LTI

SERVICE

Fairway

WORKSHOP MANUAL

SECTION 8

ENGINE ELECTRICS, STARTER, ALTERNATOR, HEATER PLUGS

At the time of going to print, the illustrations and text appearing in this workshop manual are representative of manufacture. Whilst retaining the basic features shown herein, the manufacturer reserves the right to make, at any time, and without necessarily updating this manual, any alterations considered convenient for improvement or for any other reason.

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ELECTRICAL SYSTEM

SECTION EL

CONTENTS

STARTING MOTOR FITTED TO SERIES 2.7 DIESEL ENGINE

TYPE S13-107A
MODEL HITACHI-GEAR REDUCTION TYPE
PART NO CODE 23300

SOME PARTS OF THIS SECTION DEAL
WITH OTHER TYPES OF STARTING MOTORS
ALWAYS REFER TO HITACHI-S13-107A MODEL

SPECIAL TOOLS

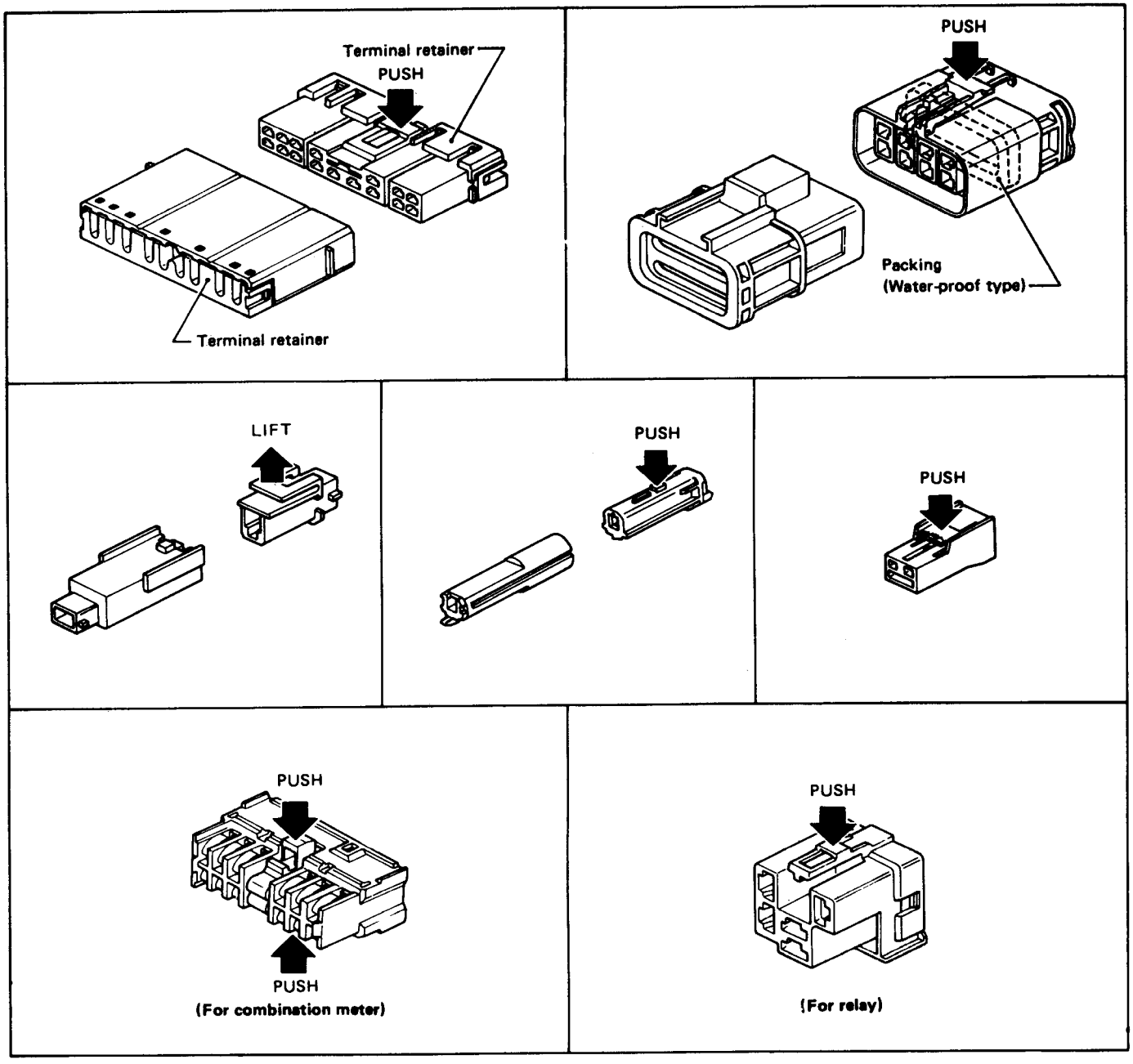
A SUITABLE MULTI METER

HARNESS CONNECTOR

- All harness connectors have been modified to prevent accidental looseness or disconnection.
- The connector can be disconnected by pushing or lifting the locking section.

CAUTION:
Do not pull the harness when disconnecting the connector.

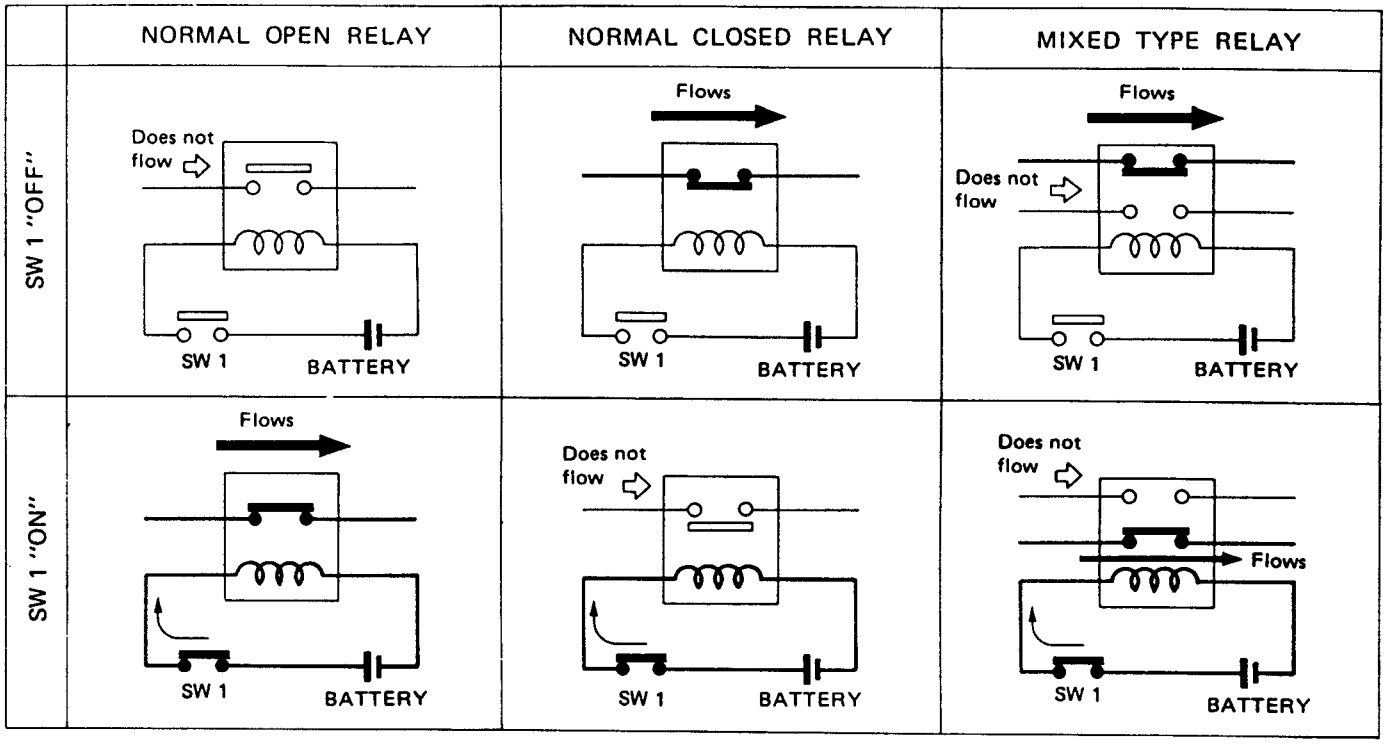
[Example]



SEL769D

Normal Open, Normal Closed and Mixed Type Relays

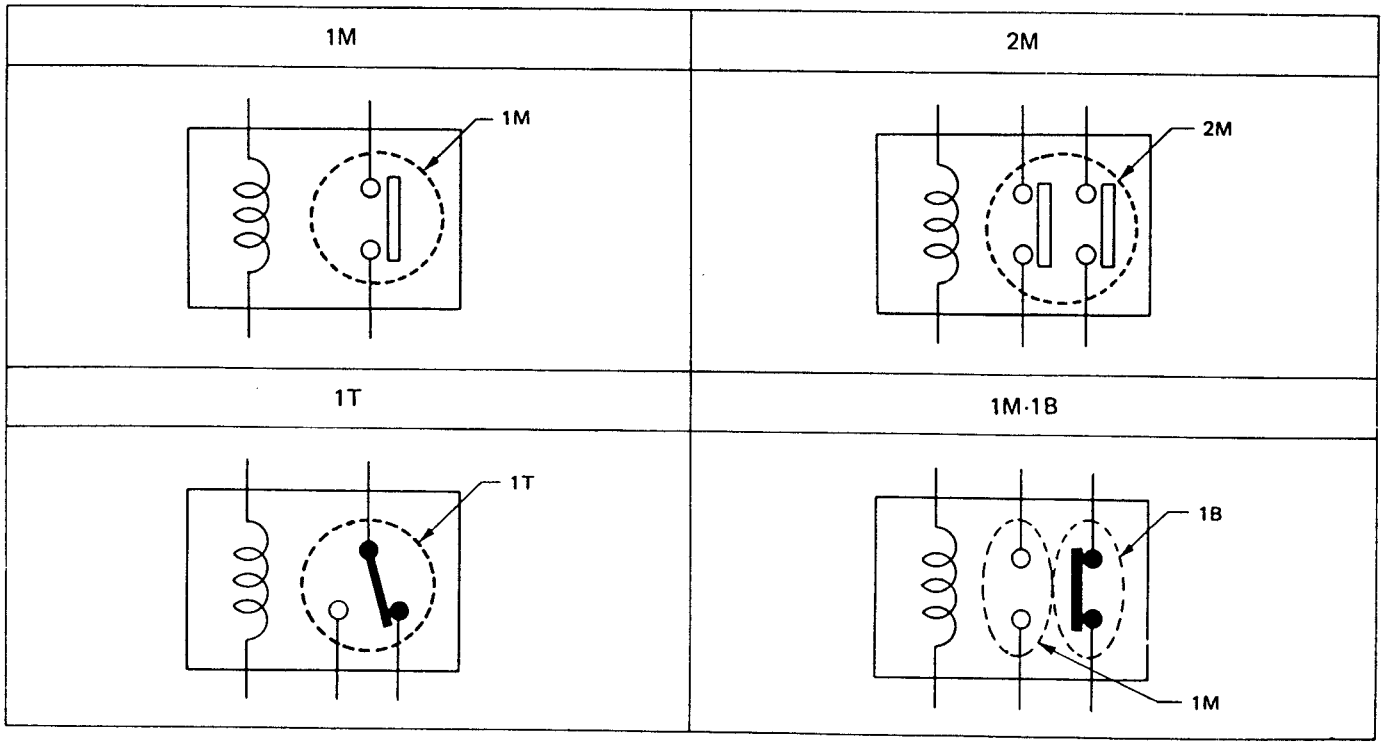
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



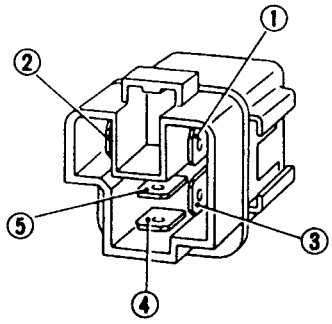
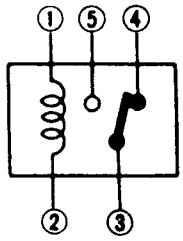
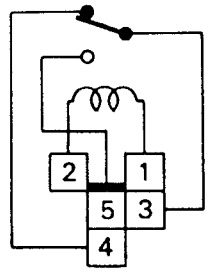
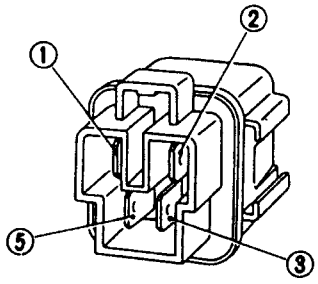
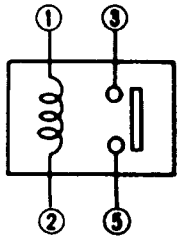
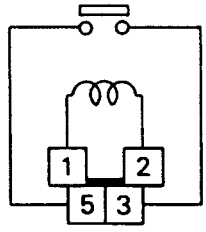
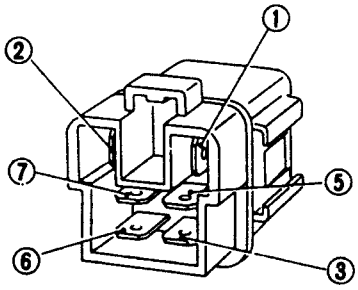
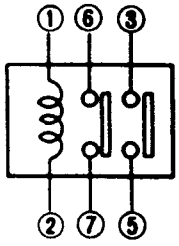
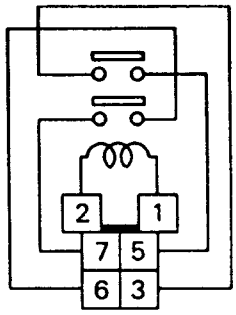
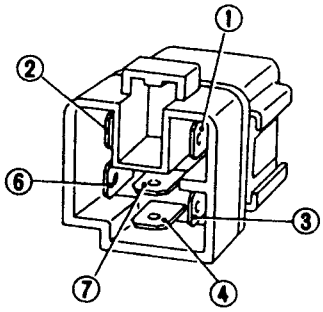
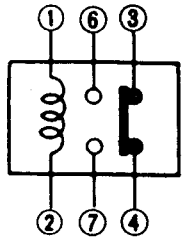
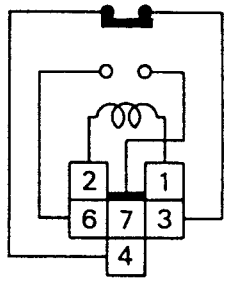
SEL881H

Type of Standardized Relays

1M ..... 1 Make
1T ..... 1 Transfer
2M ..... 2 Make
1M·1B ..... 1 Make 1 Break

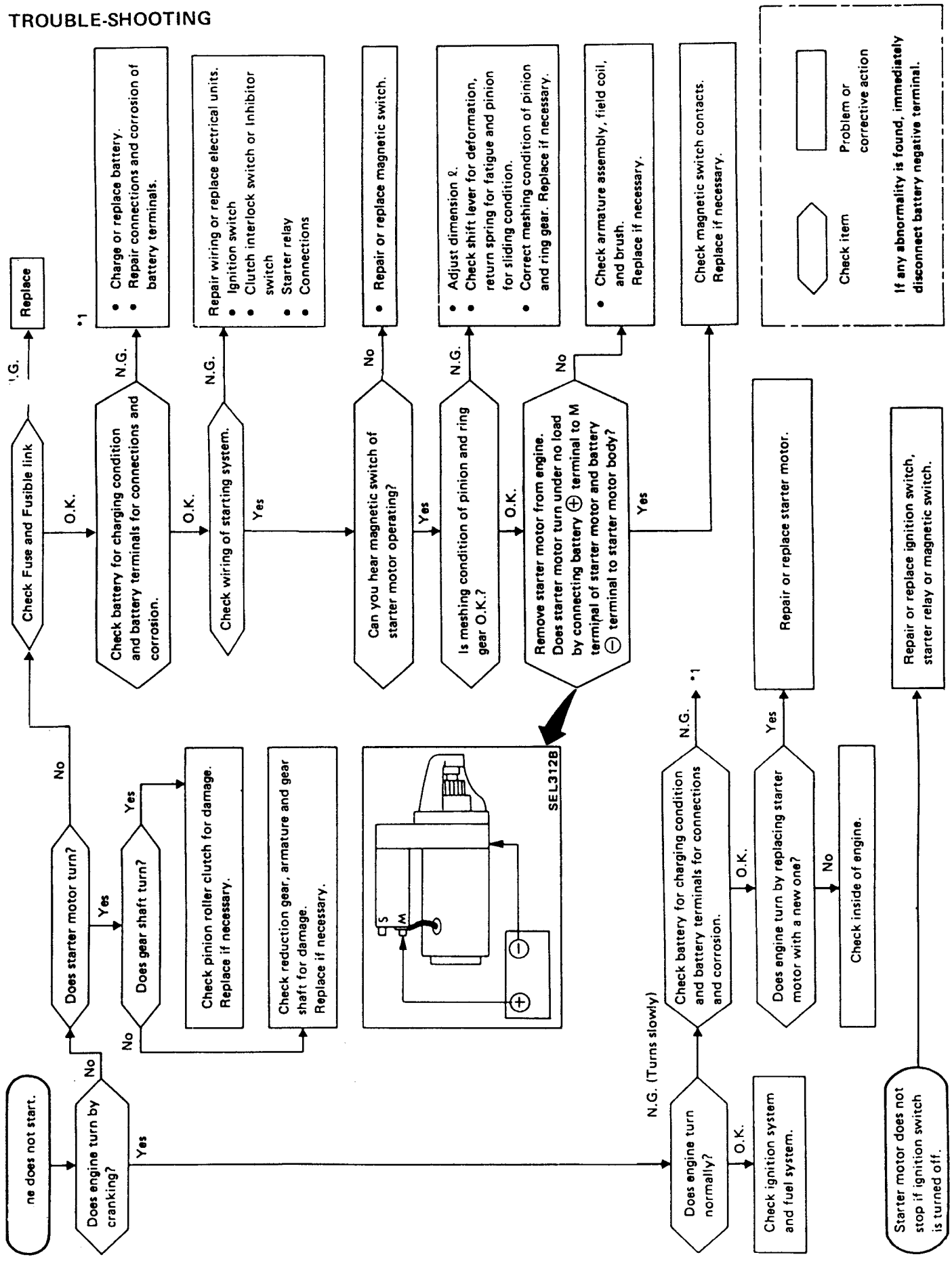


SEL882H

Type	Outer view	Circuit	Connector symbol and connection	Case color
1T				BLACK
1M				BLUE
2M				BROWN
1M·1B				GRAY

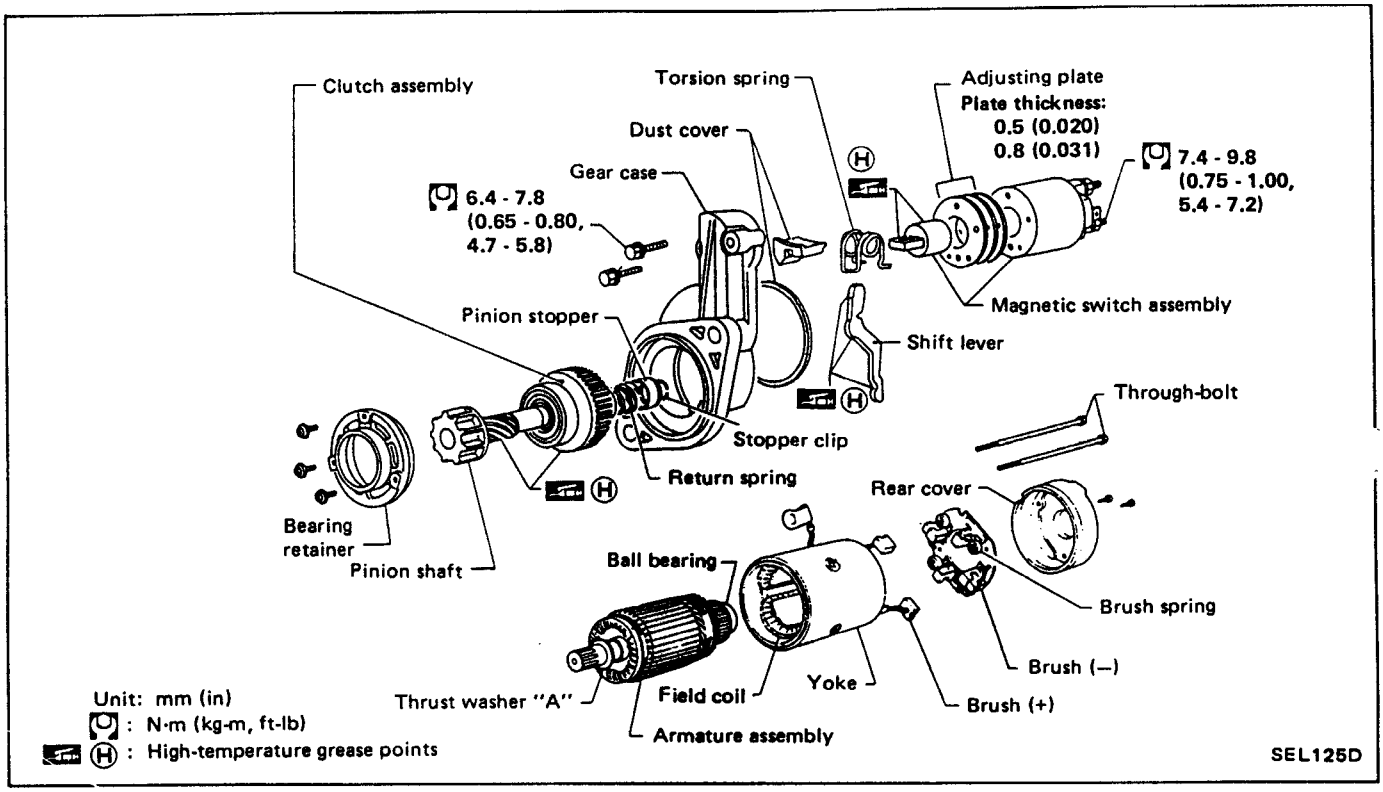
SEL883H

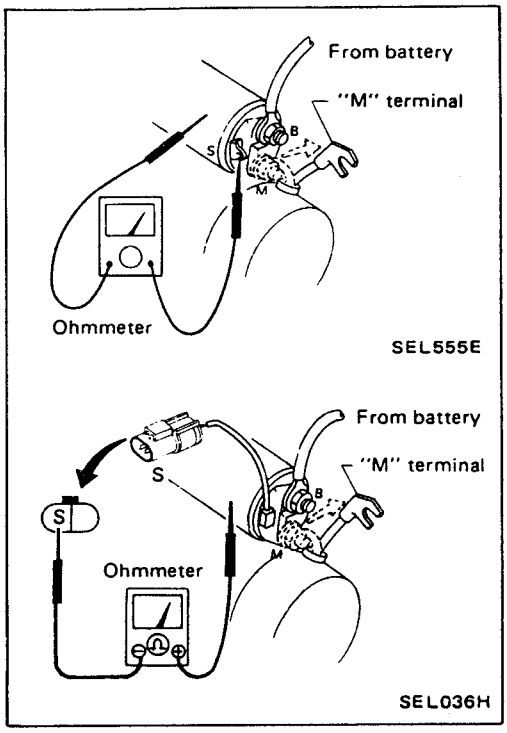
TROUBLE-SHOOTING



Construction (Cont'd)

DIESEL ENGINE MODEL
S13-106A, -107A

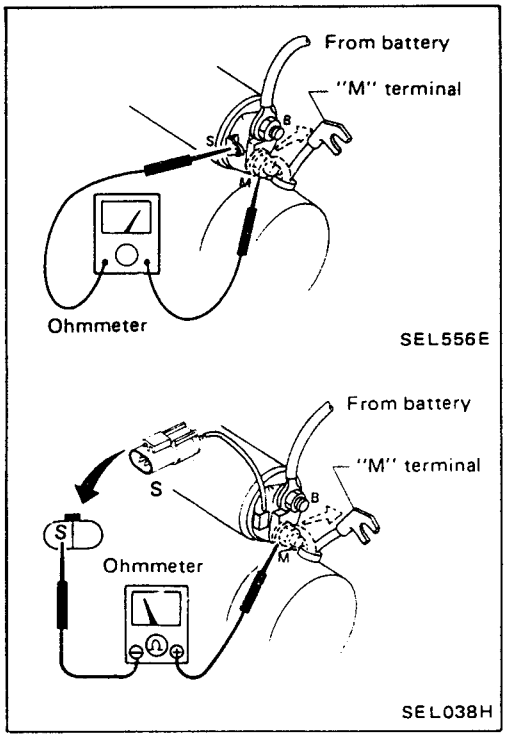




Magnetic Switch Check

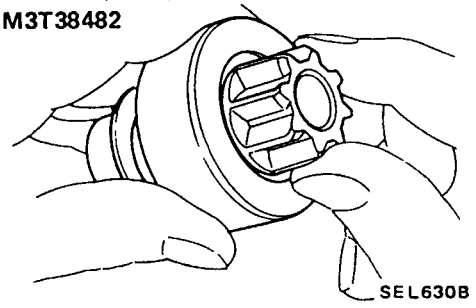
- Before starting to check, disconnect battery ground cable.
- Disconnect "M" terminal of starter motor.

1. Continuity test (between "S" terminal and switch body).
   - No continuity ... Replace.

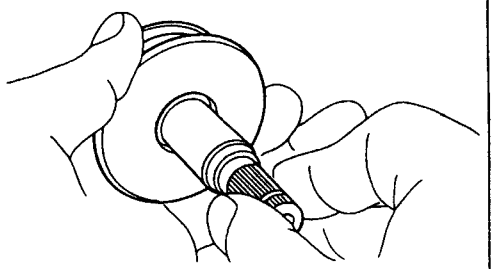


2. Continuity test (between "S" terminal and "M" terminal).
   - No continuity ... Replace.

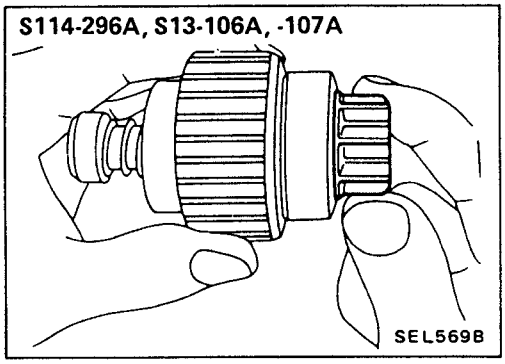
S114-348, -607, -608, M3T29482D, M3T38482

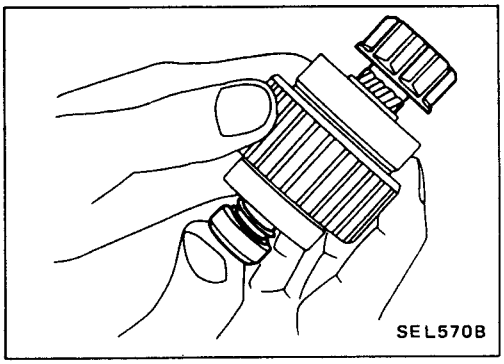


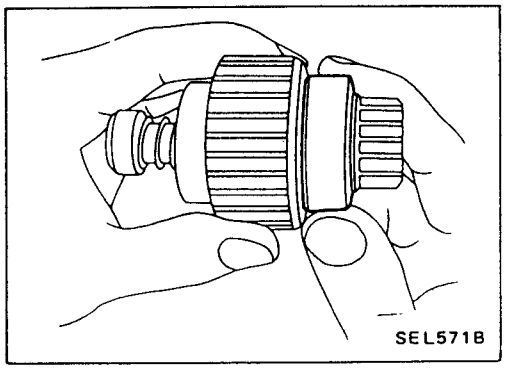
M2T52881



S114-296A, S13-106A, -107A







Pinion/Clutch Check

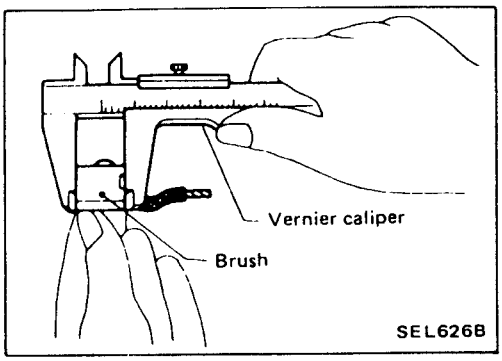
1. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
- If it does not lock (or locks) in either direction or unusual resistance is evident ... Replace.

2. Check pinion movement. (S114-296A and S13-106A, -107A)
- If it is hard to move, apply grease or, if necessary, replace.

3. Check ball bearing. (S114-296A, and S13-106A, -107A)
   Spin outer race of ball bearing to ensure that it turns smoothly without binding.
- Abnormal resistance ... Replace.

4. Inspect pinion teeth.
- Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)

5. Inspect reduction gear teeth.
- Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)



Brush Check

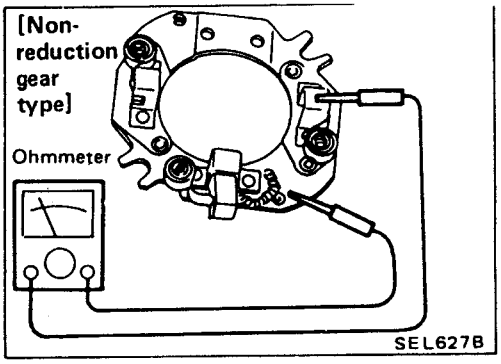
BRUSH

Check wear of brush.

Wear limit length:

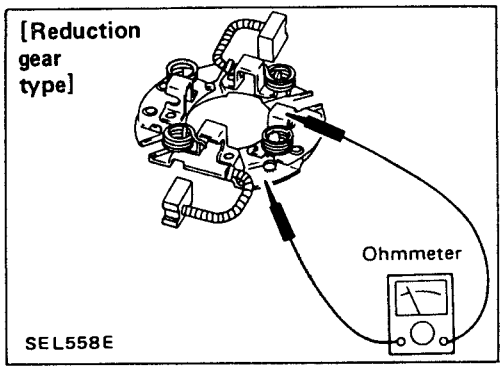
Refer to "Service Data and Specifications."

- Excessive wear ... Replace.



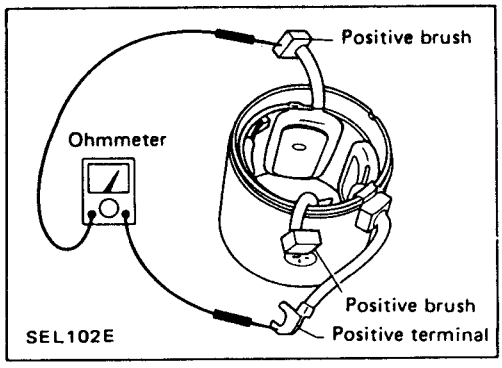
BRUSH HOLDER

1. Perform insulation test between brush holder (positive side) and its base (negative side).
   - Continuity exists ... Replace.
2. Check brush to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

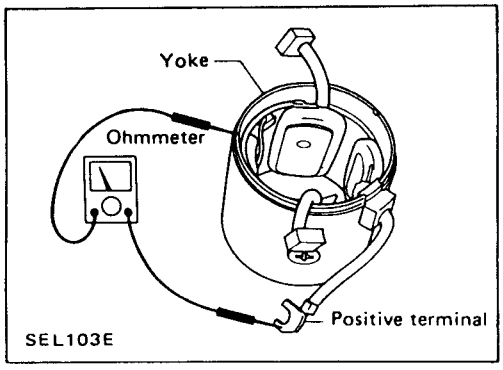


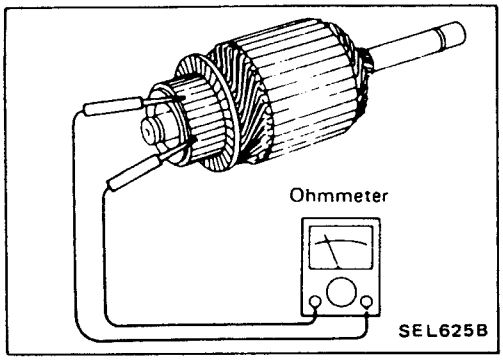
Field Coil Check

1. Continuity test (between field coil positive terminal and positive brushes).
   - No continuity ... Replace field coil.



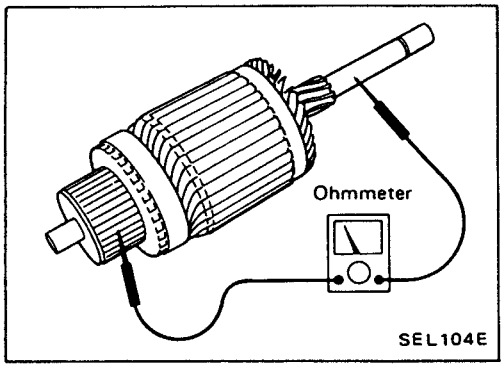
2. Insulation test (between field coil positive terminal and yoke).
   - Continuity exists ... Replace field coil.



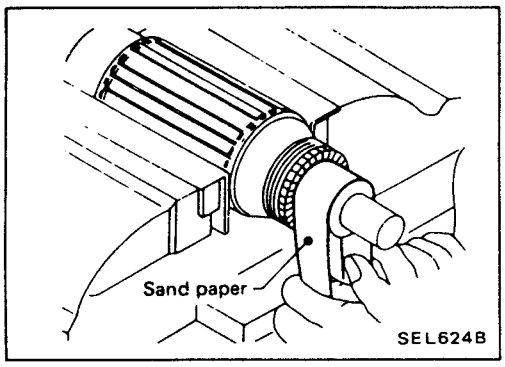


Armature Check

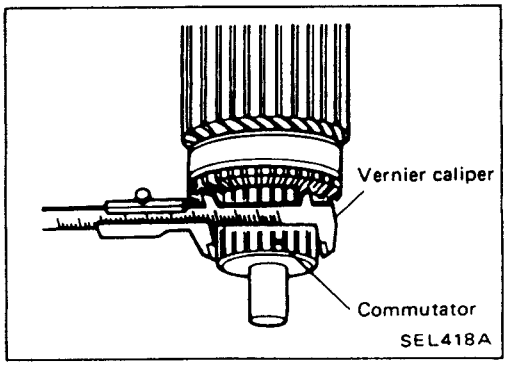
1. Continuity test (between two segments side by side).
   - No continuity ... Replace.



