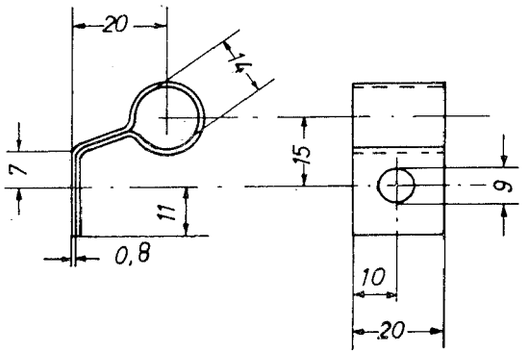


Fig. 3

When using this clip a piece of flat steel must be fixed onto the above mentioned screw in order to facilitate the fixing.

8. Properly lay capillary tube from outside sensor over bumper bracket up to indicator.

   Seal 12 mm bore in the front compartment with grommet. Roll up and fix behind the dashboard any possibly remaining capillary tube (see Fig. 2).

9. Connect indicator lamp to circuit of instrument light (58b).

10. Connect indicator warning lamp to ignition/starter terminal 15/54.

11. Pull battery cable back into front compartment and connect.

12. To fix indicator mount clamp bracket from behind and tighten with clamp nuts.

Note: Any inaccurate indication can only be adjusted by the manufacturers or their representatives.

TRAILER HITCH

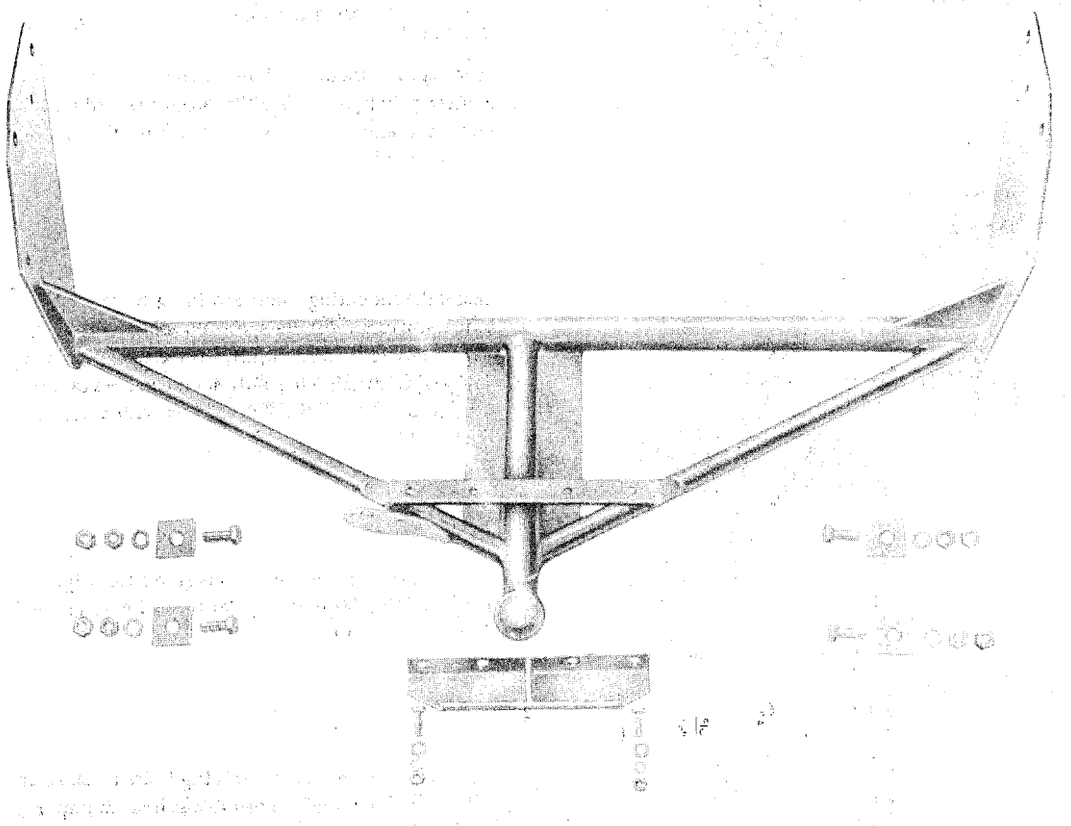


Fig. 1

Installation

1. Loosen bumper bracket retaining bolts at body and bumper.

2. Pull bumper back by about 1/2 inch and detach cable for license plate illumination.

3. Withdraw bumper, together with brackets, from the body.

4. Scrape off undercoating in the areas to be covered by the hitch mounting plate and, on the engine side, where washers will fit, in order to provide a clean, metallic base for mounting.

