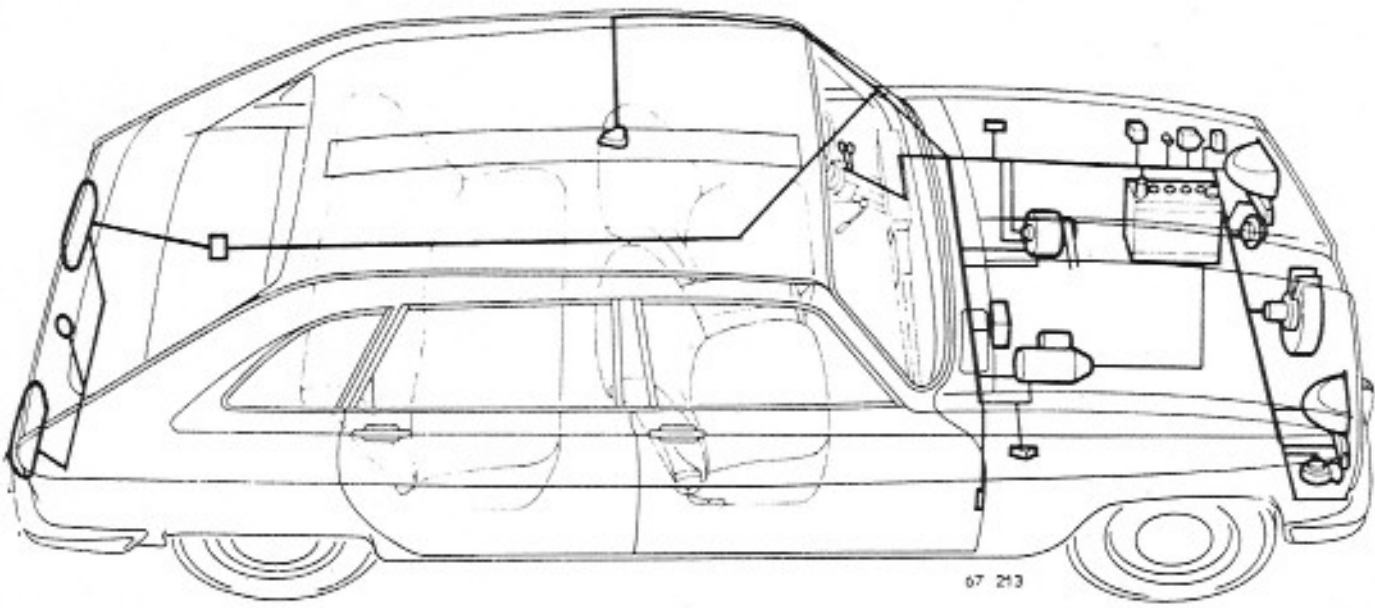
Chapter C

ELECTRICAL EQUIPMENT AND IGNITION

C

CONTENTS OF CHAPTER


07 213

A/ - 1966 MODEL

1 - LIST OF COMPONENTS

1 - Left-hand headlight
2 - Right-hand headlight
3 - Front left-hand side direction indicator light.
4 - Front right-hand side direction indicator light.
5 - Horn
6 - Horn
7 - Motor fan unit relay
8 - Voltage regulator
9 - Motor fan unit
10 - Motor fan temperature switch
11 - Battery
12 - Oil pressure switch
13 - Alternator
14 - Distributor
15 - Temperature switch
16 - Coil
17 - Starter
18 - Fuses
19 - Connection block on scuttle panel
20 - Windscreen wiper motor
21 - Spark plugs
22 - Heater motor
23 - Right-hand parking light
24 - Left-hand parking light
25 - 25 a Instrument panel light
26 - Headlight tell-tale
27 - Choke tell-tale
28 - Fuel contents indicator
29 - Oil pressure and water temperature warning light
30 - Ammeter
31 - Direction indicator tell-tale
32 - Parking light switch
33 - Windscreen wiper switch
34 - Flasher unit
35 - Cigar lighter
36 - Glove compartment light
37 - Heater switch
38 - Instrument panel lighting rheostat
39 - 39 a Connection block
40 - 40 a Connection block
41 - Left-hand door switch
42 - 42 a Connection block
43 - Direction indicator switch
44 - Right-hand door switch
45 - Stop switch
46 - Choke knob
47 - Ignition and starting switch
48 - Luggage compartment light
49 - Interior light
50 - Rear connection plate
51 - Tailgate switch
52 - Fuel contents rheostat
53 - Rear left-hand stop and tail light
54 - Rear right-hand stop and tail light
55 - Rear left-hand direction indicator
56 - Rear right-hand direction indicator
57 - Number plate light
58 - Connection between leads 149 and 173.

II - LIST OF HARNESSES

A - Engine harness
B - Chassis harness
C - Horn and lighting switch harness
D - Instrument panel harness
E - Rear harness
F - Interior light harness
G - Luggage compartment light harness
H - Postive starter lead
K - Negative starter lead

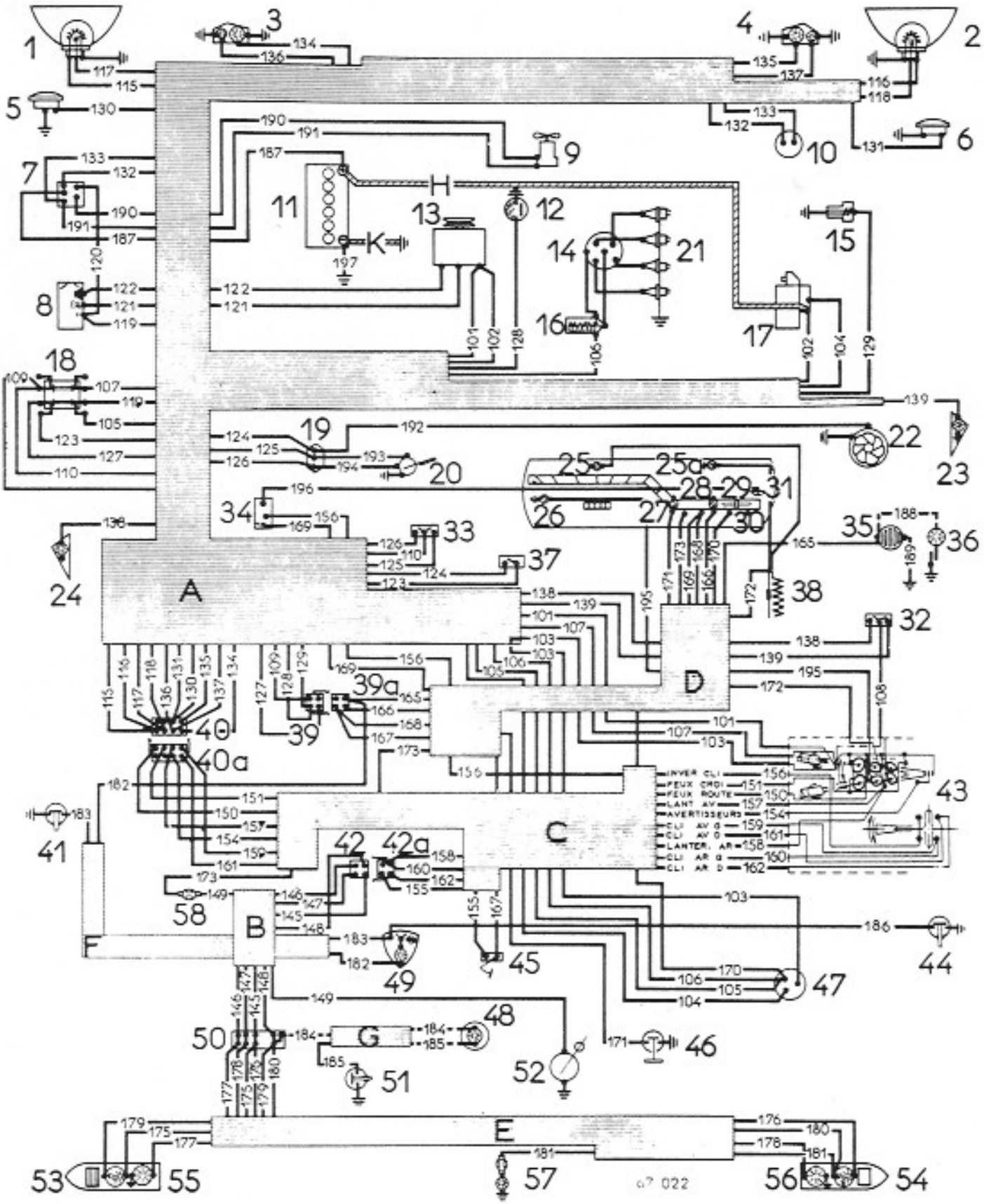
III - LIST OF WIRES

Harness	Wire No	Colour of sleeve and wire	Wire connected from	Wire connected to	Wire diameter in	Wire diameter AWG No
	101	Blue, yellow wire	13	43	30/10	9
	102	Covered, yellow wire	17	13	30/10	9
	103	White (lg. switch) blue (Dl sw.) Buff wire	43	47	20/10	12
	104	Aluminium grey wire	47 (R)	17	20/10	12
	105	Red, red wire	47 (B)	18	16/10	14
	106	Red, salmon wire	47 (B)	16	12/10	16
	107	Blue, blue wire	43	18	16/10	14
	108	Blue, blue wire	43	32	9/10	19
	109	Blue, blue wire	18	39	16/10	14
	110	Blue, grey wire	18	33	12/10	16
	115	Green wire	40	1 head	12/10	16
	116	Green wire	40	2 head	12/10	16
	117	Salmon pink wire	40	1 C	12/10	16
	118	Salmon pink wire	40	2 C	12/10	16
	119	Red, red wire	18	8 (+Reg)	16/10	16
	120	Red, grey wire	8 (+Reg)	7 (Coil)	12/10	16
A	121	Green, blue wire	8 (Fld)	13 (Fld)	16/10	14
	122	Black, white wire	8 (-)	13 (-)	16/10	14
	123	Red, grey wire	18	37	12/10	16
	124	Brown, grey wire	37 (+)	19	12/10	16
	125	Green, green wire	33 (Mot.)	19	12/10	16
	126	Blue, green wire	33 (Parked)	19	12/10	16
	127	Red, grey wire	18	39	12/10	16
	128	Covered green wire	39	12	12/10	16
	129	Covered green wire	39	15	12/10	16
	130	Covered green wire	40	5	12/10	16
	131	Covered grey wire	40	6	12/10	16
	132	Black, grey wire	7	10	12/10	16
	133	Black, grey wire	10	7	12/10	16
	134	Blue wire	40	3 (F.L.H.)	9/10	19
	135	Red wire	40	4 (F.R.H ind.)	9/10	19
	136	White wire	40	3 FLH side lt	9/10	19
	137	White wire	40	4 FRH side lt	9/10	19
	138	Violet, black wire	32	24 LH park.	9/10	19
	139	Brown, black wire	32	23 RH "	9/10	19

Harness	Wire No	Colour of sleeve and wire	Wire connected		Wire diameter	
			from	to	in	AWG No
B	145	Pink, salmon wire	42	50	12/10	16
	146	Violet, blue wire	42	50	9/10	19
	147	Brown, red wire	42	50	9/10	19
	148	Yellow, white wire	42	50	9/10	19
	149	White wire	58	52	9/10	19
C	150	Blue wire	43 (H. light)	40 a	16/10	14
	151	Red wire	43 dipped	40 a	16/10	14
	154	White wire	43 Horn	40 a	16/10	14
	155	Pink, salmon wire	45 (stop)	42 a	12/10	16
	156	Blue, salmon wire	35 Switch	43	12/10	16
	157	White wire	43 side lts	40 a	9/10	19
	158	White wire	43 tail lts	42 a	9/10	19
	159	Blue wire	43 FLHdir.ind	40 a	9/10	19
	160	Blue wire	43 RLHdir.ind	42 a	9/10	19
	161	Red wire	43 FRHdir.ind	40 a	9/10	19
	162	Red wire	43 RRHdir.ind	42 a	9/10	19
D	165	Blue, blue wire	39 a	35	16/10	14
	166	Brown, green wire	39 a	29	12/10	16
	167	Red, grey wire	39 a	45 (+ stop)	12/10	16
	168	Red, grey wire	39 a	+ Ins. panel	12/10	16
	169	Red, grey wire	+ Ins. panel	34 (+)	12/10	16
	170	White red (Ins. panel) Red (ignition) grey wire	47 (B)	30	12/10	16
	171	Black, black wire	27	46	9/10	19
	172	Yellow, black wire	43	38	9/10	19
	173	Violet, white wire	28	58	9/10	19
E	175	Pink, blue wire	50	53LH stop tail	9/10	19
	176	Pink, blue wire	50	54RH stop tail	9/10	19
	177	Violet, red wire	50	55RLHdir.ind	9/10	19
	178	Brown, red wire	50	56RRHdir.ind	9/10	19
	179	Yellow, white wire	50	53RLHdir.ind	9/10	19
	180	Yellow, white wire	50	54RRHdir.ind	9/10	19
	181	White wire	54	57	9/10	19
F	182	Blue, white wire	39 a	49	9/10	19
	183	White wire	49	41	9/10	19
G	184	Yellow, white wire	50	48	9/10	19
	185	Black wire	48	51	9/10	19

Harness	Wire No.	Colour of sleeves and wires	Wire connected		Wire diameter	
			from	to	mm	AWG No.
Single wires	186	White wire covered with orange cotton	49	44	9/10	19
	187	White, grey wire	11	7	20/10	12
	188	Blue, black wire	35	36	9/10	19
	189	Black, grey wire	35	Earth (ground)	12/10	16
	190)	Red, black wire	7(Mot.)	9	16/10	14
	191)	Black, black wire	9	7 (-)	16/10	14
	192	Brown, grey wire	19(+Mot.)	22	12/10	16
	193	Green, green wire	19	20	12/10	16
	194	Blue, green wire	19 (Park)	20	12/10	16
	195	Blue wire	43	26	9/10	19
	196	Direction indicator tell-tale	34(REP.)	31	9/10	19
	197	Yellow wire	11	Earth (ground) Bodywork	30/10	9

IV - 1966 MODEL WIRING DIAGRAM



B/ - 1967 MODEL

V - LIST OF COMPONENTS

1 - Left-hand headlight
2 - Right-hand headlight
3 - Front left-hand side direction indicator light.
3a Front right-hand side direction indicator light.
4 - Left-hand side horn
5 - Right-hand side horn
6 - Motor fan unit relay
7 - Motor fan cooling unit
8 - Motor fan temperature switch
9 - Voltage regulator
10 - Battery
11 - Alternator
12 - Oil pressure switch
13 - Spark plugs
14 - Distributor
15 - Temperature switch
16 - Front left-hand brake pad
17 - Coil
18 - Starter
19 - Front right-hand brake pad
20 - Fuses
21 - Windscreen wiper motor
22 - Heater
23 - Right-hand parking light
24 - Left-hand parking light
25 - Flasher unit
26 - 26 a Instrument panel light
27 - Connection block on scuttle panel
28 - Headlight tell-tale
28 a Front brake pad wear warning light.
29 - Fuel contents indicator
30 - Oil pressure and water temperature warning light
31 - Ammeter
32 - Direction indicator tell-tale
33 - Windscreen wiper switch
34 - Instrument panel lighting rheostat
35 - Parking light switch
36 - Cigar lighter
37 - Glove compartment light
38 - Heater rheostat
39 - 39 a Connection block
40 - 40 a Connection block
41 - Left-hand door switch
42 - Direction indicator switch
43 - Right-hand door switch
44 - 44 a Connection block
45 - Stop switch
46 - Ignition and starting switch
47 - Luggage compartment light
48 - Interior light
49 - Fuel contents rheostat
50 - Tailgate switch
51 - Rear left-hand stop and tail light
52 - Rear right-hand stop and tail light
53 - Rear left-hand direction indicator
54 - Rear right-hand direction indicator
55 - Number plate light
56 - Connection between leads 154 and 174

II - LIST OF HARNESSES

A - Engine harness
B - Chassis harness
C - Horn and lighting switch harness
D - Instrument panel harness
E - Interior light harness
F - Positive starter lead
G - Negative starter lead