2. Insulation test (between each commutator and shaft).
   - Continuity exists ... Replace.

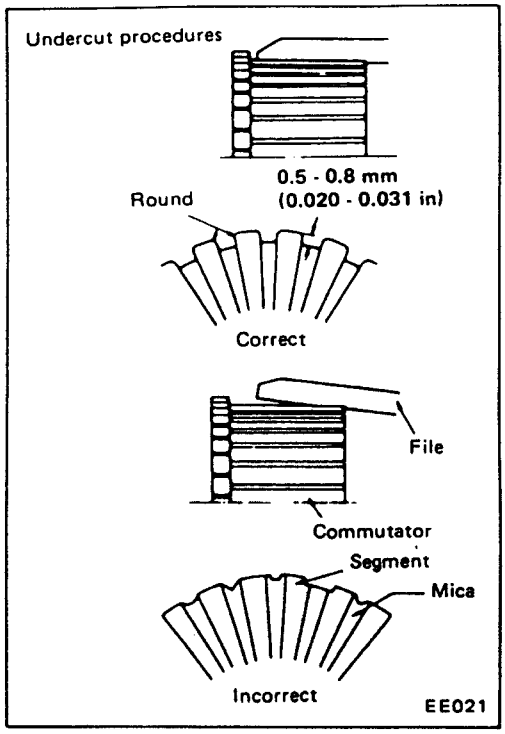


3. Check commutator surface.
   - Rough ... Sand lightly with No. 500 - 600 sandpaper.



4. Check diameter of commutator.
   Commutator minimum diameter:
   Refer to "Service Data and Specifications."
   - Less than specified value ... Replace.

Armature Check (Cont'd)



5. Check depth of insulating mica from commutator surface.
   - Less than 0.2 mm (0.008 in) ... Undercut to 0.5 - 0.8 mm (0.020 - 0.031 in)

Assembly

Carefully observe the following instructions.

HIGH TEMPERATURE GREASE POINT

- Rear cover metal
- Gear case metal
- Center bracket metal
- Frictional surface of pinion
- Moving portion of shift lever
- Plunger of magnetic switch
- Reduction gear
- Armature shaft gear

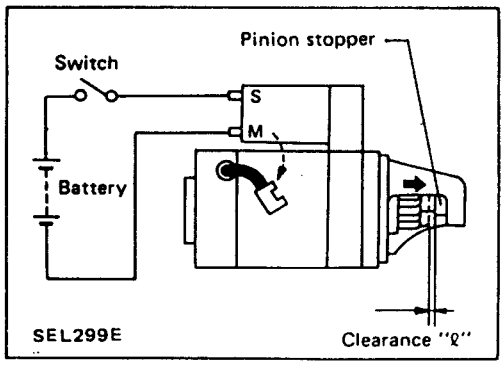
PINION PROTRUSION LENGTH ADJUSTMENT

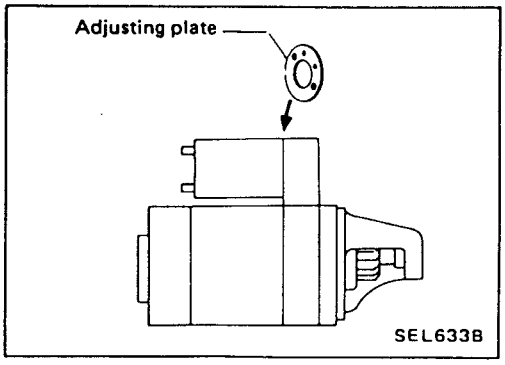
Non-reduction gear type

With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance "ℓ" between the front edge of the pinion and the pinion stopper.

Clearance "ℓ":

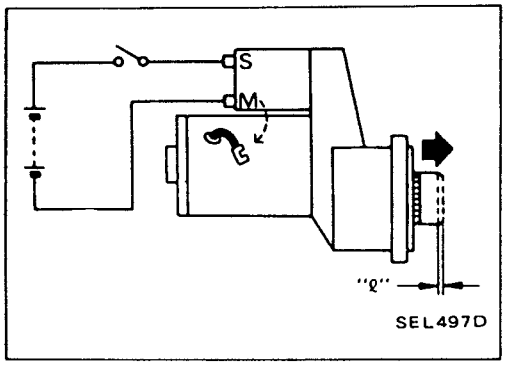
Refer to "Service Data and Specifications."





- Not in the specified value ... Adjust with adjusting plate.

Assembly (Cont'd)

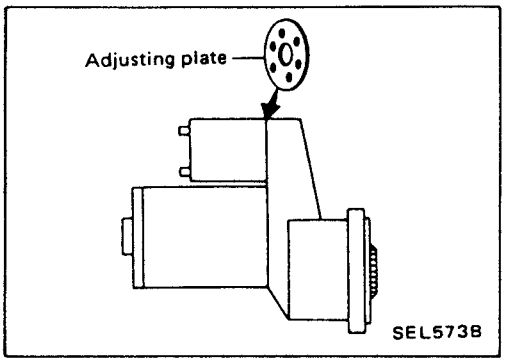


Reduction gear type

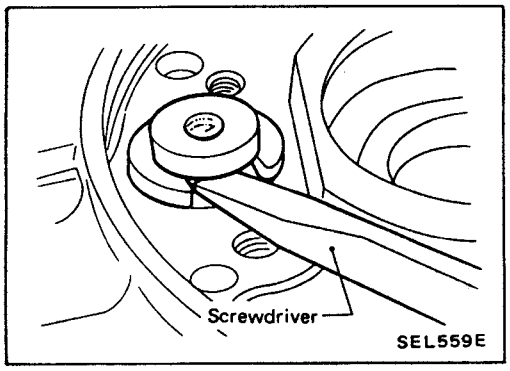
Measure movement "ℓ" in height of pinion when pinion is pushed out with magnetic switch energized and when pinion is pulled out by hand until it touches stopper.

Movement "ℓ":

Refer to "Service Data and Specifications."



- Not in the specified value ... Adjust by adjusting plate.



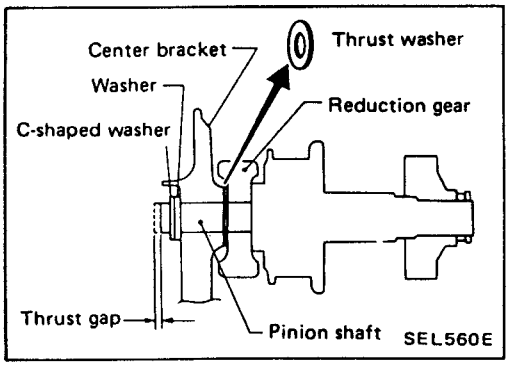
PINION SHAFT THRUST GAP ADJUSTMENT

M2T52881

Check thrust gap with a gap gauge by pulling pinion shaft in the axial direction with a screwdriver.

Maximum of thrust gap:

0.5 mm (0.020 in)



- If thrust gap is over the specified value, adjust it with thrust washer.

STARTER

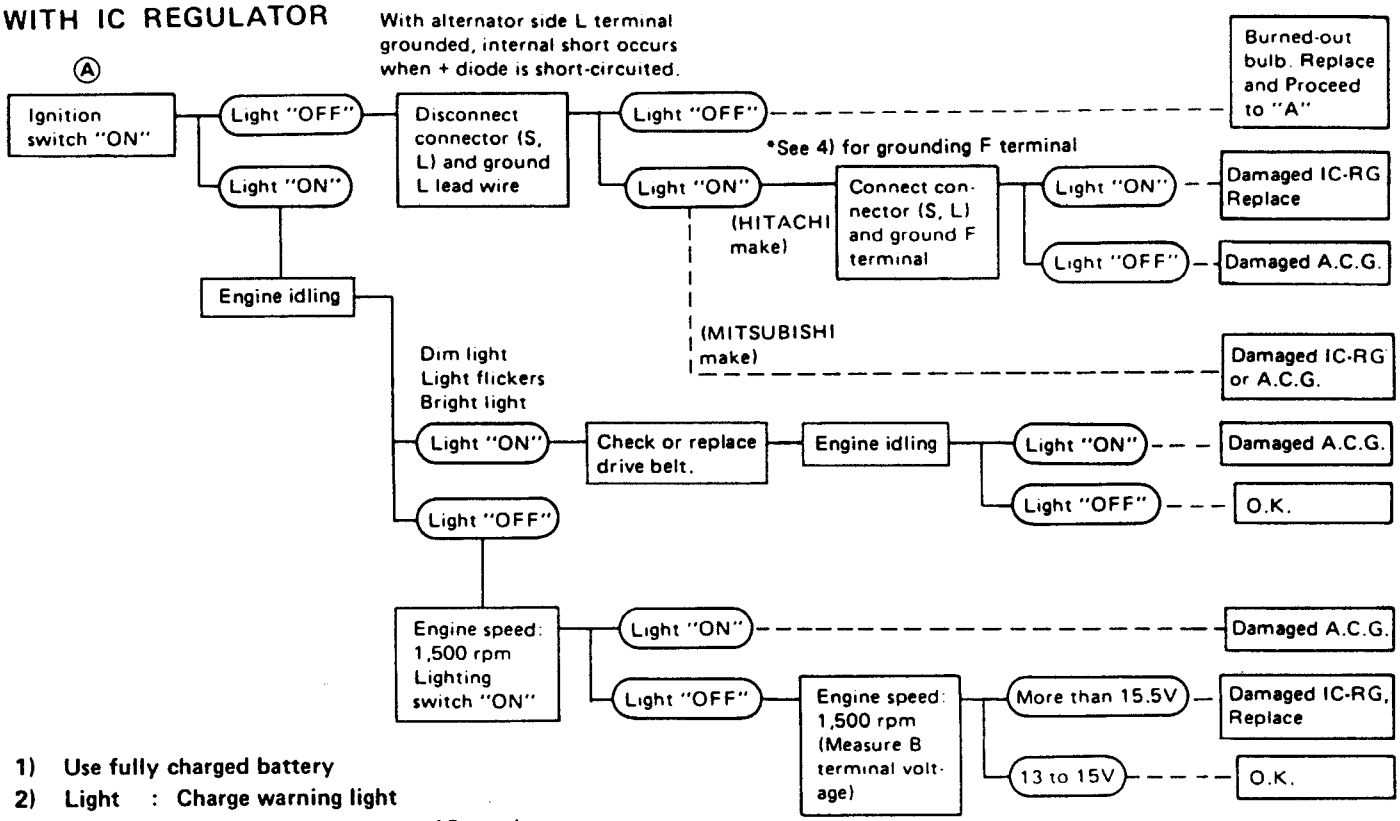
Type	S114-348	M3T29482D	S114-296A	M2T52881	S114-607	M3T38482	S114-608	S13-106A	S13-107A
	HITACHI	MITSUBISHI	HITACHI	MITSUBISHI	HITACHI	MITSUBISHI	HITACHI		
	Non-reduction		Reduction		Non-reduction			Reduction	
Applied model	Z20S M/T				Z24S			TD23, 27 Except Europe	TD23 Europe & cold area
	4-speed		5-speed, Optional for 4-speed		M/T		A/T		
System voltage V	12								
No-load Terminal voltage V	11.5		11	11.5				11	
Current A	Less than 60		Less than 100			Less than 60	Less than 100		
Revolution rpm	More than 7,000	More than 6,500	More than 3,900	More than 3,000	More than 7,000	More than 6,500	More than 6,000	More than 3,900	
Minimum diameter of commutator mm (in)	39 (1.54)	31.4 (1.236)	29 (1.14)	31 (1.22)	39 (1.54)	31.4 (1.236)	39 (1.54)	35.5 (1.398)	
Minimum length of brush mm (in)	12 (0.47)	11.5 (0.453)	11 (0.43)	11.5 (0.453)	11 (0.43)	11.5 (0.453)	11 (0.43)	9 (0.35)	
Brush spring tension N (kg, lb)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)	16.7 - 21.6 (1.7 - 2.2, 3.7 - 4.9)	15.7 - 19.6 (1.6 - 2.0, 3.5 - 4.4)	16.7 - 22.6 (1.7 - 2.3, 3.7 - 5.1)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)	13.7 - 25.5 (1.4 - 2.6, 3.1 - 5.7)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)	26.5 - 32.4 (2.7 - 3.3, 6.0 - 7.3)	
Clearance of bearing metal and armature shaft mm (in)	Less than 0.2 (0.008)		–	–	Less than 0.2 (0.008)	–	Less than 0.2 (0.008)	–	
Clearance "ℓ" between pinion front edge and pinion stopper mm (in)	0.3 - 2.5 (0.012 - 0.098)	0.5 - 2.0 (0.020 - 0.079)	–	–	0.3 - 2.5 (0.012 - 0.098)	0.5 - 2.0 (0.020 - 0.079)	0.3 - 2.5 (0.012 - 0.098)	–	
Movement "ℓ" in height of pinion mm (in)	–	–	0.3 - 1.5 (0.012 - 0.059)	0.5 - 2.0 (0.020 - 0.079)	–	–	–	0.3 - 1.5 (0.012 - 0.059)	

Trouble-shooting

Before conducting an alternator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test. The alternator can be checked easily by referring to the Inspection Table.

Before starting trouble-shooting, inspect the fusible link.

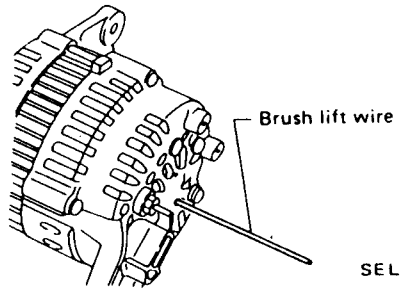
WITH IC REGULATOR



1) Use fully charged battery
2) Light : Charge warning light
   A.C.G. : Alternator parts except IC regulator
   IC-RG : IC regulator
   O.K. : IC-alternator is in good condition
   When reaching "Damaged A.C.G.", remove alternator from vehicle and disassemble, inspect and correct or replace faulty parts
4) *Method of grounding F terminal (HITACHI make only)

Gasoline engine model

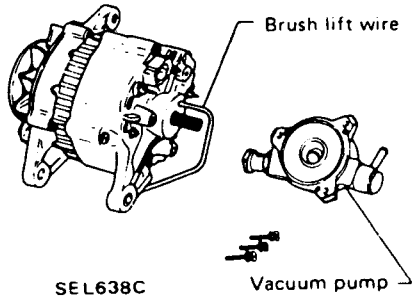
Connect tip of wire to brush and attach wire to alternator body.



SEL766D

Diesel engine model

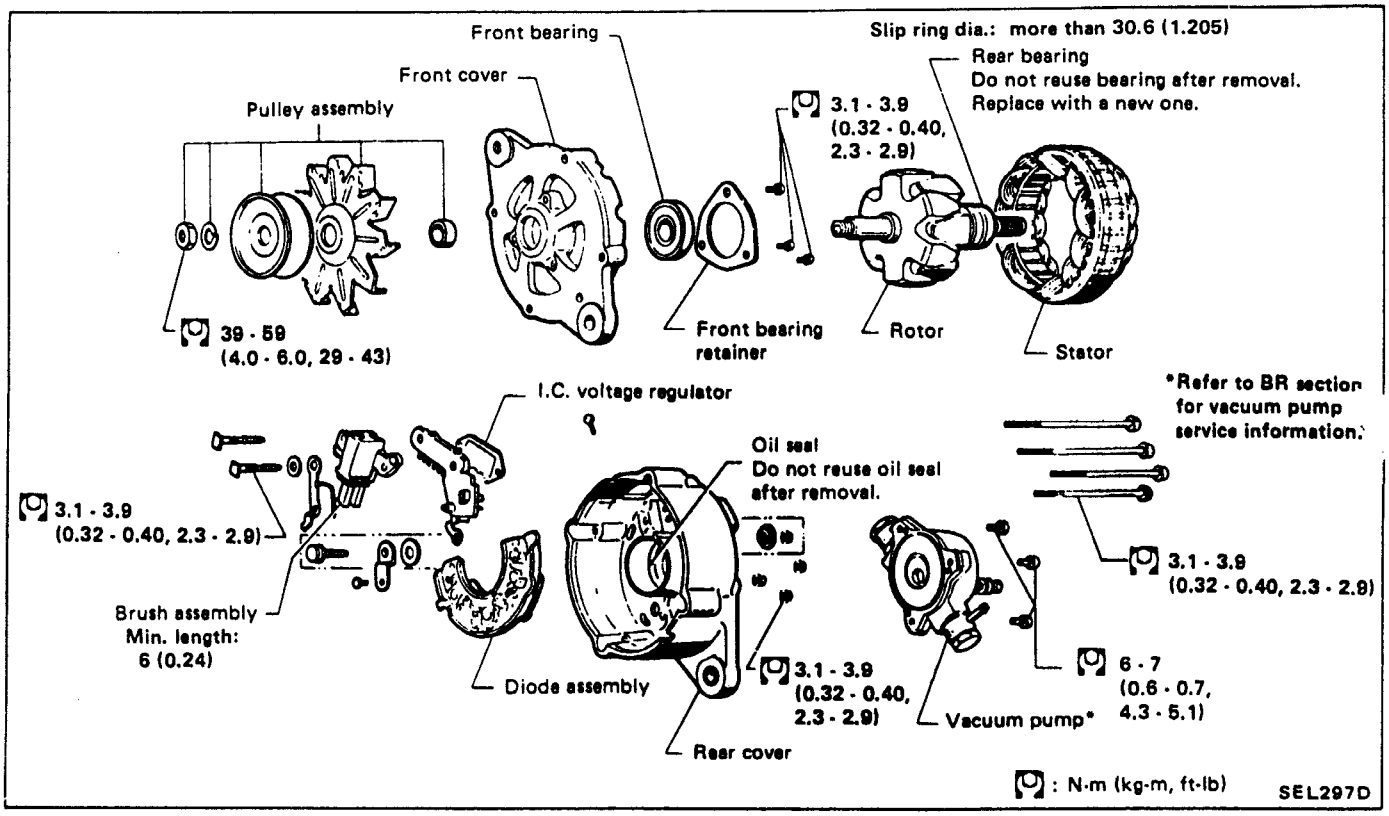
Remove vacuum pump and connect tip of wire to brush and attach wire to alternator body.



SEL638C

5) Terminals "S", "L", "B" and "E" are marked on rear cover of alternator.

DIESEL ENGINE MODEL
LR150-428E and -430C, LR170-408C and -407E

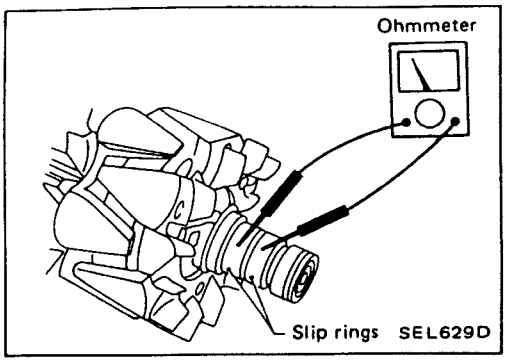


HITACHI

AUTOMATIC LR170 - 412 70 AMP
MANUAL LR170 - 413 OUTPUT

AUTO – 23100 – 02N19
SYN – 23100 – 02N18

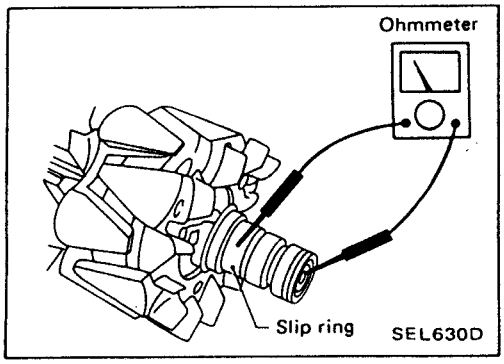
COMPLETE WITH VAC PUMP



Disassembly

ROTOR SLIP RING CHECK

1. Continuity test
   - No continuity ... Replace rotor.

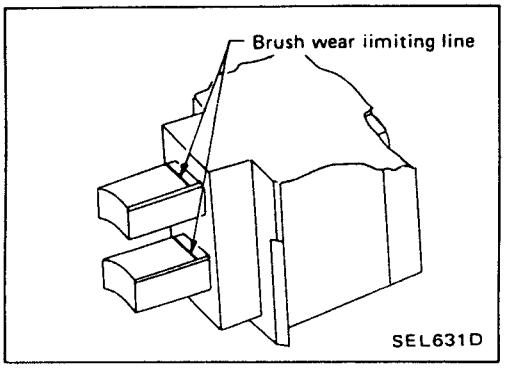


2. Insulator test
   - Continuity exists ... Replace rotor.
3. Check slip ring for wear.

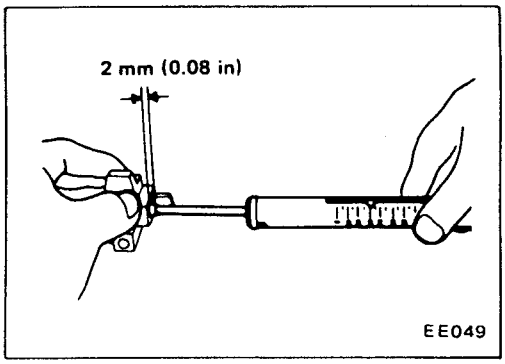
   Slip ring minimum outer diameter:

   Refer to "Service Data and Specifications."

BRUSH CHECK



1. Check smooth movement of brush.
   - Not smooth ....Check brush holder and clean.
2. Check brush for wear.
   - Replace brush if it is worn down to the limit line.



3. Check brush lead wire for damage.
   - Damaged ... Replace.
4. Check brush spring pressure.

   Measure brush spring pressure with brush projected approximately 2 mm (0.08 in) from brush holder.

   Spring pressure:

   Refer to "Service Data and Specifications."
   - Not within the specified values ... Replace.

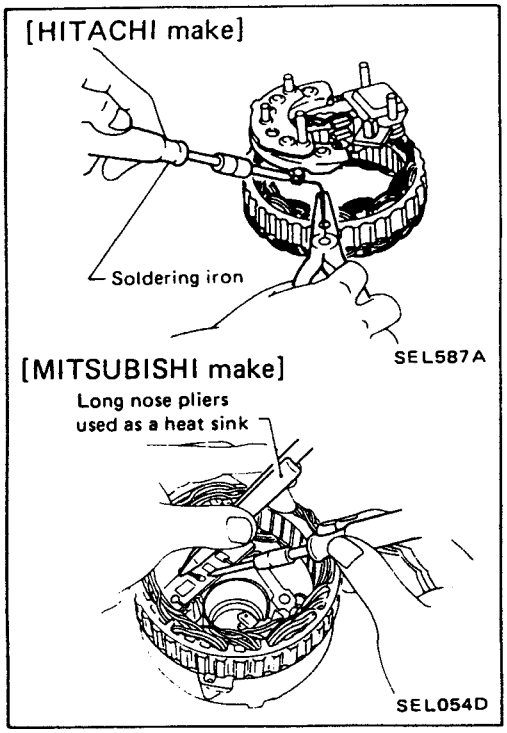
Disassembly (Cont'd)

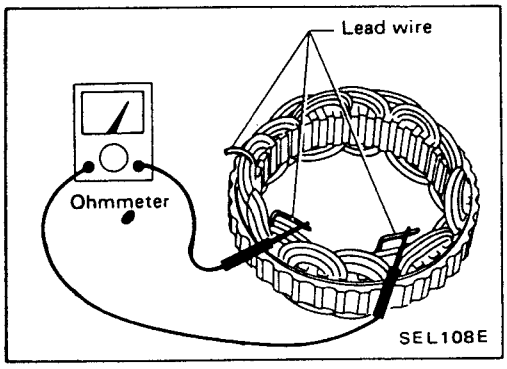
STATOR CHECK

To test the stator or diode, separate them by unsoldering the connecting wires.

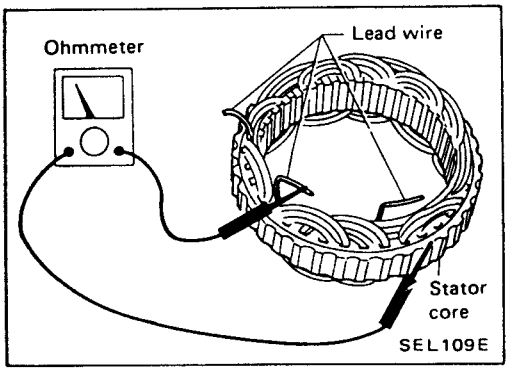
CAUTION:

Use only as much heat as required to melt solder. Otherwise, diodes will be damaged by excessive heat.





1. Continuity test
   - No continuity ... Replace stator.



2. Ground test
   - Continuity exists ... Replace stator.

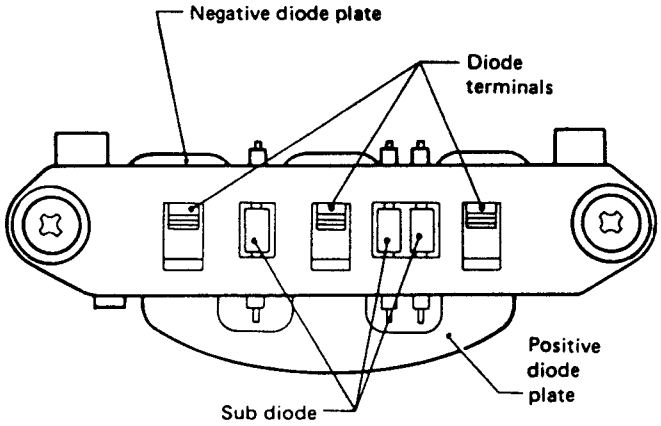
Diode Check

MAIN DIODES

- Use an ohmmeter to check condition of diodes as indicated in chart below.
- If any of the test results is not satisfactory, replace diode assembly.

	Ohmmeter probes		Continuity
	Positive ⊕	Negative ⊖	
Diodes check (Positive side)	Positive diode plate	Diode terminals	Yes
	Diode terminals	Positive diode plate	No
Diodes check (Negative side)	Negative diode plate	Diode terminals	No
	Diode terminals	Negative diode plate	Yes

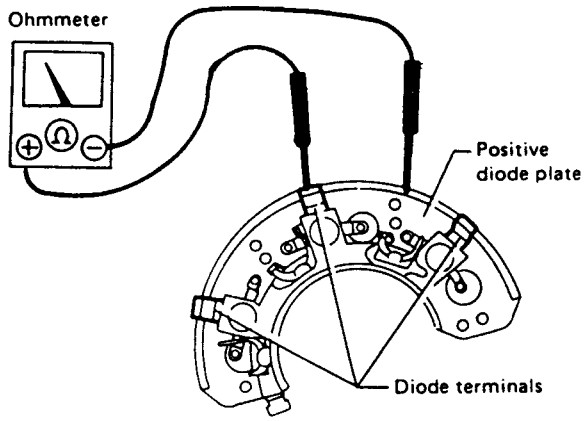
[MITSUBISHI make]



SEL767D

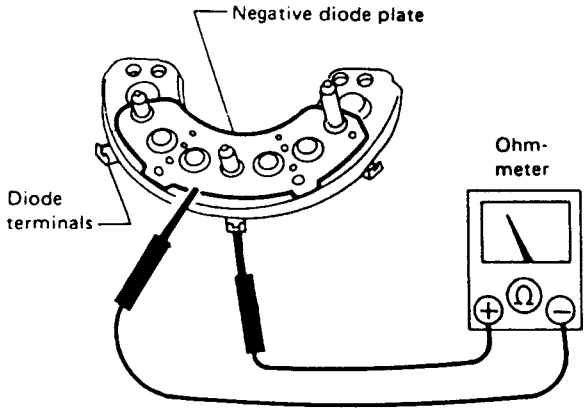
[HITACHI make]

Positive side



SEL319E

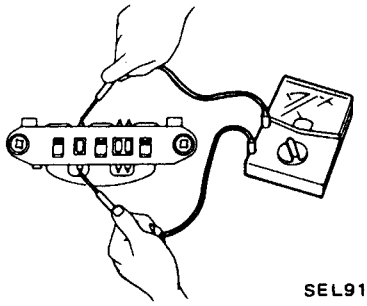
Negative side



SEL320E

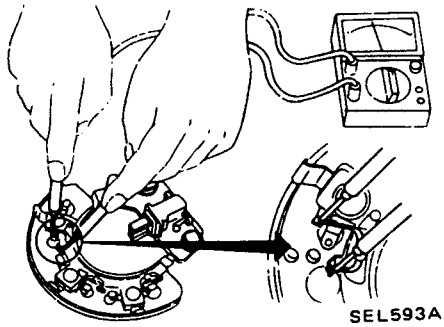
Diode Check (Cont'd)

[MITSUBISHI make]



SEL910A

[HITACHI make]



SEL593A

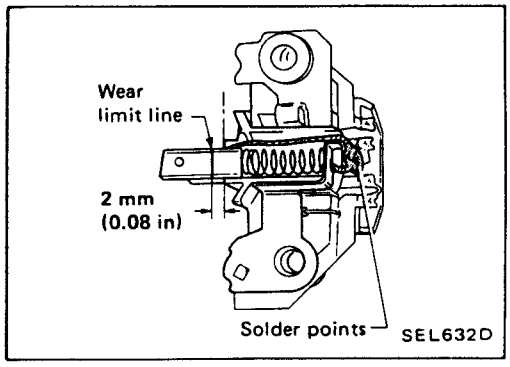
SUB-DIODES

- Attach ohmmeter's probe to each end of diode to check for continuity.
- Continuity is N.G. ... Replace diode assembly.

Assembly

Carefully observe the following instructions.

- When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.

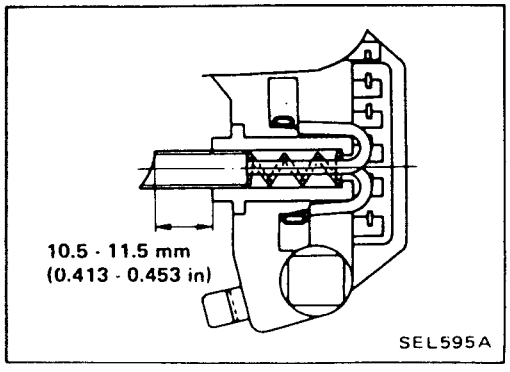


SEL632D

WHEN SOLDERING BRUSH LEAD WIRE

[MITSUBISHI make]

- Position brush so that its wear limit line protrudes 2 mm (0.08 in) beyond end face of brush holder.

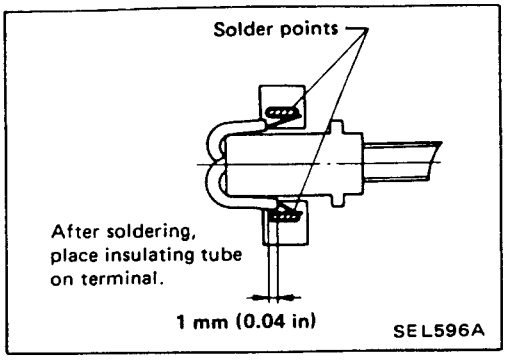


SEL595A

[HITACHI make]

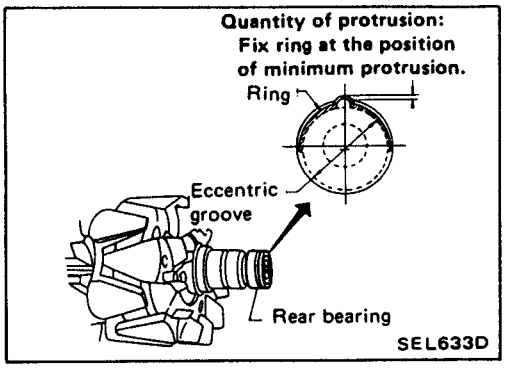
(1) Position brush so that it extends 10.5 to 11.5 mm (0.413 to 0.453 in) from brush holder.

Assembly (Cont'd)



(2) Coil lead wire 1.5 times around terminal groove. Solder outside of terminal.

When soldering, be careful not to let solder adhere to insulating tube as it will weaken the tube and cause it to break.

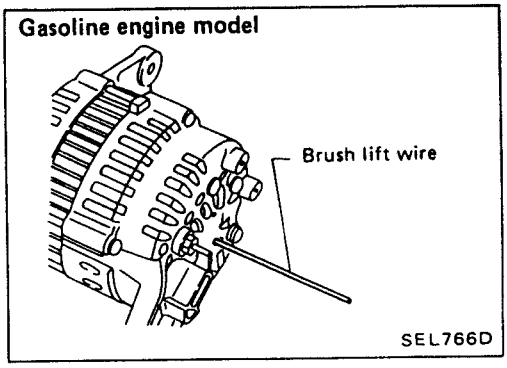


RING FITTING IN REAR BEARING
(Except for A1T22971, A5T20972, A2T40972 and A3T40472)

- Fit ring into groove in rear bearing so that it is as close to the adjacent area as possible.

CAUTION:

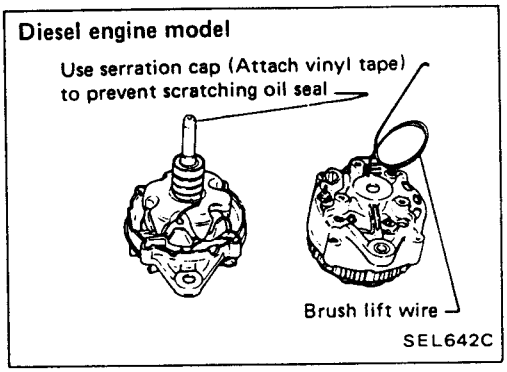
Do not reuse rear bearing after removal.

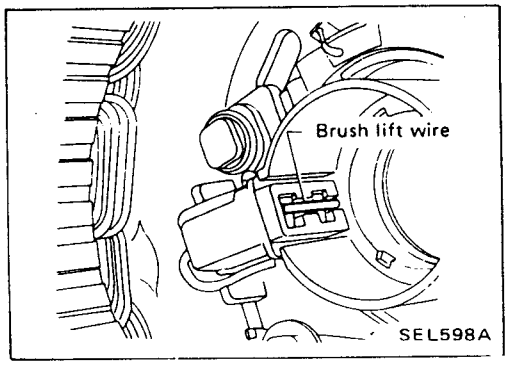


REAR COVER INSTALLATION

(1) Before installing front cover with pulley and rotor with rear cover, push brush up with fingers and retain brush, by inserting brush lift into brush lift hole from outside.