5. Slide the trailer hitch assembly into place and secure with bumper bracket retaining screws (see Fig. 2 and 3).

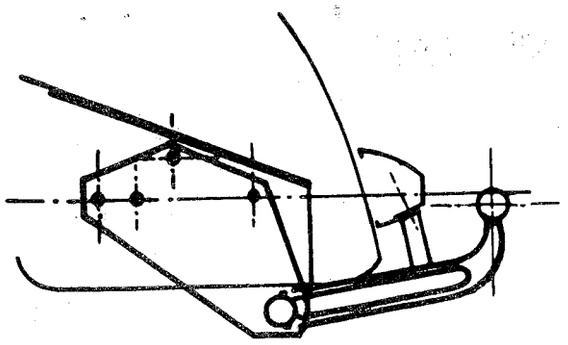


Fig. 2

6. Using an angle-head drill and a short drill bit of 12.5 mm (1/2 inch) diameter, drill the two additional mounting holes by using the mounting plate as guide.

7. Drill the holes on the opposite side of car.

   Note:

   The topmost mounting hole can be marked with a center punch and drilled from within the engine compartment.

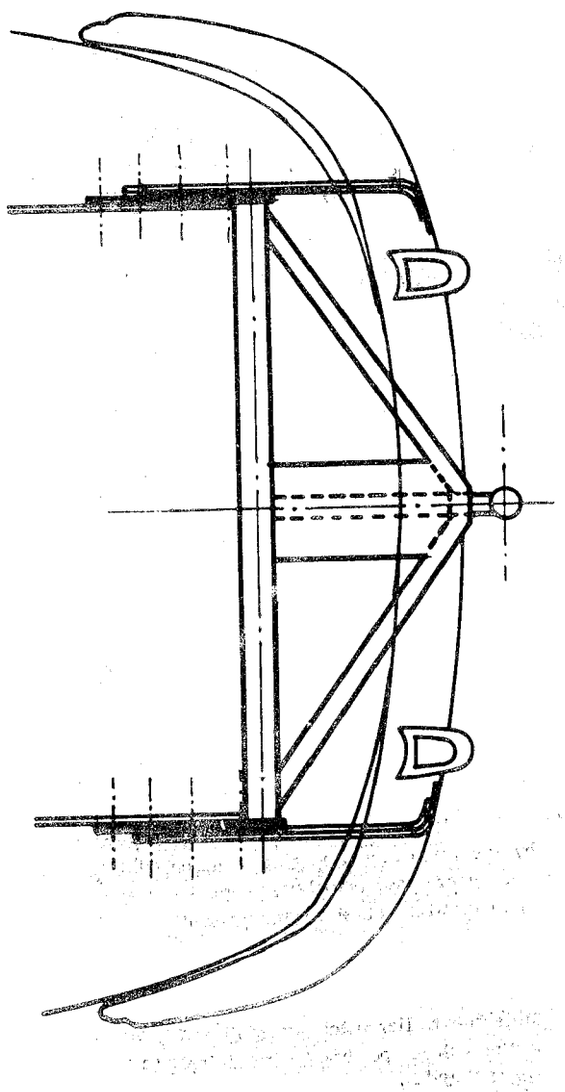


Fig. 3

8. Insert the mounting plate retaining bolts for both sides, together with the large washers which are supplied with the hitch kit, insert lock-washers, and tighten with nuts, then secure with a second nut to lock.

9. Remove bracket retaining bolts (used for aligning plate for drilling).

10. Loosen bumper bracket retaining bolts at bumper and reset brackets by the width of mounting bracket thickness (approx. 5 mm or .2 inch). If necessary, lengthen mounting holes in bumper brackets.