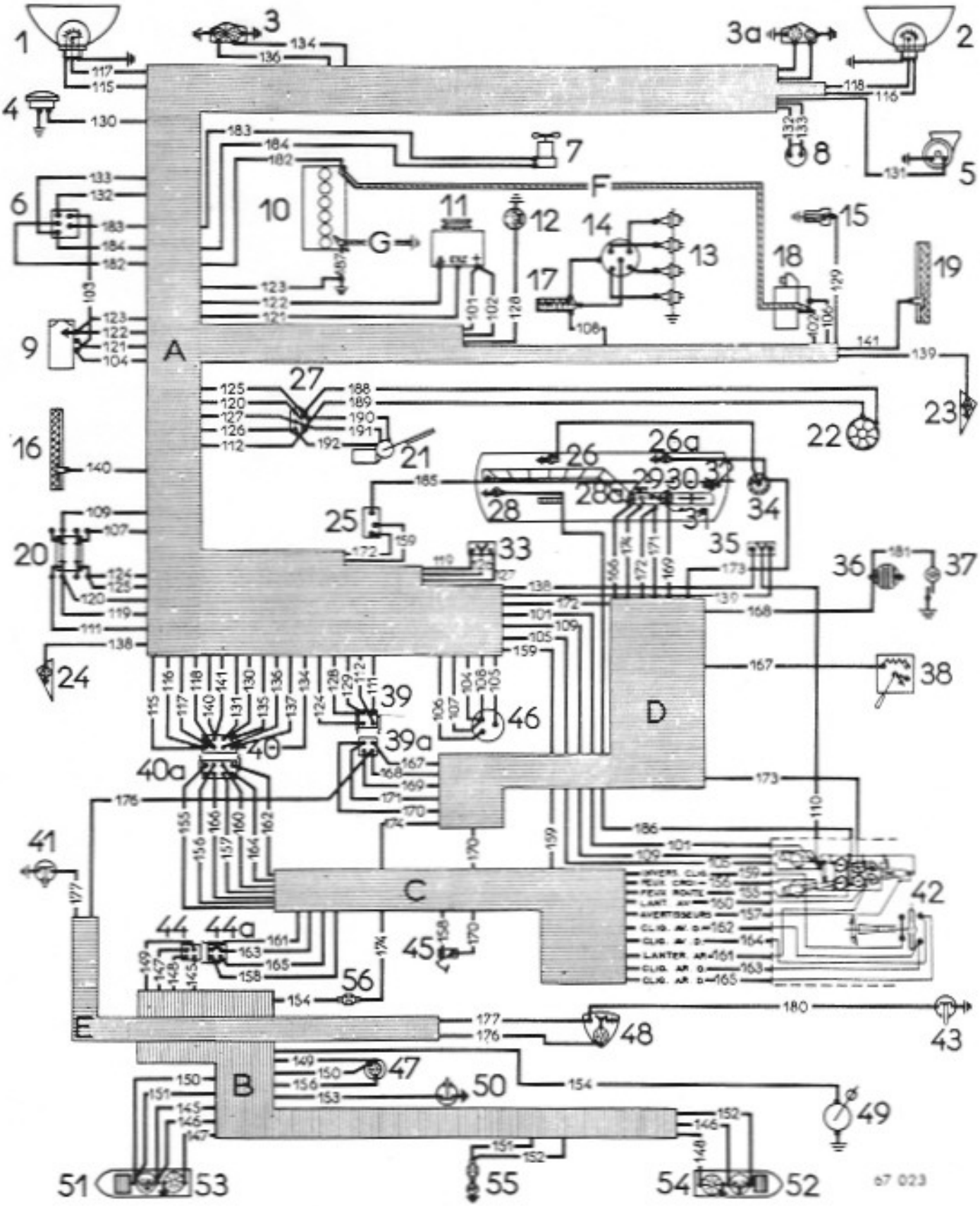
VII - LIST OF WIRES

Harness	Wire No.	Colour of sleeves and wires	Wire connected		Wire diameter	
			from	to	mm	AWG No.
	101	Blue, yellow wire	11(+Alt)	42	30/10	9
	102	Covered yellow wire	18	11(+Alt)	30/10	9
	103	Red, grey wire	9 + Reg.	6 Coil	12/10	16
	104	Red, red wire	46 (B)	9 + Reg.	16/10	14
	105	White (Neiman) Blue (Dir. Ind. switch) Buff wire	42	46 (+)	20/10	12
	106	Aluminium grey wire	46 (R)	18	20/10	12
	107	Red, red wire	46 (B)	20	16/10	14
	108	Red, salmon pink wire	46 (B)	17	12/10	16
	109	Blue, blue wire	42	20	16/10	14
	110	Blue, blue wire	42	35	9/10	19
	111	Blue wire	20	39	16/10	14
	112	Yellow wire	27	39	12/10	16
	115	Green wire	40	1 l.h.hd.lt.	12/10	16
	116	Green wire	40	2 r.h.hd.lt.	12/10	16
	117	Salmon pink wire	40	1 l.h.dir.ind	12/10	16
	118	Salmon pink wire	40	2 r.h.dir.ind	12/10	16
	119	Blue, salmon pink wire	20	33 (+)	12/10	16
A	120	Blue, salmon pink wire	20	27	12/10	16
	121	Green, blue wire	9 Exc.	11 Exc.	16/10	14
	122	Black, white wire	9 (-)	11 (-)	16/10	14
	123	Black, white wire	9 (-)	10 (-)	16/10	14
	124	Red, grey wire	20	39	12/10	16
	125	Red, grey wire	20	27	12/10	16
	126	Green wire	33	27	12/10	16
	127	Grey wire	33 (Park)	27	12/10	16
	128	Green covered wire	12	39	12/10	16
	129	Green covered wire	15	39	12/10	16
	130	Green covered wire	40	4 l.h.horn	12/10	16
	131	Grey covered wire	40	5 r.h.horn	12/10	16
	132	Black, grey wire	6 "RAD"	8	12/10	16
	133	Black, grey wire	8	6 (-)	12/10	16
	134	Blue wire	40	3 Front l.h. dir. ind.	9/10	19
	135	Red wire	40	3 Front r.h. dir. ind.	9/10	19
	136	White wire	40	3 Front l.h. switch	9/10	19
	137	White wire	40	3 Front r.h. switch	9/10	19
	138	Black wire	35	24	9/10	19
	139	Brown, black wire	35	23	9/10	19
	140	Black covered wire	40	16	12/10	16
	141	Black covered wire	40	19	12/10	16

Harness	Wire No	Colour or sleeves and wires	Wire connected		Wire diameter	
			From	to	mm	AWG No
	145	Salmon pink wire	44	51RLH stop	12/10	16
	146	Black wire	51	52RRH stop	12/10	16
	147	Blue wire	44	53RLHdir.ind	9/10	19
	148	Red wire	44	54RRHdir.ind	9/10	19
B	149	Clear, white wire	44	47	9/10	19
	150	Clear, white wire	47	51 RLH	9/10	19
	151	White wire	51	55	9/10	19
	152	White wire	55	52RRH	9/10	19
	153	Black wire	47	50	9/10	19
	154	White wire	56	49	9/10	19
	155	Blue wire	42(headligh)	40 a	16/10	14
	156	Red wire	42 "Dip"	40 a	16/10	14
	157	White wire	42 "Horn"	40 a	16/10	14
	158	Pink, salmon pink wire	45 Stop	44 a	12/10	16
	159	Blue, salmon pink wire	25 "Com"	42	12/10	16
	160	White wire	42 side	40 a	9/10	19
C	161	White wire	42 R.stop	44 a	9/10	19
	162	Blue wire	42FLHdir.ind	40 a	9/10	19
	163	Blue wire	42RLHdir.ind	44 a	9/10	19
	164	Red wire	42FRHdir.ind	40 a	9/10	19
	165	Red wire	42RRHdir.ind	44 a	9/10	19
	166	Black, black wire	28 a	40 a	9/10	19
	167	Yellow wire	39 a	38	12/10	16
	168	Clear, blue wire	39 a	36	16/10	14
	169	Brown, green wire	39 a	30	12/10	16
D	170	Red, grey wire	39 a	45 "stop"	12/10	16
	171	Red,grey wire	39 a	+ panel	12/10	16
	172	Red,grey wire	+ panel	25 "+"	12/10	16
	173	Yellow, black wire	42	34	9/10	19
	174	White wire	29	56	9/10	19
E	176	Blue, white wire	39 a	48	9/10	19
	177	White wire	48	41	9/10	19

Harness	Wire No.	Colour of sleeves and wires	Wire connected		Wire diameter	
			from	to	mm	AWG No.
Single wires	180	White wire covered with orange cotton	48	43	9/10	19
	181	Clear, blue wire	36	37	9/10	19
	182	White, grey covered wire	10	6(+)	20/10	12
	183	Red, black wire	6"Mot"	7	16/10	14
	184	Black, black wire	7	6(-)	16/10	14
	185	Direction indicator tell-tale	25"REP"	32	9/10	19
	186	Blue wire	42	28	9/10	19
	187	Yellow wire	10	Earth Bdy. (ground)	30/10	9
	188	Red, grey wire	27	22	12/10	16
	189	Yellow wire	27	22	12/10	16
	190	Blue, salmon pink wire	27	21	12/10	16
	191	Grey wire	27	21 Park	12/10	16
	192	Green wire	27	21	12/10	16

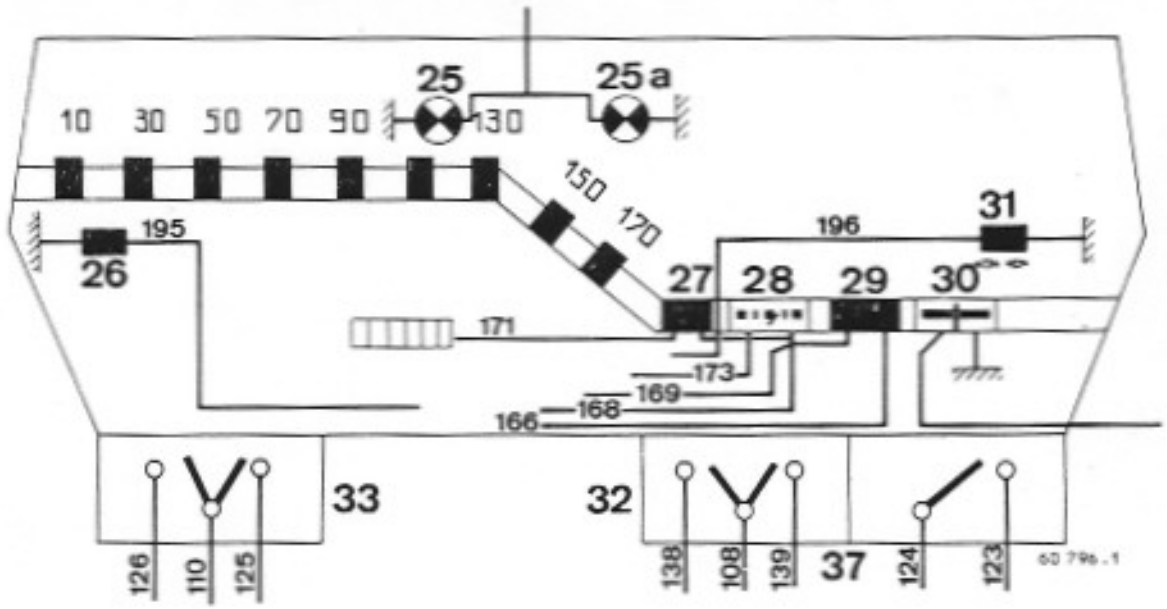
VIII - 1967 MODEL WIRING DIAGRAM



IX - DETAILS OF CONNECTIONS

1) - Instrument panel :

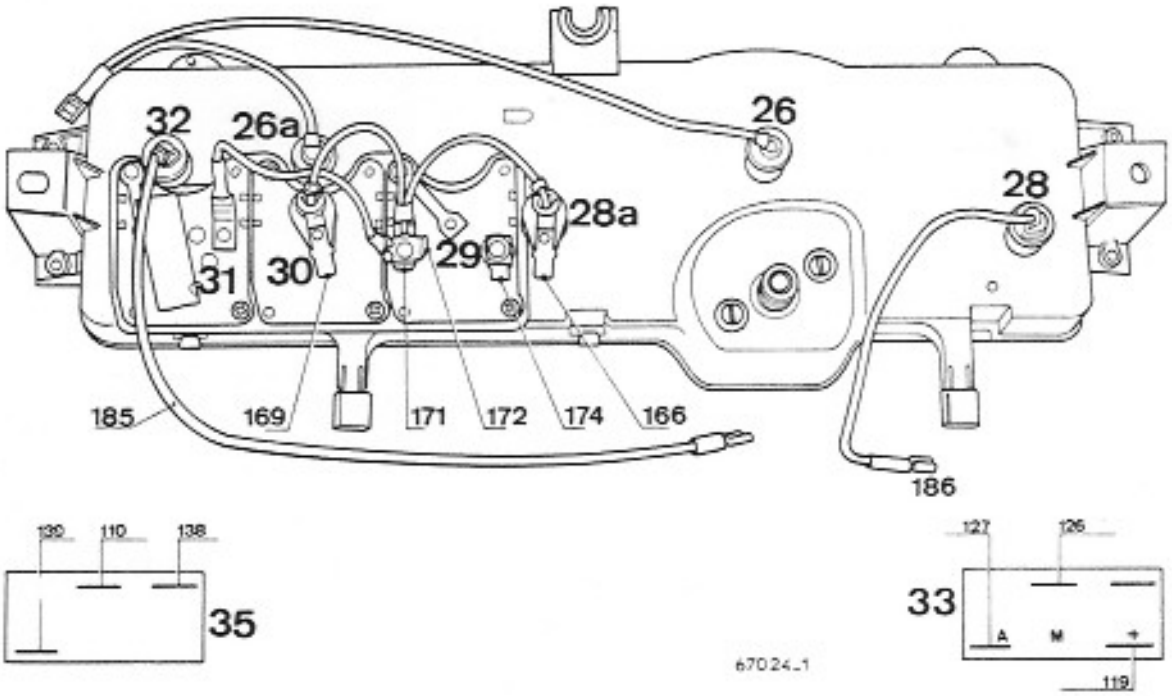
a) - 1966 Model



25-25a - Panel lighting
26 - Headlight tell-tale
27 - Choke tell-tale
28 - Fuel contents indicator
29 - Water temperature and oil pressure warning light
30 - Ammeter
31 - Direction indicator tell-tale
32 - Parking light switch
33 - Windscreen wiper switch
37 - Heater switch

Wire No.	Colours	Wire No.	Colours
108	Blue, blue wire	166	Brown, green wire
110	Blue, grey wire	168	Red, grey wire
123	Red, grey wire	169	
124	Brown, grey wire	170	Red and white, grey wire
125	Green, green wire	171	Black, black wire
126	Blue, green wire	173	Violet, white wire
138	Violet, black wire	195	Blue wire
139	Brown, black wire	196	Direction indicator tell-tale
165	Blue, blue wire		

b) - 1967 Model



26-26a - Instrument panel lighting
28 - Headlight tell-tale
28a - Brake wear warning light
29 - Fuel contents indicator
30 - Oil pressure and water temperature warning light
31 - Ammeter
32 - Direction indicator tell-tale
33 - Windscreen wiper switch
35 - Parking light switch

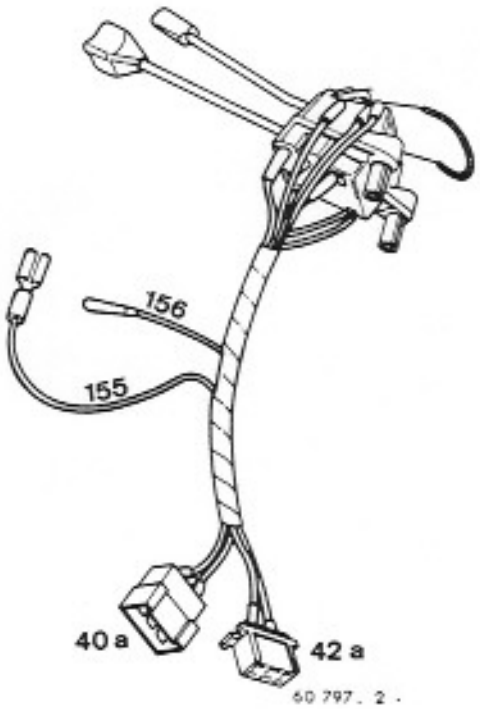
Wire No.	Colours	Wire No.	Colours
110	Blue, blue wire	169	Brown, green wire
119	Blue, salmon pink wire	171	Red, grey wire
126	Green wire	172	Red, grey wire
127	Grey wire	174	White wire
138	Black wire	185	Direction indicator tell-tale
139	Brown, black wire	186	Blue wire
166	Black, black wire		

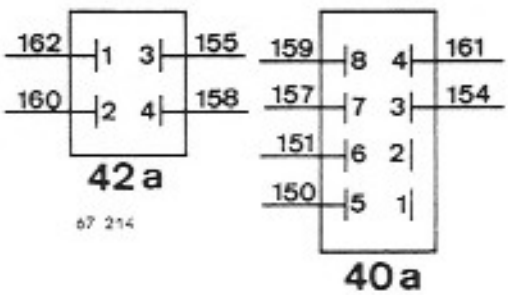
2) - Horn and lighting switch - 1966-67 Model

From the 17749th vehicle onwards, the only horn and lighting switch fitted, has been No. 9 847 607 which has a single contact to operate both horns simultaneously.

For interchangeability instructions when replacing the old type switch by the new one, see section XVI page 37.

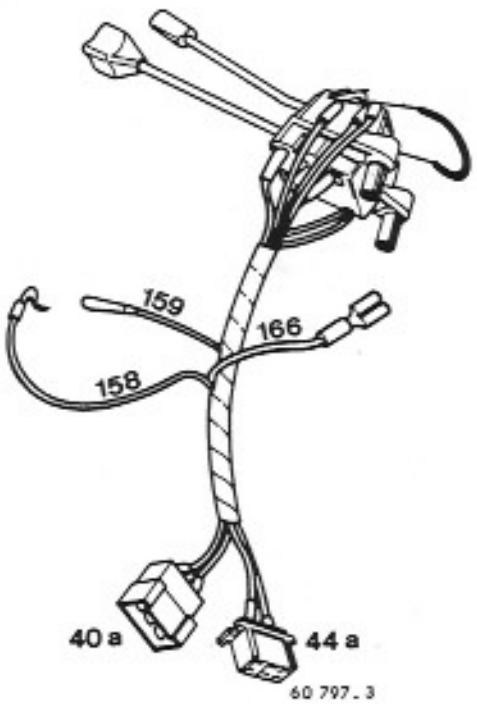
a) - 1966 Model

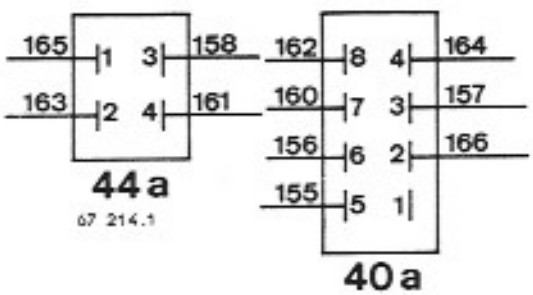




Wire No.	Colours
150	Blue wire
151	Red wire
154	White wire
155	Pink, salmon pink wire
156	Blue, salmon pink wire
157	White wire
158	White wire
159	Blue wire
160	Blue wire
161	Red wire
162	

b) - 1967 Model

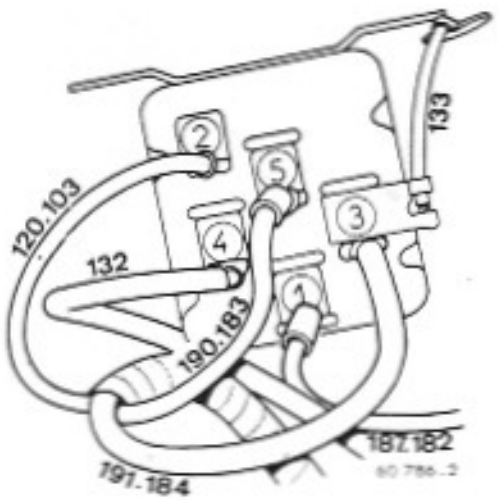




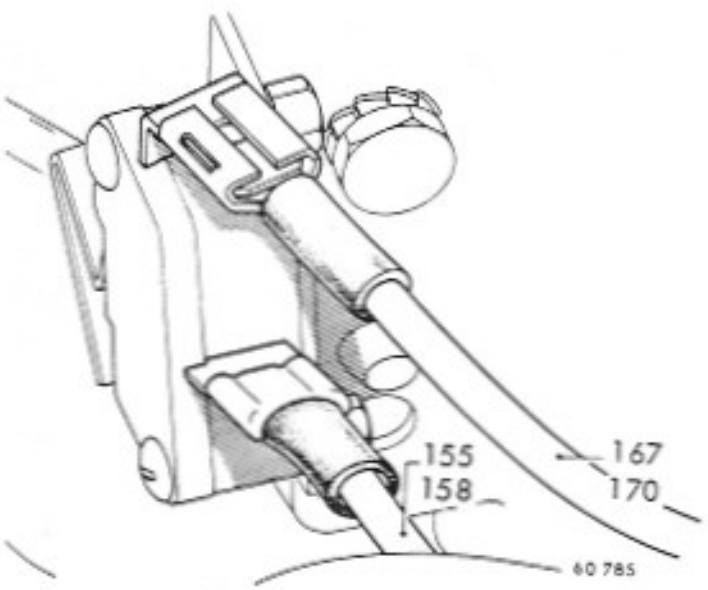
Wire No.	Colours
155	Blue wire
156	Red wire
157	White wire
158	Pink, salmon pink wire
159	Blue, salmon pink wire
160	White wire
161	
162	Blue wire
163	
164	Red wire
165	
166	Black, black wire