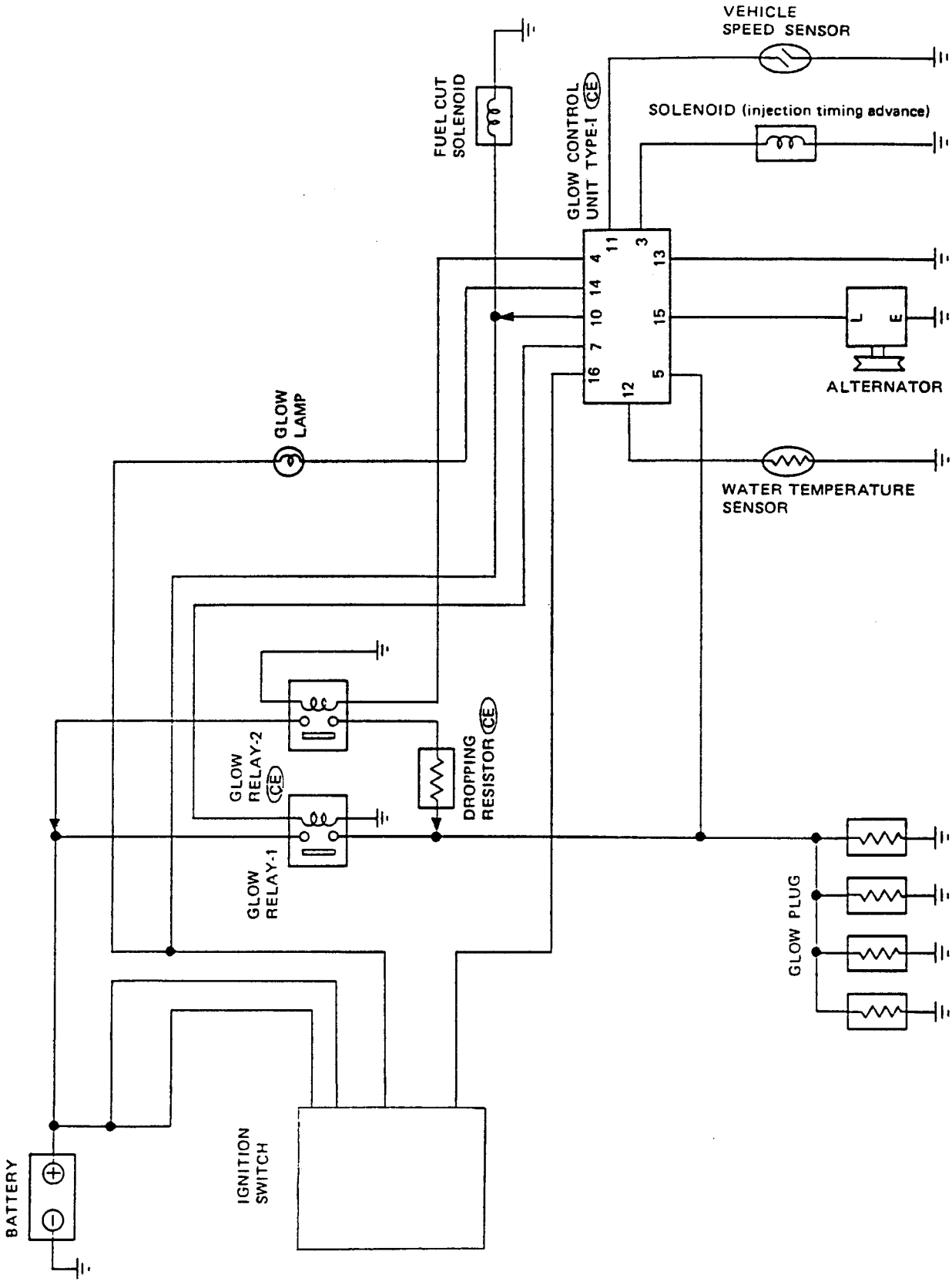
(2) After installing front and rear sides of alternator, pull out brush lift wire.





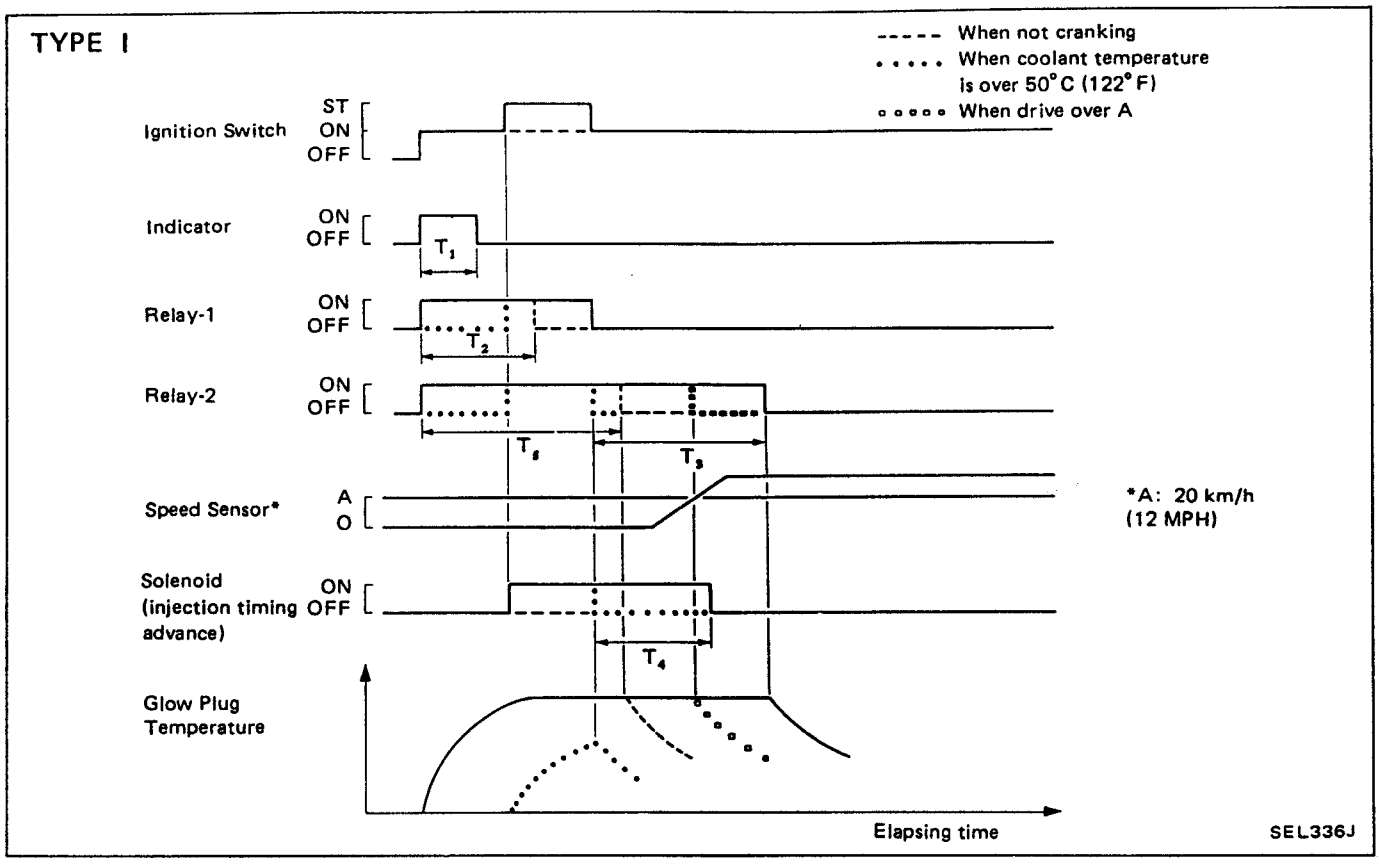
Type	A1T22971	LR135-61B	A5T20972	LR150-988	A2T40972	LR160-78B	A3T40472	LR160-109	LR150-428E	LR150-430C	LR170-408C	LR170-407E
	IC regulator built-in type											
	MITSUBISHI	HITACHI	MITSUBISHI	HITACHI	MITSUBISHI	HITACHI	MITSUBISHI	HITACHI				
Applied model	Z20S except Europe, Australia and Middle East		Z20S, Z24S Europe, Australia and Middle East		Z20S optional for Europe		Z20S, Z24S optional for except Europe		TD23 A/T Europe	TD23 M/T except Australia	TD27 M/T Australia TD23 M/T optional for except Australia	TD27 A/T Australia TD23 A/T optional for except Australia
Nominal rating V-A	12-35		12-50		12-60		12-70		12-50		12-70	
Ground polarity	Negative											
Minimum revolution under no-load (When 14 volts is applied) rpm	Less than 1,300	Less than 1,000	Less than 1,100	Less than 1,000	Less than 1,100	Less than 1,000	Less than 1,300	Less than 1,000				
Hot output current A/rpm	More than 27.5/2,500 More than 35/5,000		More than 40/2,500 More than 50/5,000		More than 50/2,500 More than 60/5,000		More than 50/2,500 More than 70/5,000	More than 21/1,300 More than 50/2,500 More than 70/5,000	More than 16/1,300 More than 42/2,500 More than 50/5,000		More than 26/1,300 More than 58/2,500 More than 68/5,000	
Regulated output voltage V	14.1 - 14.7	14.4 - 15.0	14.1 - 14.7	14.4 - 15.0	14.1 - 14.7	14.4 - 15.0	14.1 - 14.7	14.4 - 15.0				
Minimum length of brush mm (in)	7 (0.28)								6 (0.24)			
Brush spring pressure N (g, oz)	3.040 - 4.217 (310 - 430, 10.93 - 15.17)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)	3.040 - 4.217 (310 - 430, 10.93 - 15.17)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)	3.040 - 4.217 (310 - 430, 10.93 - 15.17)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)	3.040 - 4.217 (310 - 430, 10.93 - 15.17)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)				
Slip ring minimum outer diameter mm (in)	32.4 (1.276)	30.6 (1.205)	32.4 (1.276)	30.6 (1.205)	32.4 (1.276)	30.6 (1.205)	32.4 (1.276)	30.6 (1.205)				

Schematic



SEL446J

Description



When coolant temperature is lower than 50°C (122°F), the relay-1 and the relay-2 are turned on at the same time that the ignition switch is turned on. From this time, the "high-level" electric current flows through the glow plugs and heats them up quickly. After T_1 seconds have passed, the control unit turns off the indicator. The relay-1 automatically turns off after it has been on for T_2 seconds or the cranking time, whichever is longer.

The solenoid valve (for advance injection timing) is turned on at the time that the ignition switch is turned to "START". The relay-2 remains on for T_3 seconds and the solenoid valve remains on for T_4 seconds after the ignition switch has returned to "ON" from "START". The relay-2 allows the "low-level" current to flow through the glow plugs. The solenoid valve advances injection timing. These features improve the combustion performance of the engine after it has started.

When the coolant temperature is higher than 50°C (122°F), the relay-2 is turned on only during engine cranking.

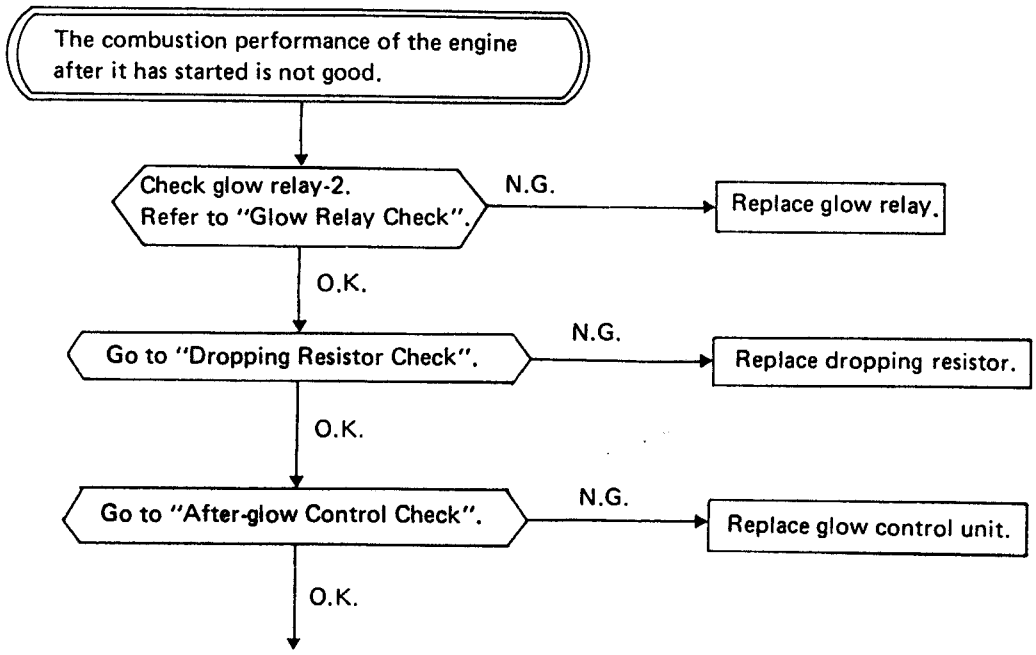
When the coolant temperature is higher than 10°C (50°F), the solenoid valve is turned on only during engine cranking.

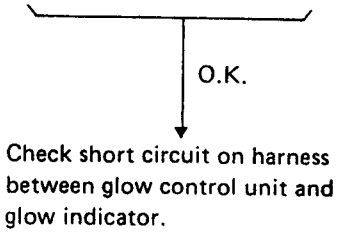
T_1:	approx. 2 - 6	[sec.]	(Varies with coolant temperature and glow plug terminal voltage.)
T_2:	approx. 3 - 11	[sec.]	(Varies with glow plug terminal voltage.)
T_3:	approx. 60 - 180	[sec.]	[When coolant temperature is below 50°C (122°F), varies with coolant temperature.]
	0	[sec.]	[When coolant temperature is over 50°C (122°F).]
T_4:	approx. 30	[sec.]	[When coolant temperature is below 10°C (50°F).]
	0	[sec.]	[When coolant temperature is over 10°C (50°F).]
T_5:	approx. 30	[sec.]	

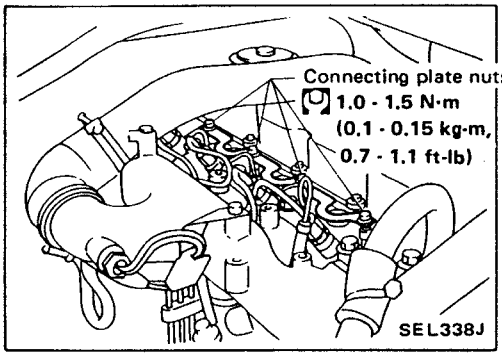
- When the ignition switch is repeatedly turned "ON" and "OFF", T_2 becomes shorter.

Trouble-shooting (Cont'd)

For models with system type I only



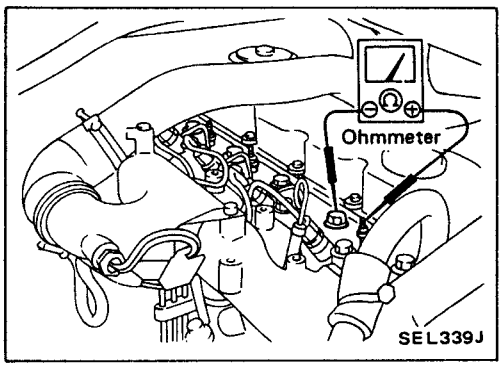




Check

GLOW PLUG CONNECTING PLATE NUTS CHECK

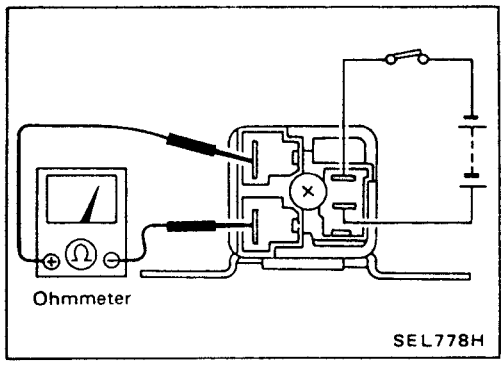
Check that all glow plug connecting plate nuts and harness nut are installed securely.



GLOW PLUG CHECK

Remove glow plug connecting plate and perform continuity test between each glow plug and cylinder head.

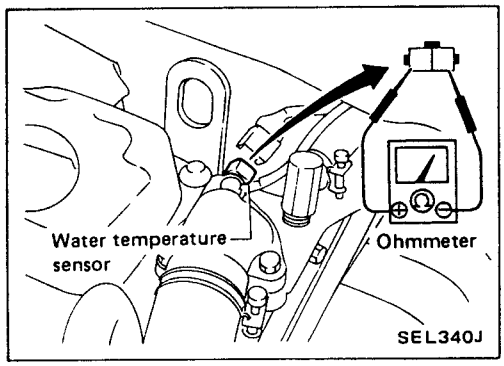
No continuity ... Replace glow plug.



GLOW RELAY CHECK

The glow relay is normally open.

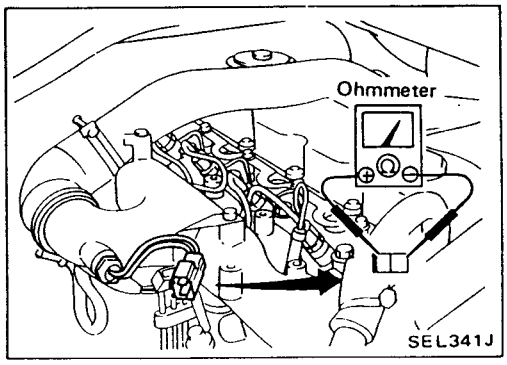
For check, refer to STANDARDIZED RELAY.



WATER TEMPERATURE SENSOR UNIT CHECK

Measure resistance to temperature as shown.

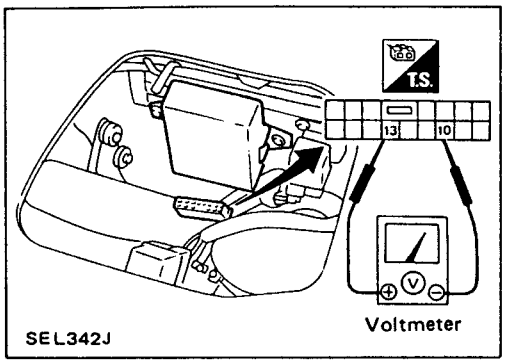
Coolant temp. °C (°F)	Resistance kΩ
−15 (5)	11.5
0 (32)	5.6
10 (50)	3.7
40 (104)	1.2



DROPPING RESISTOR CHECK (For type I only)

Measure resistance between terminals.

Resistance: approx. 0.3 Ω



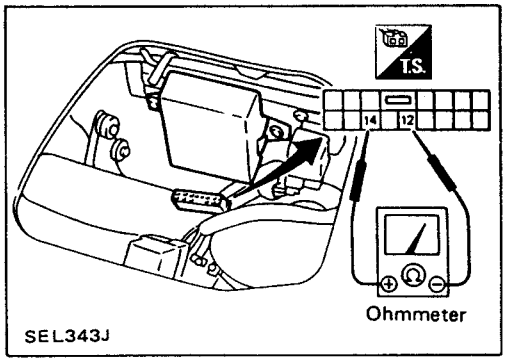
Control Unit Check (For Type I only)

POWER SUPPLY CIRCUIT CHECK

Disconnect harness connector from glow control unit and perform voltage check and continuity check.

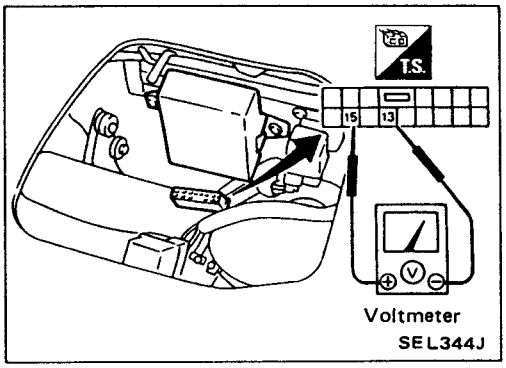
Voltmeter terminals		Ignition switch position		
(+)	(−)	OFF	ACC	ON
⑩	⑬	0V	0V	Approx. 12V

Ohmmeter terminals		Ignition switch OFF
(+)	(−)	
⑬	Body ground	Continuity exists



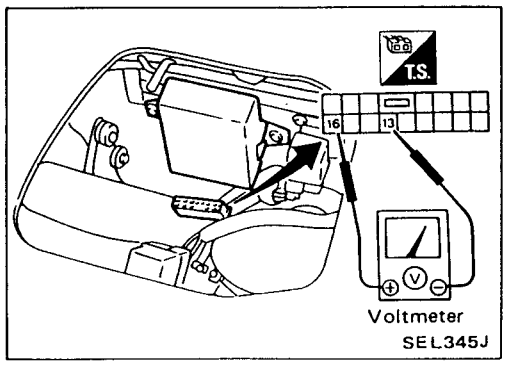
WATER TEMPERATURE SENSOR CIRCUIT CHECK

- Check continuity between terminals ⑫ and ⑭.
  Measure resistance to temperature approximately as shown in "Water temperature sensor check".



CIRCUIT TO ALTERNATOR'S "L" TERMINAL CHECK

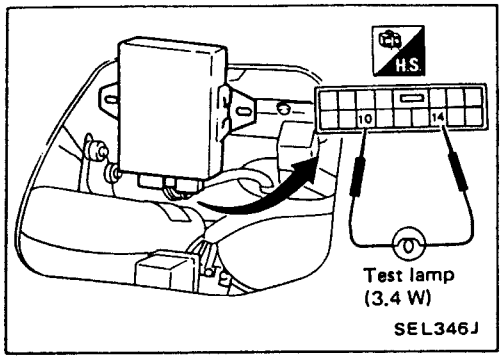
1. Turn ignition switch OFF.
2. Disconnect harness connector from glow control unit.
3. Disconnect harness connector from the alternator's "L" terminal.
4. Check terminal voltage between ⑮ and ⑬ when the ignition switch is turned to ON.
   Voltage: approx. 12V



START SIGNAL INPUT CHECK

1. Turn ignition switch OFF.
2. Disconnect harness connector from the starter motor's "S" terminal.
3. Check terminal voltage between ⑯ and ⑬ when the ignition switch is at "START".
   Voltage: approx. 12V

Control Unit Check (For Type I only) (Cont'd)

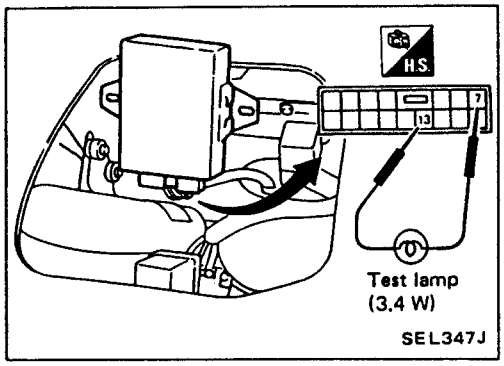


GLOW INDICATOR CONTROL CHECK

1. Turn ignition switch OFF.
2. Leave harness connector joined to glow control unit.
3. Connect test lamp to glow control unit as shown.
4. Turn ignition switch to ON and measure the time the test lamp stays lit.

Time the test lamp should stay lit.

Approx. 2 - 6 seconds.
(Varies with coolant temperature and glow plug terminal voltage.)



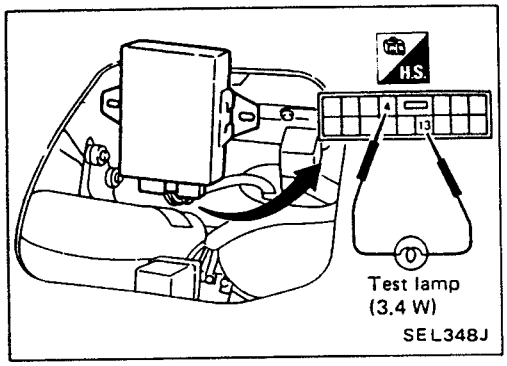
PRE-GLOW CONTROL CHECK

1. Turn ignition switch OFF.
2. Leave harness connector joined to glow control unit.
3. Connect test lamp to glow control unit as shown.
4. Turn ignition switch to ON and measure the time the test lamp stays lit.

Time the test lamp should stay lit.

Approx. 3 - 11 seconds.
(Varies with glow plug terminal voltage)

The time will be shortened if ignition switch is OFF only a short time.
Therefore, when measuring the time, leave ignition switch OFF for more than 5 minutes, and then turn ignition switch to ON.



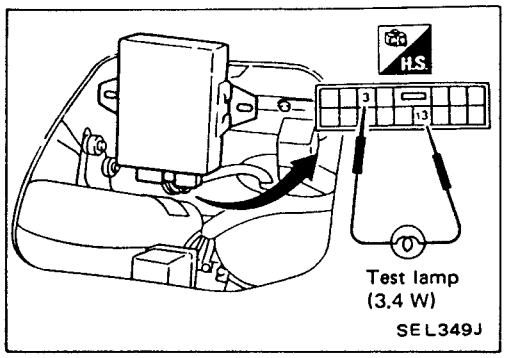
AFTER-GLOW CONTROL CHECK

1. Connect test lamp to glow control unit as shown.
2. Disconnect the harness connector from starter motor "S" terminal.
3. Make sure that test lamp comes on when ignition switch is turned to START.
4. Measure the time the test lamp stays lit when ignition switch is turned to ON from START.

Time the test lamp should stay lit.

Below 50°C (122°F)	Approx. 60 - 180 seconds (Varies with coolant temperature)
Over 50°C (122°F)	0 second

Control Unit Check (For Type I only) (Cont'd)

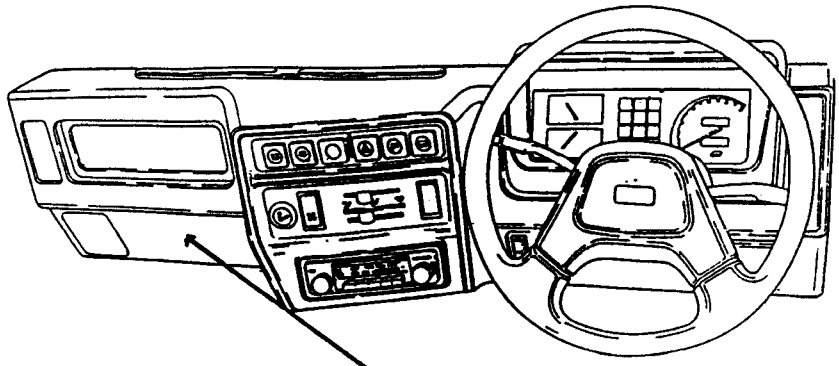


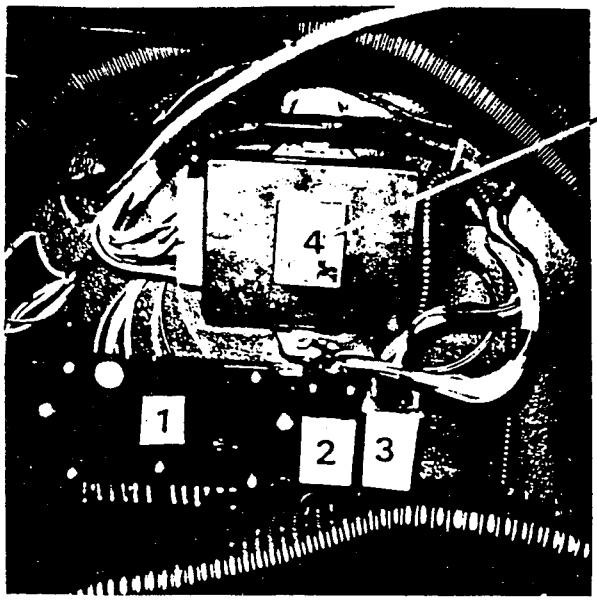
SOLENOID (injection timing advance) CONTROL CHECK

1. Connect test lamp to glow control unit as shown.
2. Disconnect the harness connector from starter motor "S" terminal.
3. Make sure that test lamp comes on when ignition switch is turned to START.
4. Measure the time the test lamp stays lit when ignition switch is turned to ON from START.

Time the test lamp should stay lit.

Below 10°C (50°F)	**Approx. 30 seconds**
Over 10°C (50°F)	**0 second**





LOCATION
OF GLOW CONTROL
UNIT

LTI
SERVICE

Fairway

WORKSHOP MANUAL

SECTION 8a

WIRING DIAGRAMS, VEHICLE ELECTRICS

SECTION EL

CONTENTS

Key to wiring diagram

Item No	Description	Location
A1	Battery	1
A2	Horn	3
A3	Radio	127
A4	Speaker right	123
A5	Speaker left	123
A6	Alternator	6
B1	Link lead (manual transmission)	8-12
C1	Instrument stabiliser	15
C2	Wiper delay unit	22-27
C3	Central door lock.cont.box	133-135
C4	Clock	76-78
C5	Control box door locking	61-70
C6	Taxi meter connector block-bulkhead	52-53
C7	Taxi meter connector block-devision	57-58
C8	Glow control box	26-32
C9	Kickdown control box (auto transmission)	51
D1	Diode	45
D2	Diode	49
D3	Temperature gauge	16
D4	Fuel gauge	17
D5	Diode	19-20

Item No	Description	Location
F1	Fuse block B6	21
F2	Fuse block B2	29
F3	Fuse block B1	60
F4	Fuse block B7	31
F5	Fuse block C6	33
F6	Fuse block C1	40
F7	Fuse block B5	68
F8	Fuse block C1	56
F9	Fuse block B3	72
F10	Fuse block B4	101
F11	Fuse block A2	85
F12	Fuse block A1	82
F13	Fuse block A4	87
F14	Fuse block A3	89
F15	Fuse block A6	91
F16	Fuse block A5	93
F17	Fuse block A7	96
F18	Fuse block C3	99
F19	Fuse block C7	109
F20	Fuse block C4	136
F21	Fuse block C5	127
F22	Line fuse (pick up for two way radio)	129
H1	Diesel heater plugs	9-15
H2	Cigar lighter	58
H3	Heated rear screen	103

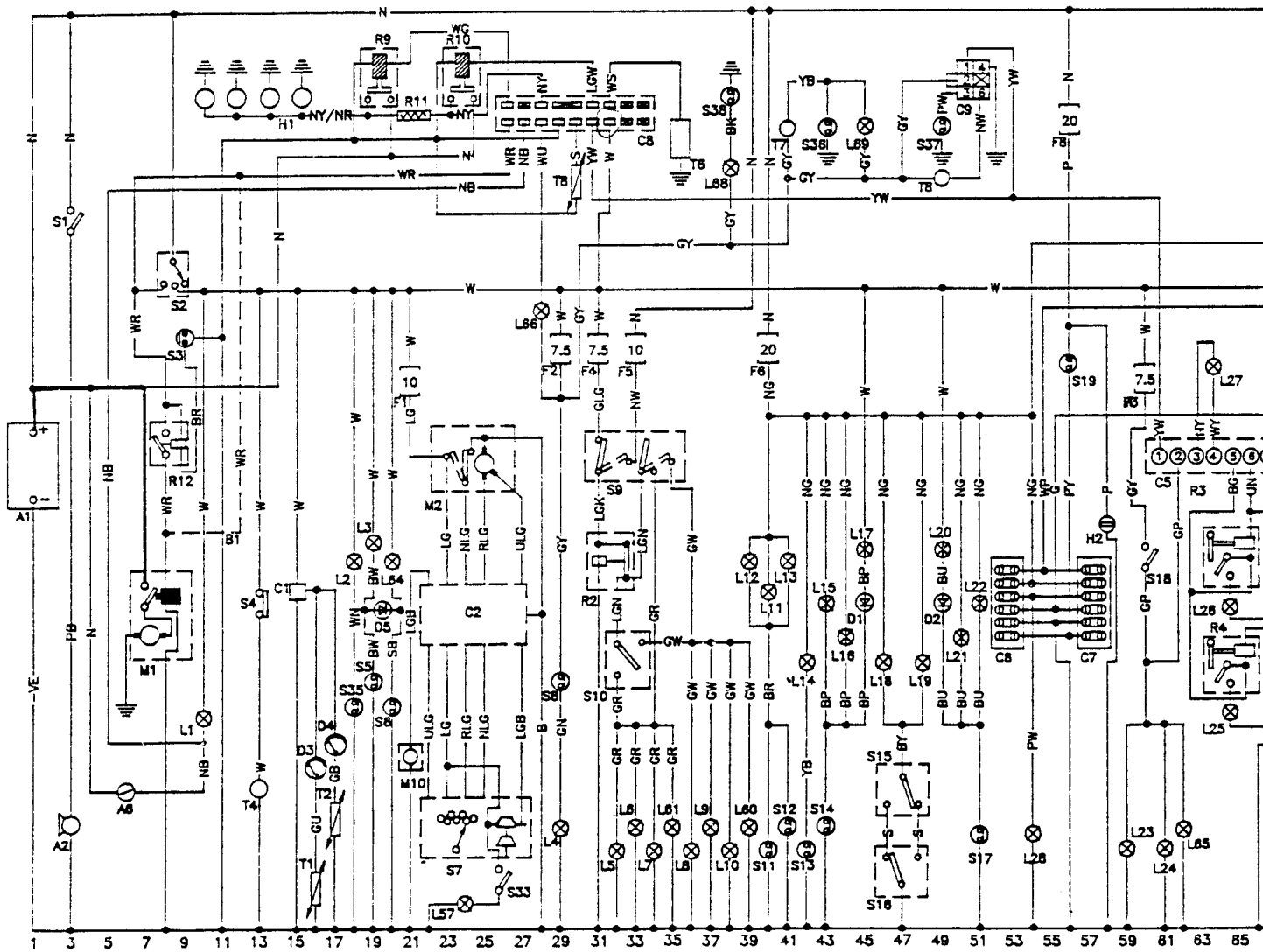
Item No	Description	Location
S1	Horn push	3
S2	Ignition switch	8-10
S3	Gearbox inhibitor switch	9
S4	Fuel cut off switch	13
S5	Low brake fluid switch	19
S6	Handbrake on w/light switch	20
S7	Screen wash/wipe switch	22-27
S8	Reverse light switch	29
S9	Hazard switch	31-35
S10	Indicator switch	32-33
S11	Courtesy switch R/L front	40
S12	Courtesy switch L/H front	41
S13	Drivers interior light switch	42
S14	Courtesy switch L/H rear	43
S15	Interior light switch-passenger	46-48
S16	Interior light switch-driver	46-48
S17	Courtesy switch R/H rear	51
S18	Brake light switch	60
S19	Hire sign switch	56
S20	Front heater switch	71
S21	Rear heater on-off sw-driver	74-76
S22	Rear heater on-off sw-passenger	74-76
S23	Rear heater high-low speed sw	74
S24	Rear screen heater switch	101
S25	Main light switch	86-87
S26	Headlamp dip switch	86-87
S27	Rear fog guard switch	96
S28	Front fog lamp switch	98
S29	Window lift switch L/H front	106-108
S30	Window lift switch R/H front	110-112
S31	Mirror switch	113-122
S32	Micro switch-drivers door	133
S33	Low wash level switch	26
S34	Panel light switch	80
S35	Oil pressure switch	18
S36	Overdrive switch (auto transmission)	43
S37	Kickdown switch (auto transmission)	49
S38	Sedimentor switch	38
S39	Key operated central door lock switch	133
S40	Drivers operated central door lock sw	133

Colour abreviation

B - Black
G - Green
K - Pink
N - Brown
O - Orange
P - Purple
R - Red
S - Slate Grey
U - Blue
W - White
Y - Yellow

Wire Identification

First letter - primary colour
Second letter - tracer colour
(lighter shade preceded by L)

