

Spider Gtv

VOLUME III

REPAIR INSTRUCTIONS

ELECTRIC SYSTEMS

55

ELECTRIC SYSTEM DIAGNOSIS

55

up to "April '97" cars

VARIANTS FOR



up to "April '97" cars

VARIANTS FOR



up to "April '97" cars

Alfa Romeo 



VOLUME III

REPAIR INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontespice | |
| 9 (9/1998) | Spider-Gtv | | Index | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 9 (9/1998) | Spider-Gtv | 55 | 12 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 12/1 to 12/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 16 | |
| 9 (9/1998) | Spider-Gtv | 55 | 21 to 22 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 22/1 to 22/2 |
| 7 (4/1997) | Spider-Gtv | 55 | 25 | |
| 8 (3/1998) | Spider-Gtv | 55 | 26 | |
| 8 (3/1998) | Spider-Gtv | 55 | | 26/1 |
| 9 (9/1998) | Spider-Gtv | 55 | 26/2 | |
| 9 (9/1998) | Spider-Gtv | 55 | 27 to 30 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 30/1 to 30/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 31 | |
| 8 (3/1998) | Spider-Gtv | 55 | 34 to 35 | |
| 7 (4/1997) | Spider-Gtv | 55 | 37 | |
| 8 (3/1998) | Spider-Gtv | 55 | 38 to 39 | |
| 9 (9/1998) | Spider-Gtv | 55 | 40 to 44 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 45 to 46 |
| 6 (9/1996) | Spider-Gtv | 55 | Index I | |
| 6 (9/1996) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 10 (11/1999) | Spider-Gtv | 55-20 | 1 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | 2 to 9 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | | 10 to 12 ANNULLED |
| 6 (9/1996) | Spider-Gtv | 55-23 | 13 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | | 2/1 to 2/2 |
| 6 (9/1996) | Spider-Gtv | 55-27 | 3 to 4 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |

(continued)

UPDATE CARD

Spider

Gtv

VOLUME III

REPAIR
INSTRUCTIONS

(continued)

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |
| (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | Index | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | | 1 to 13 |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | | 1 to 6 |

| UPDATE CARD | | | | |
|----------------------------------|----------------|---------|---------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | | 1 to 5 |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | | 1 to 12 |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | | 1 to 17 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | | 1 to 12 |
| VOLUME III SECTION II | | | | |
| 8 (3/1998) | Spider-Gtv | - | | Frontespice |
| 7 (4/1997) | Spider-Gtv '97 | - | | Index |
| 7 (4/1997) | Spider-Gtv '97 | 55-1 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-2 | | 1 to 13 |
| 7 (4/1997) | Spider-Gtv '97 | 55-3 | | 1 to 15 |
| 7 (4/1997) | Spider-Gtv '97 | 55-4 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-5 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-6 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-7 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-8 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-9 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-10 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-11 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-12 | | 1 to 7 |
| 7 (4/1997) | Spider-Gtv '97 | 55-13 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv '97 | 55-14 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-15 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-17 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-19 | | 1 to 6 |
| 10 (11/1999) | Spider-Gtv '97 | 55-20 | 1 to 4 | |
| 7 (4/1997) | Spider-Gtv '97 | 55-20 | | 5 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-21 | | 1 to 5 |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | 1 to 12 | |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | | 13 to 16 ANNULLED |
| 7 (4/1997) | Spider-Gtv '97 | 55-24 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-25 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-26 | | 1 to 28 |
| 7 (4/1997) | Spider-Gtv '97 | 55-27 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-28 | | 1 to 24 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29B | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29C | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29D | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-31 | | 1 to 11 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A1 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A2 | | 1 to 78 |

(continued)



VOLUME III

REPAIR INSTRUCTIONS

UPDATE CARD

(continued)

| UPDATE CARD | | | | |
|--------------------|-----------------------|--------------|-----------------|-----------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 11 (7/2000) | Spider-Gtv '98 | | Index | |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 1 |
| 11 (7/2000) | Spider-Gtv '98 | 55-1 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 3 |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | | 4/1 |
| 11 (7/2000) | Spider-Gtv '98 | 55-1 | 4/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-1 | 5 to 6 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 1 to 3 |
| 11 (7/2000) | Spider-Gtv '98 | 55-2 | 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-2 | 4/1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | | 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | 5 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | | 6/1 to 6/2 |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 7 to 8 |
| 11 (7/2000) | Spider-Gtv '98 | 55-2 | 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 10 |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | 11 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 12 |
| 9 (9/1998) | Spider-Gtv '98 | 55-3 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | 3 to 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | | 4/1 to 4/2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-3 | 5 to 7 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | 8 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-3 | 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-3 | | 10 to 12 |
| 11 (7/2000) | Spider-Gtv '98 | 55-3 | 13 to 14 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-3 | | 15 to 16 |
| 11 (7/2000) | Spider-Gtv '98 | 55-4 | 1 to 5 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-4 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-5 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | 3 to 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | | 5 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-6 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | 3 to 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-7 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-7 | | 2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-7 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-7 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-8 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-8 | | 2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-8 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-8 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-9 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | | 7 to 8 |
| 11 (7/2000) | Spider-Gtv '98 | 55-10 | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-10 | 2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-10 | 3 to 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-10 | | 5 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-10 | | 3 |