3) - Fan relay

Wire No.		Colours
Models		
1966-1967		
120	103	Red, grey wire
132	132	Black, grey wire
133	133	Black, grey wire
187	182	White, grey wire
190	183	Red, black wire
191	184	Black, black wire

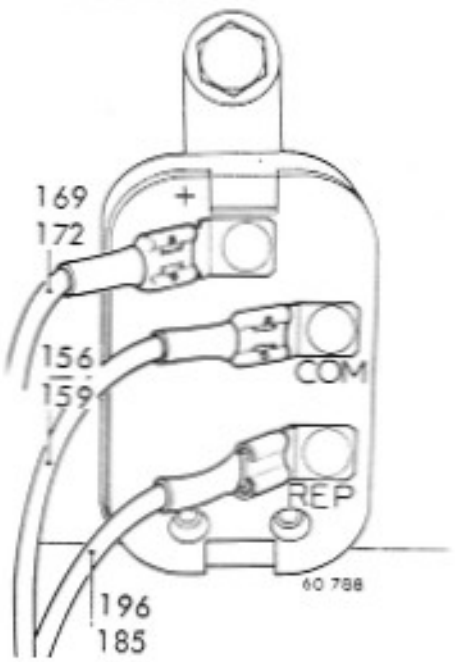


4) - Stop switch



Wire No.		Colours
Models		
1966-1967		
155	158	Pink, salmon pink wire
167	170	Red, grey wire

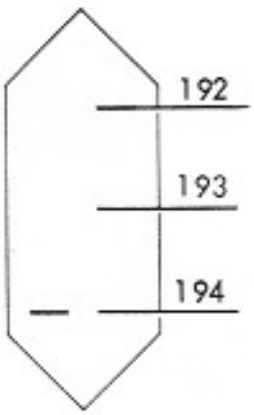
5) - Flasher unit

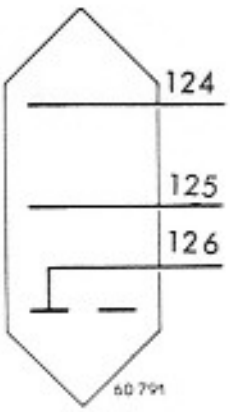


Wire No.		Colours
Models		
1966-1967		
169	172	Red, grey wire
156	159	Blue, salmon pink wire
196	185	Direction indicator tell-tale

6) - Scuttle connection plate (For windscreen wiper and heater motor connections).

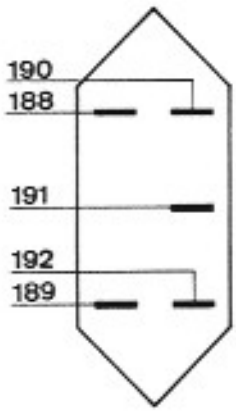
a) - 1966 Model

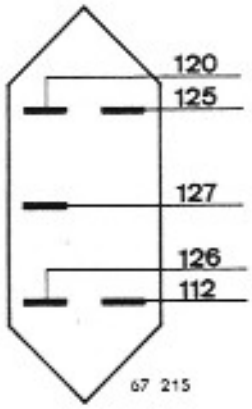




Wire No.	Colours
124	Brown, grey wire
125	Green, green wire
126	Blue, green wire
192	Brown, grey wire
193	Green, green wire
194	Blue, green wire

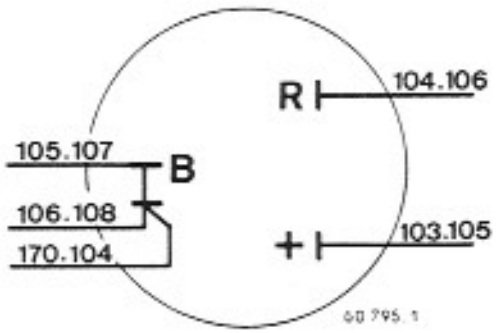
b) - 1967 Model





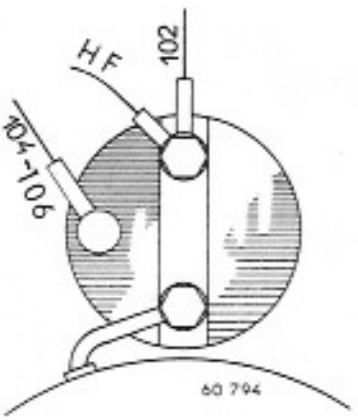
Wire No.	Colours
112	Yellow wire
120	Blue, salmon pink wire
125	Red, grey wire
126	Green wire
127	Grey wire
188	Red, grey wire
189	Yellow wire
190	Blue, salmon pink wire
191	Grey wire
192	Green wire

7) - Starting and ignition switch



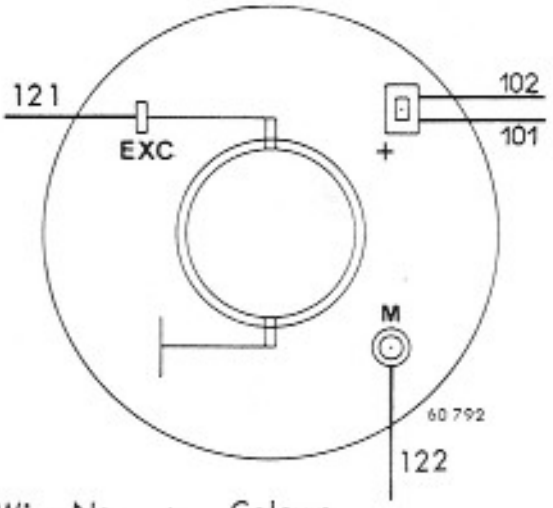
Wire No. Model		Colours
1966-1967		
103	105	White, buff wire
104	106	Aluminium, grey wire
105	107	Red, red wire
106	108	Red, salmon pink wire
	104	Red, red wire
170		Red, grey wire

8) - Starter



Wire No.		Colours
1966-1967 Model		
102	102	Yellow covered wire
104	106	Aluminium, grey wire
H	F	Positive starter lead

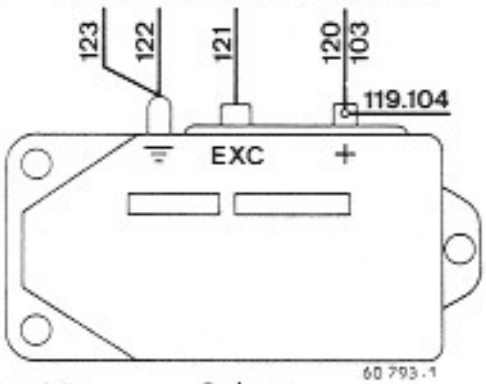
9) - Alternator



Wire No.	Colours
101	Blue, yellow wire
102	Yellow covered wire
121	Green, blue wire
122	Black, white wire

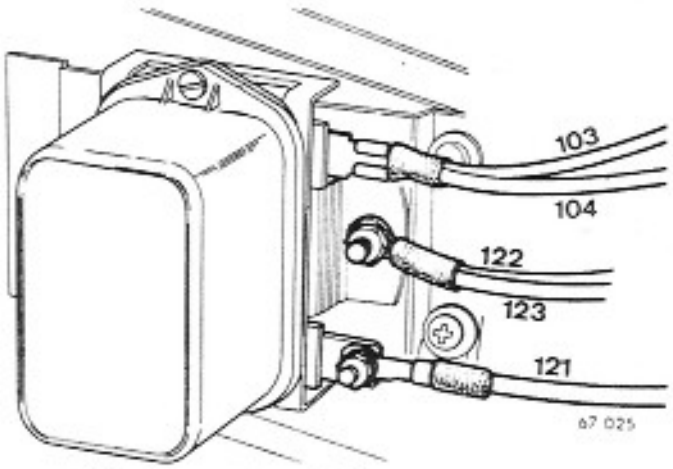
10) - Voltage regulators

a) - Electronic regulator



Wire No.		Colours
1966-1967 Models		
119	104	Red, red wire
120	103	Red, grey wire
121	121	Green, blue wire
122	122	Black, white wire
	123	Black, white wire

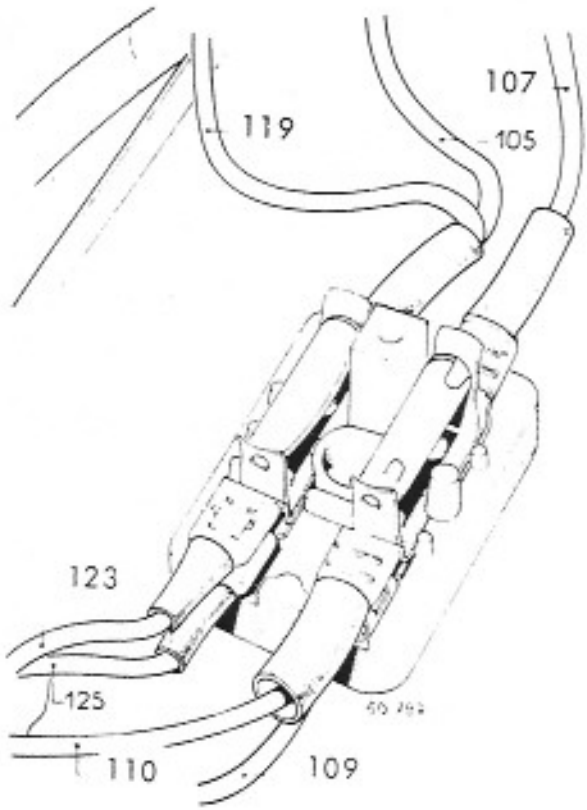
b) - Reed type regulator



Wire No.	Colours
103	Red, grey wire
104	
121	Green, blue wire
122	
123	Black, white wire

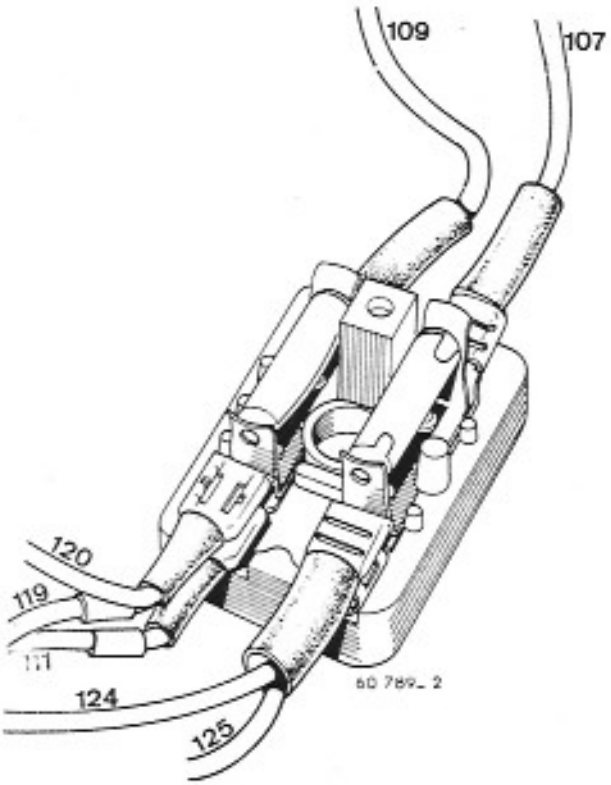
11) - Fuses

a) - 1966 Model



Wire No.	Colours
105	Red, red wire
107	Blue, blue wire
109	
110	Blue, grey wire
119	Red, red wire
123	Red, grey wire
125	Green, green wire

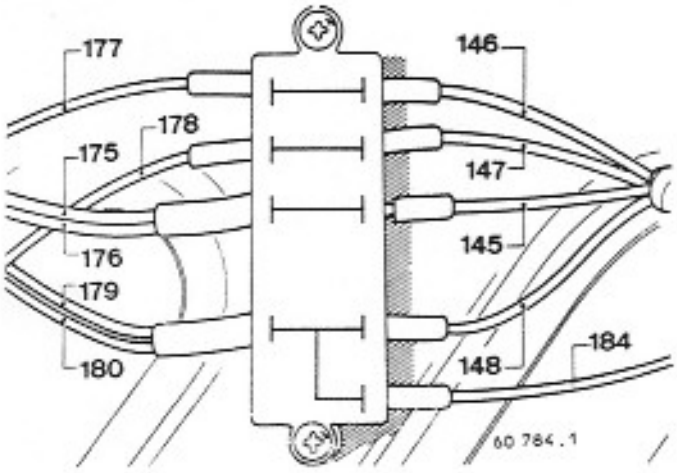
b) - 1967 Model



Wire No.	Colours
107	Red, red wire
109	Blue, blue wire
111	Blue wire
119	Blue, salmon pink wire
120	Blue, salmon pink wire
124	Red, grey wire
125	

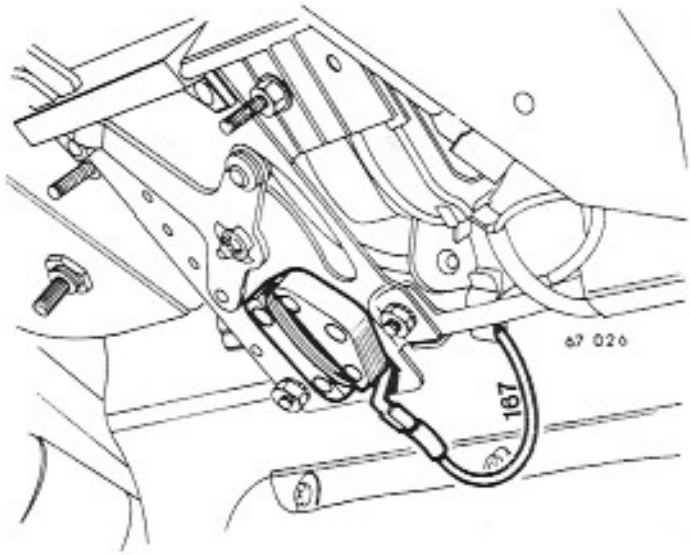
12) - Rear connection plate

1966 Model



Wire No.	Colours
145	Pink, salmon pink wire
146	Violet, blue wire
147	Brown, red wire
148	Yellow, white wire
175	Pink, blue wire
176	
177	Violet, red wire
178	Brown, red wire
179	Yellow, white wire
180	
184	Yellow, white wire

13) - Heater rheostat



Wire No.	Colour
167	Yellow wire

X - COMPONENT SPECIFICATIONS

1/- Distributor

4 cylinder distributor.

Distributor for 8.6 to 1 compression ratio engine :
Centrifugal advance curve : R.234
Vacuum correction curve : D.59.

Distributor for 7.6 to 1 compression ratio engine :
Centrifugal advance curve : R.239
Vacuum correction curve : D.59.

2/ - Batteries

Hot and temperate climate versions.

FULMEN AS 810, 9 cell - 12 volts - 40 amp hour - 6 minutes.
TUDOR 6 RF 4, 9 cell - 12 volts - 40 amp hour - 6 minutes.

Intense cold versions.

FULMEN AS 910, 11 cell - 12 volts - 40 amp hour - 8 minutes.

NOTE -
Only these three battery types are to be fitted to type R.1150 vehicles, they are the only ones which are compatible with the alternator.

3/ - Ignition coil.

12 volts - Ducellier 2765 A.

4/ - Spark plugs.

Makes : AC type 45 x L long read
Champion N 5
Spark gap:
0.6 to 0.7 mm (.025 to 028").

5/ - Flasher unit.

12 volts 40-45 watts
Fitted with tabs for clips terminals.

6/ - "Coter" temperature switch.

Temperature $115^{\circ} \pm 5^{\circ}C$ ($239\ F \pm 9$)

Warning light on instrument panel.

7/ - Motor fan unit.

a) - Fan unit ; 12 volts
b) - Relay : Cartier Ref. 90
c) - MOSTA temperature switch
Setting $82^{\circ}C - 92^{\circ}C$
($179.6^{\circ}F - 197.6^{\circ}F$)

8/ - Windscreen wiper motor.

Bosch WS 1500 R 1 F

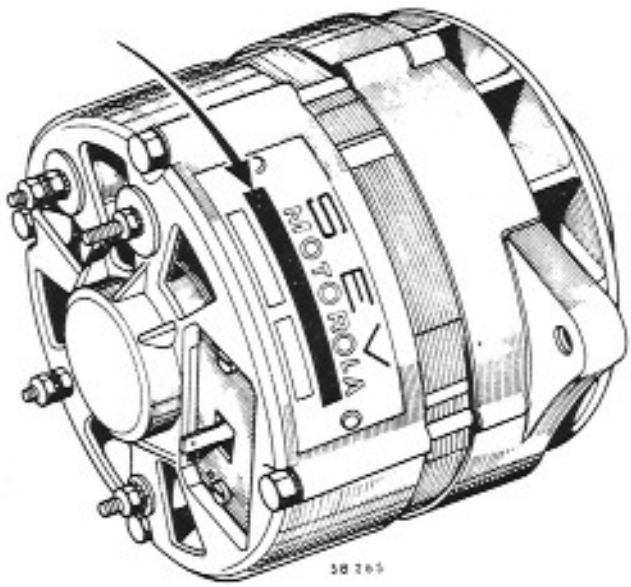
9/ - Fuse box.