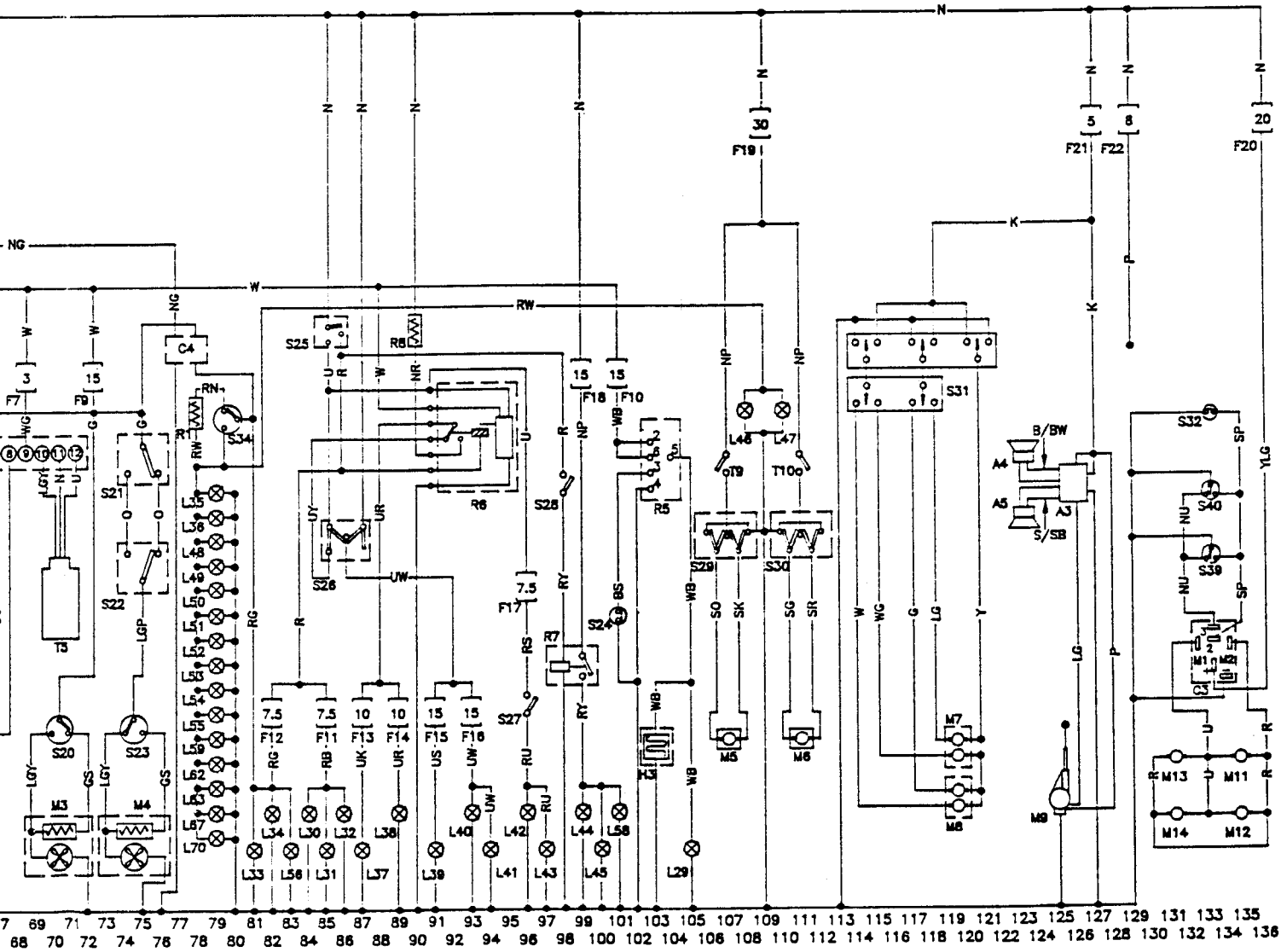


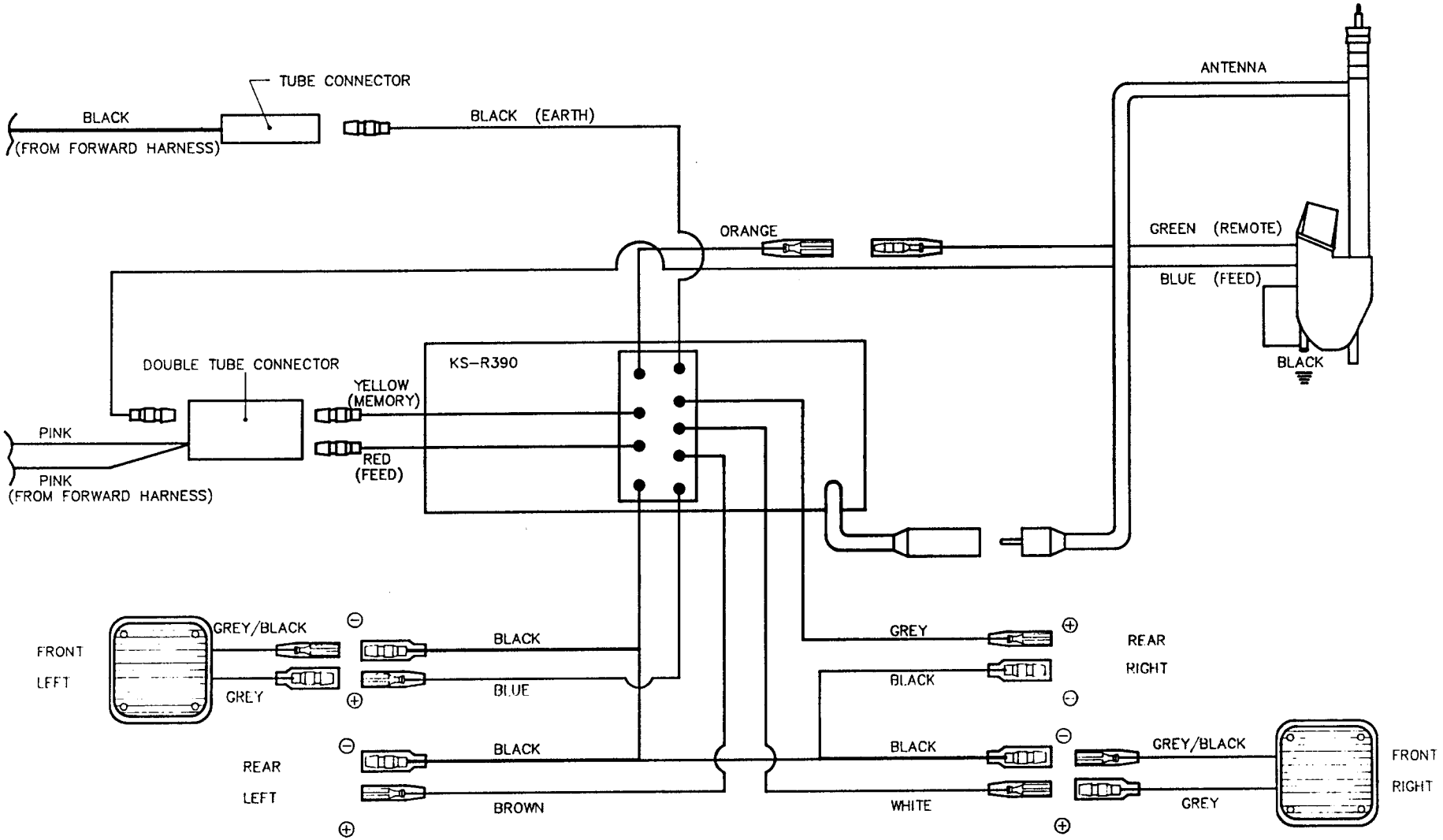
Description	Location
Ignition W/light	10
Oil pressure W/light	18
Low brake fluid W/light	19
Reverse light	29
Indicator light L/H rear	32
Indicator light L/H front	33
Indicator light W/light L/H side	34
Indicator light R/H rear	36
Indicator light R/H front	37
Indicator W/light R/H side	38
Courtesy light-roof console	40
Courtesy light-L/H side facia	39
Courtesy light-R/H side facia	41
Drivers interior light	42
Courtesy light-L/H rear	43
Puddle light-L/H rear	44
L/H rear door not closed W/light	45
Interior light-passenger L/H rear	46
Interior light-passenger R/H rear	48
R/H rear door not closed W/light	49
Puddle light R/H rear	50
Courtesy light R/H Rear	51
Brake light L/H side	59
Brake light R/H side	61
Door locked W/light L/H rear	64
Door locked W/light R/H rear	64
Rear door not closed W/light	63
Hire sign light	54
Rear screen heater W/light	105
No. plate light	84
Tail light L/H side	85
Side lamp L/H front	86
Tail light R/H side	81
Side light R/H front	82
Instrument cluster illumination L/H	79
Instrument cluster illumination R/H	79
Dipped beam L/hand	87
Dipped beam R/hand	89
Main beam L/hand	91
Main beam R/hand	93

Item No	Description	Location
L41	Main beam W/light	94
L42	Rear fog guard	96
L43	Rear fog guard W/light	97
L44	Fog lamp L/H side	99
L45	Fog lamp R/H side	100
L46	Window lift switch illumination L/side	108
L47	Window lift switch illumination R/side	110
L48	Rear fog & heated rear screen sw illumination	79
L49	Drivers interior light switch illumination front	79
L50	Hire sign switch illumination	79
L51	Front heater switch illumination	79
L52	Rear heater drivers on-off switch illumination	79
L53	Rear heater passenger on-off sw illumination	79
L54	Rear heater high-low speed switch illumination	79
L55	Drivers interior light switch illumination rear	79
L56	Side lights on W/light	83
L57	Low wash W/light	24
L58	Fog lamp W/light	101
L59	Cigar lighter illumination	79
L60	Indicator repeater R/H side	39
L61	Indicator repeater L/H side	35
L62	Autogear selector illumination	79
L63	Ashtray illumination	79
L64	Handbrake on W/light	20
L65	High level stop lamp	62
L66	Glow plug W/light	28
L67	Panel light switch illumination	79
L68	Sedimentor W/light	38
L69	Overdrive W/light	45
L70	Drivers cent.door lock switch illumination	79

Item No	Description	Location
M1	Starter motor	6-9
M2	Front screen wiper motor	22-26
M3	Front heater	69-72
M4	Rear heater	73-76
M5	Window lift motor L/H front	107
M6	Window lift motor R/H front	111
M7	Electrically operated door mirror motorsL/side	119
M8	Electrically operated door mirror motors R/side	119
M9	Electrical aerial	125
M10	Front screen wash motor	21
M11	Central door locking motor R/H side front	135
M12	Central door locking motor R/H side rear	135
M13	Central door locking motor L/H side front	131
M14	Central door locking motor L/H side rear	131
R1	Resistor panel light	78
R2	19 FL flasher unit	31-32
R3	R/H rear door lock relay	63-65
R4	L/H rear door lock relay	63-65
R5	Heated rear screen timer	102-104
R6	Dip relay	91-94
R7	Front fog lamp relay	98-99
R8	Dim dip resistor	90
R9	Glow plug relay - 1	19-20
R10	Glow plug relay - 2	23-24
R11	Resistor induction manifold	21
R12	Inhibitor Relay (auto trans)	8-9
T1	Temperature transmitter	16
T2	Fuel gauge transmitter (tank unit)	17
T4	Fuel cut off solenoid	13
T5	Sender unit (gearbox)	70
T6	Solenoid (injection timing advance)	35
T7	Overdrive cancel solenoid (auto trans)	41
T8	Kick down solenoid (auto trans	49
T9	Thermal overload switch L.H.	107
T10	Thermal overload switch R.H.	111

SECTION 8A ELECTRICS CIRCUIT WIRING DIAGRAM - FAIRWAY

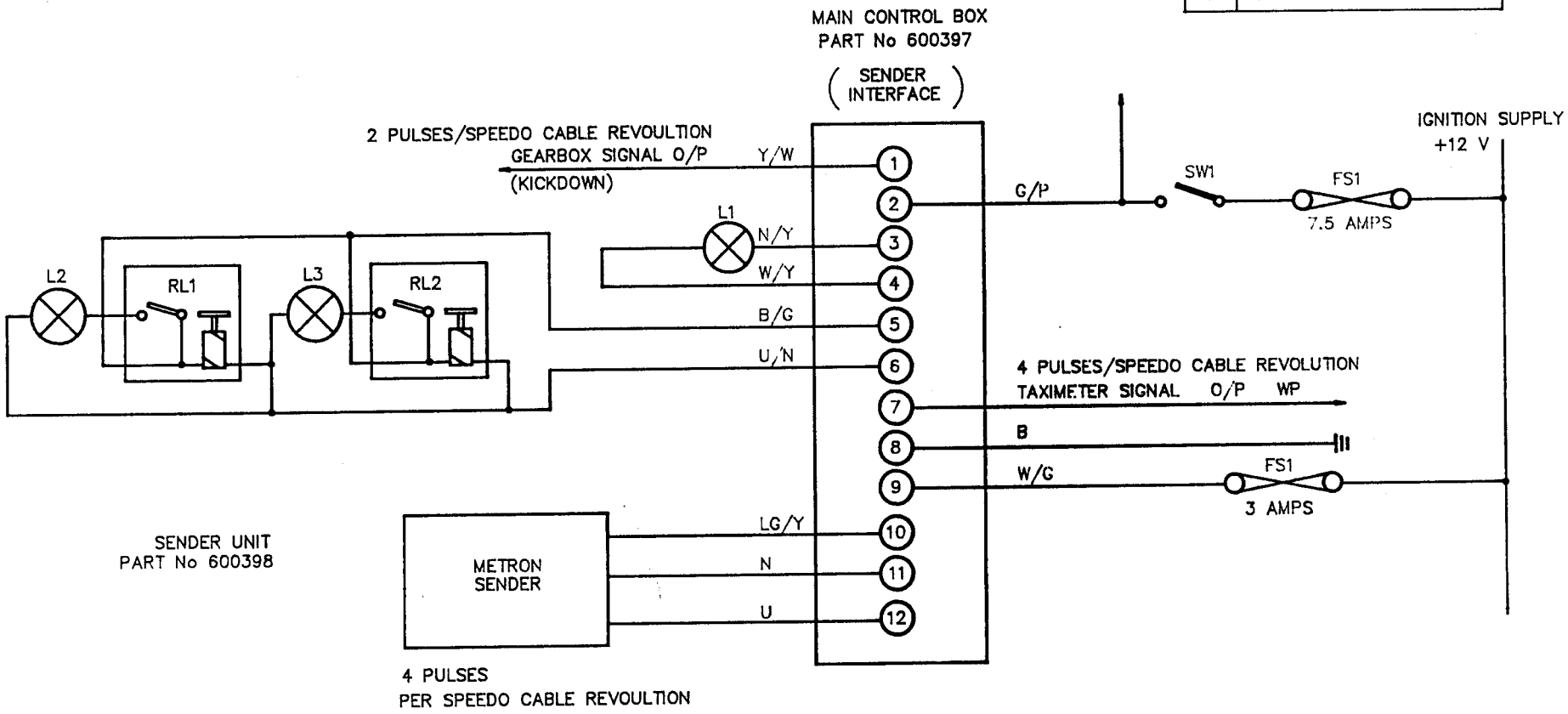




WIRING DIAGRAM - CASSETTE CAR RECEIVER

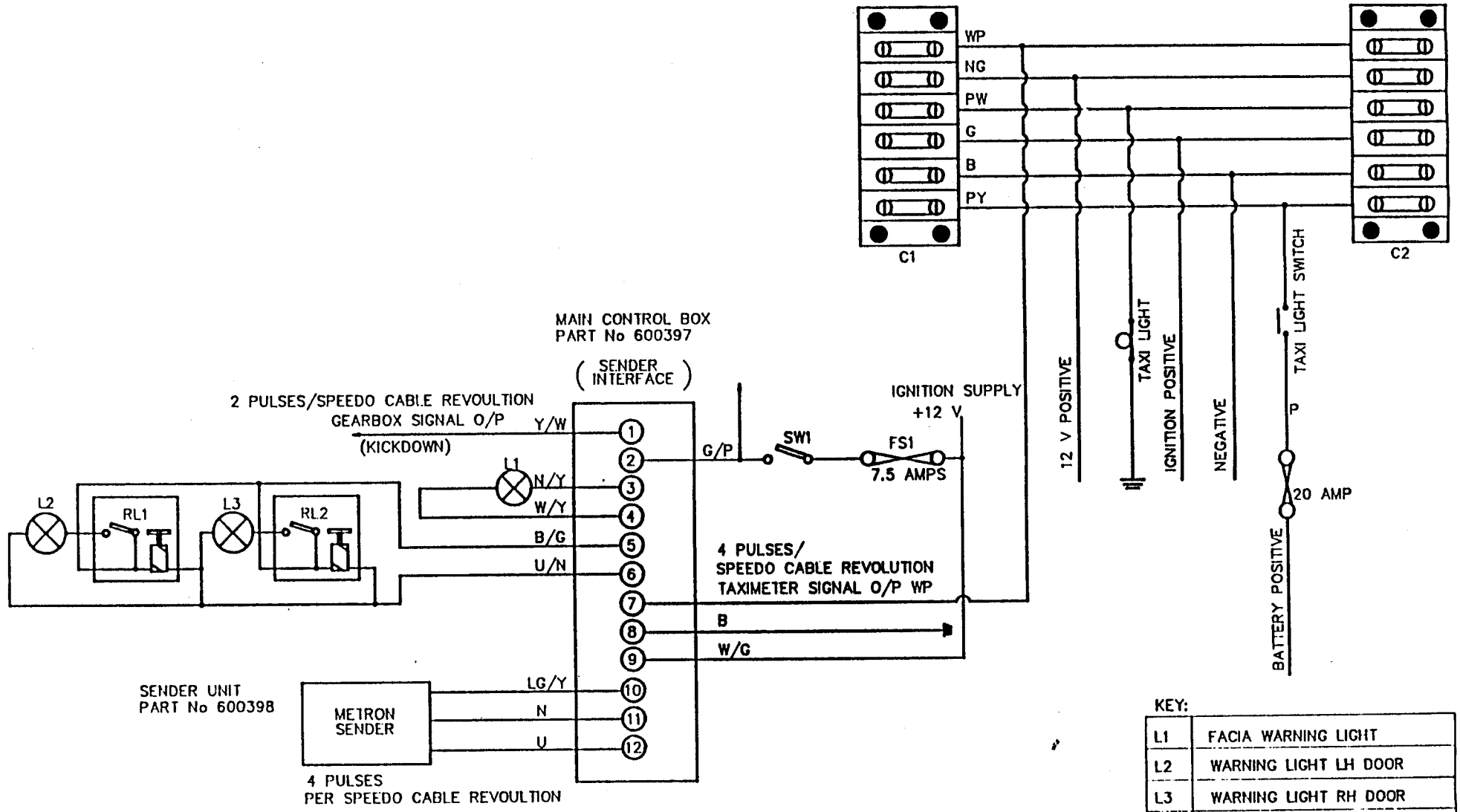
KEY:

L1	FACIA WARNING LIGHT
L2	WARNING LIGHT LH DOOR
L3	WARNING LIGHT RH DOOR
RL1	LH DOOR LOCK SOLENOID
RL2	RH DOOR LOCK SOLENOID
SW1	BRAKE LIGHT SWITCH



ELECTRONIC CONTROLS : AUTO GEARBOX KICKDOWN
Q.G.S. SYSTEM
ELECTRONIC DOOR LOCK
TAXIMETER DRIVE

WIRING DIAGRAMS FOR ELECTRONIC CONTROL



KEY:

L1	FACIA WARNING LIGHT
L2	WARNING LIGHT LH DOOR
L3	WARNING LIGHT RH DOOR
RL1	LH DOOR LOCK SOLENOID
RL2	RH DOOR LOCK SOLENOID
SW1	BRAKE LIGHT SWITCH
C1	CONNECTOR BLOCK – FACIA
C2	CONNECTOR BLOCK – DIVISION

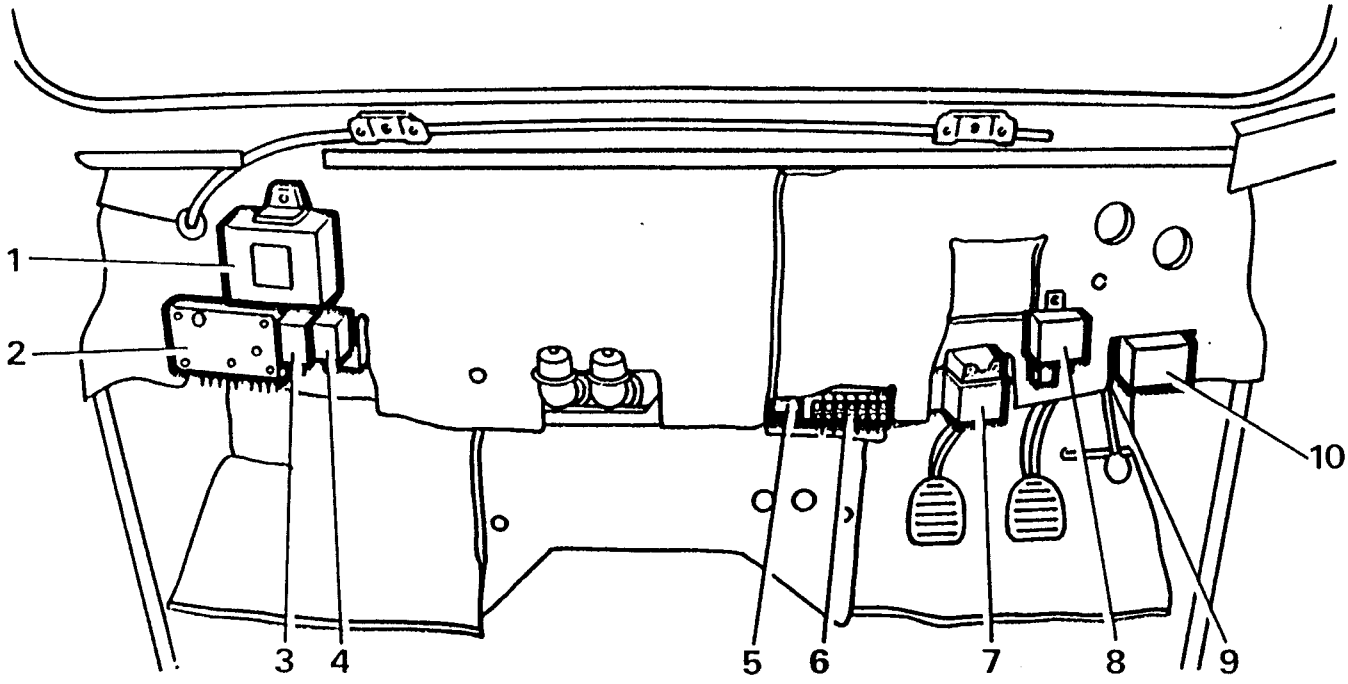
ELECTRONIC CONTROLS

AUTO GEARBOX KICKDOWN
Q.G.S. SYSTEM
ELECTRONIC DOOR LOCK
TAXIMETER DRIVE

NOTE : ALL CABLES FROM TERMINAL 7 TO CONNECTOR BLOCKS INCORPORATED IN MAIN HARNESS

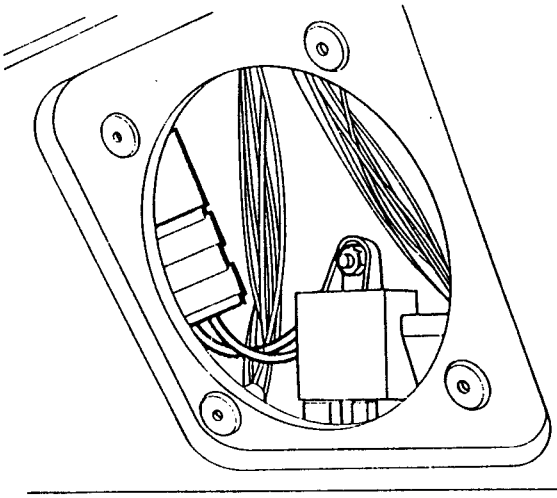
WIRING DIAGRAM FOR TAXIMETER CONNECTOR BLOCKS

Driver's compartment



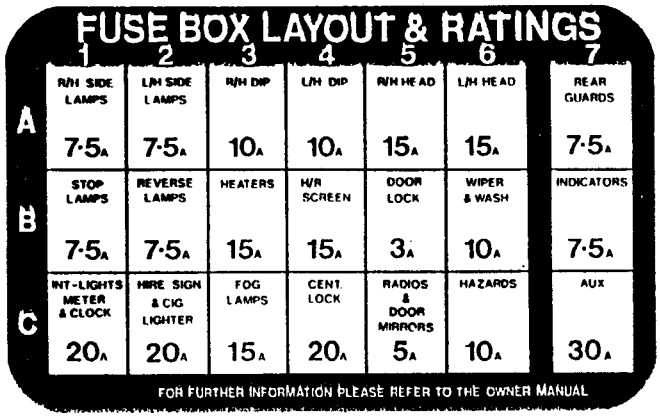
Vehicle bulkhead

1 Quick glow control.
2 Main control unit incorporating security rear door locking.
3 Heated rear screen timer.
4 Dim Dip relay.
5 Resistor, 2 level panel lights.
6 Meter terminal block.
7 Windscreen wash wipe relay.
8 Central door locking control box.
9 Kick down switch (automatic vehicles only).
10 Kick down relay (automatic vehicles only).



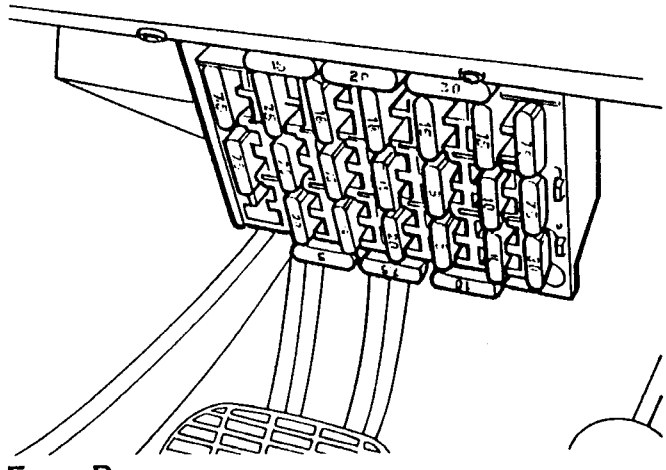
Hazard warning and direction indicator relay

To gain access to this relay first remove right hand speaker grille



Fuse label

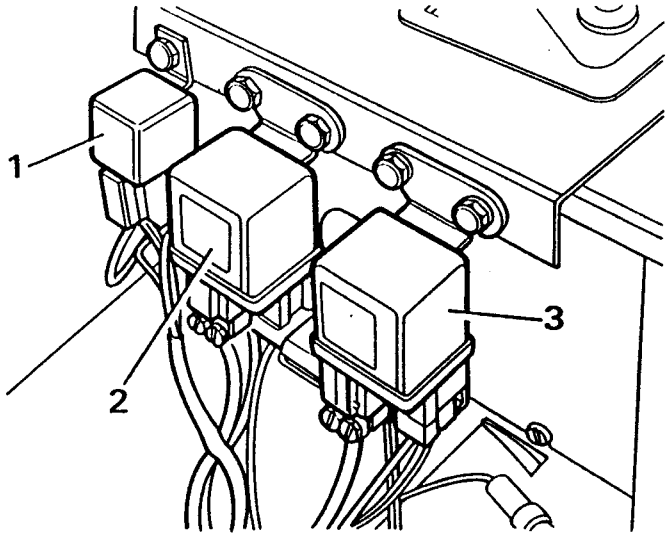
The fuse label is located on the back of the driver's sunvisor.

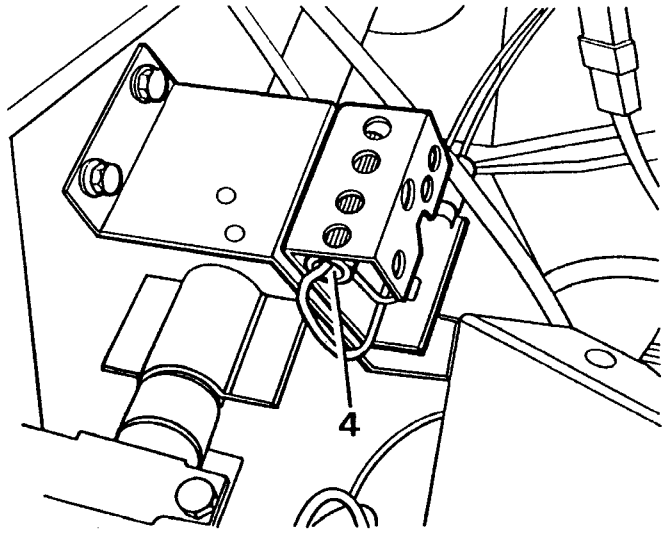


Fuse Box

The fuse box is located under the fascia above the brake pedal.

Engine compartment





These three relays are located on the right hand side of the pedal box when viewed from the driver's seat.

1 Inhibitor switch relay (automatic vehicles only).

2,3 Quick glow system relays (heater plugs).

4 Dim dip system resistor. This is located on the other side of the pedal box.

Introduction

All four access doors can be locked from the inside of the vehicle by means of the central locking switch located forward of the gear shift lever on the centre console. The doors are then locked against access from outside. Activation of the system is audible on its operation.

The doors may be locked or unlocked simultaneously by inserting the key in the driver's door and turning it anti-clockwise to lock, clockwise to unlock.

A door locking motor is fitted to each door and connected to a control box located under the fascia in front of the steering wheel. A 20 amp fuse is incorporated to protect the system, see figure 1.

A key operated microswitch is incorporated in the driver's door locking motor. When the key is turned either to lock or unlock the door the microswitch is activated and sends a signal to the control box which in turn energises all four door locking motors.

In addition a microswitch is fitted to the inside of the driver's door and is activated by the door release lever linkage. On operating the door release lever the central locking motors will be energised to the unlocked mode even if the central locking switch on the centre console has been set at the locked position.

If any fault occurs in the central locking system the following tests should be used to eliminate the various components.

Test 1. Fuse

If the 20 amp fuse protecting the circuit blows the central locking system will be completely inoperative. However all four doors can still be locked or unlocked manually by inserting the key in the individual door locks.

The fuse box is fitted under the fascia light above the brake pedal and the fuse ratings and positions are shown on a label on the back of the driver's sun visor. If on checking the fuse, the central locking system is still inoperative carry on to Test 2.

Test 2. Key operated central door lock switch (drivers door)

1. Remove the driver's door casing.

2. Disconnect the black and white plugs of the system and using a slave battery connect a test lamp circuit as shown in figure 2. Ensure that the positive lead from the battery is connected to the brown lead of the white plug.

Figure 2

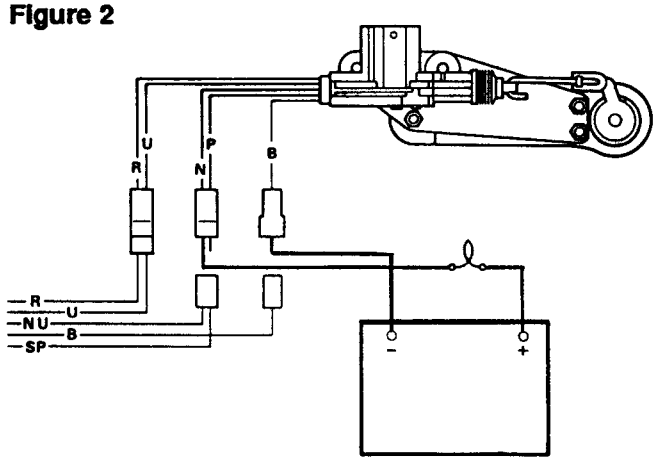
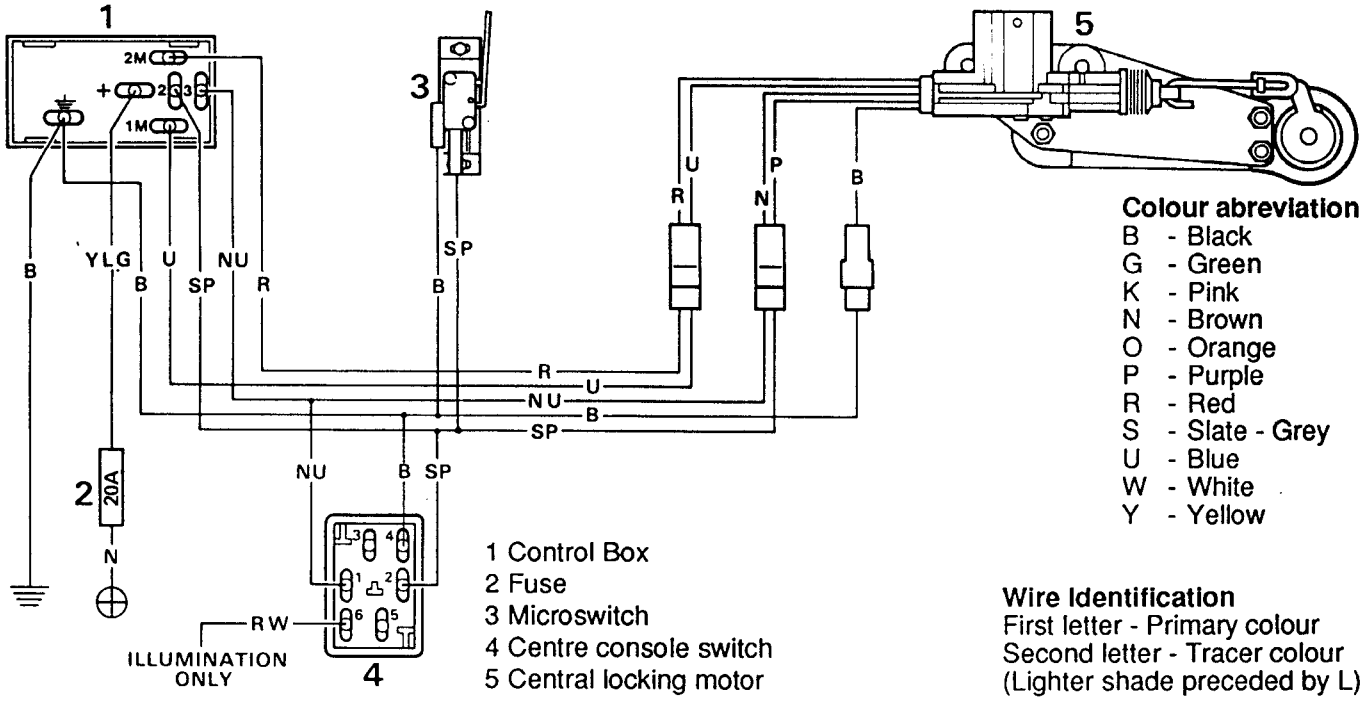


Figure 1



Colour abreviation

B - Black
G - Green
K - Pink
N - Brown
O - Orange
P - Purple
R - Red
S - Slate - Grey
U - Blue
W - White
Y - Yellow

Wire Identification

First letter - Primary colour
Second letter - Tracer colour
(Lighter shade preceded by L)

3. If the test lamp does not illuminate this would indicate a faulty key operated switch. However if the test lamp does illuminate this would indicate that the door locked side of the switch is functioning. The door unlocked side of the switch must still be checked as instructed in the next operation.

4. Connect the positive lead from the battery to the purple lead of the white plug.

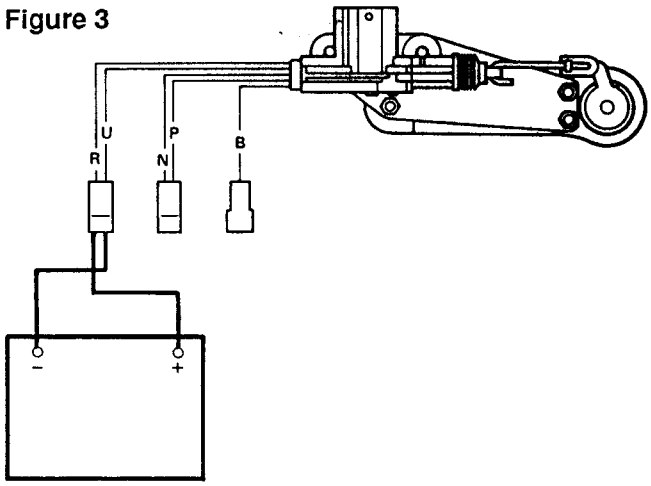
5. If the test lamp does not illuminate this would indicate a faulty key operated switch. If the test lamp illuminates then this would indicate a fault in one of the other components in the central locking system.