11. Guide bumpers, together with brackets, into openings in the body. Attach license plate illumination cable according to color code.

12. Insert bumper bracket retaining screws through holes in brackets, together with washers and lock washers, and align bumper.

    Make sure that the body does not rub against the bumper brackets. If necessary, enlarge bracket holes in the body, repainting worked surfaces to protect against rost.

13. Mark holes for bumper hitch support in bumper and drill to 8,5 mm (.32 in.) diameter.

14. Insert bumper reinforcing plate behind bumper and fasten the hitch support with bolts.

15. Tighten mounting plate and bumper bracket supporting bolts at body and bracket ends in bumper.

16. Install trailer light wiring.

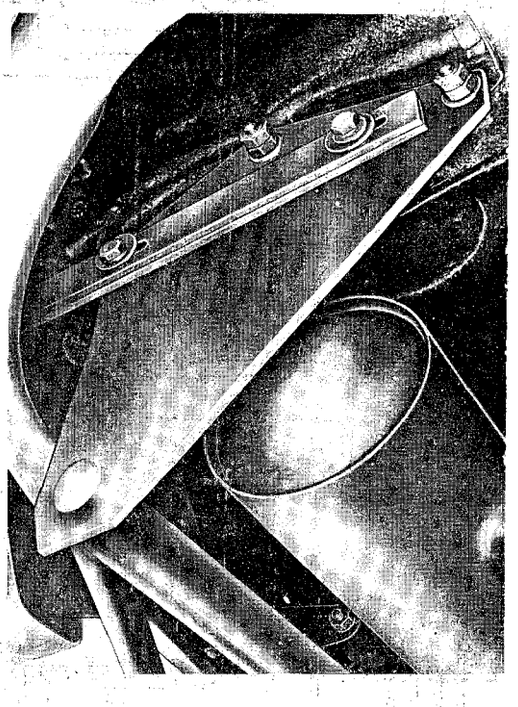


Fig. 4

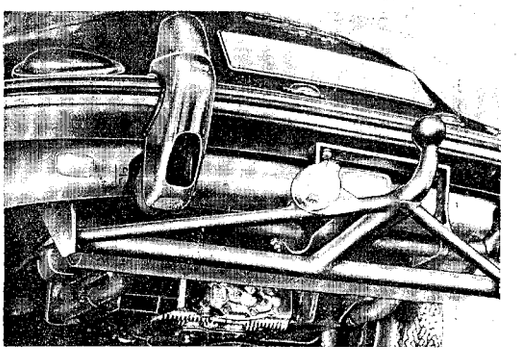


Fig. 5

Trailer Light Wiring

The following outline makes provision for the installation of a separate directional signal (blinker) control lamp on the instrument panel in driver's ligne of sight.

The system includes blinker lights and cable base manufactured by SWF, and the 5-terminal plug and socket by Hella.

It is always possible to utilize components manufactured by other firms.

1. In place of the standard blinker flasher and base with terminal bar, connect the parts 6, 7, and 7a (see Wiring Diagram).

2. Install the separate (additional) blinker control lamp to the left of the combination instrument (see Point 5, Wiring Diagram).

3. The connecting cables for the trailer tail/ stop lights and license plate illumination should be connecting to the appropriate wires in the car, as shown in the Wiring Diagram.