Two fuses - 25 amps.
8 tabs for clips terminals.

10/ - Lighting rheostat.

Continuously variable rheostat - 24 ohms.

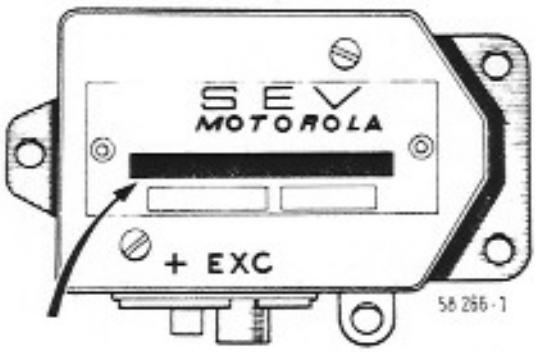
11/ - Alternator.



Make : S.E.V. MOTOROLA 12 volts.
Type : A 12/30
Nominal voltage : 12 volts.
Nominal voltage at 30 amps, current flow at 3,000 r.p.m. when warm and at a voltage of 13.2 volts.
Field coil resistance :
5.2 ± 0.2 ohms at a temperature of $25^{\circ}C$, measured across the slip rings.
Engine to alternator pulley, speed ratio : 2.12.
Weight approximately 4 kilograms.
Belt size : 13 x 8.

12/ - Voltage regulators :

a) - Electronic regulator.



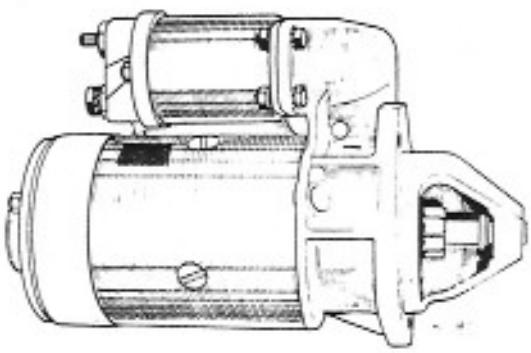
- Voltage regulator only.
- S.E.V. Motorola type : E.144.

At 25°C (77°F) the setting is :
14.40 ± 0.15 volts, this varies with the ambiant temperature. This is why it must be mounted near the battery.
In cold weather the voltage increases, and in hot weather it falls.

b) - Ducellier reed type voltage regulator.

Voltage regulator only.
The voltage setting varies between :
13.8 and 14.8 volts.

13/ - Starter.



Make PARIS-RHONE solenoid operated, 12 volts.
Diameter : 85 mm (3 11/32").
Type D 8 E 49.
Locked pinion torque : 1.1 m.da N (8 lb/ft).
Locked pinion current flow : approx. 355 A.
For "intense cold" versions.
Paris-Rhone starter - Type D 8 E 43.

XI - DISTRIBUTOR

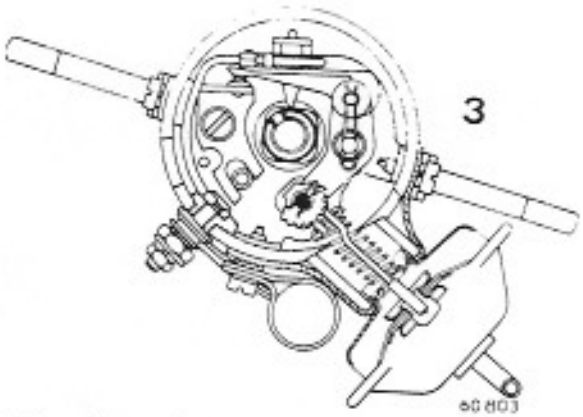
1/ - Setting the points gap and checking and adjusting the distributor static timing :

a) - Setting the points gap :

The distributor points gap can be adjusted in one of two ways :
- By measuring the points gap with a set of feeler gauges.
- By measuring the Dwell percentage by means of special instrument Elec.12 A (adaptable to 6 and 12 volts).
This measurement can be carried out either on the test bench or directly on the vehicle without removing the distributor.

Adjusting by means of measuring the points gap.

The case of a Ducellier distributor when self-wiping the points.



Adjust the points gap :
(0.4 to 0.5 mm) (.017 to .0195").
Cover the hole on the vacuum capsule with your finger and apply the maximum vacuum to the capsule with a vacuum gauge (one can also operate the rod secured to the diaphragm, and to the cam carrier plate, by hand).
Check that there is the same gap between the two extreme positions of the points, without vacuum and with maximum vacuum. If this is not the case turn the cam (3) by means of the special key.
After carrying out this adjustment check that the points gap is still correct.

Adjusting the points gap by measuring the Dwell percentage on the vehicle.

MR. 107 - Section E-620 - Paragraph II.

b) - Checking or adjusting the distributor static timing.

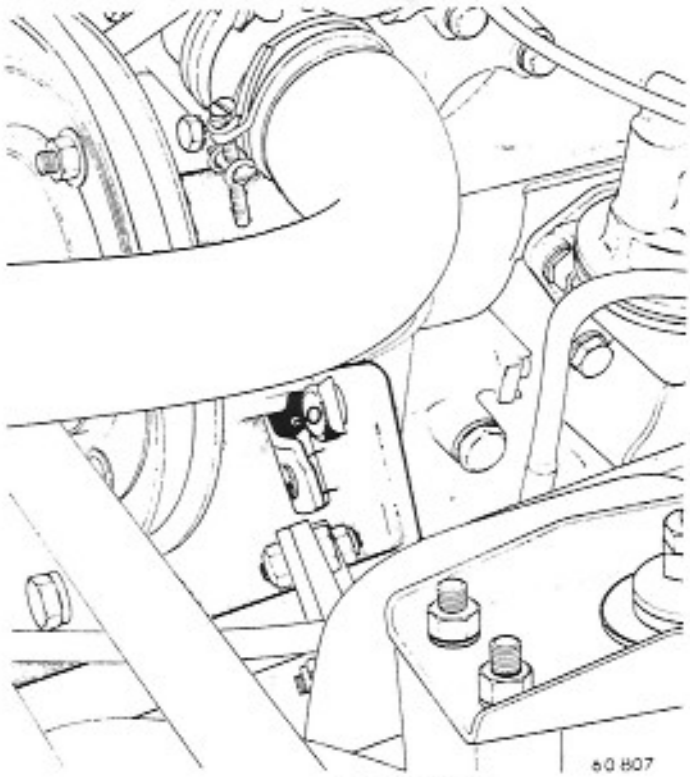
The distributor static timing can be adjusted in one of two different ways :

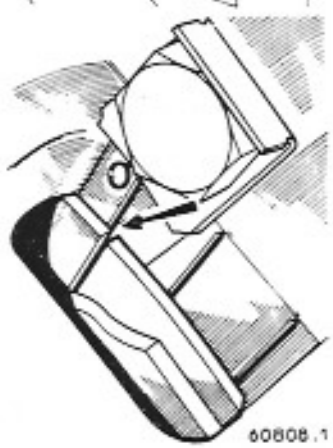
- By means of the pilot light (after adjusting the points with a set of feeler gauges).

- With a stroboscopic light (after adjusting the points gap by measuring the Dwell percentage).

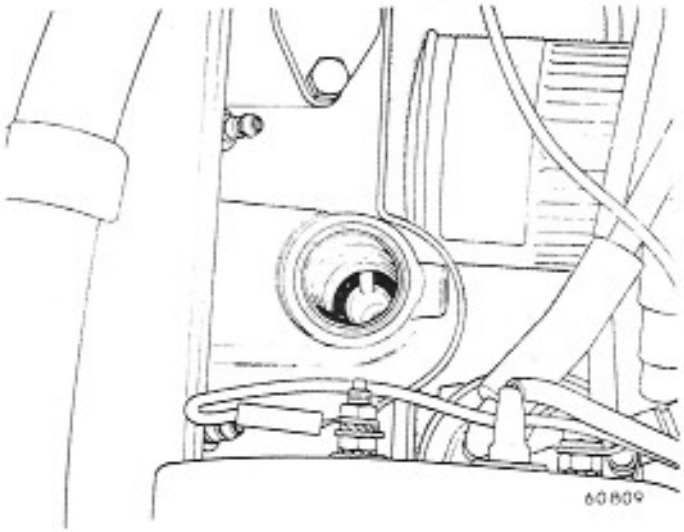
- Adjusting by means of the pilot light.

Engage 4th gear.
Lift the front right-hand or left-hand wheel :





bring the reference mark on the engine flywheel opposite the zero mark, (with the first cylinder, at the clutch end, on the compression stroke).
Static timing : $0 \pm 2°$.

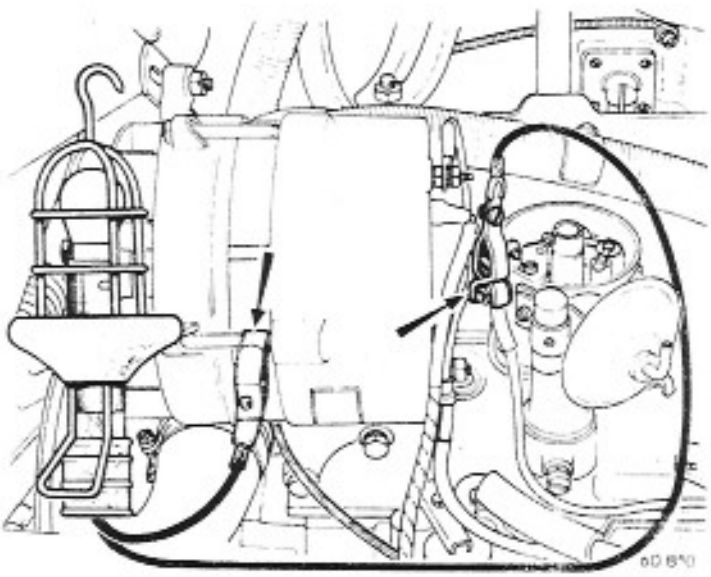


NOTE - It is essential that the engine should be turned in its normal direction of rotation when setting the distributor static timing. The wheels should therefore be turned in the forward drive direction.
In this position, the distributor "drive pinion", must be placed so that its smallest offset is on the engine side.

Refit the distributor and connect a pilot light between the distributor input (primary current) and earth (ground). Switch on the ignition.

Turn the distributor in an anti-clockwise direction until the light switches on.

NOTE - If you accidentally pass the static timing point return the distributor sharply in a backwards direction so that the operation is always completed in a clock-wise direction.

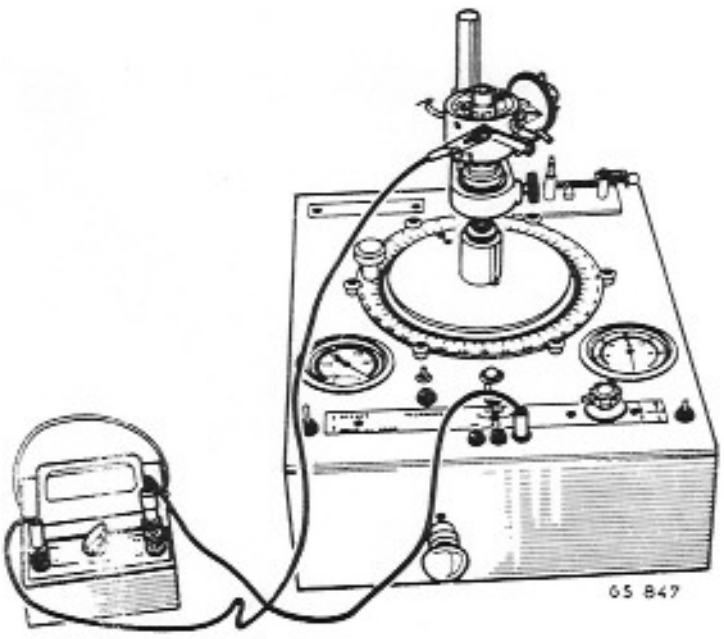


Adjusting by means of the stroboscopic light.

M.R.107 Section E-620 paragraph III.

4/ - Checking and adjusting the distributor on the test bench

a) - Adjusting the Dwell percentage (points gap).



Fit the distributor to the test bench in order to drive it.
Feed the test bench with a 12 volt battery.
Connect the instrument Ele. 12 A (12 volt terminal) to the 12 volt terminal on the test bench.
Connect terminal AL on instrument Ele.12 A to the distributor feed terminal.
Turn the distributor cam by hand to place the contacts in the closed postion, and turn the zeroing knob on instrument Ele.12 A to place the pointer on graduation 100.

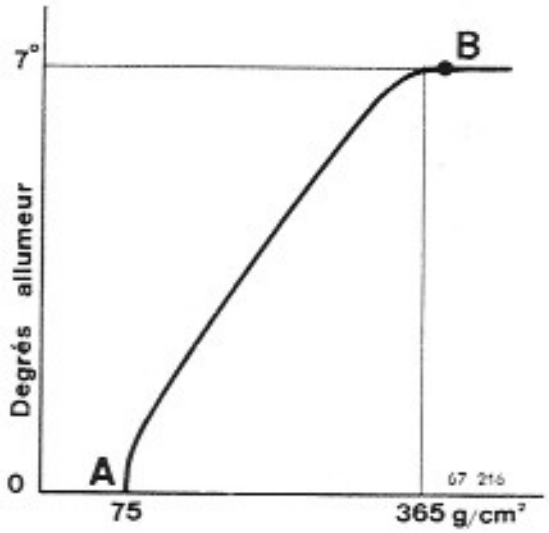
Run the distributor at approximately 1000 r.p.m.
The number of graduations shown on the instrument gives the direct Dwell percentage reading.

Adjust the distributor points to obtain the following Dwell percentage readings on Ele. 12 A.
- worn distributor : 55
- new distributor : 61 ± 3.

On Ducellier distributors with self-wiping points, the vacuum corrector can, in certain circumstances, considerably alter the points closing angle and consequently, the Dwell percentage.

In this case the Dwell must be balanced by placing it within the two extreme cases given on the vacuum correction curve.

DISTRIBUTOR SUBJECT TO MINIMUM VACUUM

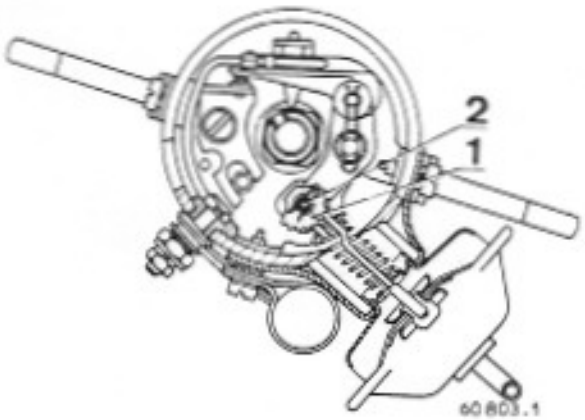


that is to say, a vacuum of less than the figure shown at point A (0° advance).
In practical circumstances this is the same as carrying out a test with the distributor subject to no vacuum.

DISTRIBUTOR SUBJECT TO MAXIMUM VACUUM.

that is to say, a vacuum which is equal or greater than the figure shown at point B, for the maximum advance 365 g/sq/cm.
Read the Dwell percentage "D1" when there is no vacuum in the distributor vacuum capsule.

Apply maximum vacuum point B on the vacuum curve for the distributor under test by means of a vacuum meter. (If the vacuum capsule has a hole at the bottom, cover this with your finger).



Read the Dwell percentage "D2" and compare it with Dwell percentage "D1. The two figures should be as near to each other as possible. (The maximum permissible difference is 4 % Dwell). If it is not, turn the balancing cam shaft (2) using the cruciform key. By changing the position of this cam one modifies figures "D1" and "D2". One must therefore recommence the two checking operations with and without vacuum, and note yet again, the difference between the two figures obtained.
Turn the balancing cam shaft until the smallest possible difference has been obtained.

Check the Dwell percentage as described in the preceding paragraph.

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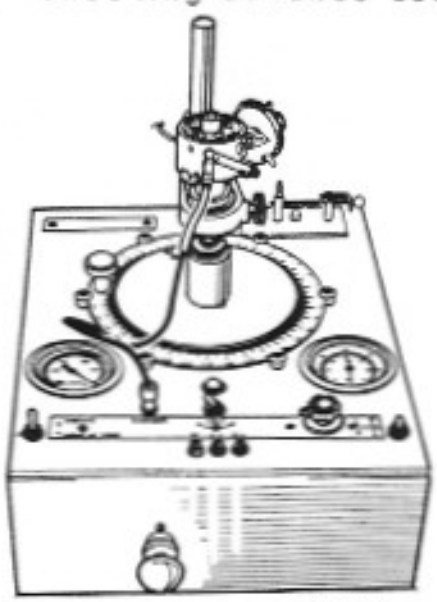
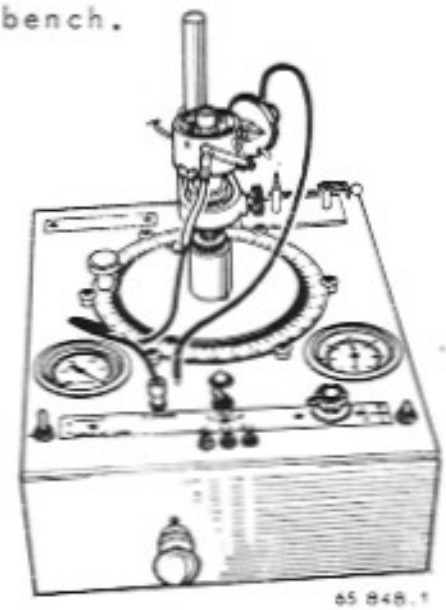
b) - Checking advance curves on the test bench.