Test 3. Central door locking motor (all doors)

1. Disconnect the blue plug from the door locking motor circuit.

2. Connect the positive lead from the slave battery to the red lead in the plug and the negative lead to the blue lead of the plug, see figure 3. In this condition the door locking motor should operate to the locked mode with the push rod and gaiter moving to the extended position.

Figure 3



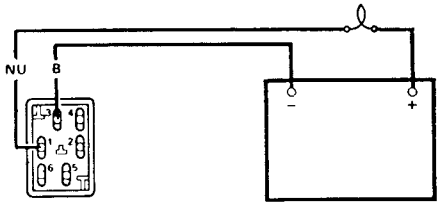
3. Reverse the leads to the blue plug, i.e., positive lead to blue lead and negative lead to red lead. In this condition the door locking motor should operate to the unlocked mode. Therefore if both locked and unlocked modes of the motor are activated the fault lies in other areas of the central locking system.

Test 4. Centre console switch

1. Prise the switch from the centre console and disconnect the switch plug.

2. Using a slave battery connect a test lamp circuit to the switch, ie positive lead to terminal 1 and negative lead to terminal 3, see figure 4.

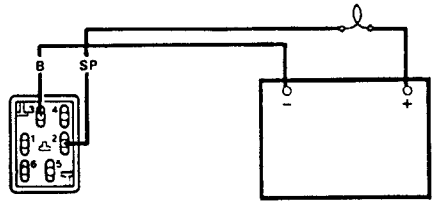
Figure 4



3. Press the switch to the doors locked position. If the test lamp does not illuminate this would indicate a faulty switch. However if the test lamp illuminates this would only indicate that the door locked side of the switch is functioning. The door unlocked side of the switch must still be checked as described in the next operation.

4. Connect the positive lead from the slave battery to terminal 2 of the switch, see figure 5.

Figure 5



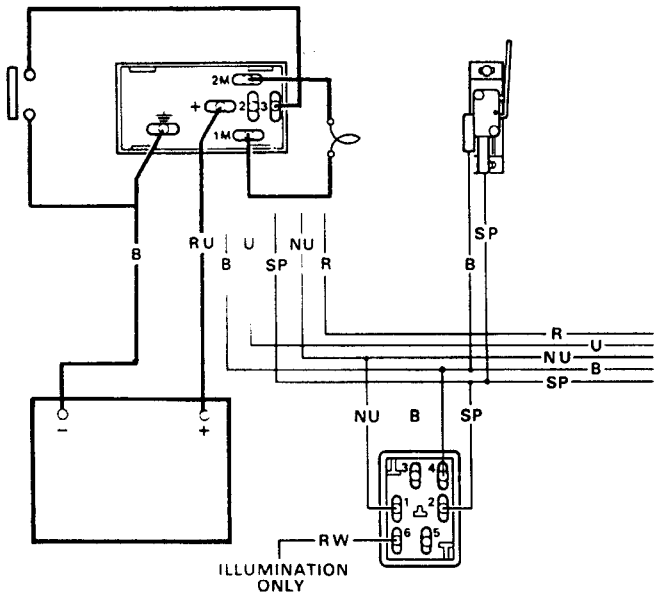
5. Press the switch to the doors unlocked position and check the circuit as in operation 3. If the switch is functioning normally and all previous tests have been carried out a faulty control box would be indicated.

Test 5. Central door locking control box.

1. Disconnect the multi-plug and earth lead from the control box.

2. Using a slave battery connect a test lamp and an on/off switch circuit as shown in figure 6.

Figure 6



3. Press the on/off switch to the on position and the test lamp should illuminate for approximately two seconds. Repeat the test as a final check. If the test lamp fails to illuminate a faulty control box is indicated.

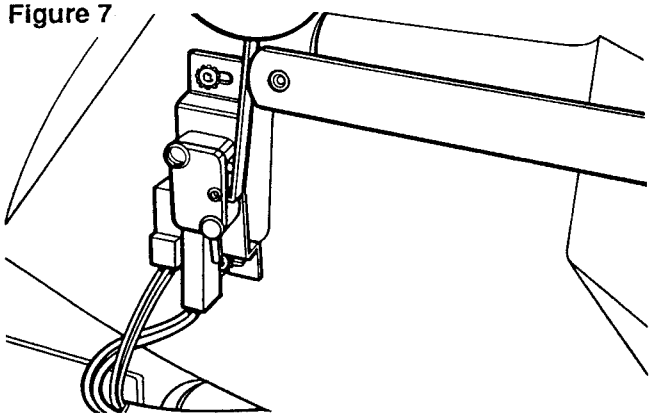
Test 6. Driver's door microswitch

This microswitch is fitted as a secondary door opening function to override the centre console door locking switch if it has been activated to the doors locked position.

1. Remove the door casing.

2. First check that the microswitch is correctly adjusted on its mounting bracket, see figure 7. With the door handle in the closed position the door release linkage should just abut the switch lever.

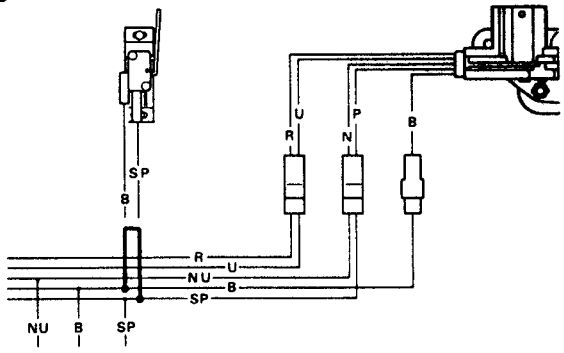
Figure 7



3. Pull the door lock release handle and the switch should energise and activate the central locking motors of all four doors to the unlocked mode. If the microswitch is faulty the driver's door central locking motor will be operated manually only but the motor of the other doors will remain locked.

4. As a final check press the centre console switch to the doors locked position, remove the two leads from the micro switch and connect together, see figure 8. This should activate the central door locking motors to the unlocked position thus indicating a faulty microswitch.

Figure 8



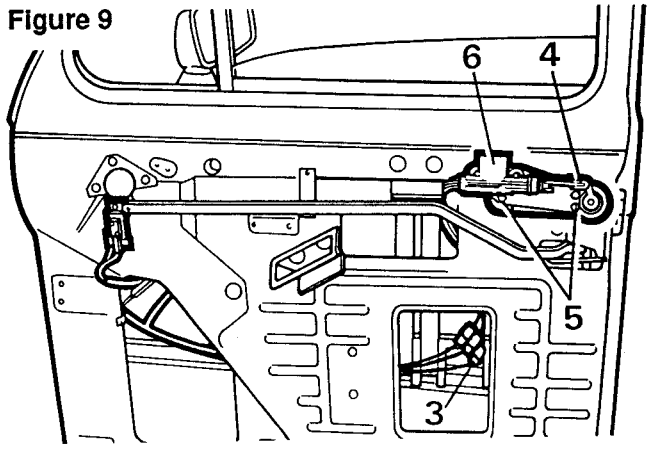
Replacing central door locking motor

1. With the door window in the raised position, disconnect the vehicle battery.

2. Remove door casing.

3. Disconnect central locking motor wiring plug/s, See figure 9.

Figure 9



4. Release retaining clip and disconnect connecting rod from door handle.

5. Remove three nuts and washers securing locking motor mounting plate to door handle studs.

6. While supporting the door handle, remove the locking motor assembly through the bottom aperture of the door panel.

7. Refit in reverse order.

Replacing central locking control box

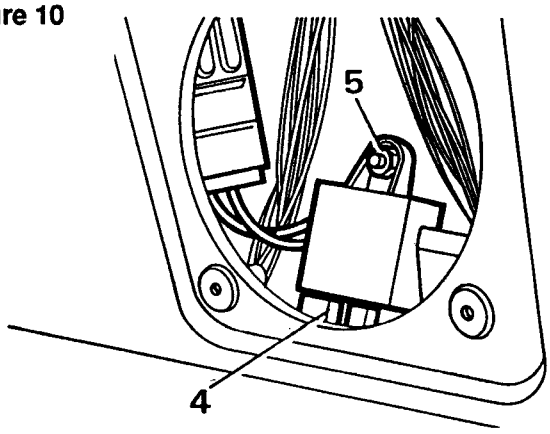
1. Disconnect battery.

2. Remove right hand radio speaker/grille from fascia.

3. Pivot down fuse box to facilitate next operation.

4. Disconnect electrical plug and earth lead from control box, see figure 10.

Figure 10



5. Unscrew retaining nut and remove control box from vehicle bulkhead through radio speaker aperture.

6. Replace in reverse order.

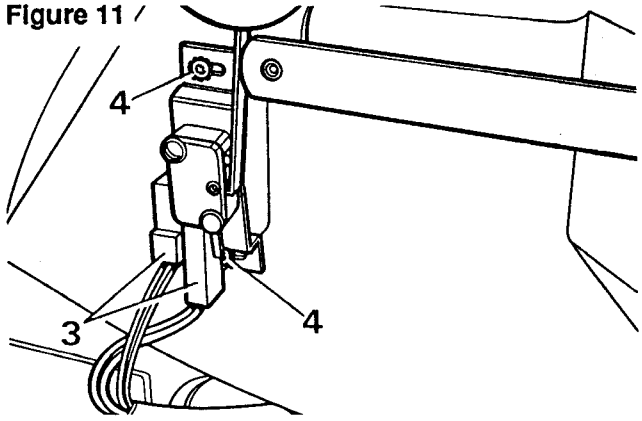
Replacing driver's door microswitch

1. Disconnect battery.

2. Remove door casing.

3. Disconnect the two leads from microswitch, see figure11.

Figure 11



4. Remove two retaining screws and detach microswitch, complete with mounting bracket.

5. Fit new microswitch in reverse order ensuring it is correctly adjusted. With the interior door handle in the closed position the door release linkage should just abut the switch lever, see figure 11.

SECTION EL

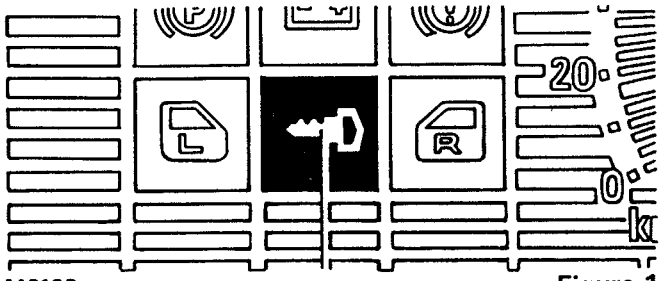
CONTENTS

Introduction

When the electronic door security locking system is fitted the rear door locks are activated by the motion of the vehicle or the driver applying the footbrake.

If the ignition is switched on while the vehicle is stationary the fascia warning light will illuminate and the rear doors can be opened.

Note: A key symbol is used and is located at the bottom centre of the warning lights, see figure 1.



M0182 **Figure 1**

As soon as the footbrake is applied the locks will operate automatically, activated by seperate relays through the brakelight switch circuit. The fascia warning light will extinguish and the doors will remain locked from the inside until the footbrake is released.

When the vehicle moves the rear doors will again lock automatically through the operation of the relays, this time activated by a proximity sensor located at the rear of the gearbox. The fascia warning light will extinguish and the doors will remain locked until the vehicle comes to rest. If the vehicle comes to rest without the footbrake being applied there will be a two second delay before the locks release.

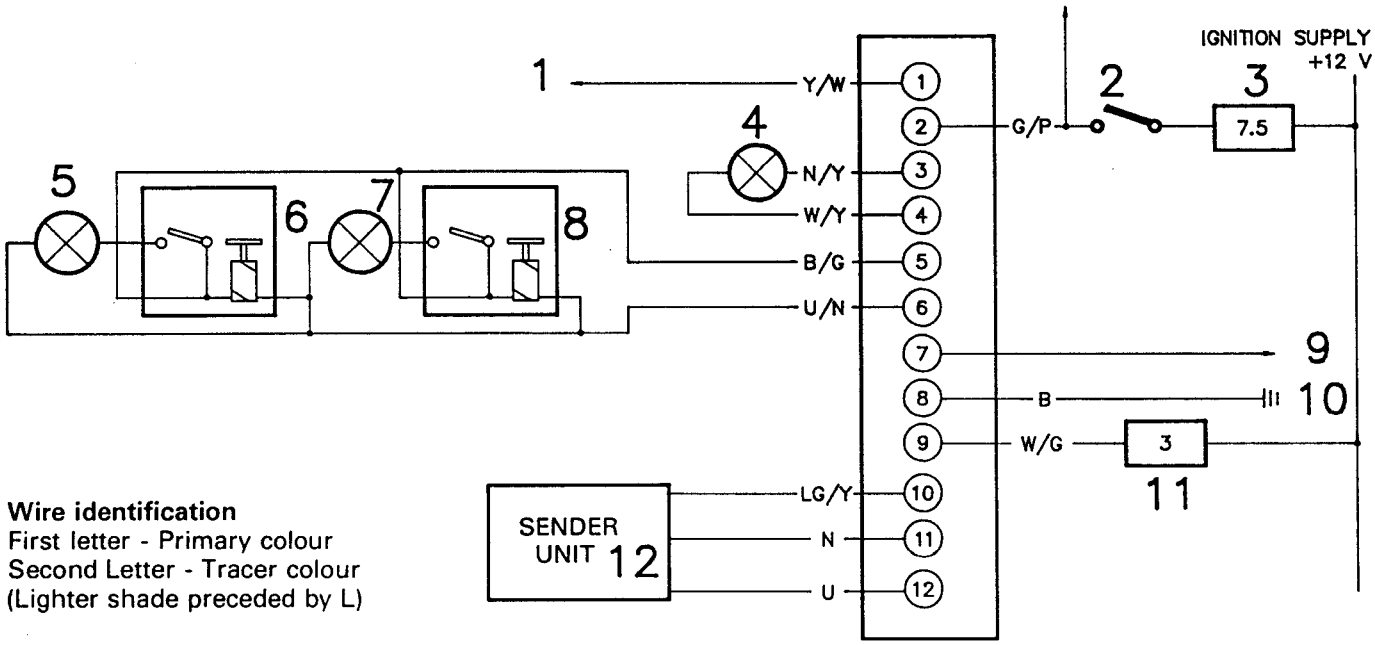
If the vehicle comes to rest with the footbrake applied the locks will not release until a few seconds after the handbrake is applied and the footbrake is released. The locks will release immediately the ignition is switched off.

When the automatic locks are activated, the rear doors can only be opened from the outside. In cases of emergency occupants can open a door by lowering the window and pressing the release button on the external handle.

When the red light, fitted on the rear doors, extinguishes the door lock is released.

If at any time the fascia warning light illuminates when the vehicle is in motion this will indicate a fault in the door security locking system and must be investigated as soon as possible.

SECURITY LOCKING SYSTEM



Wire identification
First letter - Primary colour
Second Letter - Tracer colour
(Lighter shade preceded by L)

Colour abreviation
B - Black
G - Green
K - Pink
N - Brown
O - Orange
P - Purple
R - Red
S - Slate - Grey
U - Blue
W - White
Y - Yellow

Figure 2

Key to wiring diagram

1. Output to automatic gearbox kickdown control unit and quick glow heater control unit.
2. Brake light switch.
3. 7.5 amp fuse.
4. Instrument panel warning lamp.
5. Warning light L.H. door.
6. Relay (solenoid and microswitch) L.H. door.
7. Warning light R.H. door.
8. Relay (solenoid and microswitch) R.H. door.
9. Output to Taxi meter.
10. Earth connection.
11. 3 amp fuse.
12. Sender U (Gearbox).

Test 1 Fuses

Two fuses are used in the electrical circuit of the locking system, see items 3 and 11 figure 2. If the brake light circuit 7.5 amp fuse blows the fascia warning light will illuminate. However, if the 3 amp fuse in the main supply to the control box fails this will render the locking system completely inoperative and therefore the warning light will **not** illuminate. Always check the fuses first before investigating other components in the system.

The fuse box is fitted under the fascia above the brake pedal and the fuse ratings and positions are shown on a label on the back of the driver's sun visor.

Test 2 Sender Unit

If the fascia warning light flickers or illuminates continuously when the vehicle is moving this could indicate that the sender unit, see figure 3, is faulty and should be checked.

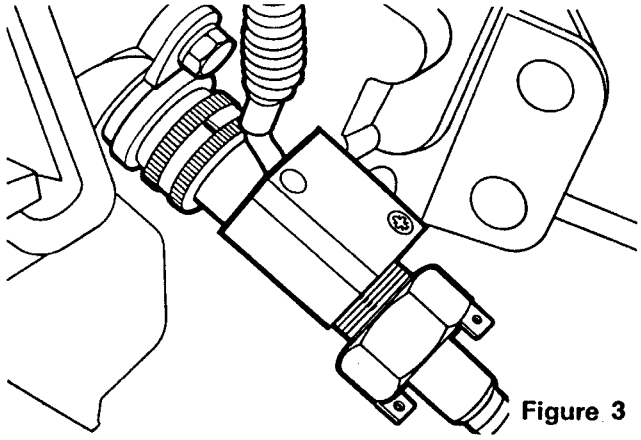


Figure 3

1. The control box is fitted under the fascia below the left hand radio speaker, see figure 4. To facilitate access to the control box terminals, remove speaker grille.

2. Remove sensor connections 10, 11 and 12 from control box.

Note: On some vehicles a sealing plate may be fitted, covering terminals 7 - 12.

3. Connect a test circuit, including a pulse meter and slave battery, to the sender unit leads at the control box, as shown in figure 5.

4. Push the vehicle slowly to rotate the sender unit drive and this should give a pulse reading of four pulses per revolution.

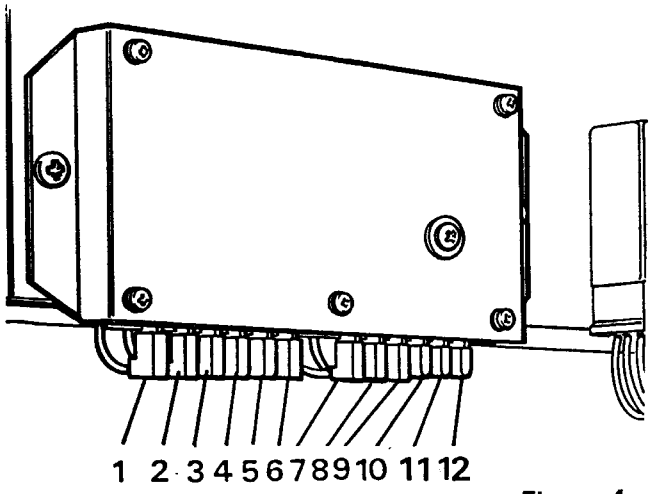


Figure 4

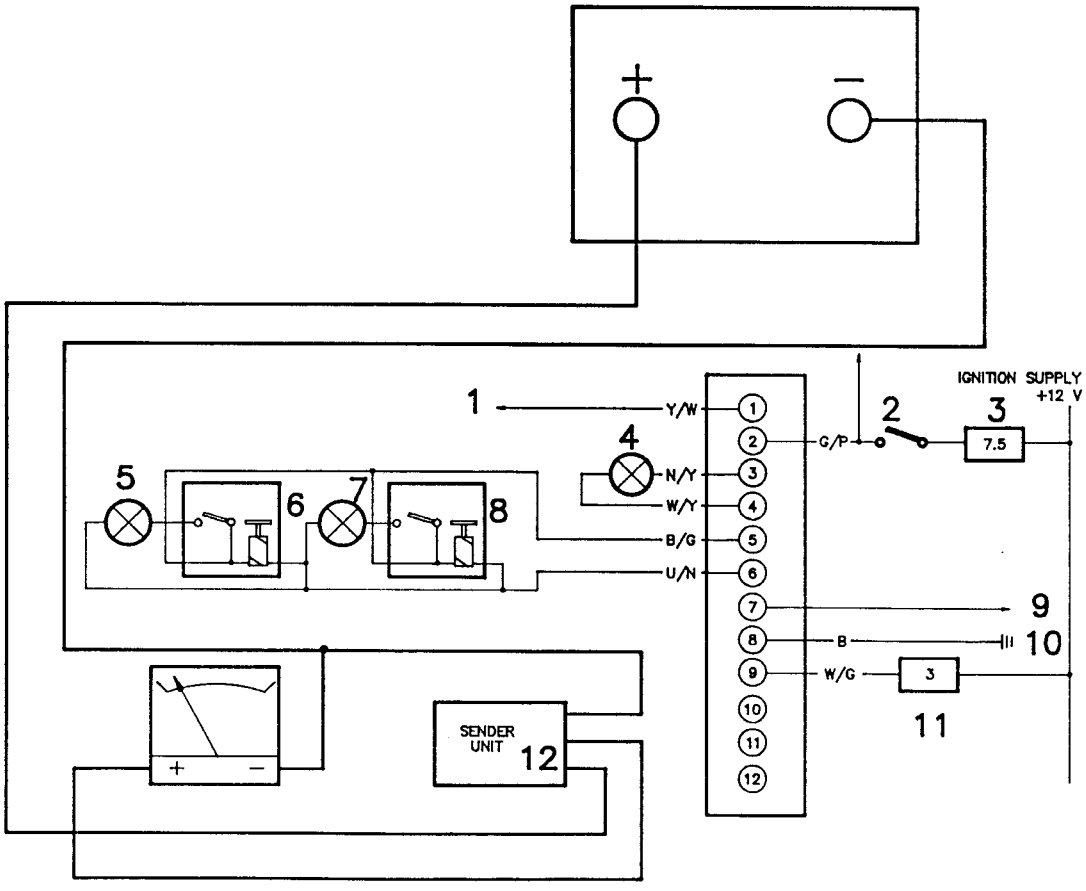


Figure 5

Test 3 Rear door solenoids and microswitches

1. Disconnect leads from terminals 5 and 6 on control box.

2. Connect positive lead from the 12 volt slave battery to the blue/brown coded wiring supply to the door solenoids and the negative lead from the battery to the black/green coded wiring as shown in figure 6. Making connection should result in the audible operation of both door solenoids.

Note: The door solenoid and microswitch can only be serviced as a combined relay, complete with mounting bracket.

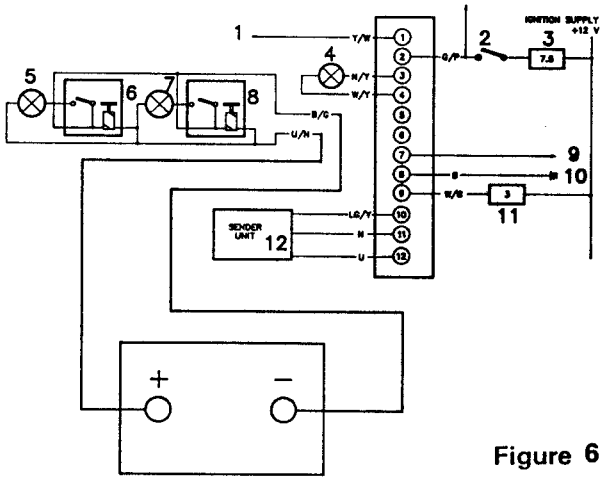


Figure 6

Test 4 Control box/door solenoids

1 Disconnect leads from terminals 5 and 6 on control box.

2 Connect a 12 volt test lamp across both terminals, see figure 7

3 Switch on vehicle ignition and apply foot brake. The test lamp should illuminate.

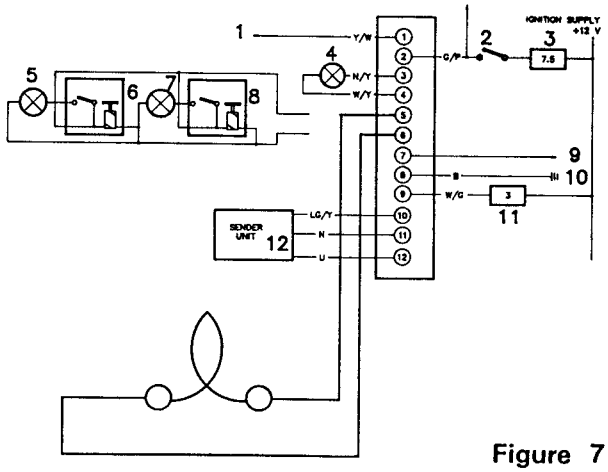
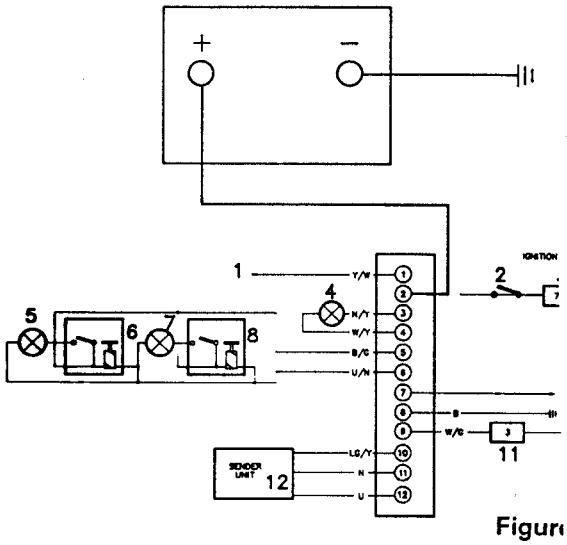


Figure 7

Test 5 Control box/brake light switch

1 Disconnect lead from terminal 2 on control

2 Connect positive lead from 12 volt slave ba terminal 2 as shown in figure 8 and switch on ignition. This should simulate the operation of th light switch and activate the rear door locks.



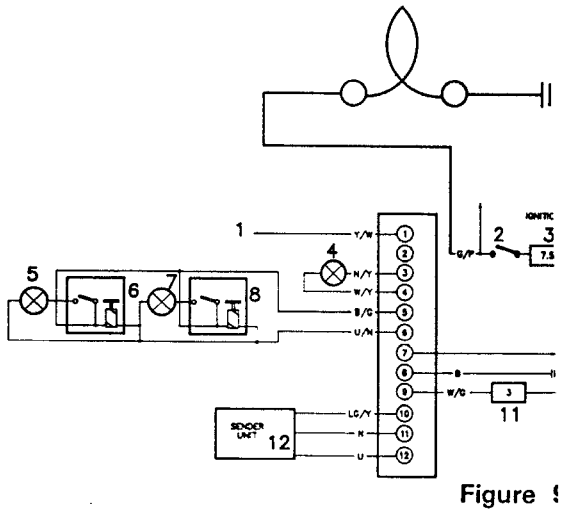
Figur

Test 6 Brake light switch and cable

1 Disconnect lead from terminal 2 on control b

2 Connect a 12 volt test lamp between the lead suitable earth, see figure 9.

3 Switch on vehicle ignition and apply foot b Operation of the brake light switch should illum the test lamp. Failure to do so would indicate fail the switch or a fault in the circuit cable.



Figure

Test 7 Fascia warning light/control box

1 Disconnect leads from terminals 3 and 4 on co box.

2 Connect a 12 volt test lamp between the terminals as shown in figure 10

3 Switch on vehicle ignition and the test lamp sh illuminate. Failure to illuminate would indicate a f in the warning light/wiring circuit or control box.

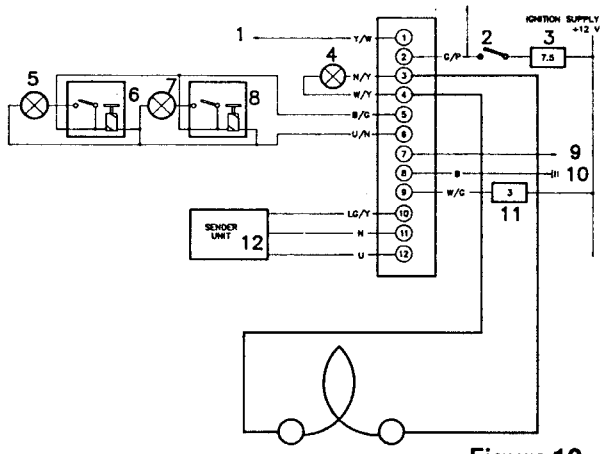


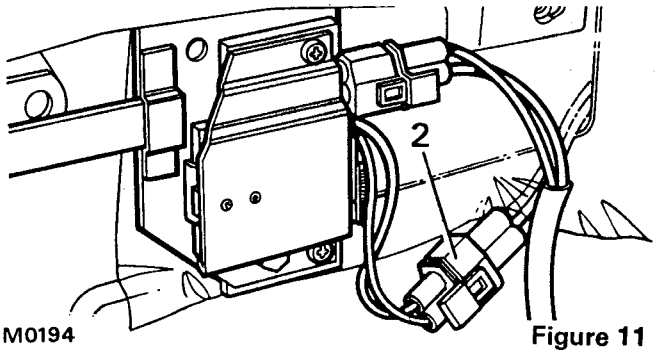
Figure 10

Test 8 Rear door warning lights

The rear door microswitches operate the warning lights mounted on both doors and inform the rear occupants that the doors are locked.

1 Switch on the vehicle ignition and apply the foot brake. This will energise the solenoids lock the doors and should illuminate the warning lights through the microswitches.

Failure to illuminate will indicate a failure in the microswitch or warning light bulb.



M0194

Figure 11

2 Disconnect the warning lamp lead as shown in figure 11.

3 Connect a 12 volt supply to the lamp harness, see figure 12. The warning lamp should illuminate thus indicating a microswitch failure.

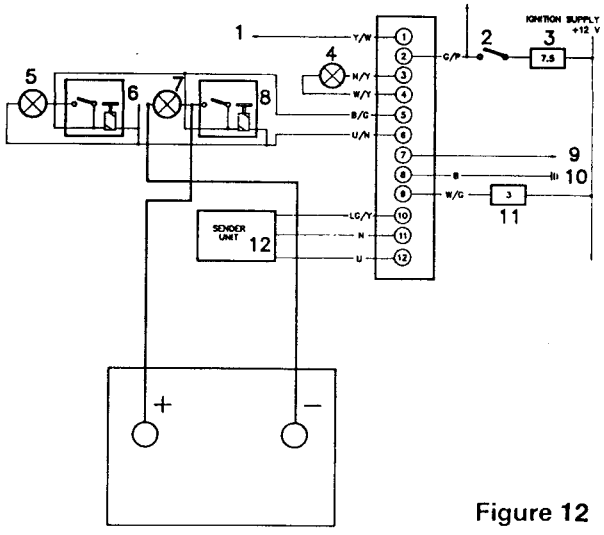


Figure 12

Replacing the sender unit

1. Disconnect terminals 10, 11, and 12 from control box.

2. Pull back carpet/matting, if fitted, and carefully release sender unit cable.

3. From under the vehicle remove rubber grommet, release cable from retaining clips and pull cable through grommet aperture.

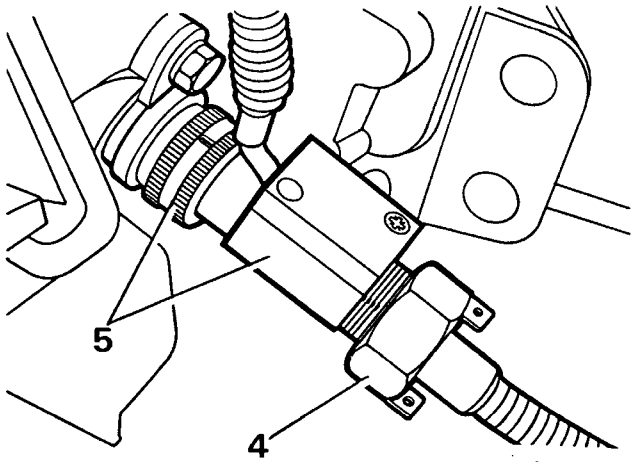


Figure 13

4. Unscrew speedometer cable adaptor from sender unit.

5. Unscrew sender unit from gearbox and fit new assembly.

6. Reroute sender unit cable, secure with retaining clips, fit rubber grommet and reconnect terminals 10, 11 and 12 at control box.

Replacing control box

1. Remove two retaining screws, carefully lower control box from under fascia, and disconnect the twelve terminals, see Figure 14.

Note: On some vehicles a sealing plate may be fitted, covering terminals 6-12.

2 Reconnect terminals to new control box, ensuring they are correctly fitted, see figure 3, wiring diagram.

3 Secure control box to bulkhead.

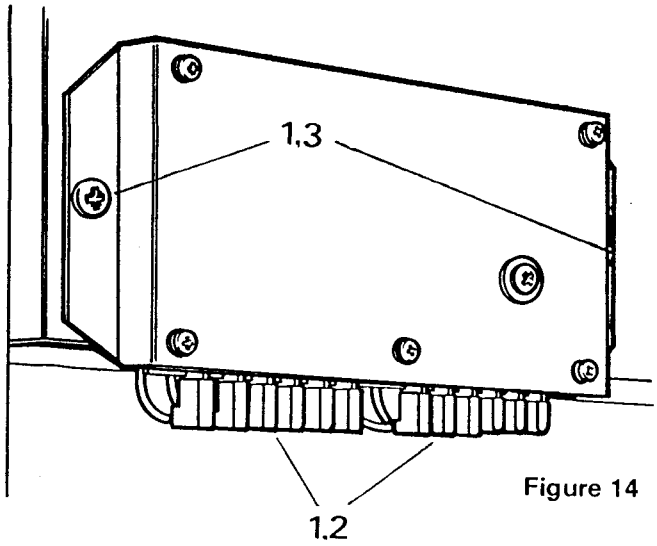


Figure 14

Replacing rear door relay (solenoid and microswitch)

1 Carefully prise out end cappings, remove retaining screws and detach grab handle, see figure 15.

2 Remove door lock release handle cover, remove single screw and withdraw handle from its spindle.

3 Remove window lock escutcheon.

4 Remove door trim panel.

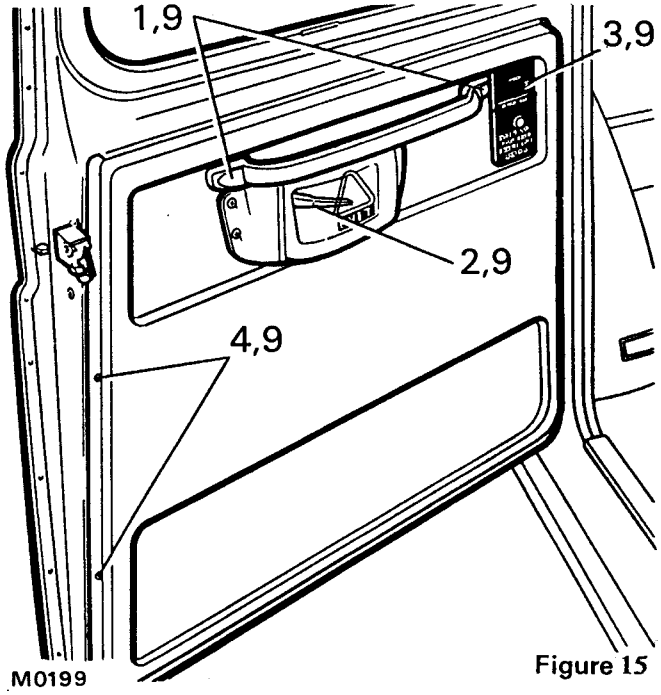


Figure 15

5 Peel back protective sheet and disconnect warning light lead plug and relay supply cable plug, see figure 16.

6 Slacken grab handle mounting bracket screws.

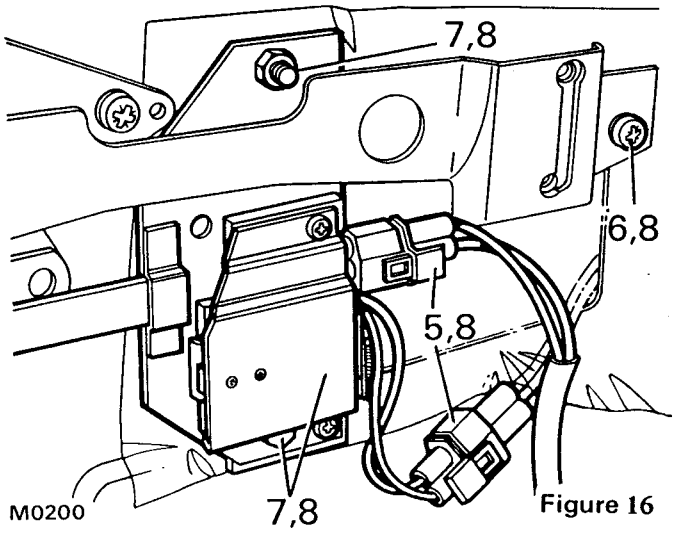


Figure 16

7 Remove top and bottom fixings, disengage relay mounting plate from retaining stud and door lock lever and lower assembly from door.