Wiring Diagram

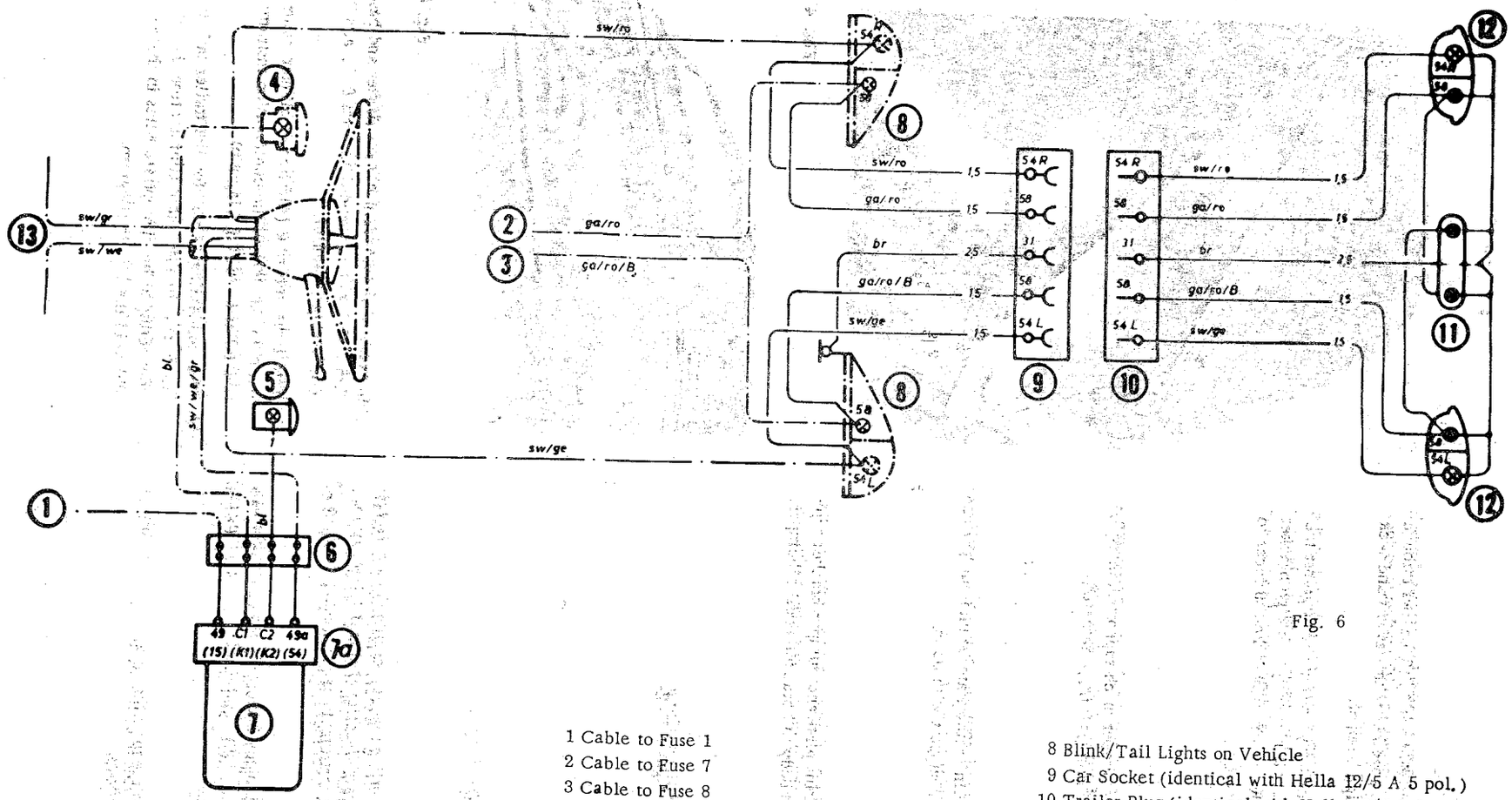


Fig. 6

sw = black
we = white
ro = red
ga = grey
br = brown
ge = yellow
bl = blue
gr = green
B = with identification strip

1 Cable to Fuse 1
2 Cable to Fuse 7
3 Cable to Fuse 8
4 Blinker Control Light in Tachometer
5 Trailer Blinker Control Light (subsequently installed)
6 Terminal Bar (identical with WEKO 404 tr 4 pol.)
7 Blinker Flasher (identical with SWF BGDO 1)
6 Volt = No. 51502
12 Volt = No. 51503

8 Blink/Tail Lights on Vehicle
9 Car Socket (identical with Hella 12/5 A 5 pol.)
10 Trailer Plug (identical with Hella 12/5 B 5 pol.)
11 License Plate Illumination (on trailer)
12 Blink/Tail Lights on Trailer
13 Cables for Forward Blinkers

— · — · — Original Cables in Car
———— New Cables Required