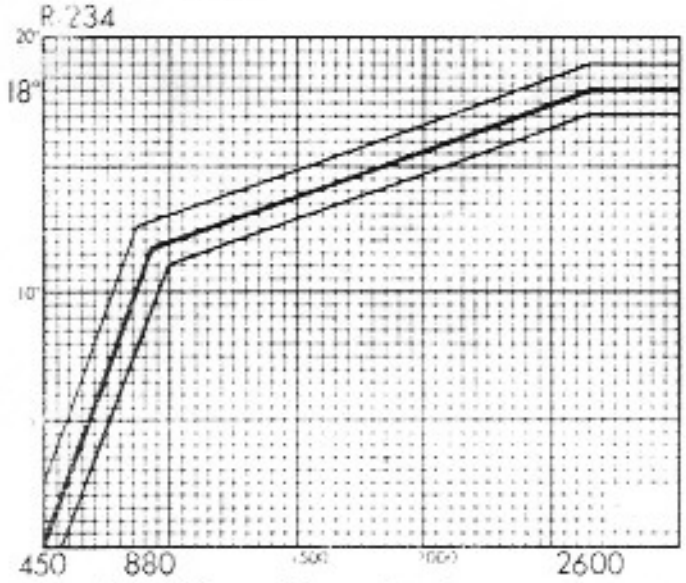
Connect the contact breaker on the bench to the distributor feed terminal.
Check the position of the 4 sparks.
Place the spark which is farthest from its theoretical position on 0, and check that the other differences in the spark positions are not more than 2 degrees from their theoretical position.
If they are change the cam plate.



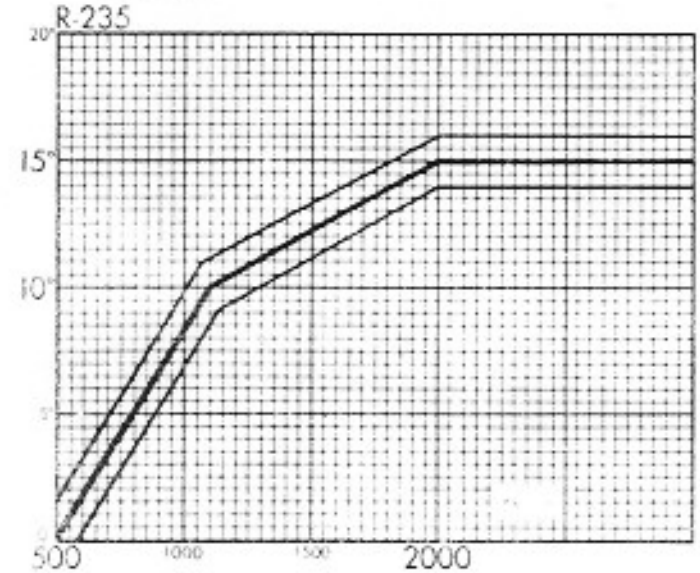
Then check the centrifugal advance curve development, followed by the vacuum advance curve.
Compare them with the curves given on the next page. If the centrifugal advance curve is not correct, replace the springs and check the bob weights.
If the vacuum advance curve development is not correct, check to see that all the moving parts are free.
Turn the serrated cam (1) to bring the curve within the tolerarances.
Replace the vacuum capsule if necessary.

XII - ADVANCE CURVES

a) - Centrifugal advance curve R. 234
(Engine with 8.6 to 1 compression ratio).

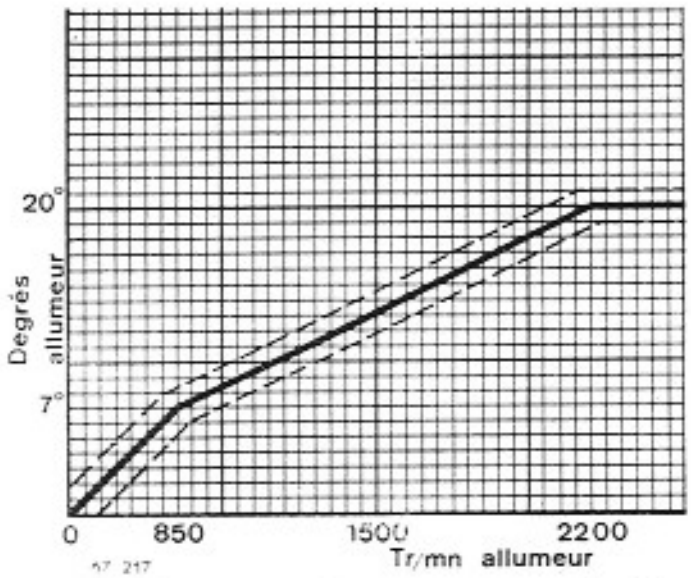


b) - Centrifugal advance curve R. 235
(Engine with 7.6 to 1 compression ratio).
This curve has been replaced by curve R. 239.

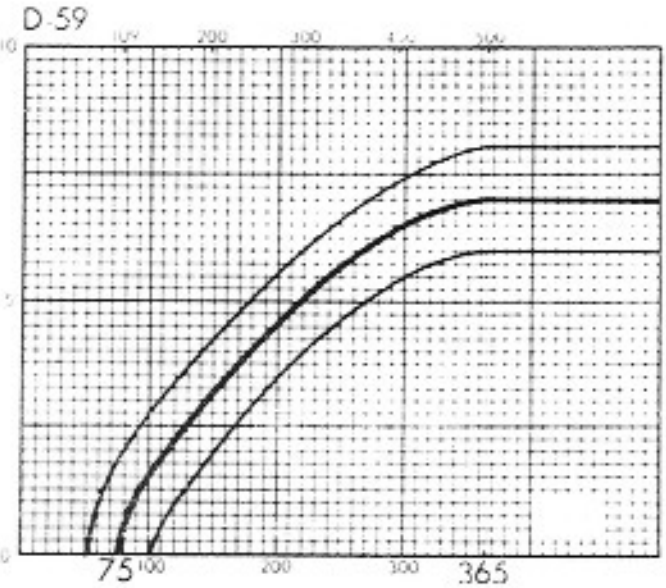


Note - The new distributors on which the advance curve is R. 239 can be used in place of the old distributors (curve R. 235) but old distributors cannot be used to replace the new ones.

c) - Centrifugal advance curve R. 239

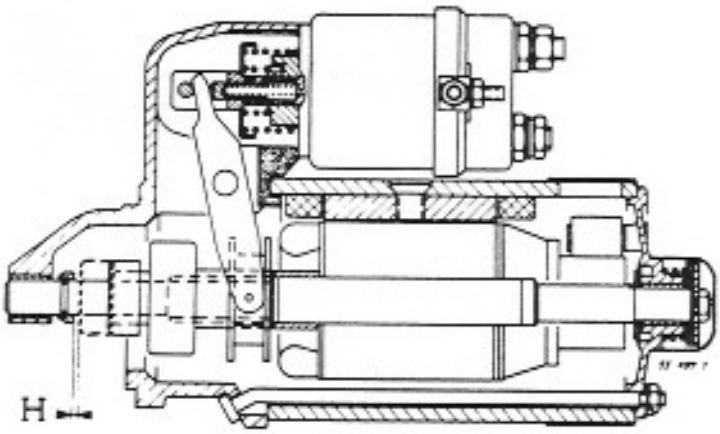


d) - Vacuum advance curve D. 59
(Engines with 8.6 and 7.6 to 1 compression ratios).



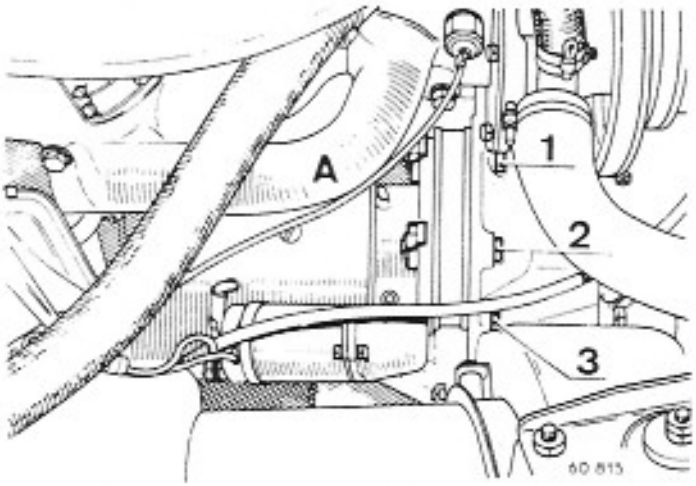
XIII - STARTERS

1/- PARIS-RHONE starter - Mechanical data



Brush length : 14 mm (35/64")
Minimum brush length : 8 mm (7/16")
Commutator diameter : 36.5 mm (1 7/16")
Minimum commutator diameter :
34 mm (1 11/32")
Depth of commutator insulation undercut :
0.5 mm (.020")
Clearance between front stop and pinion when operating : H = 0.5 to 2.5 mm (.020 to .099").

2/ - Removing - Refitting :

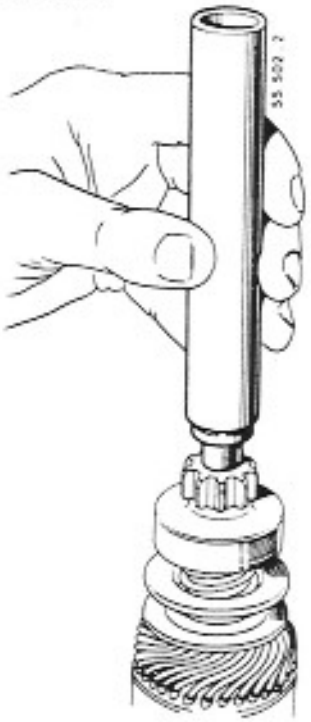


a) - Disconnect the starter feed leads.
b) - Remove the locks from the 3 bolts 1.2.3
c) - Unscrew the 3 bolts which secure the starter to the clutch housing.
d) - Remove the starter.

Note - On "Intense Cold" models fitted with a starter which is 100 mm in diameter, one must remove the manifold (A).

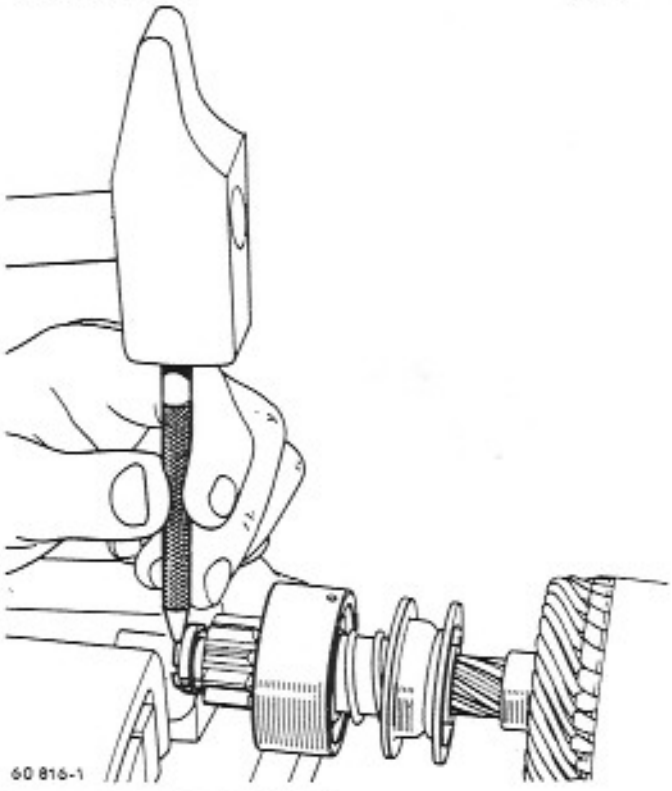
3/- Overhauling the starter

a) - Dismantling



If one is obliged to dismantle the starter to replace the armature or the starter pinion, one must remove the front stop. To remove it use a tube as shown in this illustration.

b) - Refitting the stop

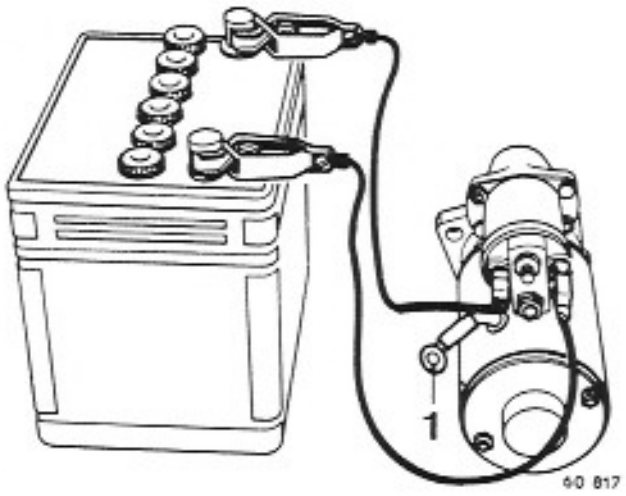


If it has been necessary to dismantle the PARIS-RHONE starter, the following points must be taken into consideration when reassembling it.

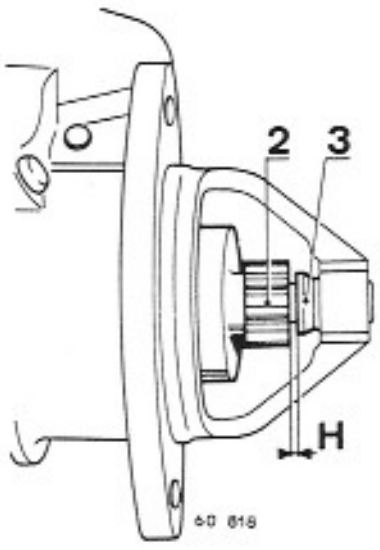
- One must also fit a new front stop.
- The snap rings must be covered with this stop.
- The end of the stop must be peaned down at four points as shown in this illustration to trap the snap rings in place.

c) - Starter switch

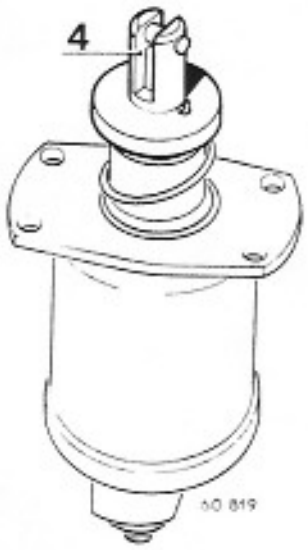
Adjusting the connection between the core and the fork.



Energise the solenoid as shown in the above illustration.
N.B. - Field coil feed terminal (1) must not be connected up.



The pinion (2) will then come into its operating position and there should be a clearance H of between 0.5 and 2.5 mm (.020" to .099") between the pinion (2) and the stop (3).



If the clearance is not correct, remove the switch and screw the fork end (4) in or out to obtain the correct clearance.

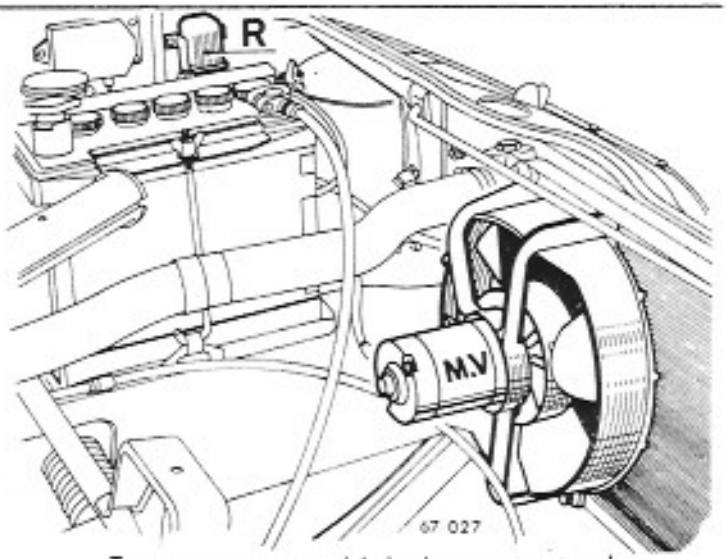
4/- Checking the starter on the test bench

The measurement of the torque and the maximum locked pinion current flow is carried out on the bench by means of bar Ele.09 fitted with two weights and claw Ele.14.
Locked pinion current flow approximately 355 amps.
Minimum torque 1.1 m.da N (8.4 lb/ft).

XIV - MOTOR-FAN UNIT

1/- Description

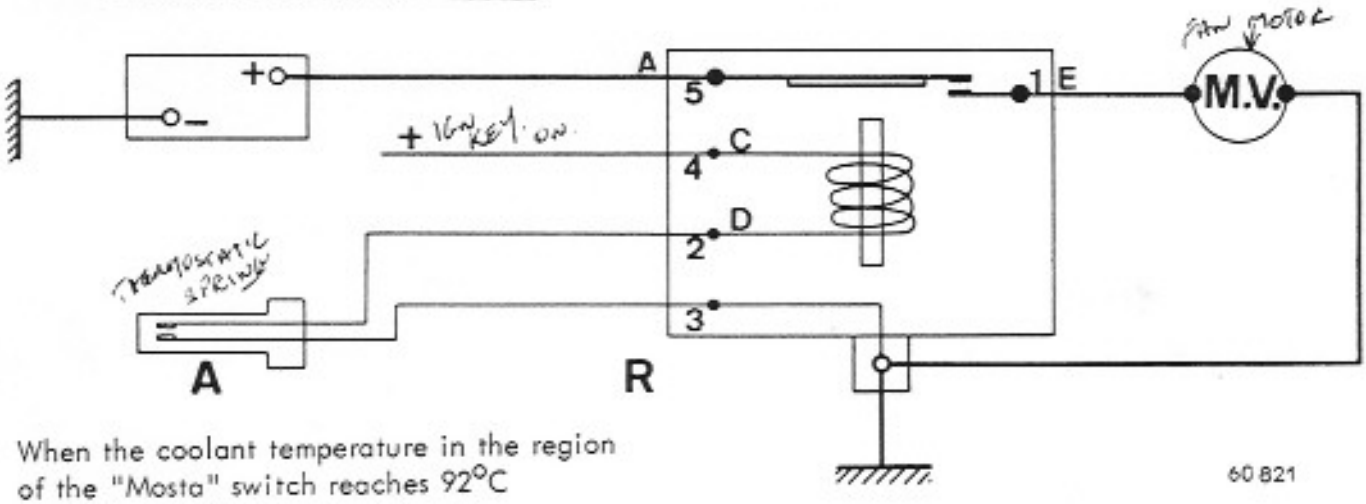
Above a certain temperature the engine is cooled by a motor-fan unit (MV) which is automatically switched on hand off to suit the engine temperature.
This system consists of :
- The motor-fan unit itself (electric motor fed with a 12 volt current and driving a fan.)
- A relay (R) which feeds current to the battery from the fan.
- A MOSTA temperature switch which automatically switches the fan and off to suit the engine temperature.