8 Fit new relay assembly, ensuring door lock lever is correctly engaged and reconnect solenoid and warning light plugs. Retighten mounting bracket screw.

9 Refit trim panel, door release handle, cover and grab handle window lock escutcheon.

Replacing rear door warning light

1 Remove door trim panel as previously described.

2 Disconnect warning light lead plug, see figure 17.

3 Peel back tape retaining warning light lead.

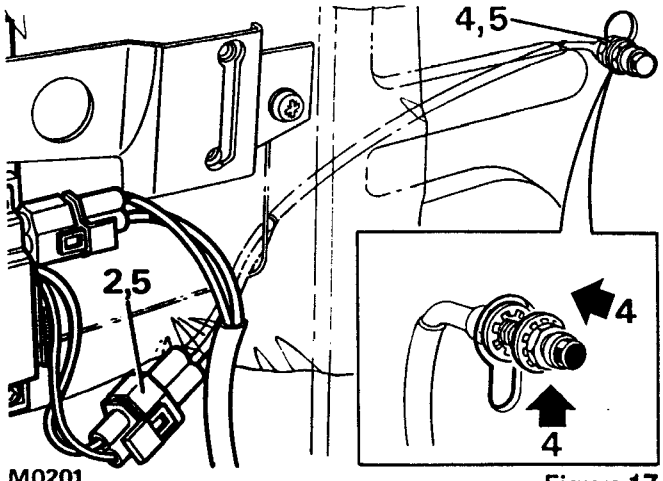


Figure 17

4 Support the warning light from inside the door panel, slacken the locknut and release the light inwards from the key hole slot.

5 Refit new warning light, connect wiring plug and replace door trim panel.

Replacing brake light switch

1 Remove two retaining bolts and carefully lift access plate from pedal box, see figure 18.

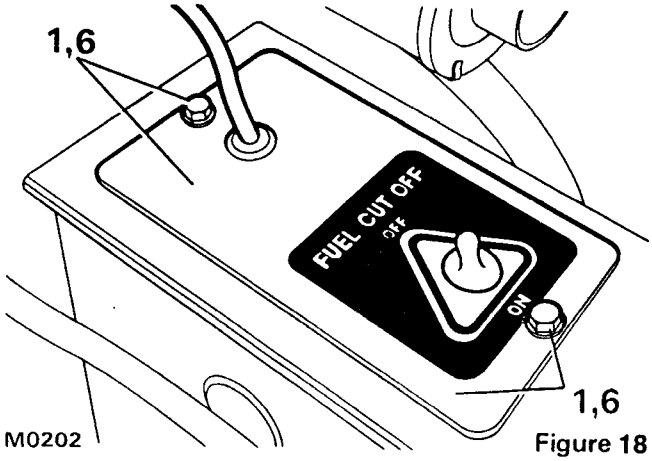
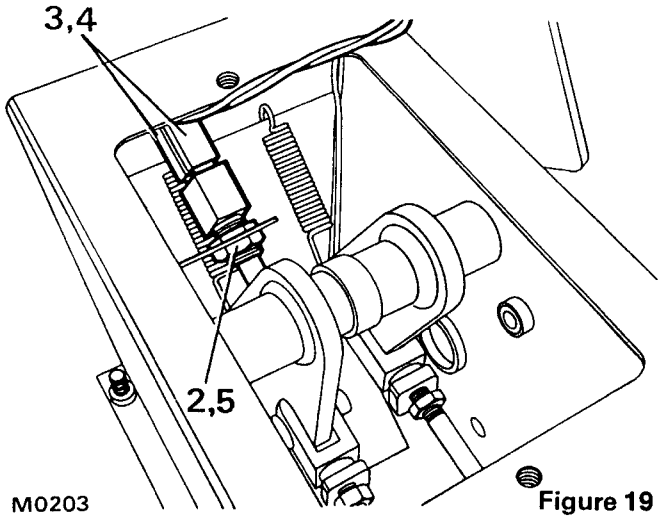


Figure 18

2 Unscrew locknut and remove brake light switch from mounting bracket.

3 Disconnect the two leads from the brake light switch, see figure 19

4 Reconnect leads to new switch.



M0203 Figure 19

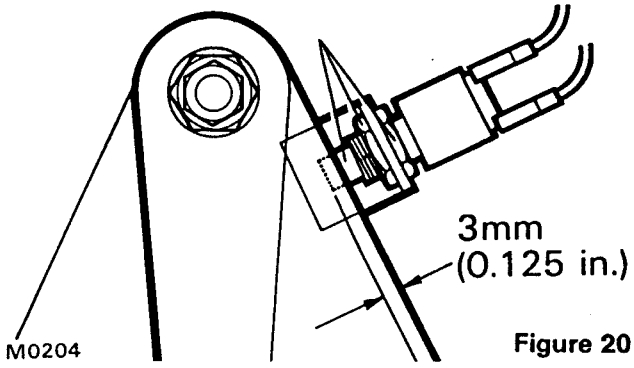
5 Fit new switch, secure loosely with locknuts and adjust as follows:-

(a) Position the switch so that the operating plunger abuts the brake pedal lever, see figure 20

(b) Push the switch down so that the plunger depresses 3mm (0.125in) and tighten locknuts.

(c) Depress brake pedal and check that the switch plunger springs out to its full travel.

(d) Release brake pedal and recheck measurement of plunger depression as in (b).



M0204 Figure 20

6 Refit pedal box access plate.

To replace fascia warning light

1 Prise out centre pad, unscrew retaining bolt, and remove, steering wheel, see figure 21.

2 Remove top and bottom multi-switch covers.

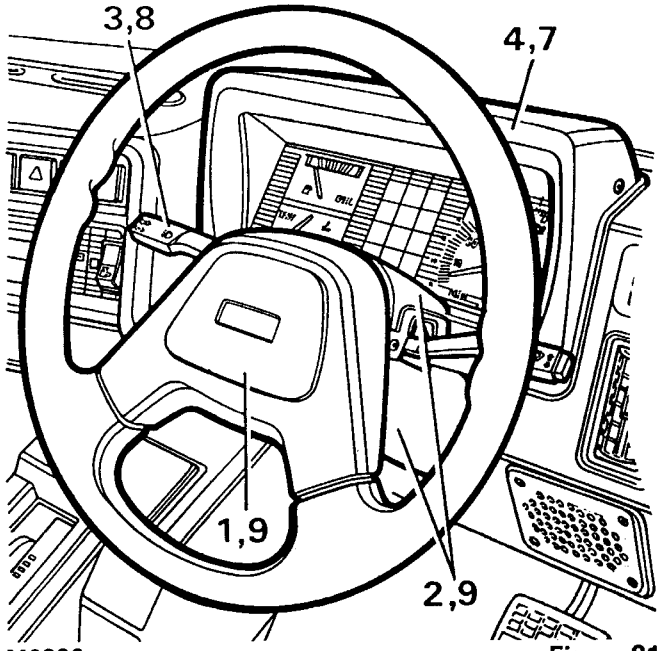
3 Remove multi-switch assembly from steering column.

4 Remove instrument binnacle cover.

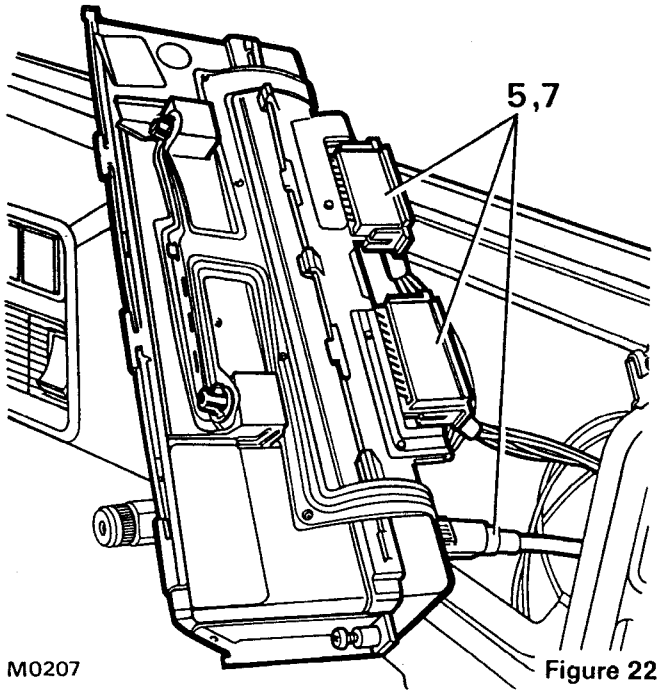
5 Remove instrument binnacle and disconnect multi-plugs and speedo cable, see figure 22.

6 Remove fascia warning light bulb, see figure 23. **Note:** Fascia warning light bulbs are serviced complete with holders.

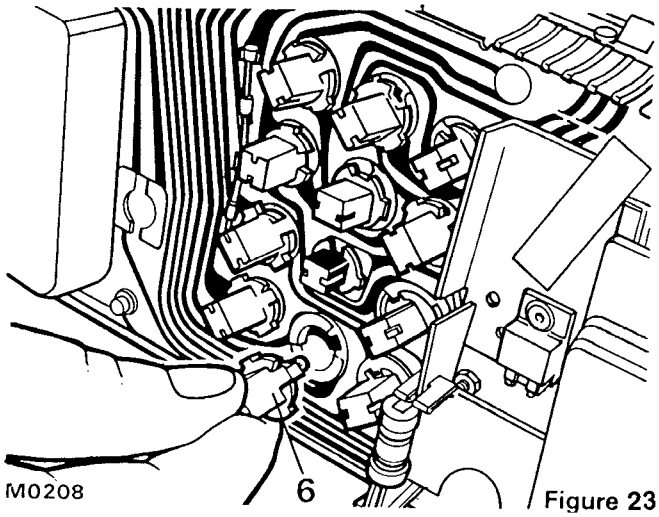
7 Reconnect multi-plugs, speedo cable and refit fascia binnacle and cover.



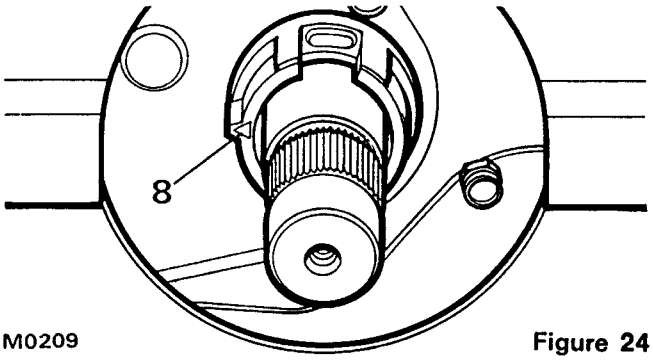
M0206 Figure 21



M0207 Figure 22



M0208 Figure 23



M0209 **Figure 24**

8 Refit multi-switch assembly to steering column, ensuring that the blue self cancelling boss is correctly positioned, i.e with the arrow pointed to the left as shown in figure 24.

9 Refit top and bottom multi-switch covers, steering wheel and centre pad.

Introduction

On most vehicles electrically operated windows are fitted to the nearside front door only, although depending on the vehicle specification they can also be fitted to the driver's door. The windows lift assembly consists of a 12 volt electric motor fitted to a mounting bracket that also supports the motor drive rack and window slide channel.

Each window is operated by a two way switch on the centre console. On automatic vehicles the switch is mounted on the front face of the storage compartment. On manual vehicles the switch is locatd next to the ash-tray at the front of the console.

A thermal overload switch is incorporated in the circuit and is located in the wiring harness just before the window lift switch. If an overload situation arises the relay will cut off the electric supply to the window lift motor for approximately three to four seconds.

A 30 amp fuse is fitted to protect the system which is shown in the schematic diagram of figure 1.

If the window lift motors fail to operate the following tests should be used to eliminate the various components.

Test 1 - Fuse

If the 30 amp fuse protecting the circuit blows, the window lift motor of each door will be inoperative. The fuse box is fitted under the fascia above the brake pedal and the fuse ratings and positions are shown on a label located on the back of the driver's sun visor. If on checking the fuse the window lift motor/s is still inoperative carry on to Test 2.

Test 2 - Window Lift Motor

1. Remove the door casing.

2. Disconnect the electrical plug from the window lift motor.

3. Connect the positive and negative leads from a slave battery to the lift motor plug, see figure 2. In this condition the window lift motor should operate.

Note: If the window is in the raised or lowered position and the lift motor fails to operate, first reverse the polarity of the leads, the motor should then operate.

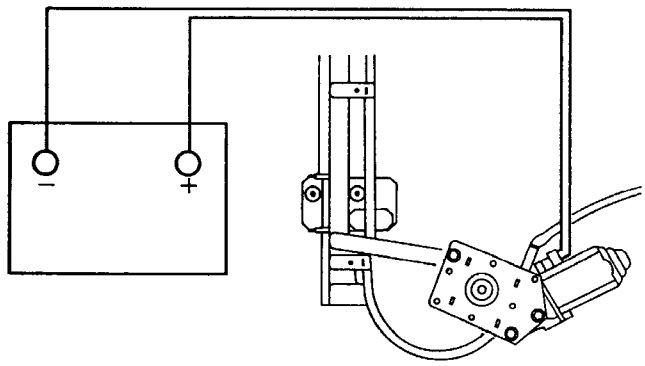
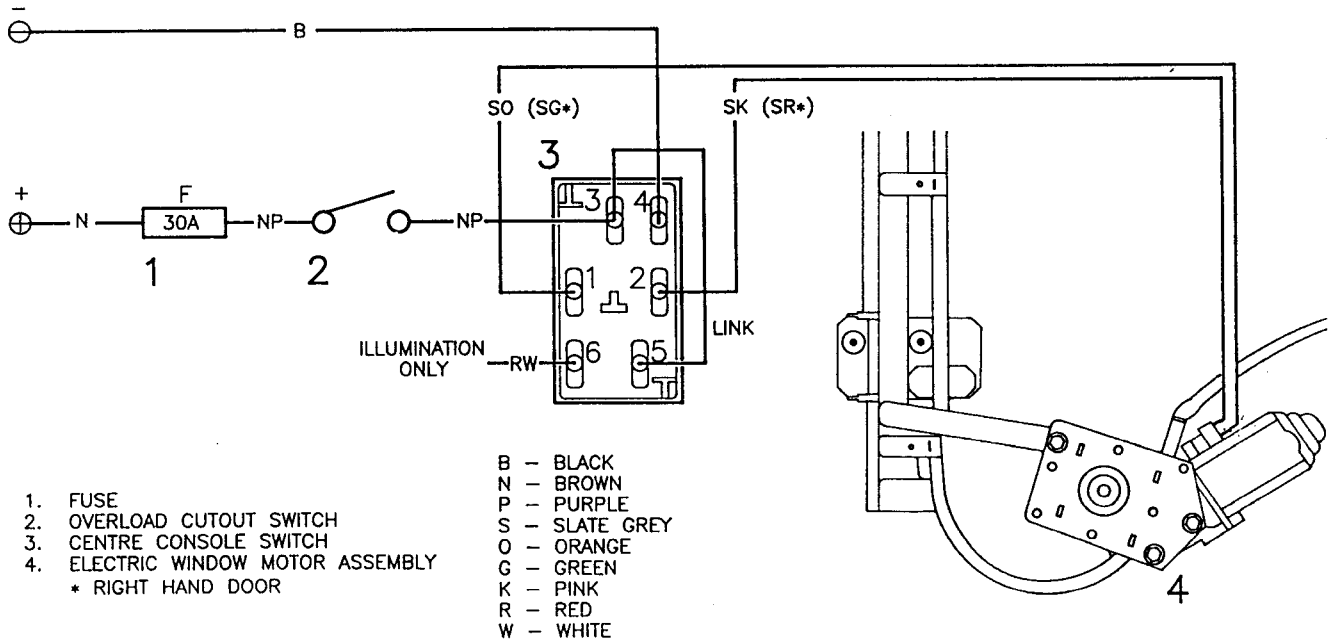


Figure 2



1. FUSE
2. OVERLOAD CUTOUT SWITCH
3. CENTRE CONSOLE SWITCH
4. ELECTRIC WINDOW MOTOR ASSEMBLY
   * RIGHT HAND DOOR

B – BLACK
N – BROWN
P – PURPLE
S – SLATE GREY
O – ORANGE
G – GREEN
K – PINK
R – RED
W – WHITE

Figure 1

Test 3 - Window Lift Motor Switch

1. Prise the switch from the centre console and disconnect the switch plug.

2. Using a slave battery connect a test lamp circuit to the switch, ie. positive lead to terminal 3 and negative lead to terminal 4, see figure 3.

3. Presss the switch to the windows lowered position. If the lamp does not illuminate this would indicate a faulty switch. However, if the test lamp does illuminate this would only indicate that the window lowering side of the switch is functioning. The window raised side of the switch must still be checked as described in the next operation.

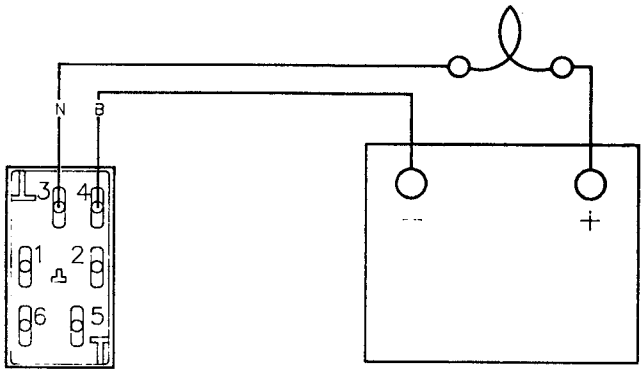


Figure 3

4. Connect the positive lead from the slave battery to terminal 2 of the switch.

5. Press the switch to the windows raised position and check the circuit as in operation 3. If the switch is functioning normally and all previous tests have been carried out and the window lift motor still fails to operate a faulty thermal overload switch would be indicated.

Test 4 - Thermal Overload Switch

1. Remove two screws and lift the trinket tray from the centre console to gain access to ther thermal overload switch, see figure 4.

Note: If electric windows are fitted in both front doors two overload switches are used, one for each lift motor.

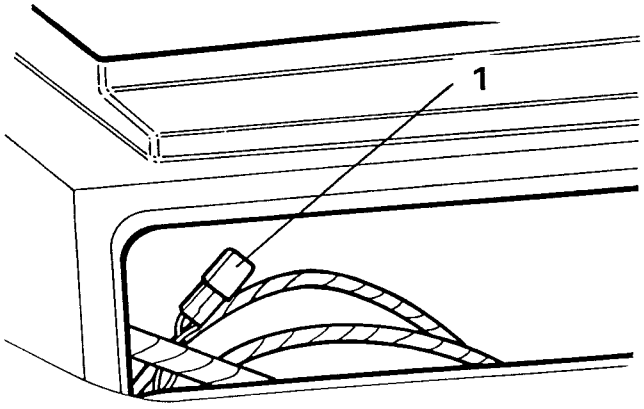


Figure 4

2. Disconnect the two leads from the switch and link them together.

3. Press the two way switch on the centre console and the window lift motor should operate, thus confirming a faulty thermal overload switch.

Replacing Window Lift Motor Assembly

1. Lower window.

2. Disconnect lift motor wiring plug, see figure 5.

3. Remove two allen bolts securing the slide channel mounting to the window.

4. Remove two bolts securing the tip of the slide channel to the door panel.

5. Unscrew three bolts, detach lift motor from door panel and remove complete assembly through access aperture, nearest hinge end of door.

6. Replace in reverse order.

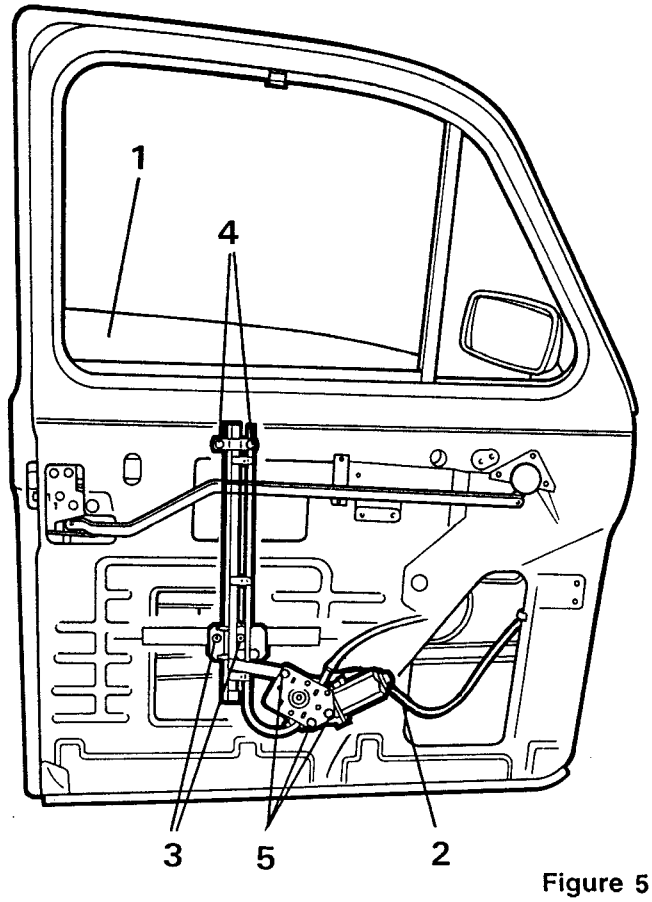


Figure 5

LTI SERVICE

Fairway DRIVER

WORKSHOP MANUAL

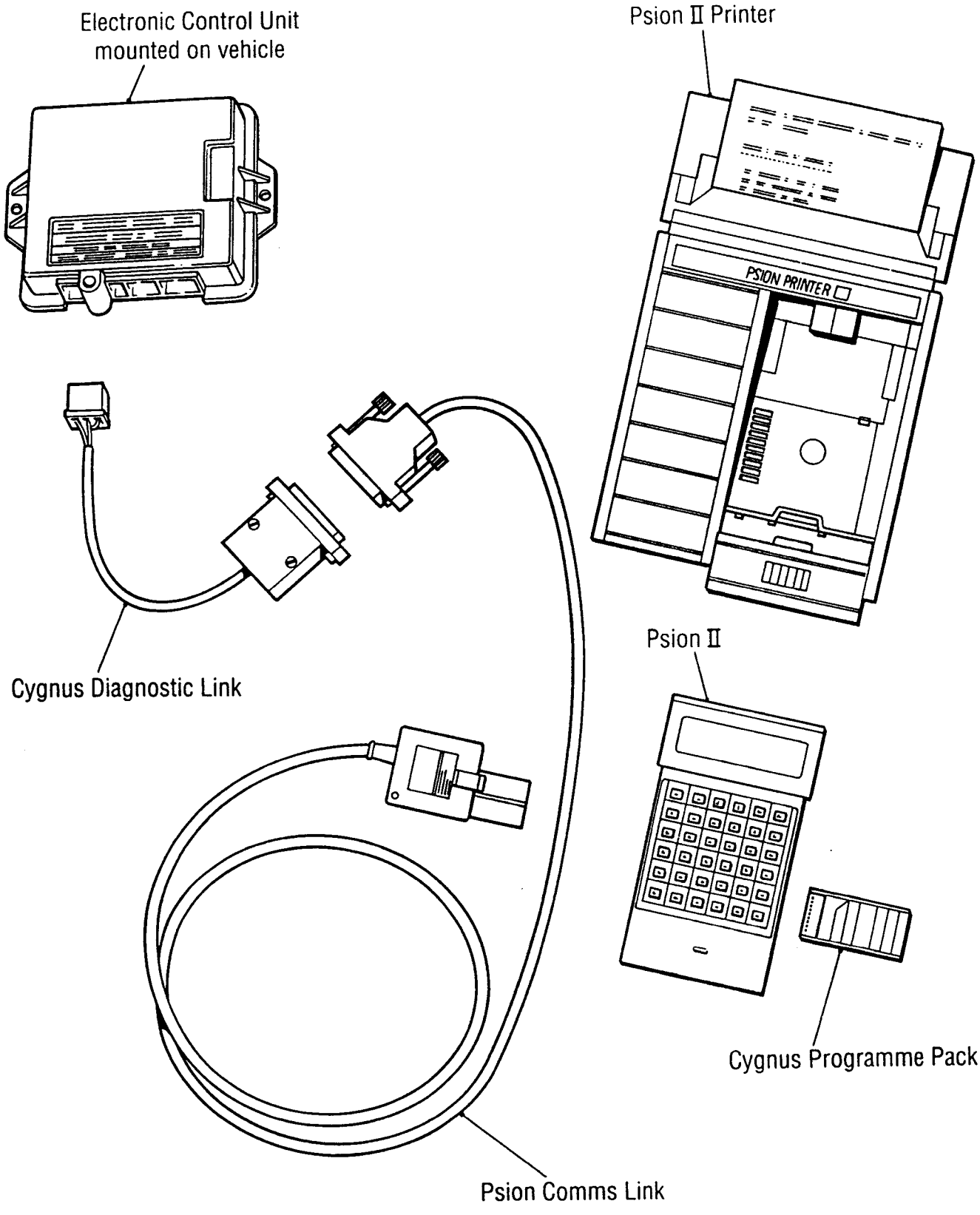
SECTION 8b

I.D.D.S DIAGNOSTICS

I.D.D.S. DIAGNOSTICS

CONTENTS

DIAGNOSTIC EQUIPMENT



8b I.D.D.S DIAGNOSTICS

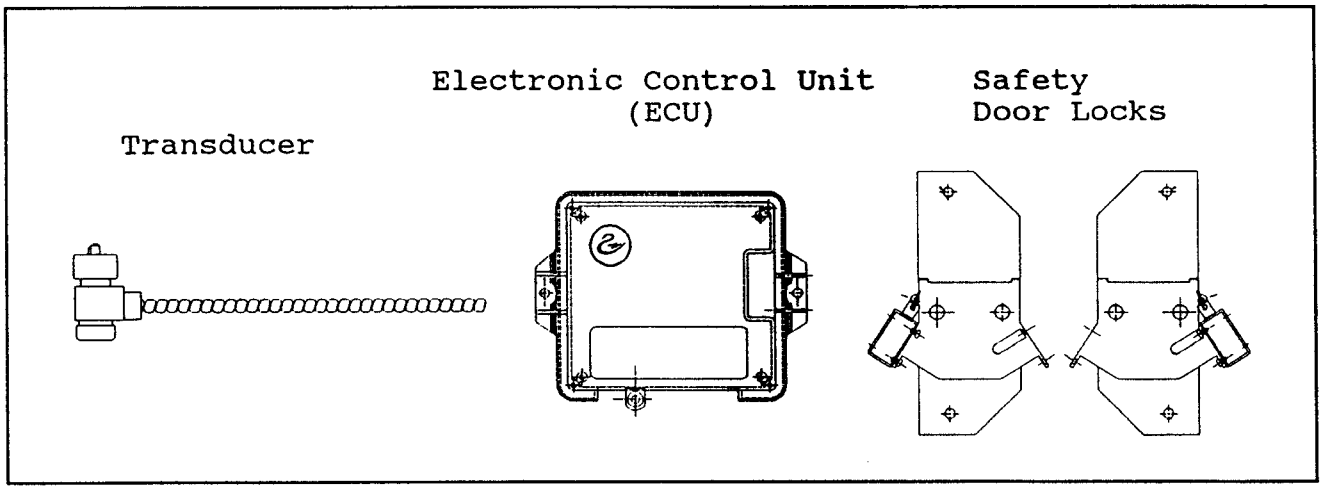
1. Scope and purpose of this document

This document describes the diagnostic and fault-finding facilities of the Cygnus IDDS as fitted to Carbodies Fairway Driver taxis from January 1992.

IDDS is a complex system with connections to a number of other components on the taxi. Fault finding might therefore be difficult and time consuming. To further complicate matters, because of its connection to the taximeter, various elements in the IDDS may be sealed by the Public Carriage Office or Hackney Carriage Officer; breaking a seal to replace a component could involve further time off the road for the taxi for re-testing and re-sealing. IDDS has been designed to permit fault finding to a certain level **without removing components from the vehicle**, by the use of dashboard indicators and plug-in diagnostics. In most cases the faulty component can be identified quickly, replacement of non-faulty parts can be avoided, and seals should only be broken where necessary.

2. Summary of the IDDS and its functions

IDDS stands for Intelligent Drive Detection System and comprises the following system elements:



The IDDS has the following additional inputs and outputs:

Inputs:

* Brake light switch
* Rear door courtesy light switches

Outputs:

* Taximeter distance pulse
* Gearbox kickdown inhibit
* Dashboard warning lamps (see below)

The main functions of the system are:

* To automatically engage the rear door safety locks when the vehicle travels faster than 2 mph, thereby preventing the rear doors from being opened from the inside.

* To provide an electronically compensated signal to the taximeter.

* To provide a signal to the gearbox kickdown inhibit control unit.

* To provide various visual and audible indications and warnings to the driver concerning the status of the rear doors.

* To provide various diagnostic and other information, including the vehicle mileage, using a hand-held Psion Organiser.

3. IDDS indicators and warnings

The IDDS controls the 3 warning lamps at the bottom of the dashboard warning lamp cluster:

In this document they are shown as follows:


indicates that the lamp is OFF

indicates that the lamp is ON continuously

indicates that the lamp is FLASHING

The IDDS also emits audible warning sounds from the ECU; these take 2 possible forms:

■ ■ ■ ■ ■ ("pip .. pip .. pip .. ") - warning beep.

▬▬▬▬ ("beeeeeee.... ") - continuous high pitched alarm.

In addition to the above warnings from the IDDS itself, each rear door is fitted with a red warning light which indicates when the safety lock for that door is engaged.

4. Explanation of warning lamps and sounds


indicates that at least one rear door is UNLOCKED. This may be normal - if the vehicle is stationary, or it may indicate a fault. Whenever this lamp is lit it is possible for a passenger to open a rear door from the inside.

When a left or right door warning lamp is flashing it indicates that that door is OPEN. A flashing lamp should always be accompanied by an audible warning.

When a left or right door warning lamp is on continuously it indicates that the safety lock in that door has failed. This warning should always be accompanied by the green "key" lamp.

■ ■ ■ This audible warning accompanies a flashing door warning lamp to indicate that a rear door is OPEN.

▬▬ A continuous alarm accompanies a flashing door warning lamp when the vehicle is moving at a speed greater than 2mph with a rear door OPEN.

5. Fault finding - first stage

5.1. Power on self test

The IDDS performs the **following self test** sequence whenever the ignition is turned on:

5.1.1. 

Both rear door safety locks engage (red warning lights in the doors are lit) for approximately 2 seconds

5.1.2. 

Both rear door safety locks disengage.

With the vehicle at rest, this is the normal condition.

If this self test sequence does not occur at all, the most likely causes are that either there is no power to the ECU (check fuse) or that the ECU has completely failed.

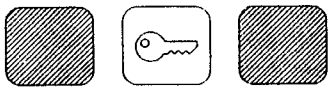
If the self test sequence does occur but with incorrect results, continue with the fault-finding process.

5.2. Brake Pedal Test

Press the brake pedal. With the brake pedal pressed all 3 dashboard indicator lamps should be off and both rear door safety locks engaged (as in 5.1.1). With the vehicle stationary this condition persists until the brake pedal is released, when the system immediately reverts to normal (as in 5.1.2).

5.3. Common warning and indication conditions

Once successfully past the self-test and brake pedal test, conclusions can be drawn from the following conditions:



(No audible warning)
If stationary - normal condition, no fault.
If moving faster than 2 mph, FAULT - suspect transducer failure - refer to 6.2.

(Audible warning: ■ ■ ■ ■ ■ ■)
Vehicle stationary.
The left hand rear door is open. Not normally a fault (unless the door is physically closed which would indicate a failed courtesy light switch).

(Audible warning: ▬▬▬▬)
The left hand rear door is open and the vehicle is being driven faster than 2 mph. Not a fault (unless the door is physically closed which would indicate a failed courtesy light switch).

(No audible warning)
FAULT : the right hand rear door safety lock has failed, either due to mechanical failure (eg jammed) or electrical failure of some kind. Investigate by inspecting the lock mechanism itself and/or by the use of plug-in diagnostics (see 7).
This warning condition occurs whenever the rear door safety locks should be engaged, whether the vehicle is moving or at rest.

(Audible warning: ▬▬▬▬ , vehicle moving)
SERIOUS FAULT : The left hand rear door safety lock has failed, the door is open and the vehicle is moving faster than 2 mph.

Warnings or indications other than those shown above (apart from juxtaposition of left and right) normally require more in depth diagnostics to determine possible causes.

6. Checking for known or suspected faults:

6.1. Taximeter not recording

If the taximeter does not appear to be recording on distance, or is recording very slowly, follow this procedure to determine the fault.

6.1.1. Perform power-on self test (5.1). If this does not occur at all then the most likely causes are that either there is no power to the ECU (check fuse) or that the ECU has completely failed. If this test is successful proceed to next step.

6.1.2. Perform brake test (5.2) to confirm that the door locks function and that the green key lamp is extinguished when the doors lock. If so proceed to the next step. If not then the next step cannot be used, but the transducer is suspect - go to 6.2.4.

6.1.3. Do the doors lock and the green key light extinguish when the vehicle is driven? If so it is unlikely that the transducer is at fault, proceed to next step. If not then the transducer is suspect - go to 6.2.4.

6.1.4. At this stage the most likely causes of failure are:

6.1.4.1. Wiring fault between ECU and taximeter.
6.1.4.2. Taximeter fault
6.1.4.3. ECU fault
6.1.4.4. A combination of the above, e.g. faulty wiring causing damage to taximeter.

Useful information may be gained at this stage by using the pulse count mode of the taximeter if it has one, but it is more likely that substitution of known working units will be the most effective method of identifying the fault.