Temperature at which the contacts close :
$92°C \begin{smallmatrix}+1.5\\-1\end{smallmatrix}$ $(197.6°F \begin{smallmatrix}+2.7\\-1.8\end{smallmatrix})$

Temperature at which the contacts open :
$82°C \begin{smallmatrix}+2\\-1.5\end{smallmatrix}$ $(179.6°F \begin{smallmatrix}+3.6\\-2.7\end{smallmatrix})$

2/- Principle of operation



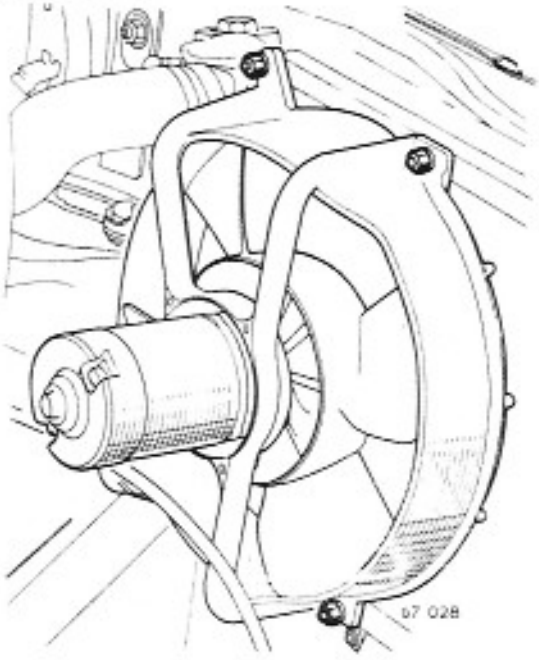
When the coolant temperature in the region of the "Mosta" switch reaches 92°C (197°F), the Mosta switch cont ac

When the coolant temperature in the region of the "Mosta" switch reaches 92°C (197.6°F), the Mosta switch contacts close, the relay coil is energised and its armature is moved over.
The fan motor is fed with current and the fan rotates.
The increase in the air circulation through the radiator and in the engine compartment reduces the coolant temperature.

When this temperature reaches : 82°C (179.6° F), the Mosta temperature contacts open again , the relay coil is no longer fed with current, the armature is released and the contacts open ; the current supply to the fan is switched off.

3/ - Removing and refitting the motor-fan unit :

Switch off the battery current.
Mark the two leads which feed the motor fan unit so that they are not connected to the wrong terminals when refitting.
Disconnect the two clips which feed the motor on the control relay R.
Remove the 4 bolts which secure the fan to the radiator.



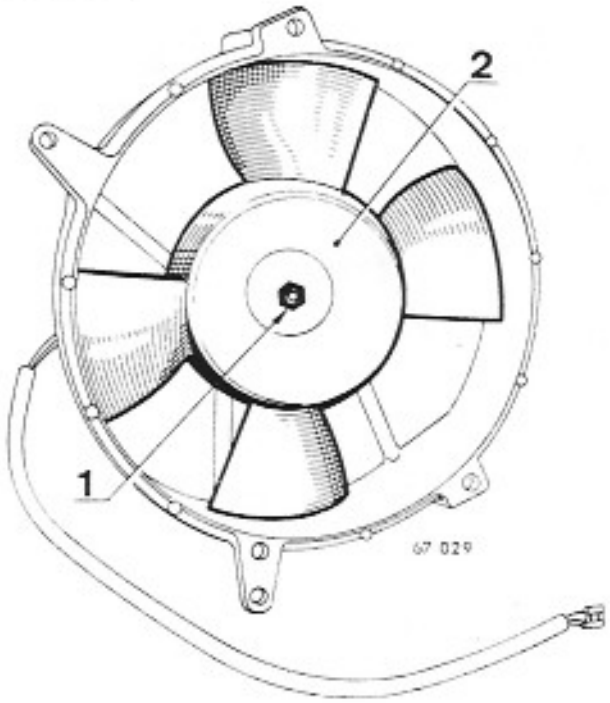
5/- Dismantling the motor-fan unit

The motor-fan unit consists of 3 distinct parts.
a) The electric motor which drives the fan and its housing.
b) The fan.
c) The protective fan casing.

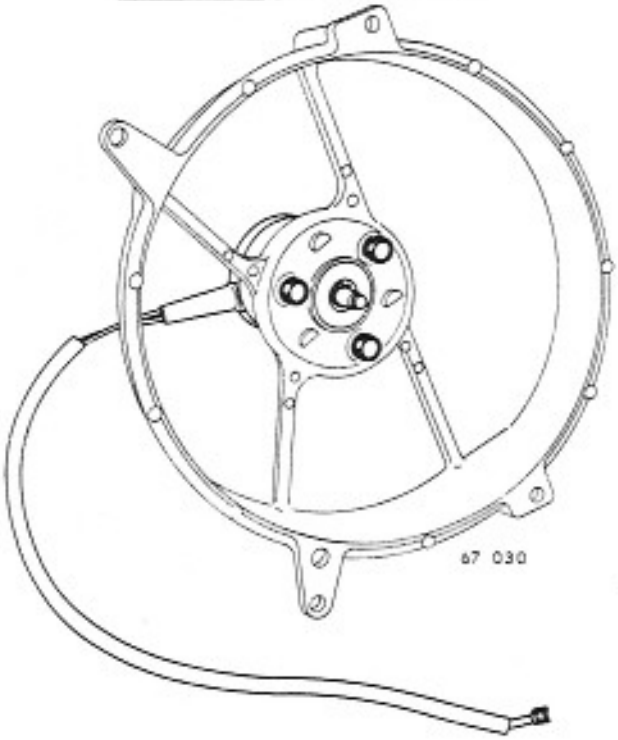
6/ - Removing the fan

Unscrew nut (1) which secures the fan to its drive shaft.
Remove the fan (2) forwards.

Warning : It is a left-hand thread.

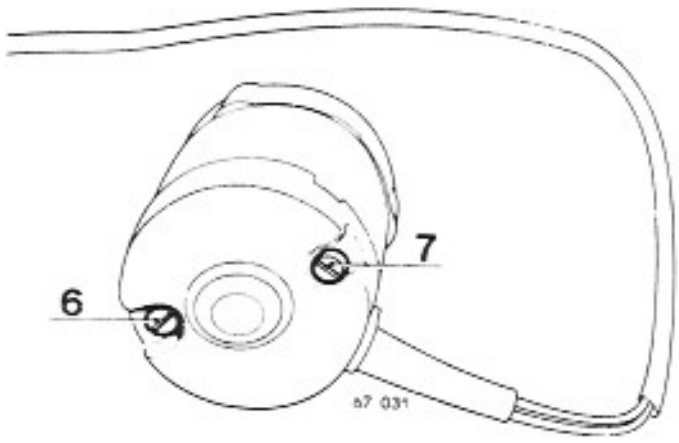


7/- Remove the fan support and protective casing :

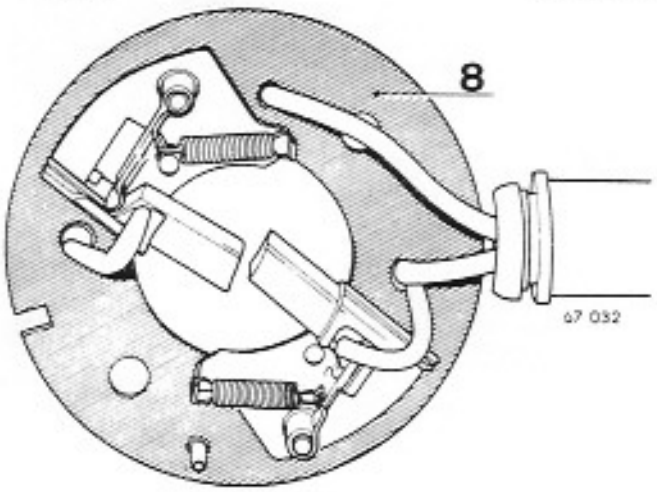


Unscrew and remove the screws which fasten the support to the electric motor body and separate these 2 parts.

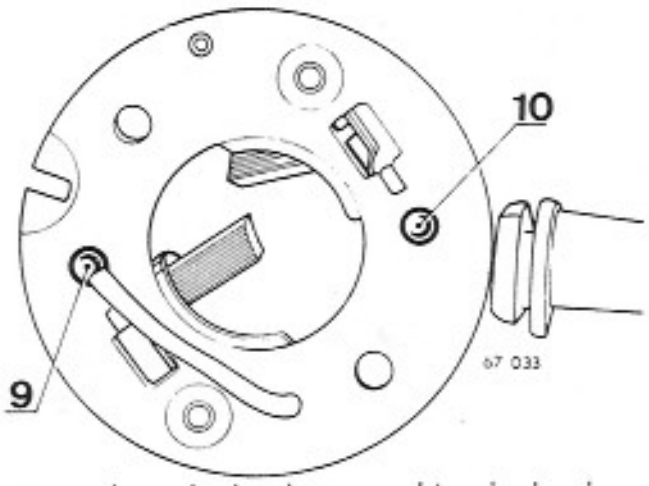
8/- Replacing the fan-unit motor carbon brushes



Unscrew the two screws (6) and (7) which secure the rear end plate to the body.



Remove the end plate and pull back the brush carrier plate (8).



To replace the brushes, unsolder the brush leads at soldering points 9 and 10.

9/ - Checking the fan-unit

Use the pilot light Ele.225 for this operation.
Switch on the ignition.

A/ - Connect the pilot light between terminal 5 on the relay and earth (ground). If the light does not switch on, check the lead which connects the battery to terminal 5.
If the light switches on, check the relay coil feed system.

B/ - Connect the light between the + on the regulator and earth (ground).
If the light does not switch on, check the connecting lead between the voltage regulator and the ignition switch.
If the light switches on, check the lead which connects the regulator to terminal (4).

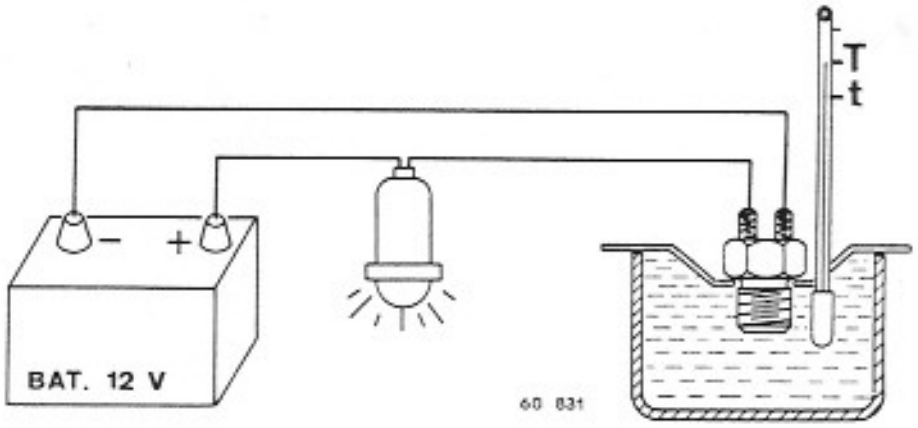
C/ - Connect the pilot light between terminal (4) and earth (ground).
If the light does not switch on, recondition or replace the lead.
If the light switches on, check the relay coil.

D/ - Connect terminal 2 on the relay to earth (ground).
If the relay does not work replace it.
If the relay works and the motor-fan unit does not run.

E/ - Connect the pilot light between number 1 relay terminal and earth (ground). The relay coil is still to be energised.
If the light does not switch on, replace the relay.
If the light switches on, check :
- the motor feed harness.
- the motor itself.
If the motor runs correctly, check the earthing (grounding circuit) for the relay coil (MOSTA temperature switch).

F/ - Remove the lead which connects terminal 2 on the relay to earth (ground), and short-circuit the 2 terminals on the MOSTA temperature switch by means of a lead.
If the motor turns, replace the MOSTA temperature switch.
If the motor does not turn, check the leads connecting :
- terminal 2 on the relay to the MOSTA temperature switch.
- the MOSTA temperature switch to terminal 3 on the relay.
- Check the relay earth (ground). (terminal 3).

10/- Checking the MOSTA temperature switch



The switch should make contact at a temperature

T of $92 \begin{smallmatrix} +1.5 \\ -1 \end{smallmatrix}$ °C ($197.6 \begin{smallmatrix} +2.7 \\ -1.8 \end{smallmatrix}$ F)

The switch should open at a temperature of

t of $82 \begin{smallmatrix} +2 \\ -1.5 \end{smallmatrix}$ °C ($179.6 \begin{smallmatrix} +3.6 \\ -2.7 \end{smallmatrix}$ F)

The difference between the temperature at which the contacts open and the temperature at which the contacts close should always be greater than 6°C (11° F) and less than 20° C (36° F).

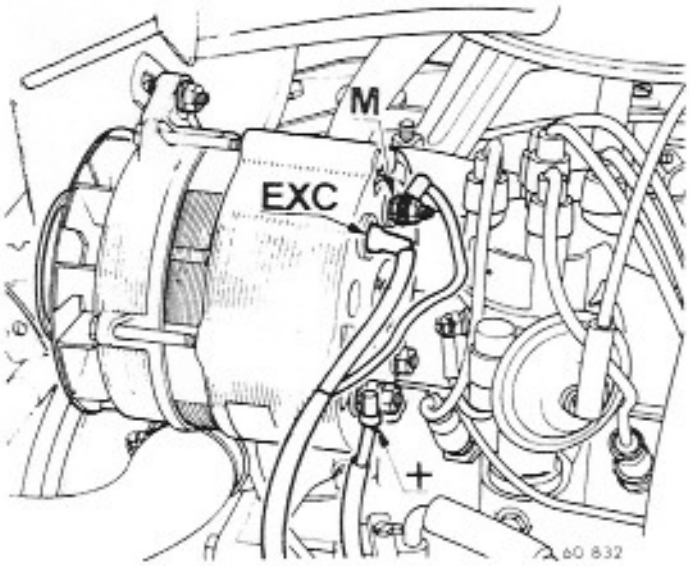
Checking

- Connect a 0.1 amp. pilot light between the (+) terminal of a battery and one of the terminals of the temperature switch.
- Connect the other terminal of the temperature switch to the (-) terminal of the battery.
- The light should not switch on.
- Immerse the lower part of the temperature switch in water which has been raised to a temperature
t + 0.5° C (94°C) (201.2°F).

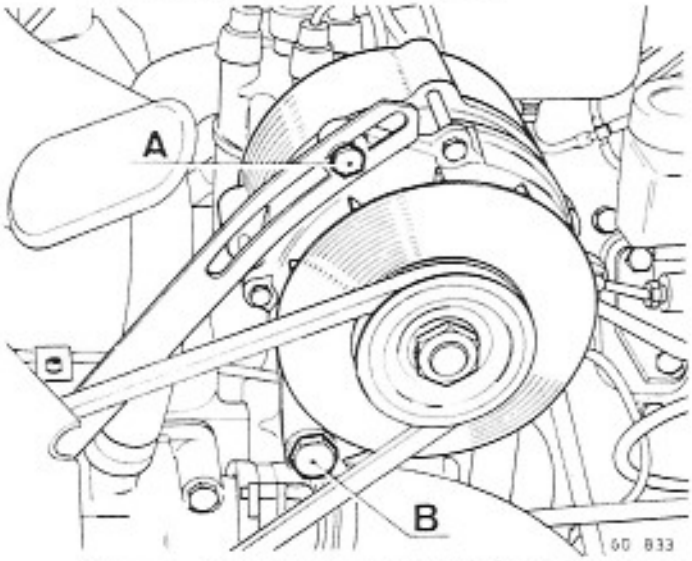
Before a period of five minutes has elapsed the light should switch on.
- Pour cold water into the tank (whilst keeping the water moving in order to obtain a uniform temperature at all points in the tank).
When the temperature of the water has fallen to t - 0.5°C (80°C) the light should switch out.

XV - ALTERNATOR

1/- Removing and refitting the alternator



Disconnect the battery.
Disconnect the 3 alternator leads :
- + terminal
- field terminal (EXC)
- earth (ground) terminal (M).



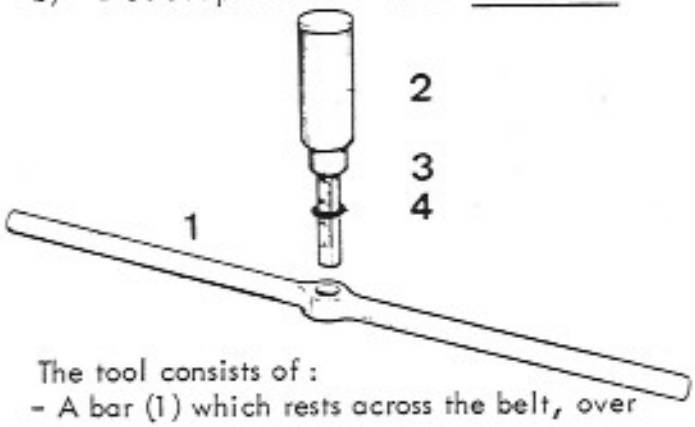
Unscrew and remove bolt (A) (which is used to adjust the belt tension) on the tensioner.
- Unscrew bolt B which secures the alternator to the cylinder block.
- Remove the belt.

2/- Checking and adjusting the belt tension.

a) - Checking principle

The belt tension is checked by measuring its deflection under a load of 3 m.da N (6 lb 13 ounces).
This check is carried out by special tool Ele.346.

b) - Description of tool Ele.346



The tool consists of :
- A bar (1) which rests across the belt, over the two pulley centres.

- A plunger (2) which slides in the bar and permits load to be applied to the belt.

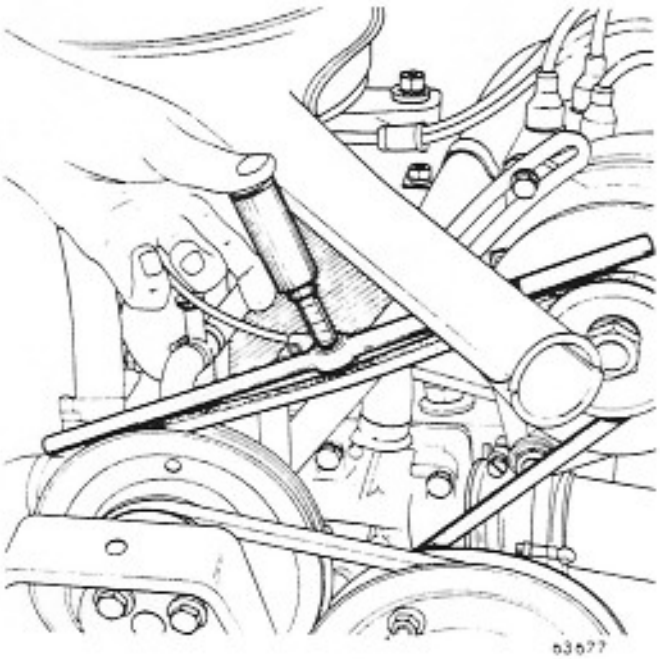
- The plunger body contains a rated spring which rests on the sliding component (3).

- The sliding component is graduated in millimeters and gives a belt deflection reading.

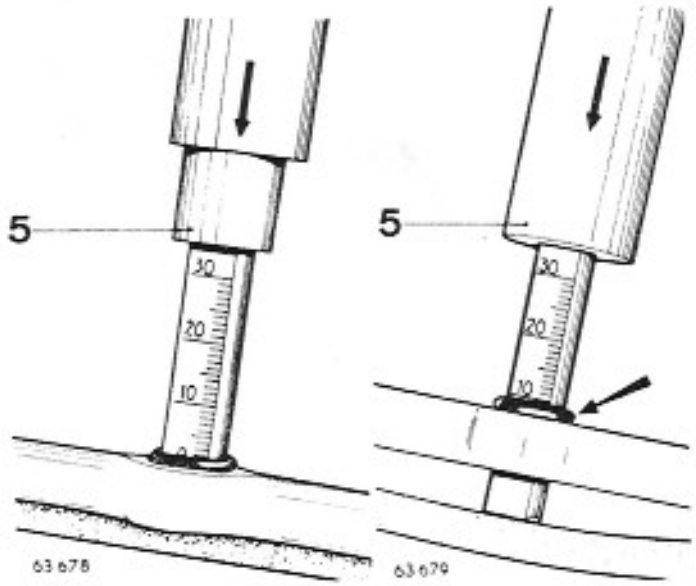
- A rubber ring (4)is fitted round the sliding component.

- This ring permits one to read the belt deflection after removing the tool from the belt in cases where the belt is in a position to which access is difficult and from which a direct reading cannot be obtained.

c) - Using tool Ele. 346



Press the bar against the belt with the plunger approximately half-way between the pulleys



- Press on the plunger until the shoulder (5) on the sliding part makes contact with the shoulder body. In this position, the load of 3 da. N is being applied to the belt.

At this point :

- Take the belt deflection reading from the top edge of the bar, and compare this reading with the figure given in the following list.

---

d) - Adjusting figures

Deflection under a load of 3 m.da N
(6lb 3 ounces)
On fitting: 7 to 9.5 mm (9/32 to 3/8")
After 2000 kms (1200 miles) : 7 to 9.5 mm
(9/32 to 3/8").

NOTE - The maximum permissible deflection is 13 mm (33/64").
When the deflection is greater than this, retension the belt.

3/- Checking the alternator-regulator combination

This check is carried out either on the vehicle or on a bench and is dealt within M.R. 107 (section D-010).

XVI - HORN AND LIGHTING SWITCH

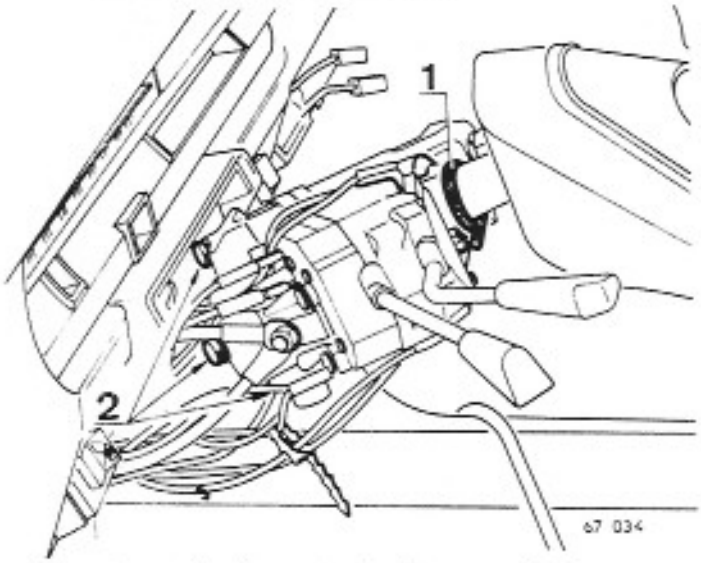
Removing and refitting the horn and lighting switch

- Remove the two protective half-shells on the horn and lighting switch.

Remove the glove compartment.

Disconnect :
- the two plug blocks 40a and 44a.
- the lead 158 (Pink on a salmon pink wire) from the stop switch.
- the lead 159 (Blue on a salmon pink wire) from the flasher unit.
- the lead 166 (Black on a black wire). Brake pad warning light, and free the harness from the dashboard.

Disconnect the leads that are not part of the horn and lighting switch harness from the switch and mark them.

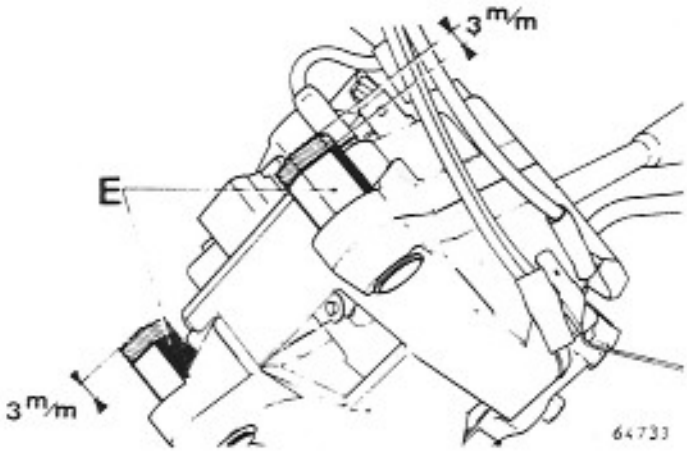


- Free the direction indicator switch return spring (1).
- Remove the 3 screws (2) which secure the horn and lighting switch to its support.
- Free the horn and lighting switch.

The following modifications have to be carried out, when replacing the horn and lighting switch on vehicles previous to 17.749.

Modification instructions

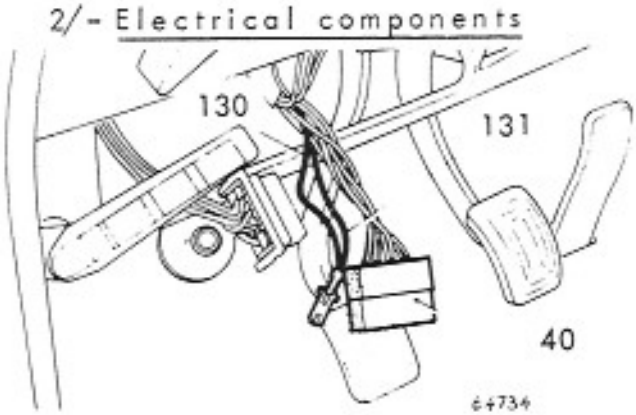
1/- Mechanical components



The nuts (E) which secure the new horn and lighting switch are deeper and cannot be fitted to the steering column bracket. As a consequence 3 mm (1/8") must be removed from the top of them in order to bring them to the same size as the nuts on the old type switch.

NOTE -
When using the old type switch on an old vehicle merely place a 3 mm (1/8") washers under the nuts.

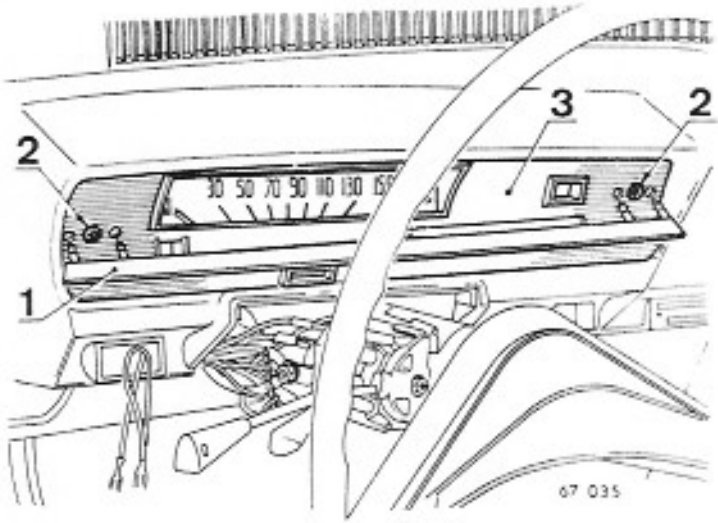
2/- Electrical components



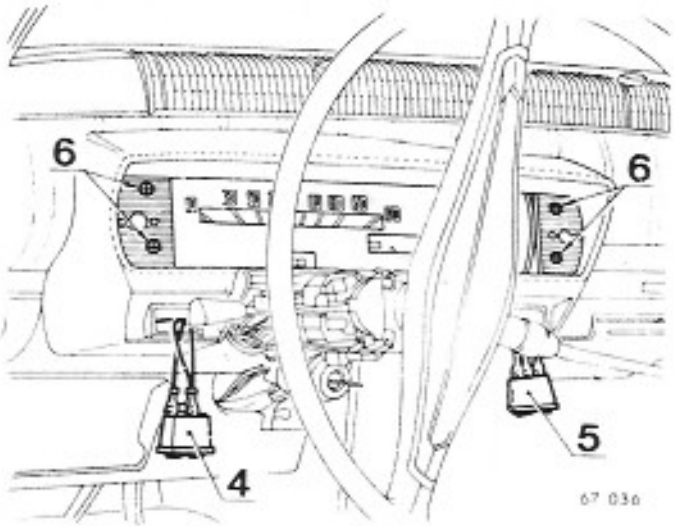
Connect the leads 130 and 131 on plug block (40) by crimping them together so that the town (low tone) and road horns operate simultaneously.
These two leads are connected in the block and should coincide with lead No. 154 on the new switch.

XVII - INSTRUMENT PANEL

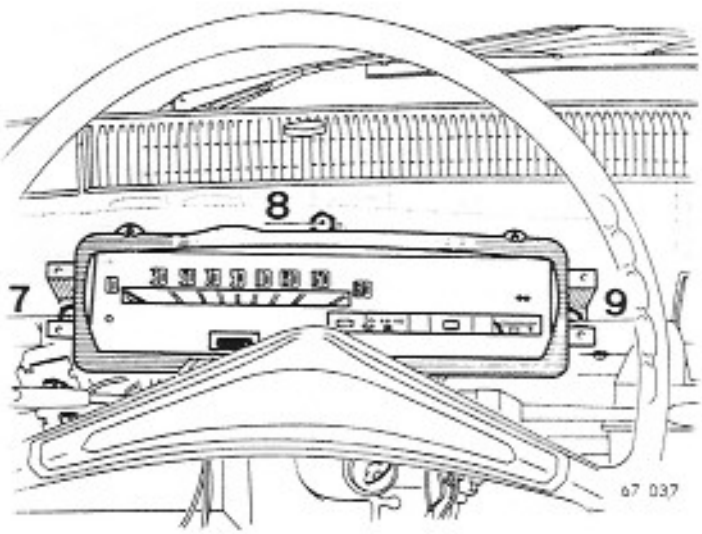
Removing



Remove the horn and lighting switch half shells.
Remove the bead (1).
Remove the two screws (2) which hold the embellisher in place (3).



Take out the 2 switches 4 and 5.
Mark the leads which are connected to them.
Disconnect the leads and remove the switches.
Remove the 4 screws (6) which secure the instrument panel in place.
Remove the instrument panel.



Unscrew the 3 bolts 7, 8 and 9 which secure the instrument panel assembly in position.
Disconnect the speedometer drive cable.
Take out the instrument panel assembly and remove it after disconnecting the leads.

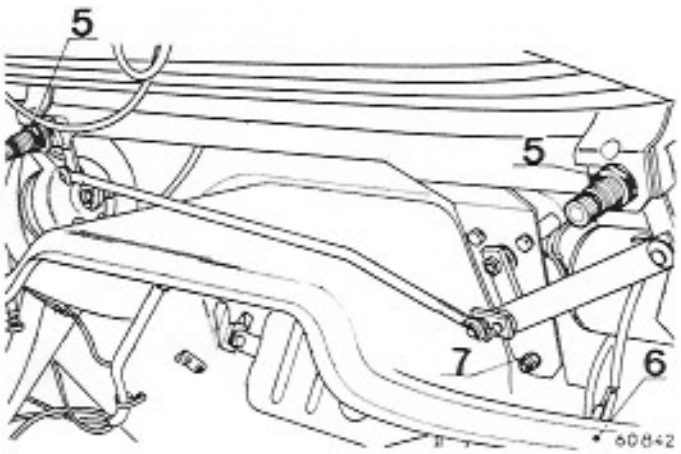
Refitting

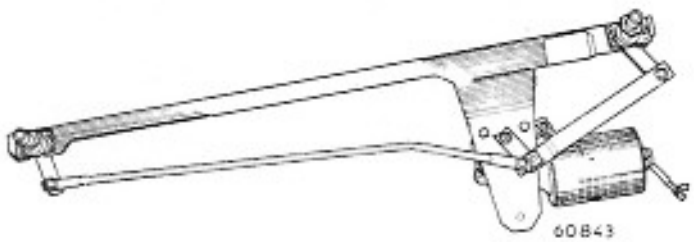
Carry out the removing operations in reverse (Consult section entitled "Component connections").

XVIII - WINDSCREEN WIPERS

1/- Removing and refitting the windscreen wiper motor.

a) - Removing





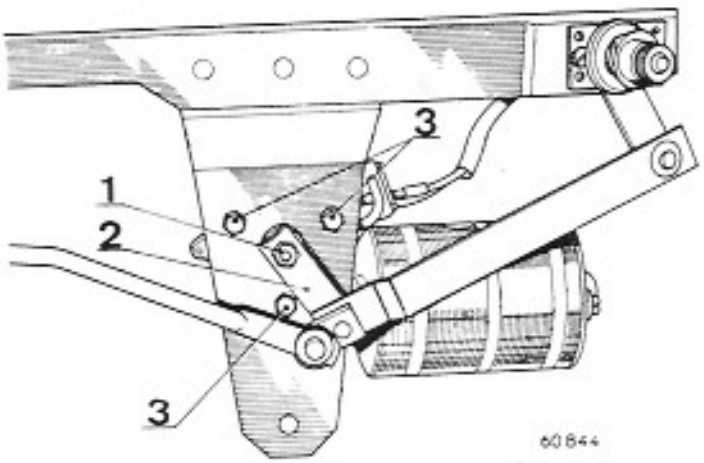
Remove the windscreen wiper arms.
Unscrew the nuts which secure the 2 bearings.
Remove the scuttle grill.
Mark the feed leads and disconnect them from the connection plates (6).
Loosen the two bearing securing nuts (5).
Remove the third securing point (7).
Slide the backplate by a few centimetres towards the right-hand side of the vehicle in order to release it from its mounting slides.
Remove the plate from its location.

b) - Refitting

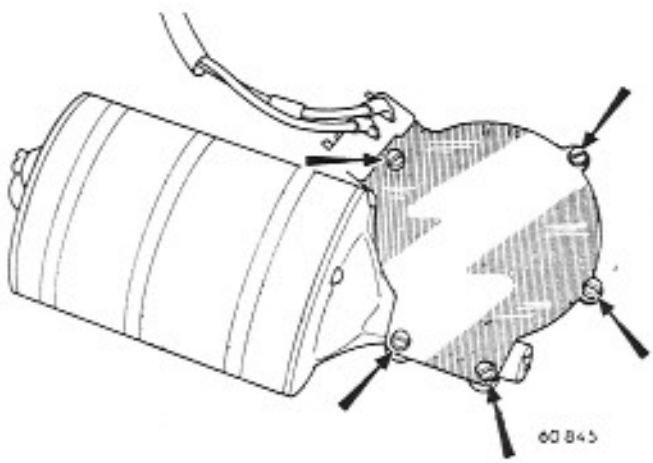
Carry out the removing operations in reverse.
See the Bodywork chapter, for the operations involved in refitting the scuttle grill.

2/ - Dismantling and reassembling the electric motor

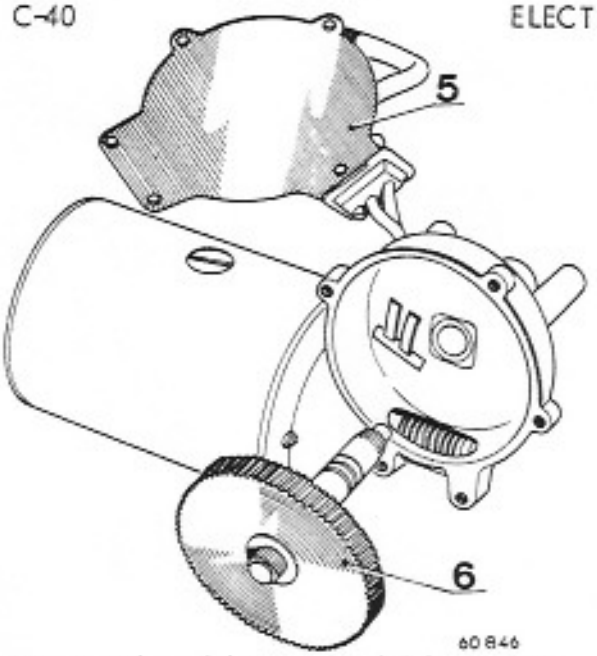
a) - Dismantling



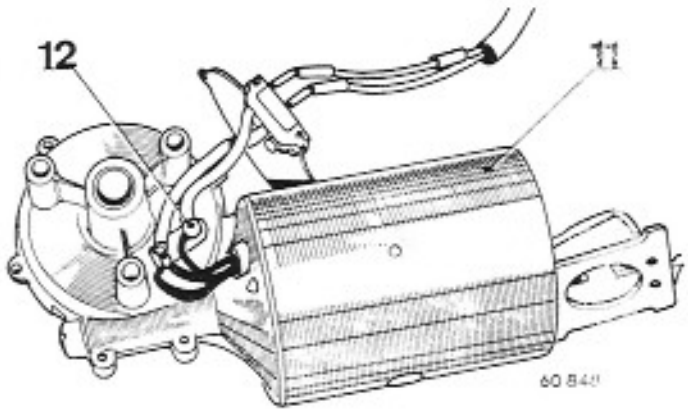
Remove the centre bolt (1) from the drive shaft and disconnect the drive link (2).
Remove the 3 bolts (3) which secure the motor to its support.