6.2. Suspect transducer

6.2.1. Perform power-on self test (5.1). If this does not occur at all then the most likely causes are that either there is no power to the ECU (check fuse) or that the ECU has completely failed. If this test is successful proceed to next step.

6.2.2. Perform brake test (5.2) to confirm that the door locks function and that the green key lamp is extinguished when the doors lock. If so proceed to the next step. If not then the next step cannot be used, but the transducer is still suspect - go to 6.2.4.

6.2.3. Do the doors lock and the green key light extinguish when the vehicle is driven? If so it is unlikely that the transducer is at fault. If not then the transducer is still suspect - go to 6.2.4.

6.2.4. Plug in the Psion Organiser diagnostic link, press ON/CLEAR twice to turn on, select the IDDS option from the main menu and then select the PULSES option.

The Psion will now count incoming pulses from the transducer (NB maximum speed 30 mph). On a Fairway Driver there should be approximately 4000 - 4200 pulses to a mile depending on tyres etc. If this test

shows a correct pulse count then the transducer is not at fault. If an incorrect count is shown then the most likely cause is a failed transducer, but before replacing it perform the quick test in the next step.

6.2.5. With the Psion diagnostic link still connected, disconnect the transducer plug from the ECU and plug in a known, working transducer held by hand in the luggage space. Rotate the shaft of the transducer by hand whilst observing the Psion display - there should be 4 pulses per complete turn. If 4 pulses per turn are observed then the transducer fitted to the vehicle is faulty and should be replaced. If no pulses are observed from the known, working transducer then the ECU is suspect and should be replaced.

6.3. Door safety lock(s) not engaging

The door safety locks should engage when either the brake pedal is pressed or when the vehicle travels faster than 2 mph.

The possible causes of failure are:

6.3.1. Faulty lock
6.3.2. Jammed lock mechanism
6.3.3. Other mechanical failure in door
6.3.4. Faulty wiring between ECU and lock
6.3.5. Faulty ECU

Door safety lock failure is reported on the dashboard by the green key lamp accompanied by a red door warning lamp continuously on. For example

means that there is a fault with the right hand safety lock.

Having arrived at the conclusion that a safety lock is suspect the next stage is to remove the door casing and examine the lock mechanism and its associated components. If the door lock unit does not prove faulty, or there is no obvious jamming or other mechanical problem, plug-in diagnostics should be used to further analyse the system before removing the ECU.

7. Plug-in diagnostics using Psion Organiser

Where faults appear more complex than those described above, plug in diagnostics can be used to obtain further information about the system.

To use the plug-in diagnostic facilities, connect a Psion Organiser fitted with the Cygnus program pack to the ECU using the special connecting link. Make sure that the ignition is turned on. Select

the IDDS option from the Psion main menu; this will lead to a second menu showing the available options:

```
INFO STATUS
PULSES EXIT
```

If the message "COMMS FAILURE ... Check Connection" appears instead of this menu it means that the ECU is not responding, possible causes are connecting link failure or ECU failure. Having successfully reached this menu, various functions can be performed:

INFO displays a static list of items of information stored within the ECU

STATUS provides a dynamic display of the ECU's inputs and outputs.

PULSES provides a dynamic count of pulses received from the transducer.

EXIT Exits from IDDS menu back to Psion main menu

7.1. Checking the serial number of the ECU

Select the INFO option from the menu. The serial number is displayed on the top line. The top line will always show the serial number during the INFO function while the second line can be caused to show other items listed in 7.2 below. If a printer is connected then this list will automatically be printed out.

7.2. Reading the mileage and other information

Having selected the INFO function, pressing the up and down arrow keys on the Psion Organiser will scroll through the following list of items on the second line of the display:

Ratio: Must be 4224 for the Fairway Driver. **Any other value here will cause inaccurate taximeter recording.**

Version: The software version of the ECU.

Date: The week and year of manufacture of the ECU.

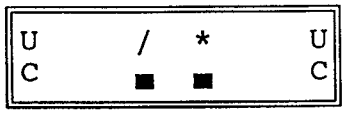
Mileage: The total recorded mileage.

Error status: If this is a '1' then there has been an error in the ECU's memory and the mileage total will not be accurate. If this is a '0' then the mileage total should be accurate.

Pressing any other key from the INFO display will cause an exit to the IDDS menu (INFO STATUS PULSES).

7.3. The status display

Selecting the STATUS option from the IDDS menu causes the following display:



Each symbol on the display represents a component of the IDDS system and will change according to the status of that component.

The <u>top row</u> represents the door safety locks, the brake pedal and the green "key" lamp in the dashboard instrument panel.

The extreme left and right symbols represent the left and right safety lock respectively; a **U** indicates that the lock should be unlocked or disengaged, an **L** indicates that it should be locked, and an **F** indicates that a fault has been detected with it.

When 'F' is displayed there will be an adjacent number indicating the class of fault, see 7.4.

The leftmost of the two centre symbols represents the condition of the brake pedal: / indicates that the pedal is not pressed and _indicates that it is.

The rightmost of the two centre symbols represents the condition of the green "key" lamp: * indicates that it is lit, ■ indicates that it is not, and an **F** indicates that there is a fault with the bulb - usually a short circuit.

The <u>bottom row</u> represents the left and right rear doors and the corresponding red warning lamps in the instrument panel.

A **C** indicates that a door is closed, an O indicates that it is open.

Each lamp is represented in the same way as the green "key" lamp: * indicates that it is lit, ■ indicates that it is not, and an F indicates that there is a fault with the bulb - usually a short circuit. When these lamps flash the corresponding symbol on the Psion display may not flash in correct sync - this does not represent a fault, merely a limitation of the speed of communication between ECU and Psion.

The STATUS display can be printed out at any time by pressing the P key on the Psion.

To exit from the STATUS display press any key except P.

7.4. Fault codes for the safety door locks

When an F symbol is displayed for a door safety lock there will be an adjacent fault code which can be interpreted as follows:

1 ECU fault

2 ECU fault

3 ECU fault

4 Door lock fault - possible microswitch failure

6 Door lock or wiring fault - there is a short circuit between the door lock drive and +12V.

7 Door lock or wiring fault - the door lock is using too much current - possible solenoid failure.

7.5. Checking transducer pulses.

Selecting the PULSES option from the IDDS menu shows a count of incoming transducer pulses. The count is reset to zero every time the function is selected.

Important note: because of the limitation of speed of communication between the ECU and the Psion, the pulse count may not be accurate over 30 mph.

To exit from the PULSES function, press any key - in some circumstances this may not work first time in which case repeat.

LTI SERVICE

Fairway DRIVER

WORKSHOP MANUAL

SECTION 8c

WIRING DIAGRAMS

WIRING DIAGRAM RHD - KEY

8c

WIRING COLOURS

B	BLACK	P	PURPLE
G	GREEN	S	SLATE/GREY
K	PINK	U	BLUE
N	BROWN	W	WHITE
O	ORANGE	Y	YELLOW

WIRING IDENTIFICATION

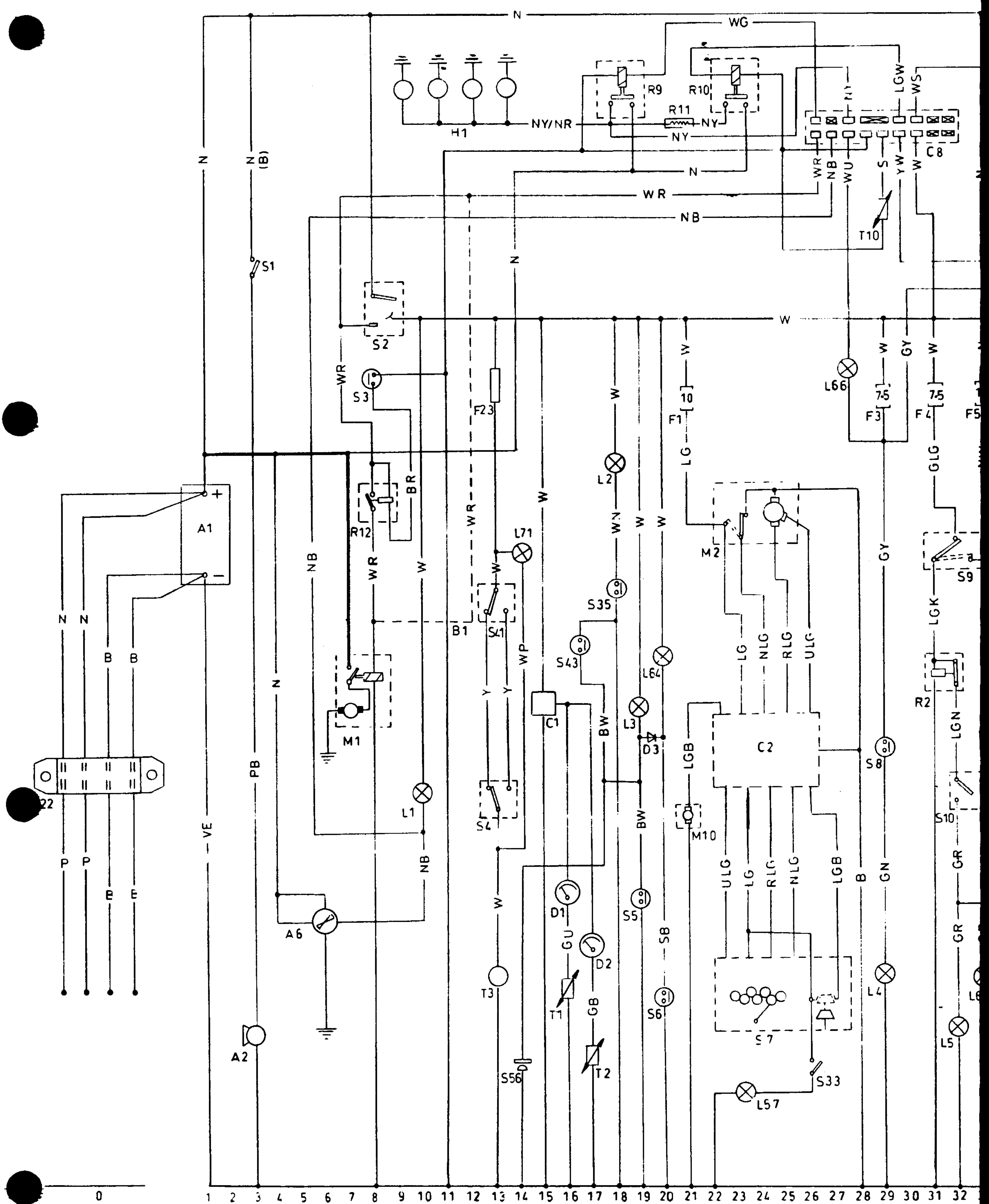
FIRST LETTER	PRIMARY COLOUR
SECOND LETTER	TRACER COLOUR
LIGHTER SHADE	PRECEDED BY LETTER L

ITEM	DESCRIPTION	LOCATION
A1	BATTERY	1
A2	HORN	3
A3	RADIO	130
A4	SPEAKER - RIGHT	126
A5	SPEAKER - LEFT	126
A6	ALTERNATOR	6
B1	LINK LEAD (MANUAL TRANSMISSION)	8-12
C1	INSTRUMENT STABILISER	15
C2	WIPER DELAY UNIT	22-26
C3	CENTRAL DOOR LOCK CONTROL BOX	137
C4	CLOCK	80-81
C5	CONTROL BOX-DOOR LOCKING	51-63
C6	TAXI METER CONNECTOR BLOCK	44
C7	TAXI METER LIGHT BOX	69
C8	GLOW CONTROL BOX	26-32
C9	KICKDOWN CONTROL BOX (AUTO TRANS)	53-54
C10	CONTROL BOX-REMOTE DOOR LOCKING	142-144
C11	CONTROL BOX-WINDOW LIFT LH FRONT (AUTO)	118-120
C12	CONTROL BOX-WINDOW LIFT RH FRONT (AUTO)	122-124
D1	TEMPERATURE GAUGE	16
D2	FUEL GAUGE	17
D3	DIODE	19-20
F1	FUSE BLOCK B7	21
F2	FUSE BLOCK B2	64
F3	FUSE BLOCK B3	29
F4	FUSE BLOCK B8	31
F5	FUSE BLOCK C7	33
F6	FUSE BLOCK C2	40
F7	FUSE BLOCK B6	65
F8	FUSE BLOCK C3	69
F9	FUSE BLOCK B4	70
F10	FUSE BLOCK B5	105
F11	FUSE BLOCK A3	89
F12	FUSE BLOCK A2	86
F13	FUSE BLOCK A5	91
F14	FUSE BLOCK A4	93
F15	FUSE BLOCK A7	95
F16	FUSE BLOCK A6	97
F17	FUSE BLOCK A8	100
F18	FUSE BLOCK C4	103
F19	FUSE BLOCK C8	113
F20	FUSE BLOCK C5	140
F21	FUSE BLOCK C6	131
F22	FUSE BOX FOR RADIO TELEPHONE	0
F23	FUSIBLE LINK	13
H1	DIESEL HEATER PLUGS	9-14
H2	CIGAR LIGHTER	48
H3	HEATED REAR SCREEN	107
L1	IGNITION WARNING LIGHT	10
L2	OIL PRESSURE WARNING LIGHT	18
L3	LOW FLUID, LOW VACUUM AND BRAKE PAD W/L	19
L4	REVERSE LIGHT	29
L5	INDICATOR LIGHT LH REAR	32
L6	INDICATOR LIGHT LH FRONT	33
L7	INDICATOR WARNING LIGHT LH SIDE	34
L8	INDICATOR WARNING LIGHT RH REAR	36
L9	INDICATOR LIGHT RH FRONT	37
L10	INDICATOR WARNING LIGHT RH SIDE	38
L11	COURTESY LIGHT - ROOF CONSOLE	40
L12	COURTESY LIGHT LH SIDE FACIA	39

ITEM	DESCRIPTION	LOCATION
L13	COURTESY LIGHT RH SIDE FACIA	41
L14	DRIVERS INTERIOR LIGHT	42
L15	COURTESY LIGHT LH REAR	49
L16	PUDDLE LIGHT LH REAR	50
L17	LH REAR DOOR NOT CLOSED WARNING LIGHT	54-55
L18	INTERIOR LIGHT-PASSENGER LH REAR	71
L19	INTERIOR LIGHT-PASSENGER RH REAR	73
L20	RH REAR DOOR NOT CLOSED WARNING LIGHT	56
L21	PUDDLE LIGHT RH REAR	42-43
L22	COURTESY LIGHT RH REAR	43
L23	BRAKE LIGHT LH SIDE	63
L24	BRAKE LIGHT RH SIDE	65
L25	DOOR LOCKED WARNING LIGHT LH REAR	56
L26	DOOR LOCKED WARNING LIGHT RH REAR	56
L27	REAR DOORS NOT CLOSED WARNING LIGHT	65
L28	HIRE SIGN LIGHT	46
L29	REAR SCREEN HEATER WARNING LIGHT	109
L30	NO PLATE LIGHT	88
L31	TAIL LIGHT LH SIDE	89
L32	SIDE LIGHT LH FRONT	90
L33	TAIL LIGHT RH SIDE	85
L34	SIDE LIGHT RH FRONT	86
L35	INSTRUMENT CLUSTER ILLUMINATION LHS	81-84
L36	INSTRUMENT CLUSTER ILLUMINATION RHS	81-84
L37	DIPPED BEAM LH SIDE	91
L38	DIPPED BEAM RH SIDE	93
L39	MAIN BEAM LH SIDE	95
L40	MAIN BEAM RH SIDE	97
L41	MAIN BEAM WARNING LIGHT	98
L42	REAR FOG GUARD	100
L43	REAR FOG GUARD WARNING LIGHT	101
L44	FOG LAMP LH SIDE	103
L45	FOG LAMP RH SIDE	104
L46	WINDOW LIFT SWITCH ILLUMINATION LH SIDE	112
L47	WINDOW LIFT SWITCH ILLUMINATION RH SIDE	114
L48	REAR FOG GUARD & HEATED REAR SCREEN-SWITCH ILLUMINATION	82-83
L49	DRIVERS INTERIOR LIGHT SWITCH-ILLUMINATION (FRONT)	82-83
L50	HIRE SIGN SWITCH ILUMINATION	82-83
L51	FRONT HEATER SWITCH ILLUMINATION	82-83
L52	DRIVERS REAR HEATER ON-OFF SWITCH-ILLUMINATION	82-83
L53	PASSENGERS REAR HEATER ON-OFF SWITCH-ILLUMINATION	82-83
L54	REAR HEATER HIGH-LOW SPEED SWITCH-ILLUMINATION	82-83
L55	DRIVERS INTERIOR LIGHT SWITCH-ILLUMINATION (REAR)	82-83
L56	SIDE LIGHTS ON WARNING LIGHT	87
L57	LOW WASHER FLUID WARNING LIGHT	23
L58	FOG LAMP WARNING LIGHT	105
L59	CIGAR LIGHTER ILLUMINATION	82-83
L60	INDICATOR REPEATER RH SIDE	39
L61	INDICATOR REPEATER LH SIDE	35
L62	AUTO GEAR SELECTOR ILLUMINATION	82-83
L63	ASHTRAY ILLUMINATION	82-83
L64	HANDBRAKE ON WARNING LIGHT	20
L65	HIGH LEVEL BRAKE LIGHT	66
L66	GLOW PLUG WARNING LIGHT	27-28
L67	PANEL LIGHT SWITCH ILLUMINATION	82-83
L68	SEDIMENTOR WARNING LIGHT	37-38
L69	OVERDRIVE WARNING LIGHT	46-47
L70	DRIVERS CENTRAL DOOR LOCKING SWITCH-ILLUMINATION	82-83
L71	FUEL SWITCH OFF WARNING LIGHT	14
L72	BELT RELEASED WARNING LIGHT (WHEEL CHAIR)	79

8c WIRING DIAGRAM RHD-KEY

ITEM	DESCRIPTION	LOCATION
L73	WINDOW LIFT SWITCH ILLUMINATION LHS (AUTO)	120
L74	WINDOW LIFT SWITCH ILLUMINATION RHS (AUTO)	122
L75	REAR WINDOW LIFT SWITCH ILLUMINATION LH SIDE-DRIVER	157
L76	REAR WINDOW LIFT SWITCH ILLUMINATION RH SIDE-DRIVER	157
L77	REAR WINDOW LIFT SWITCH ILLUMINATION LH SIDE-PASSENGER	157
L78	REAR WINDOW LIFT SWITCH ILLUMINATION RH SIDE-PASSENGER	157
M1	STARTER MOTOR	6-8
M2	FRONT SCREEN WIPER MOTOR	22-25
M3	FRONT HEATER	74-76
M4	REAR HEATER	78-79
M5	WINDOW LIFT MOTOR LH SIDE FRONT	111-112
M6	WINDOW LIFT MOTOR RH SIDE FRONT	114-115
M7	ELECTRICALLY OPERATED DOOR MIRROR LH SIDE	150-151
M8	ELECTRICALLY OPERATED DOOR MIRROR RH SIDE	150-151
M9	ELECTRICALLY OPERATED AERIAL	129
M10	FRONT SCREEN WASH MOTOR	21
M11	CENTRAL DOOR LOCKING MOTOR RH SIDE FRONT	139-140
M12	CENTRAL DOOR LOCKING MOTOR RH SIDE REAR	139-140
M13	CENTRAL DOOR LOCKING MOTOR LH SIDE FRONT	135-136
M14	CENTRAL DOOR LOCKING MOTOR LH SIDE REAR	135-136
M15	WINDOW LIFT MOTOR LH SIDE FRONT (AUTO)	118-119
M16	WINDOW LIFT MOTOR RH SIDE FRONT (AUTO)	122-123
M17	WINDOW LIFT MOTOR LH SIDE REAR	154-156
M18	WINDOW LIFT MOTOR RH SIDE REAR	158-160
R1	RESISTOR PANEL LIGHTS	81
R2	19 FL FLASHER UNIT	31-32
R3	RH REAR DOOR LOCKING SOLENOID	57-59
R4	LH REAR DOOR LOCKING SOLENOID	57-59
R5	HEATED REAR SCREEN TIMER	106-109
R6	DIM DIP RELAY	95-99
R7	FRONT FOG LAMP RELAY	102-103
R8	DIM DIP RESISTOR	92
R9	GLOW PLUG RELAY 1	18-19
R10	GLOW PLUG RELAY 2	22-23
R11	RESISTOR-INDUCTION MANIFOLD	20-21
R12	INHIBITOR RELAY (AUTO TRANSMISSION)	8-9
R13	HEADLAMP SWITCH OVERLOAD RELAY	87-88
S1	HORN PUSH	3
S2	IGNITION SWITCH	8-9
S3	GEARBOX INHIBITOR SWITCH	8
S4	FUEL CUT OFF SWITCH	13
S5	LOW BRAKE FLUID SWITCH	19
S6	HANDBRAKE ON WARNING LIGHT SWITCH	20
S7	SCREEN WASH/WIPE SWITCH	22-27
S8	REVERSE LIGHT SWITCH	29
S9	HAZARD SWITCH	31-35
S10	INDICATOR SWITCH	31-33
S11	COURTESY SWITCH RH FRONT	40
S12	COURTESY SWITCH LH FRONT	41
S13	DRIVERS INTERIOR LIGHT SWITCH	42
S14	COURTESY SWITCH LH REAR	50
S15	INTERIOR LIGHT SWITCH-PASSENGER	72
S16	INTERIOR LIGHT SWITCH-DRIVER	72
S17	COURTESY SWITCH RH REAR	43
S18	BRAKE LIGHT SWITCH	64
S19	HIRE SIGN SWITCH	47
S20	FRONT HEATER SWITCH	75
S21	REAR HEATER ON-OFF SWITCH - DRIVER	78-79
S22	REAR HEATER ON-OFF SWITCH - PASSENGER	78-79
S23	REAR HEATER HIGH-LOW SPEED SWITCH	78
S24	HEATED REAR SCREEN SWITCH	105
S25	LIGHT SWITCH	90-91
S26	HEADLAMP DIP SWITCH	90-91
S27	REAR FOG GUARD SWITCH	100
S28	FRONT FOG LAMP SWITCH	102
S29	WINDOW LIFT SWITCH LH FRONT	110-112
S30	WINDOW LIFT SWITCH RH FRONT	114-116
S31	ELECTRIC MIRROR SWITCH	146-152
S32	MICRO SWITCH-DRIVERS DOOR	137
S33	LOW WASH LEVEL SWITCH	26
S34	PANEL LIGHT SWITCH	83-84
S35	OIL PRESSURE SWITCH	18
S36	OVERDRIVE SWITCH-AUTOMATIC TRANSMISSION	45
S37	KICKDOWN SWITCH-AUTOMATIC TRANSMISSION	51-52
S38	SEDIMENTOR WARNING LIGHT SWITCH	38
S39	KEY OPERATED CENTRAL DOOR LOCKING SWITCH	137
S40	DRIVER OPERATED CENTRAL DOOR LOCKING SWITCH	137
S41	DRIVERS FUEL CUT OFF SWITCH	13
S42	BELT RELEASE SWITCH	80
S43	LOW VACUUM SWITCH	16-17
S44	WINDOW LIFT SWITCH LH FRONT (AUTO)	118-120
S45	WINDOW LIFT SWITCH RH FRONT (AUTO)	122-124
S46	WINDOW LIFT-THERMAL OVERLOAD SWITCH L H FRONT	110-111
S47	WINDOW LIFT-THERMAL OVERLOAD SWITCH RH FRONT	115-116
S48	WINDOW LIFT-THERMAL OVERLOAD SWITCH LH FRONT	116-117
S49	WINDOW LIFT-THERMAL OVERLOAD SWITCH RH FRONT	125-126
S50	WINDOW LIFT SWITCH LH SIDE REAR-PASSENGER	154-156
S51	WINDOW LIFT SWITCH RH SIDE REAR-PASSENGER	158-160
S52	WINDOW LIFT SWITCH LH SIDE REAR - DRIVER	154-156
S53	WINDOW LIFT SWITCH RH SIDE REAR- DRIVER	158-160
S54	WINDOW LIFT-THERMAL OVERLOAD SWITCH LH REAR	154-155
S55	WINDOW LIFT-THERMAL OVERLOAD SWITCH RH REAR	159-160
S56	LOW BRAKE PAD WARNING CONTACTS	14
T1	TEMPERATURE TRANSMITTER	16
T2	FUEL GAUGE TRANSMITTER (TANK UNIT)	17
T3	FUEL CUT OFF SOLENOID	13
T4	SENDER UNIT (GEARBOX)	61-63
T5	SOLENOID (INJECTION TIMING ADVANCE)	35
T6	OVERDRIVE CANCEL SOLENOID (AUTO TRANS)	42
T7	KICK DOWN SOLENOID (AUTO TRANSMISSION)	51-52
T8	BELT RELEASE SOLENOID	80
T9	TERMINAL BLOCK FOR CYGNUS TAXI METER	67-69
T10	THERMISTOR-GLOW CONTROL BOX	29



N
WG
H1
NY/NR
R9
R10
R11
NY
LGW
WS
C8
WR
NB
WU
S
YW
W
T10
N (B)
S1
S2
S3
F23
BR
R12
A1
B1
S41
L71
WP
Y
S4
M1
NB
L1
A6
PB
VE
A2
P
B
E
22
C1
L2
WN
S35
S43
L64
L3
D3
BW
D1
D2
GU
GB
T1
T2
S5
S6
SB
S56
T3
10
F1
LG
M2
C2
NLG
RLG
ULG
LGB
M10
S7
S33
L57
L66
7·5
F3
F4
F5
GY
GLG
S9
LGK
R2
LGN
S8
S10
GN
GR
L4
L5
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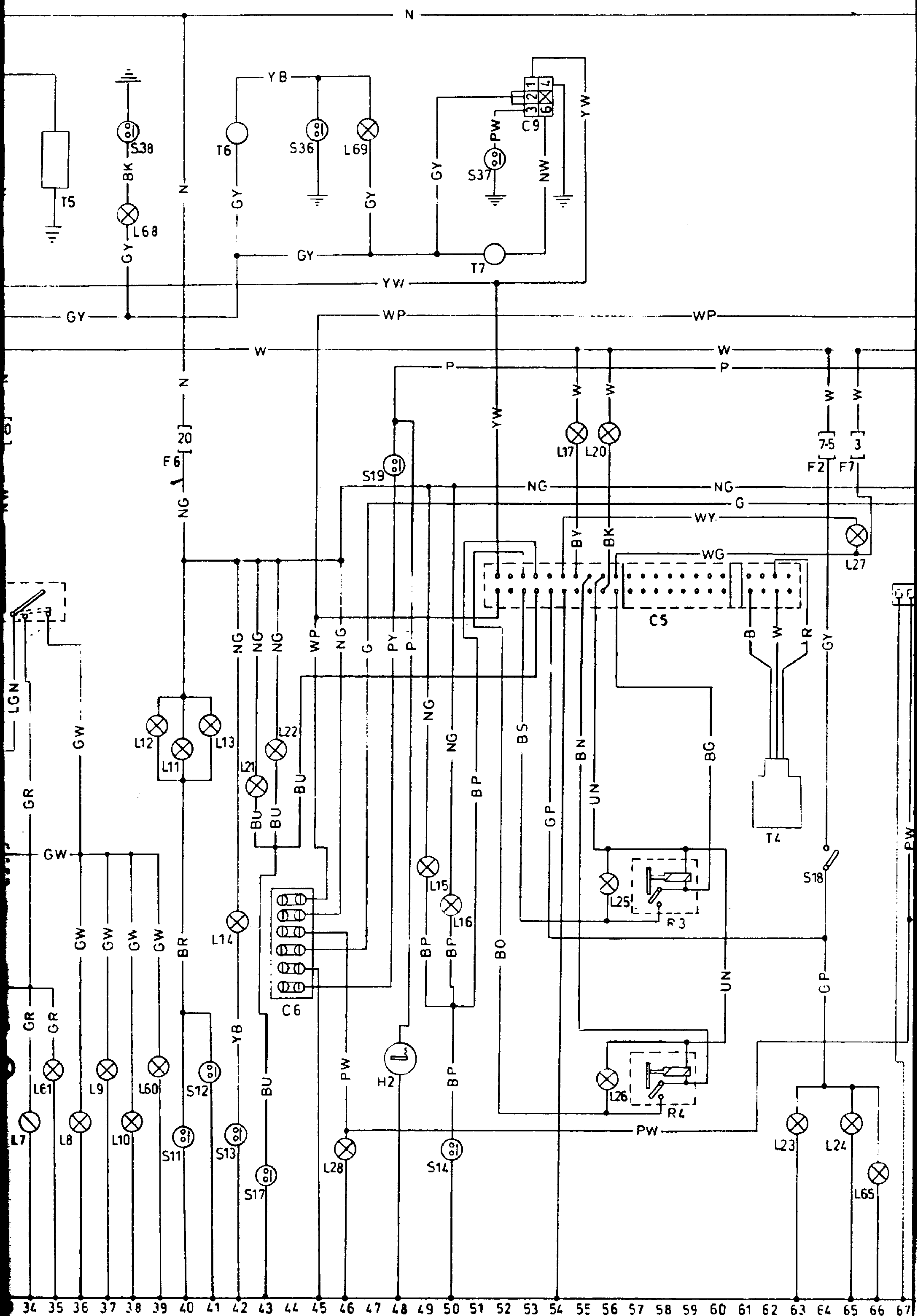

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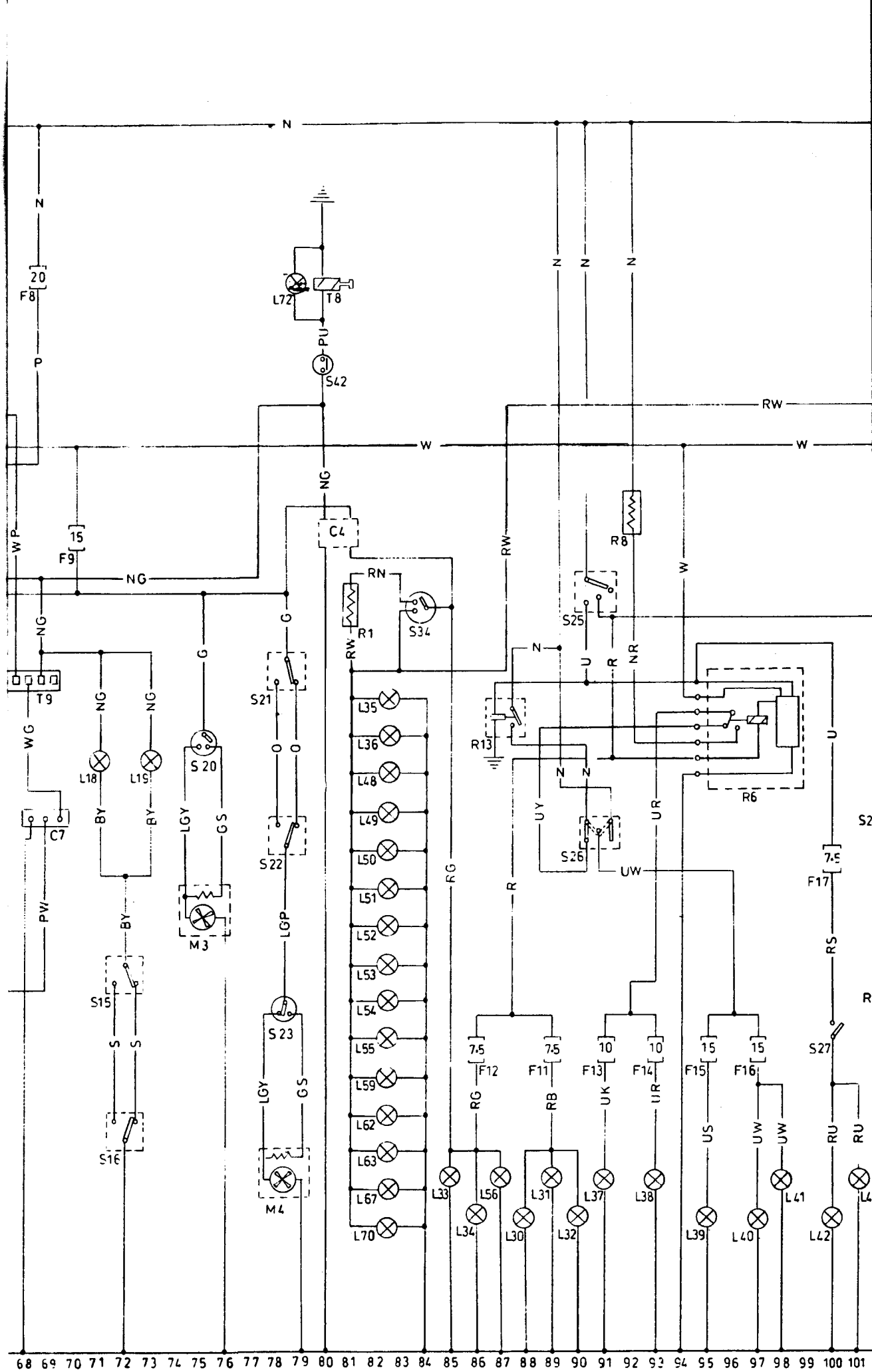
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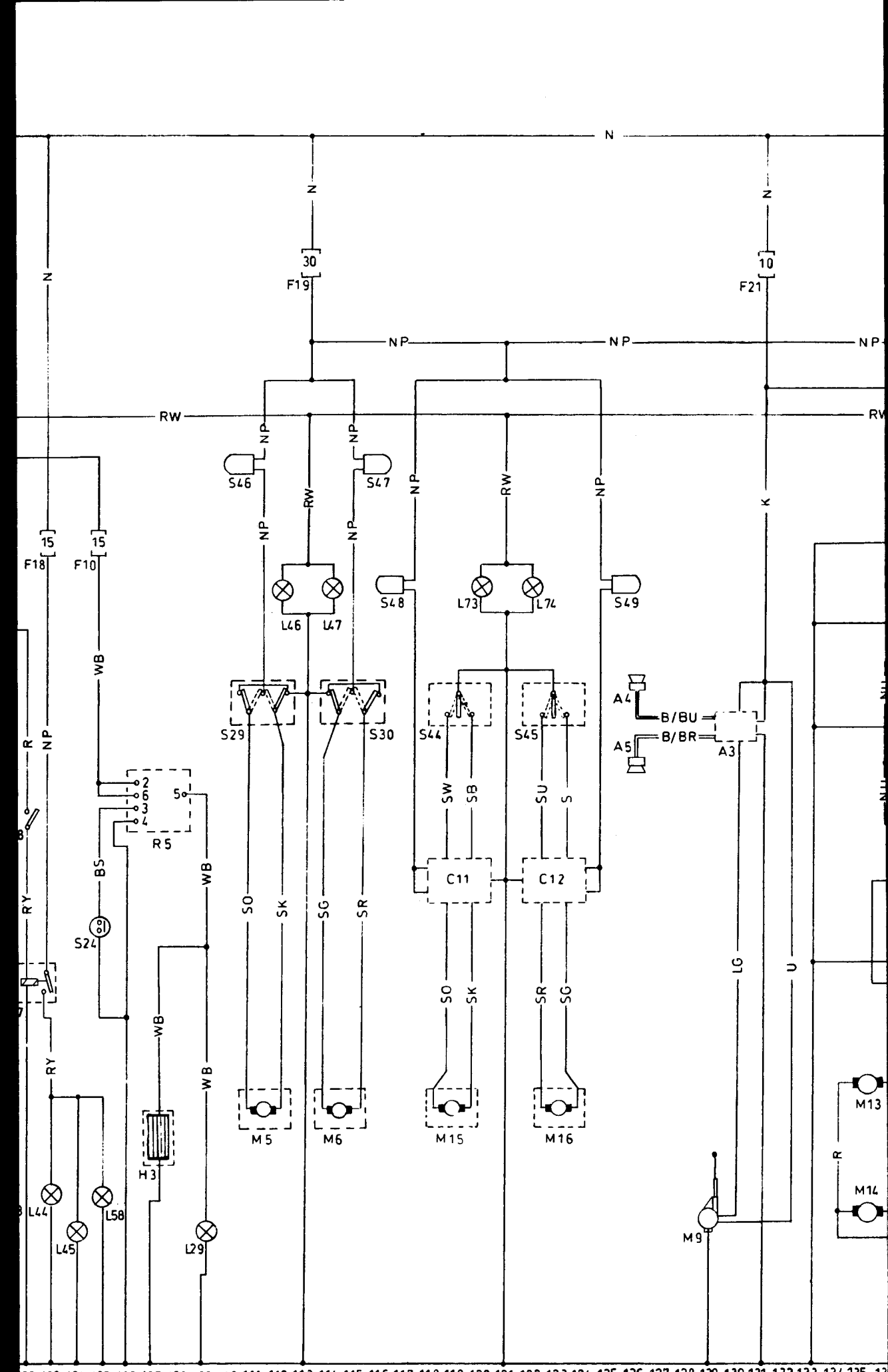
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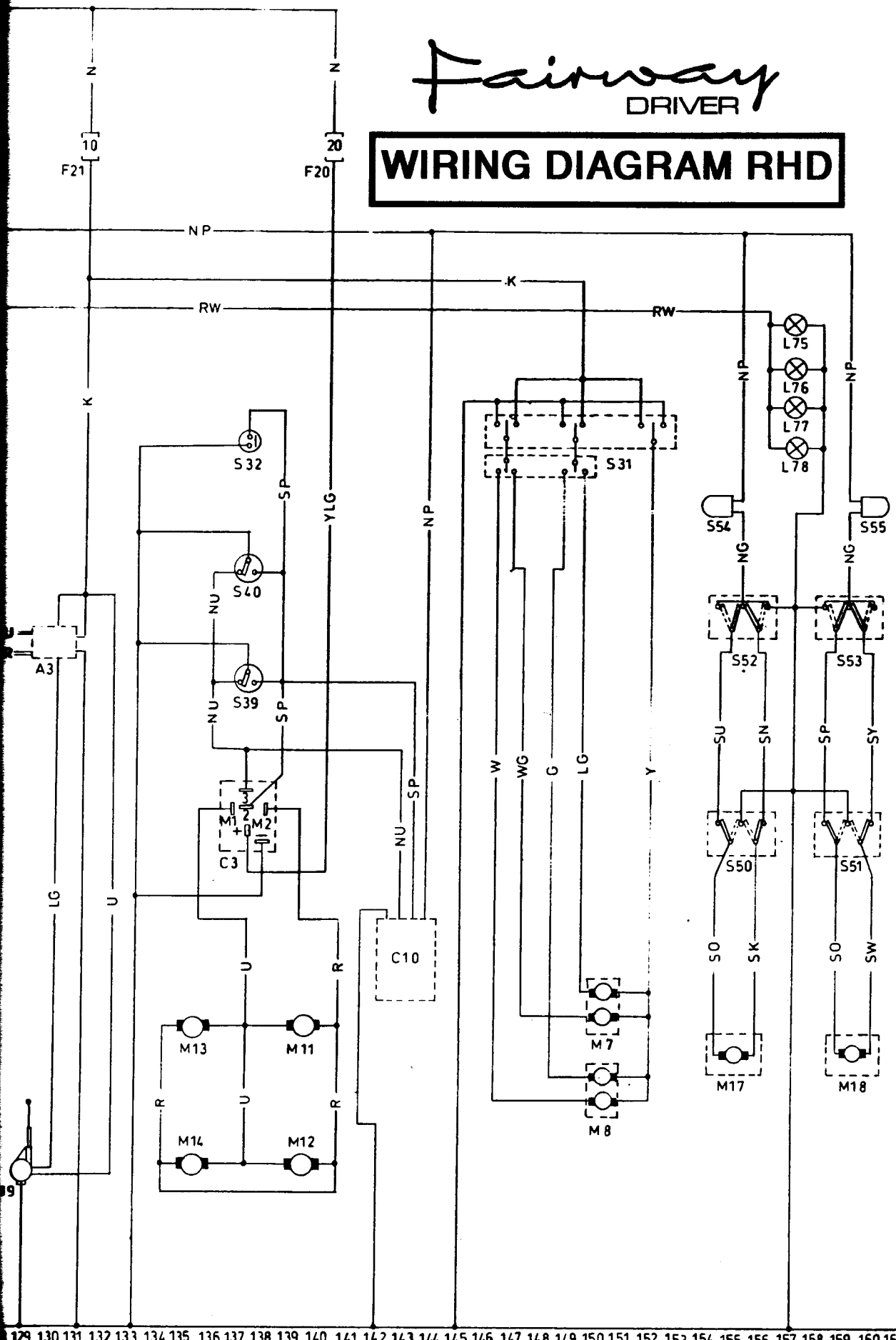
Fairway
DRIVER