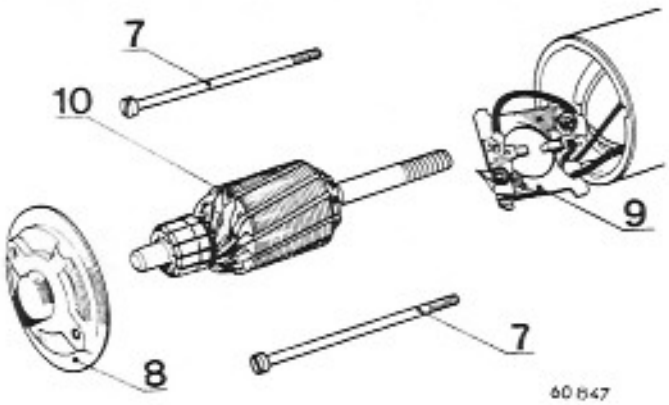
Unscrew the 5 screws which secure the gear train casing cover plate.



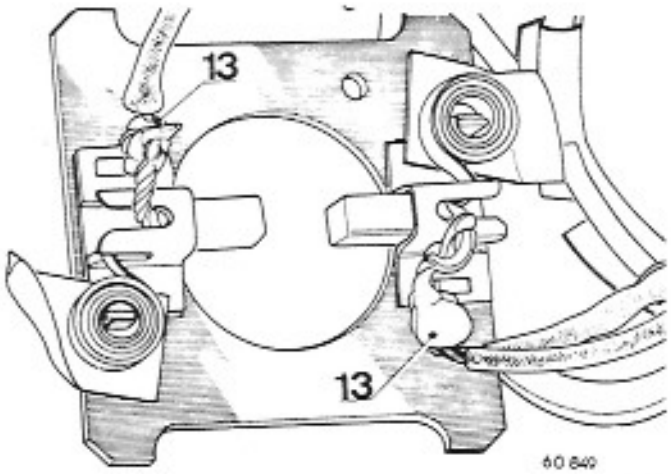
Remove plate (5) and wheel (6) which is driven by a worm.



To remove body (11) and the field shoes, one must unsolder the joints on the connection plate leads (12). Previously mark the positions that these leads occupy.



Remove the two tie bolts (7).
Take off :
- The end plate (8).
- The brush carrier plate (9).
- The armature (10).



Unsolder joints (13) on the brushes if necessary, and replace them.
Clean the commutator and reassemble the unit.

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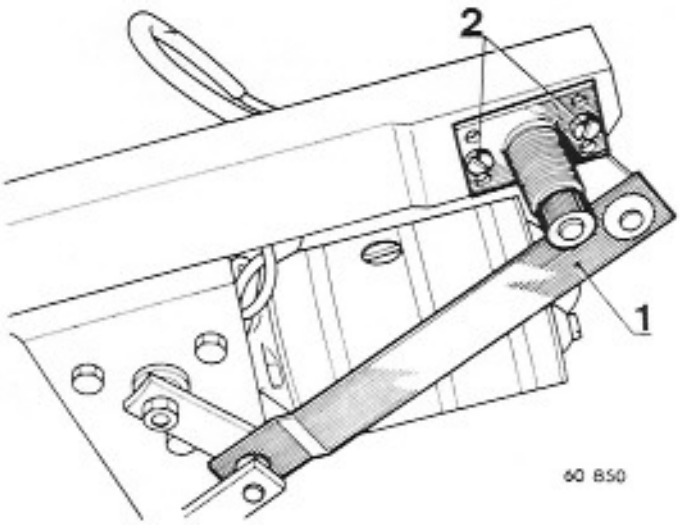
b) - Reassembling

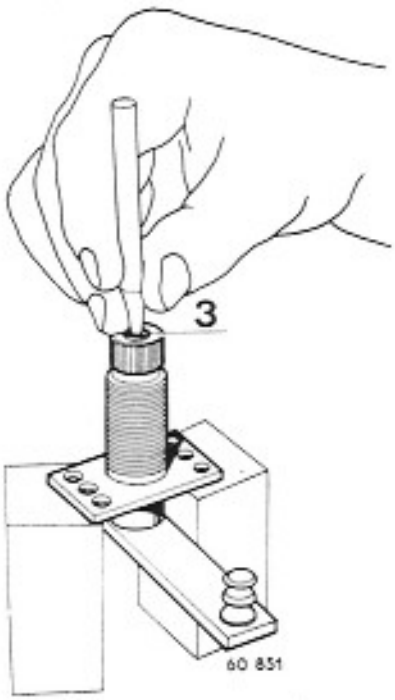
Carry out the above operations in reverse.

3/- Freeing a windscreen wiper bearing

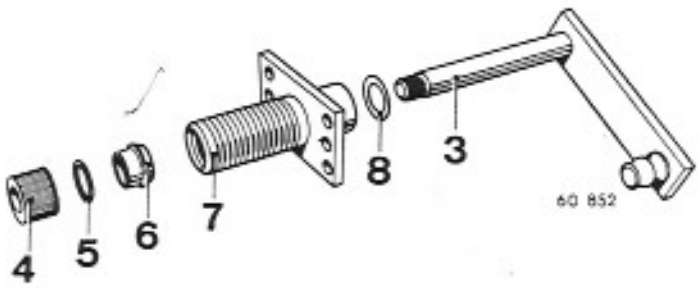
a) - Dismantling the bearing.



Remove the scuttle grill and the motor - linkage assembly.
Disconnect the connection link (1).
Remove the two bolts (2) which secure the bearing in position.



Remove the dab of paint at the end of shaft (3).



Push out the pin and put aside the various components :
- splined end fitting (4).
- washer (5).
- seal (6).
- bearing body (7).
- elastic washer (8) and shaft (3).

Clean the shaft and the bearing bushes, grease them on refitting.

b) - Reassembling

Carry out the removing operations in reverse.
Push in the splined fitting (4) until it reaches the bottom of the chamfer on shaft (3).

4) Replacing a windscreen wiper motor 1966 model by a 1967 model motor.

When fitting a 1967 model windscreen wiper motor to a 1966 model vehicle, one must :

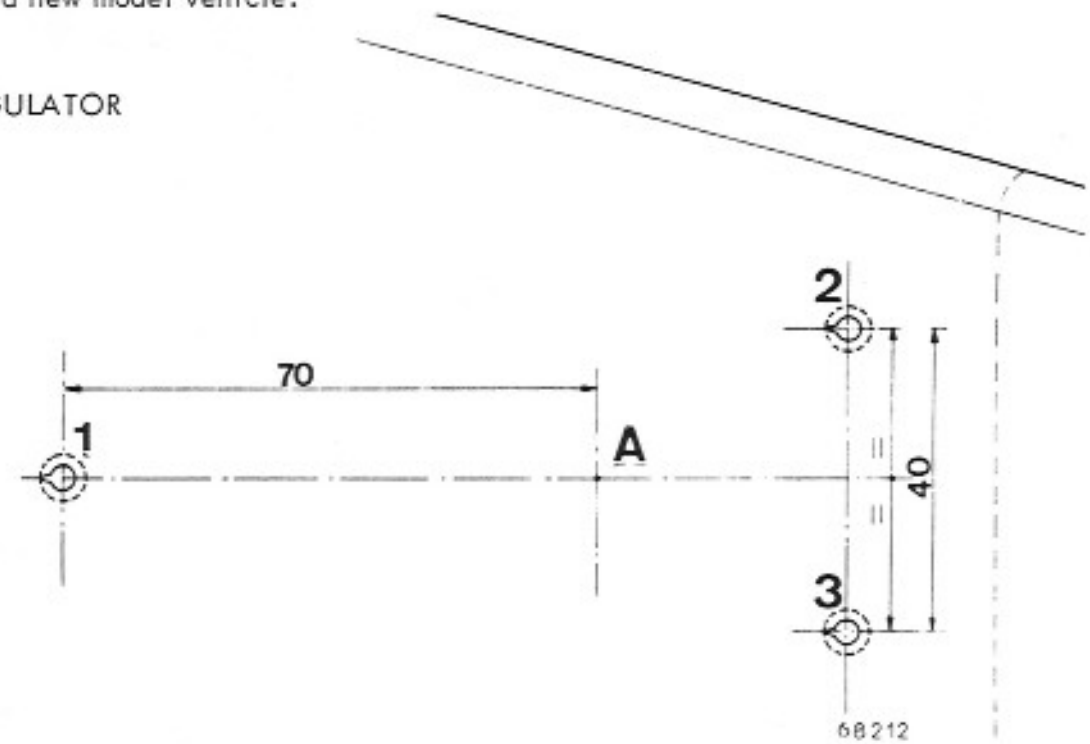
a) open out the three securing holes to a diameter of 6.5 mm (17/64").
b) replace the three connection plate on the scuttle by a five connection plate No 558 361.
c) fit a blue wire No 120 to the salmon pink wire from the fuse box (blue sleeve) to the scuttle connection plate (see wiring diagrams on pages C.17 and C.19).
d) change the connections on the windscreen wiper switch to make it the same as the 1967 model (see page C.14).

XIX - SPECIAL FEATURES OF THE 1968 MODEL

A/- ALTERNATOR

A new S.E.V. alternator no. 7 700 500 295 with an additional rear securing point is fitted, and this is secured by a longer bolt no. 7 700 501 241.
A new type alternator with the new type bolt can be fitted to an old type vehicle, but an old type alternator must not be fitted to a new model vehicle.

B/- REGULATOR



Only reed type regulators are fitted to 1968 models.
To replace an electronic voltage regulator by a reed type regulator, an additional hole must be drilled in the wheel arch.

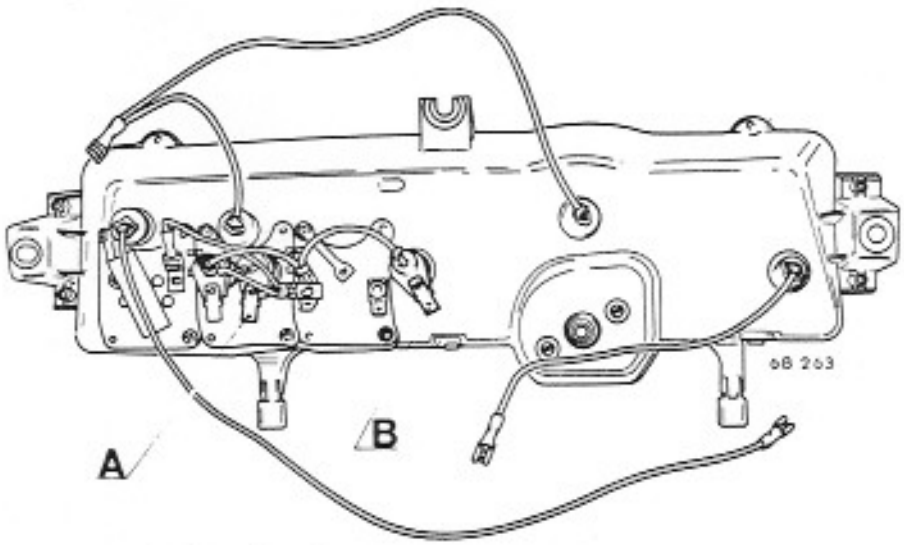
1 - 2 - 3 are the existing holes for an electronic voltage regulator.
A : is the hole which must be drilled to fit a reed type regulator.

In order to keep only one type of voltage regulator in stock, we advise you to order the Ducellier voltage regulator no. 8 558 282 with a detachable round plug on the Ext terminal. This permits one to use it on the old and the new type wiring harnesses.

New harnesses : remove the plug
Old harnesses : leave the plug in position.

C/- INSTRUMENT PANEL AND WIRING HARNESSES

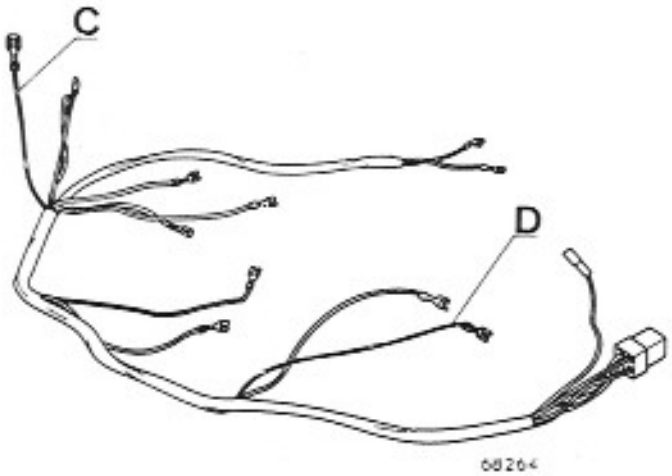
1/ Instrument panel



The new instrument panel is fitted with an additional warning light in the choke (A).
The brake warning light acts, at the same time, as a warning that the handbrake is engaged and that the brake pads are worn.

If the warning light switches on, push the handbrake fully in. If it remains switched on.
Check the front brake pads.

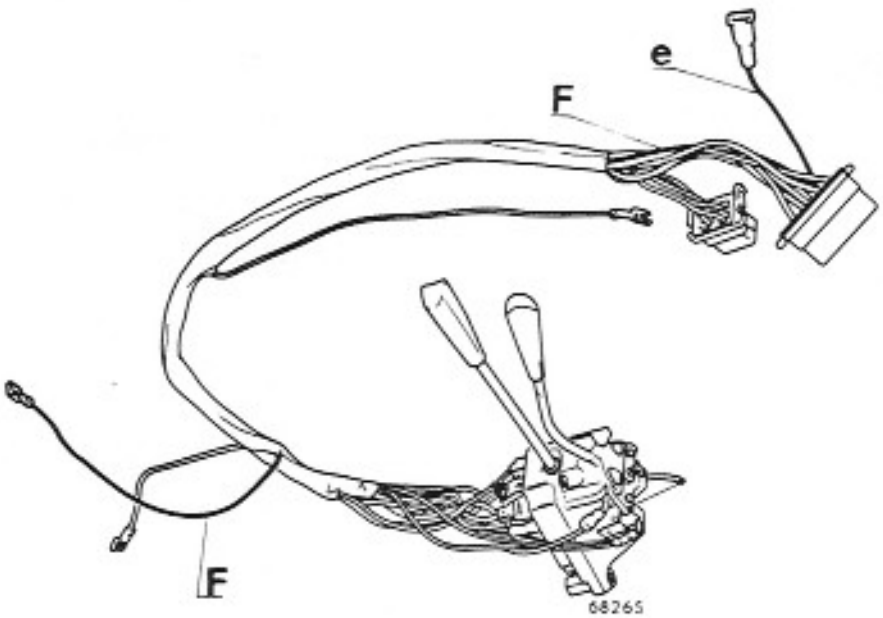
2/- Instrument panel wiring harness



On the 1968 model there is additional wire in the harness for the choke warning light (C.D.).

Whenever replacing an old type harness by a new one, the choke warning light lead must be removed.
It is : a black lead (with a clip protector) at the instrument panel end (C), and a black lead only at the choke knob end (D).

3/ - Horn and lighting switch



There is a new horn and lighting switch harness with an additional lead (e) between the handbrake switch and the connection block.
It is connected in parallel with the brake pad wear warning light in the connection block (black lead) (F).
If an old type horn and lighting switch is replaced by a new one, remove lead (e).

XX - ESSENTIAL PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT OPERATIONS ON THE ELECTRICAL INSTALLATION.

ALL THE INSTRUCTIONS AIMED AT AVOIDING DAMAGE TO THE RECTIFIER DIODES MUST BE FOLLOWED ABSOLUTELY.

A - SWITCH OFF THE ENGINE WHENEVER DISCONNECTING THE BATTERY :

Never disconnect the battery when the engine is running. (This also applies to batteries with an isolating switch in the charging circuit : NEVER SWITCH OFF THE SWITCH UNTIL THE ENGINE HAS STOPPED).

B - NEVER RUN THE ENGINE WITHOUT THE ALTERNATOR BEING CONNECTED UP TO THE BATTERY :

After repairs, before starting the engine, ensure that the alternator is connected to the battery.

C - CHARGING BATTERIES :

1/ Never connect up the charger without first disconnecting the two battery leads : that is to say, isolating the battery from the vehicle electrical system.

2/ Ensure that the leads are connected the right way round when connecting up the battery.

D - AVOID ANY FORM OF SHORT CIRCUIT :

IN ALL CIRCUMSTANCES WHEN REMOVING THE FIRST SPARKING PLUG (THAT NEAREST THE ALTERNATOR), DISCONNECT THE BATTERY BY MEANS OF THE ARELCO SWITCH TERMINAL, BECAUSE THERE IS A RISK THAT YOU WILL TOUCH THE POSITIVE TERMINAL ON THE ALTERNATOR WITH THE PLUG SPANNER.

E - REGULATOR :

ESSENTIAL PRECAUTIONS ARE TO BE CARRIED OUT WHEN HANDLING THE VOLTAGE REGULATOR WIRING HARNESS :

1/ Never earth (ground) the voltage regulator terminal marked "EXC", or the lead which connects this terminal to the field terminal to the alternator.

2/ Never connect the leads on the voltage regulator to the wrong terminals.

3/ Never disconnect the voltage regulator whilst the alternator is still rotating.

4/ Never operate the voltage regulator without it being connected to earth (ground). This would result in immediate damage to the regulator.