WIRING DIAGRAM RHD



WIRING DIAGRAM LHD - KEY

WIRING COLOURS

B	BLACK	P	PURPLE
G	GREEN	S	SLATE/GREY
K	PINK	U	BLUE
N	BROWN	W	WHITE
O	ORANGE	Y	YELLOW

WIRING IDENTIFICATION

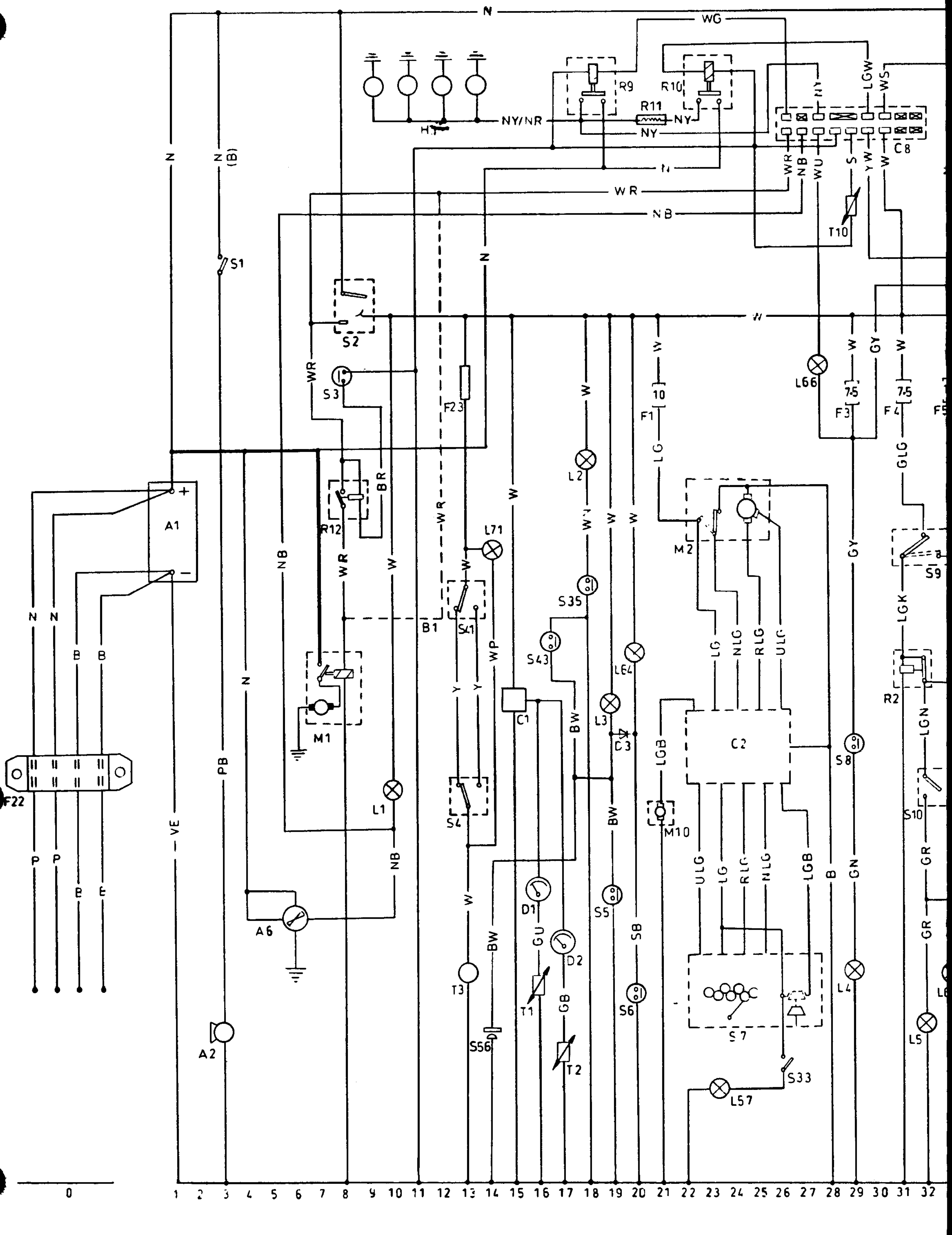
FIRST LETTER	PRIMARY COLOUR
SECOND LETTER	TRACER COLOUR
LIGHTER SHADE	PRECEDED BY LETTER L

ITEM	DESCRIPTION	LOCATION
A1	BATTERY	1
A2	HORN	3
A3	RADIO	130
A4	SPEAKER - LEFT	126
A5	SPEAKER - RIGHT	126
A6	ALTERNATOR	6
B1	LINK LEAD (MANUAL TRANSMISSION)	8-12
C1	INSTRUMENT STABILISER	15
C2	WIPER DELAY UNIT	22-26
C3	CENTRAL DOOR LOCK CONTROL BOX	137
C4	CLOCK	80-81
C5	CONTROL BOX-DOOR LOCKING	51-63
C6	TAXI METER CONNECTOR BLOCK	44
C7	TAXI METER LIGHT BOX	69
C8	GLOW CONTROL BOX	26-32
C9	KICKDOWN CONTROL BOX (AUTO TRANS)	53-54
C10	CONTROL BOX-REMOTE DOOR LOCKING	142-144
C11	CONTROL BOX-WINDOW LIFT RH FRONT (AUTO)	118-120
C12	CONTROL BOX-WINDOW LIFT LH FRONT (AUTO)	122-124
D1	TEMPERATURE GAUGE	16
D2	FUEL GAUGE	17
D3	DIODE	19-20
F1	FUSE BLOCK B7	21
F2	FUSE BLOCK B2	64
F3	FUSE BLOCK B3	29
F4	FUSE BLOCK B8	31
F5	FUSE BLOCK C7	33
F6	FUSE BLOCK C2	40
F7	FUSE BLOCK B6	65
F8	FUSE BLOCK C3	69
F9	FUSE BLOCK B4	70
F10	FUSE BLOCK B5	105
F11	FUSE BLOCK A3	89
F12	FUSE BLOCK A2	86
F13	FUSE BLOCK A5	91
F14	FUSE BLOCK A4	93
F15	FUSE BLOCK A7	95
F16	FUSE BLOCK A6	97
F17	FUSE BLOCK A8	100
F18	FUSE BLOCK C4	103
F19	FUSE BLOCK C8	113
F20	FUSE BLOCK C5	140
F21	FUSE BLOCK C6	131
F22	FUSE BOX FOR RADIO TELEPHONE	0
F23	FUSIBLE LINK	13
H1	DIESEL HEATER PLUGS	9-14
H2	CIGAR LIGHTER	48
H3	HEATED REAR SCREEN	107
L1	IGNITION WARNING LIGHT	10
L2	OIL PRESSURE WARNING LIGHT	18
L3	LOW FLUID, LOW VACUUM AND BRAKE PAD W/L	19
L4	REVERSE LIGHT	29
L5	INDICATOR LIGHT RH REAR	32
L6	INDICATOR LIGHT RH FRONT	33
L7	INDICATOR WARNING LIGHT LH SIDE	34
L8	INDICATOR WARNING LIGHT LH REAR	36
L9	INDICATOR LIGHT LH FRONT	37
L10	INDICATOR WARNING LIGHT RH SIDE	38
L11	COURTESY LIGHT - ROOF CONSOLE	40
L12	COURTESY LIGHT RH SIDE FACIA	39

ITEM	DESCRIPTION	LOCATION
L13	COURTESY LIGHT LH SIDE FACIA	41
L14	DRIVERS INTERIOR LIGHT	42
L15	COURTESY LIGHT LH REAR	49
L16	PUDDLE LIGHT LH REAR	50
L17	RH REAR DOOR NOT CLOSED WARNING LIGHT	54-55
L18	INTERIOR LIGHT-PASSENGER RH REAR	71
L19	INTERIOR LIGHT-PASSENGER LH REAR	73
L20	LH REAR DOOR NOT CLOSED WARNING LIGHT	56
L21	PUDDLE LIGHT LH REAR	42-43
L22	COURTESY LIGHT LH REAR	43
L23	BRAKE LIGHT RH SIDE	63
L24	BRAKE LIGHT LH SIDE	65
L25	DOOR LOCKED WARNING LIGHT RH REAR	56
L26	DOOR LOCKED WARNING LIGHT LH REAR	56
L27	REAR DOORS NOT CLOSED WARNING LIGHT	65
L28	HIRE SIGN LIGHT	46
L29	REAR SCREEN HEATER WARNING LIGHT	109
L30	NO PLATE LIGHT	88
L31	TAIL LIGHT RH SIDE	89
L32	SIDE LIGHT RH FRONT	90
L33	TAIL LIGHT LH SIDE	85
L34	SIDE LIGHT LH FRONT	86
L35	INSTRUMENT CLUSTER ILLUMINATION RHS	81-84
L36	INSTRUMENT CLUSTER ILLUMINATION LHS	81-84
L37	DIPPED BEAM RH SIDE	91
L38	DIPPED BEAM LH SIDE	93
L39	MAIN BEAM RH SIDE	95
L40	MAIN BEAM LH SIDE	97
L41	MAIN BEAM WARNING LIGHT	98
L42	REAR FOG GUARD	100
L43	REAR FOG GUARD WARNING LIGHT	101
L44	FOG LAMP RH SIDE	103
L45	FOG LAMP LH SIDE	104
L46	WINDOW LIFT SWITCH ILLUMINATION RH SIDE	112
L47	WINDOW LIFT SWITCH ILLUMINATION LH SIDE	114
L48	REAR FOG GUARD & HEATED REAR SCREEN-SWITCH ILLUMINATION	82-83
L49	DRIVERS INTERIOR LIGHT SWITCH-ILLUMINATION (FRONT)	82-83
L50	HIRE SIGN SWITCH ILLUMINATION	82-83
L51	FRONT HEATER SWITCH ILLUMINATION	82-83
L52	DRIVERS REAR HEATER ON-OFF SWITCH-ILLUMINATION	82-83
L53	PASSENGERS REAR HEATER ON-OFF SWITCH-ILLUMINATION	82-83
L54	REAR HEATER HIGH-LOW SPEED SWITCH-ILLUMINATION	82-83
L55	DRIVERS INTERIOR LIGHT SWITCH-ILLUMINATION (REAR)	82-83
L56	SIDE LIGHTS ON WARNING LIGHT	87
L57	LOW WASHER FLUID WARNING LIGHT	23
L58	FOG LAMP WARNING LIGHT	105
L59	CIGAR LIGHTER ILLUMINATION	82-83
L60	INDICATOR REPEATER LH SIDE	39
L61	INDICATOR REPEATER RH SIDE	35
L62	AUTO GEAR SELECTOR ILLUMINATION	82-83
L63	ASHTRAY ILLUMINATION	82-83
L64	HANDBRAKE ON WARNING LIGHT	20
L65	HIGH LEVEL BRAKE LIGHT	66
L66	GLOW PLUG WARNING LIGHT	27-28
L67	PANEL LIGHT SWITCH ILLUMINATION	82-83
L68	SEDIMENTOR WARNING LIGHT	37-38
L69	OVERDRIVE WARNING LIGHT	46-47
L70	DRIVERS CENTRAL DOOR LOCKING SWITCH-ILLUMINATION	82-83
L71	FUEL SWITCH OFF WARNING LIGHT	14
L72	BELT RELEASED WARNING LIGHT (WHEEL CHAIR)	79

8c WIRING DIAGRAM LHD-KEY

ITEM	DESCRIPTION	LOCATION
L73	WINDOW LIFT SWITCH ILLUMINATION LHS (AUTO)	120
L74	WINDOW LIFT SWITCH ILLUMINATION RHS (AUTO)	122
L75	REAR WINDOW LIFT SWITCH ILLUMINATION RH SIDE-DRIVER	157
L76	REAR WINDOW LIFT SWITCH ILLUMINATION LH SIDE-DRIVER	157
L77	REAR WINDOW LIFT SWITCH ILLUMINATION RH SIDE-PASSENGER	157
L78	REAR WINDOW LIFT SWITCH ILLUMINATION LH SIDE-PASSENGER	157
M1	STARTER MOTOR	6-8
M2	FRONT SCREEN WIPER MOTOR	22-25
M3	FRONT HEATER	74-76
M4	REAR HEATER	78-79
M5	WINDOW LIFT MOTOR RH SIDE FRONT	111-112
M6	WINDOW LIFT MOTOR LH SIDE FRONT	114-115
M7	ELECTRICALLY OPERATED DOOR MIRROR RH SIDE	150-151
M8	ELECTRICALLY OPERATED DOOR MIRROR LH SIDE	150-151
M9	ELECTRICALLY OPERATED AERIAL	129
M10	FRONT SCREEN WASH MOTOR	21
M11	CENTRAL DOOR LOCKING MOTOR LH SIDE FRONT	139-140
M12	CENTRAL DOOR LOCKING MOTOR LH SIDE REAR	139-140
M13	CENTRAL DOOR LOCKING MOTOR RH SIDE FRONT	135-136
M14	CENTRAL DOOR LOCKING MOTOR RH SIDE REAR	135-136
M15	WINDOW LIFT MOTOR RH SIDE FRONT (AUTO)	118-119
M16	WINDOW LIFT MOTOR LH SIDE FRONT (AUTO)	122-123
M17	WINDOW LIFT MOTOR RH SIDE REAR	154-156
M18	WINDOW LIFT MOTOR LH SIDE REAR	158-160
R1	RESISTOR PANEL LIGHTS	81
R2	19 FL FLASHER UNIT	31-32
R3	LH REAR DOOR LOCKING SOLENOID	57-59
R4	RH REAR DOOR LOCKING SOLENOID	57-59
R5	HEATED REAR SCREEN TIMER	106-109
R6	DIM DIP RELAY	95-99
R7	FRONT FOG LAMP RELAY	102-103
R8	DIM DIP RESISTOR	92
R9	GLOW PLUG RELAY 1	18-19
R10	GLOW PLUG RELAY 2	22-23
R11	RESISTOR-INDUCTION MANIFOLD	20-21
R12	INHIBITOR RELAY (AUTO TRANSMISSION)	8-9
R13	HEADLAMP SWITCH OVERLOAD RELAY	87-88
S1	HORN PUSH	3
S2	IGNITION SWITCH	8-9
S3	GEARBOX INHIBITOR SWITCH	8
S4	FUEL CUT OFF SWITCH	13
S5	LOW BRAKE FLUID SWITCH	19
S6	HANDBRAKE ON WARNING LIGHT SWITCH	20
S7	SCREEN WASH/WIPE SWITCH	22-27
S8	REVERSE LIGHT SWITCH	29
S9	HAZARD SWITCH	31-35
S10	INDICATOR SWITCH	31-33
S11	COURTESY SWITCH LH FRONT	40
S12	COURTESY SWITCH RH FRONT	41
S13	DRIVERS INTERIOR LIGHT SWITCH	42
S14	COURTESY SWITCH RH REAR	50
S15	INTERIOR LIGHT SWITCH-PASSENGER	72
S16	INTERIOR LIGHT SWITCH-DRIVER	72
S17	COURTESY SWITCH LH REAR	43
S18	BRAKE LIGHT SWITCH	64
S19	HIRE SIGN SWITCH	47
S20	FRONT HEATER SWITCH	75
S21	REAR HEATER ON-OFF SWITCH - DRIVER	78-79
S22	REAR HEATER ON-OFF SWITCH - PASSENGER	78-79
S23	REAR HEATER HIGH-LOW SPEED SWITCH	78
S24	HEATED REAR SCREEN SWITCH	105
S25	LIGHT SWITCH	90-91
S26	HEADLAMP DIP SWITCH	90-91
S27	REAR FOG GUARD SWITCH	100
S28	FRONT FOG LAMP SWITCH	102
S29	WINDOW LIFT SWITCH RH FRONT	110-112
S30	WINDOW LIFT SWITCH LH FRONT	114-116
S31	ELECTRIC MIRROR SWITCH	146-152
S32	MICRO SWITCH-DRIVERS DOOR	137
S33	LOW WASH LEVEL SWITCH	26
S34	PANEL LIGHT SWITCH	83-84
S35	OIL PRESSURE SWITCH	18
S36	OVERDRIVE SWITCH-AUTOMATIC TRANSMISSION	45
S37	KICKDOWN SWITCH-AUTOMATIC TRANSMISSION	51-52
S38	SEDIMENTOR WARNING LIGHT SWITCH	38
S39	KEY OPERATED CENTRAL DOOR LOCKING SWITCH	137
S40	DRIVER OPERATED CENTRAL DOOR LOCKING SWITCH	137
S41	DRIVERS FUEL CUT OFF SWITCH	13
S42	BELT RELEASE SWITCH	80
S43	LOW VACUUM SWITCH	16-17
S44	WINDOW LIFT SWITCH RH FRONT (AUTO)	118-120
S45	WINDOW LIFT SWITCH LH FRONT (AUTO)	122-124
S46	WINDOW LIFT-THERMAL OVERLOAD SWITCH R H FRONT	110-111
S47	WINDOW LIFT-THERMAL OVERLOAD SWITCH LH FRONT	115-116
S48	WINDOW LIFT-THERMAL OVERLOAD SWITCH RH FRONT	116-117
S49	WINDOW LIFT-THERMAL OVERLOAD SWITCH LH FRONT	125-126
S50	WINDOW LIFT SWITCH RH SIDE REAR-PASSENGER	154-156
S51	WINDOW LIFT SWITCH LH SIDE REAR-PASSENGER	158-160
S52	WINDOW LIFT SWITCH RH SIDE REAR - DRIVER	154-156
S53	WINDOW LIFT SWITCH LH SIDE REAR- DRIVER	158-160
S54	WINDOW LIFT-THERMAL OVERLOAD SWITCH RH REAR	154-155
S55	WINDOW LIFT-THERMAL OVERLOAD SWITCH LH REAR	159-160
S56	LOW BRAKE PAD WARNING CONTACTS	14
T1	TEMPERATURE TRANSMITTER	16
T2	FUEL GAUGE TRANSMITTER (TANK UNIT)	17
T3	FUEL CUT OFF SOLENOID	13
T4	SENDER UNIT (GEARBOX)	61-63
T5	SOLENOID (INJECTION TIMING ADVANCE)	35
T6	OVERDRIVE CANCEL SOLENOID (AUTO TRANS)	42
T7	KICK DOWN SOLENOID (AUTO TRANSMISSION)	51-52
T8	BELT RELEASE SOLENOID	80
T9	TERMINAL BLOCK FOR CYGNUS TAXI METER	67-69
T10	THERMISTOR-GLOW CONTROL BOX	29



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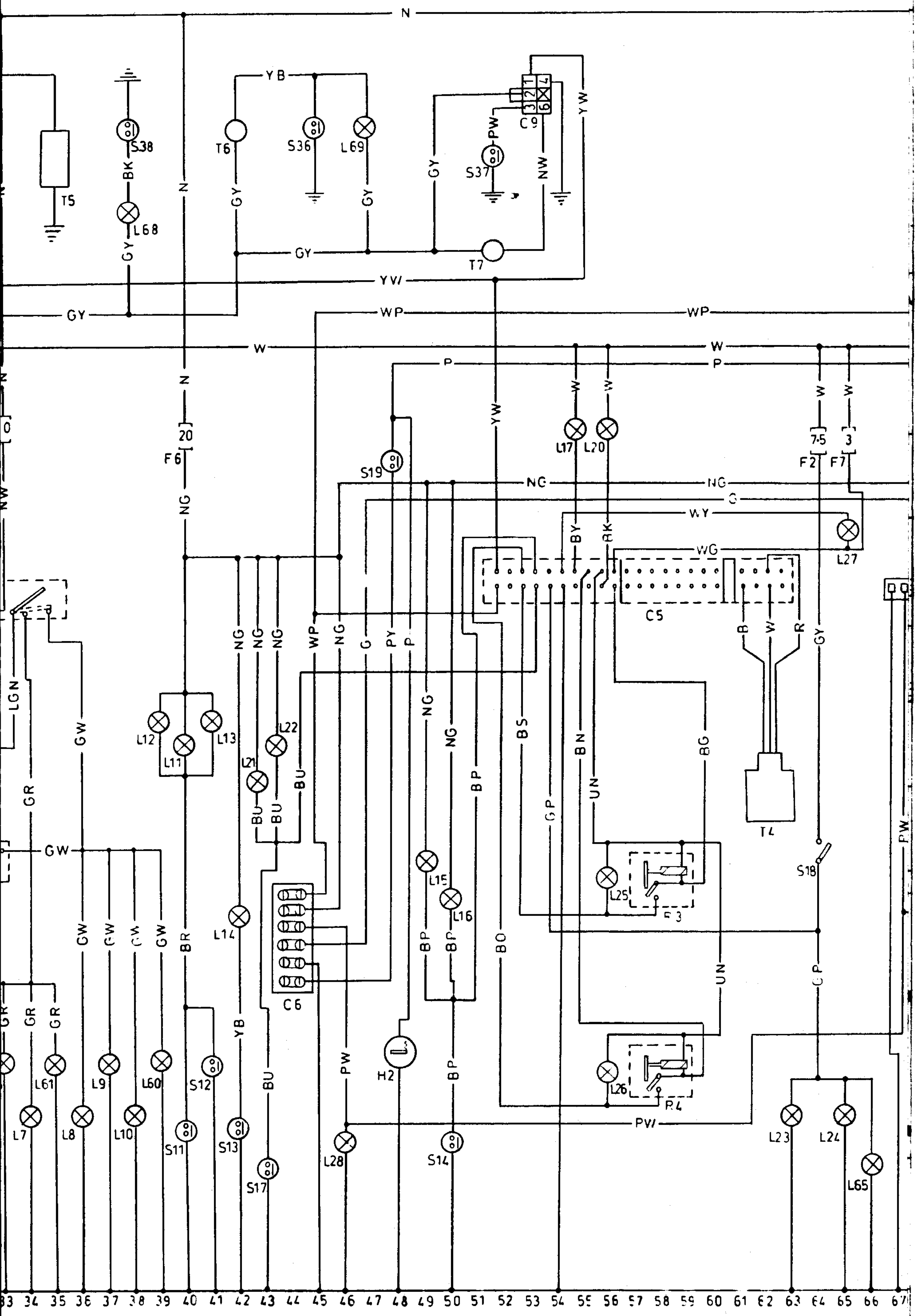

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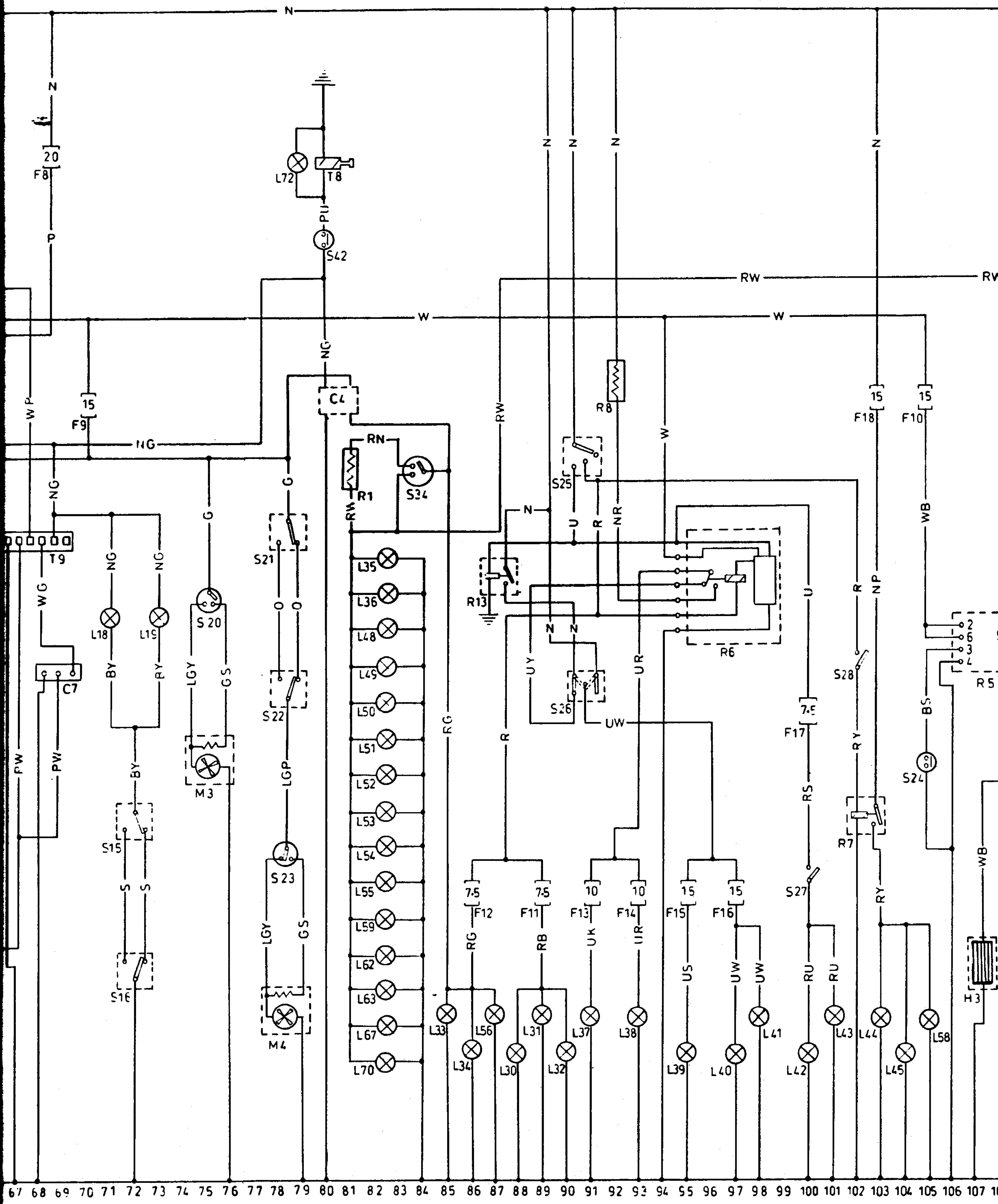

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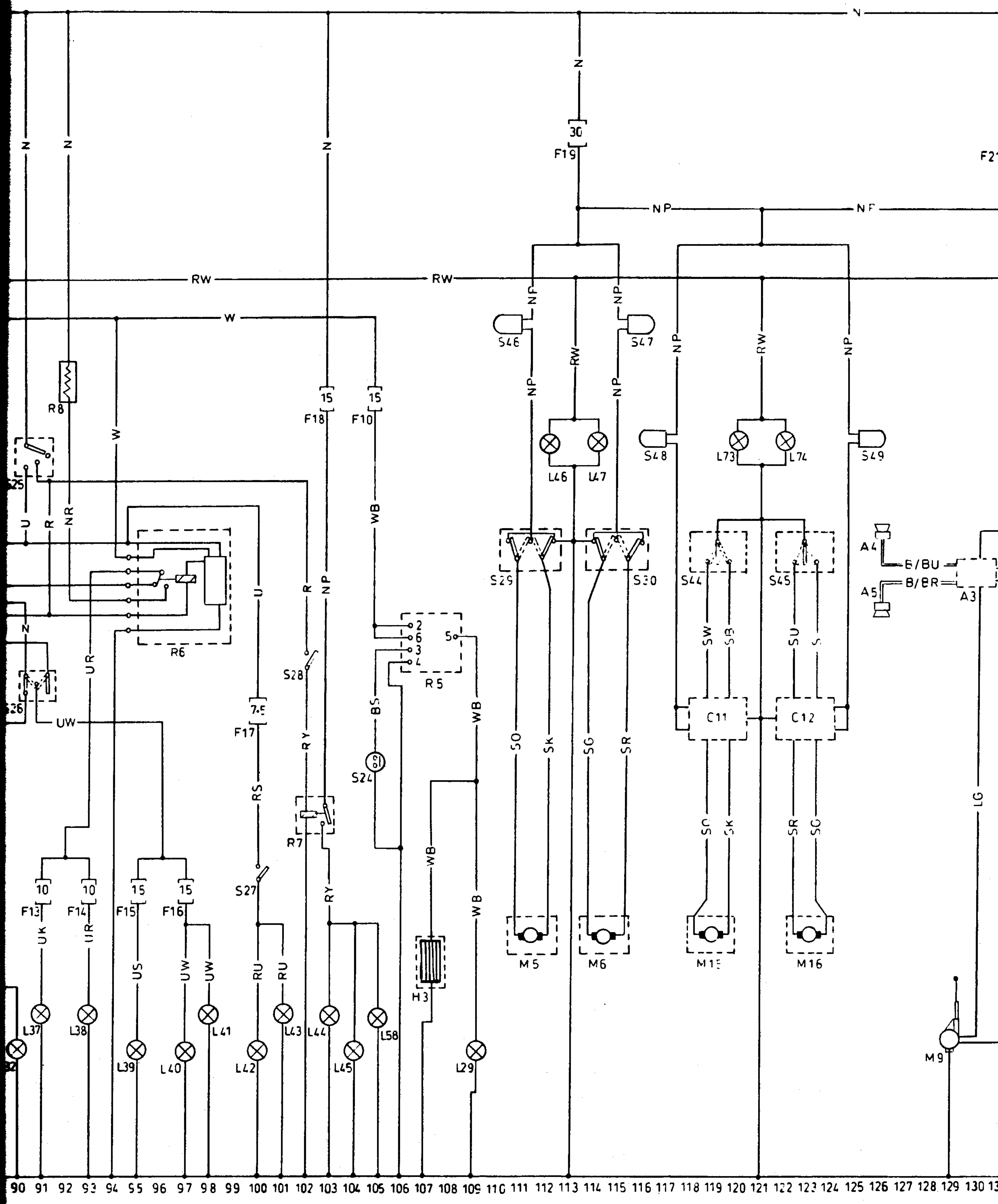
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Fairway DRIVER

WIRING DIAGRAM LHD