| UPDATE CARD | | | | |
|--------------------|-----------------------|---------------|-------------------|-----------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 9 (9/1998) | Spider-Gtv '98 | 55-11 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-11 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-11 | | 3 to 5 |
| 9 (9/1998) | Spider-Gtv '98 | 55-12 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-12 | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-12 | | 5 to 7 |
| 11 (7/2000) | Spider-Gtv '98 | 55-13 | 1 to 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-13 | 3 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-13 | 4 to 14 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-13 | | 15 to 18 |
| 11 (7/2000) | Spider-Gtv '98 | 55-14 | 1 to 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-14 | 4/1 to 4/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-14 | 5 to 6 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-14 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-15 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-15 | | 2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-15 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-15 | | 7 to 8 |
| 11 (7/2000) | Spider-Gtv '98 | 55-16 | | 1 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-17 | | 2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-17 | 3 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-17 | 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | | 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-18 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18 | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18 | | 5 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 1 to 7 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18A | 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 9 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18A | 10 to 16 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 17 |
| 11 (7/2000) | Spider-Gtv '98 | 55-19 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-19 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-19 | 3 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-19 | 4 to 7 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-19 | | 8 to 10 |
| 10 (11/1999) | Spider-Gtv '98 | 55-20 | 1 to 2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-20 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-20 | | 9 to 10 |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-21 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | 3 to 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-22 | 1 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-22A | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-22A | 2 to 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-22B | 1 to 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-22B | | 5 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-23 | | 2 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 7 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-23 | 8 to 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 10 | |

UPDATE CARD



VOLUME III

REPAIR INSTRUCTIONS

(continued)

| UPDATE CARD | | | | |
|--------------------|-----------------------|--------------|---------------------|---------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | | 11 |
| 9 (9/1998) | Spider-Gtv '98 | 55-24 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-24 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-24 | | 3 to 4 |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 1 to 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 4 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | | 4/1 |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 4/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | | 4/3 to 4/4 |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 5 to 6 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 6/1 to 6/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 7 to 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 9 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 10 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 10/1 to 10/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | | 10/3 to 10/4 |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 11 to 12 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 12/1 to 12/2 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 13 to 14 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | | 14/1 to 14/2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-26 | 15 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 16 to 18 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-27 | | 1 to 4 |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-28 | 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 4 |
| 11 (7/2000) | Spider-Gtv '98 | 55-28 | 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-28 | 6 to 7 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-28 | 8 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-28 | | 8/1 to 8/2 |
| 11 (7/2000) | Spider-Gtv '98 | 55-28 | 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 10 to 11 |
| 11 (7/2000) | Spider-Gtv '98 | 55-28 | 12 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29A | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 2 to 3 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-29A | | 4 to 5 |

| UPDATE CARD | | | | |
|--------------------|------------------------|---------------|---------------|----------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 6 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29A | 7 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29B | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29B | 2 to 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29B | | 4 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29B | 7 to 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29C | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29C | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29C | | 5 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29C | 9 to 10 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29D | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29D | 2 to 3 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-29D | | 4 to 5 |
| 9 (9/1998) | Spider-Gtv '98 | 55-29D | 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29D | 7 to 8 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-29E | | 1 to 10 |
| 11 (7/2000) | Spider-Gtv '98 | 55-29F | | 1 to 10 |
| 11 (7/2000) | Spider-Gtv '98 | 55-31 | 1 to 6 | |
| 9 (3/1998) | Spider-Gtv '98 | 55-32 | 1 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-32 | 2 | |
| 9 (3/1998) | Spider-Gtv '98 | 55-32 | 3 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-32 | 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-A1 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-A1 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-A1 | 3 to 4 | |
| 11 (7/2000) | Spider-Gtv '98 | 55-A2 | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-A2 | 1 to 83 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-A2 | | 84 to 94 |
| 11 (7/2000) | Spider-Gtv 2000 | 55-A1b | | 1 to 4 |
| 11 (7/2000) | Spider-Gtv 2000 | 55-A2b | | 1 to 68 |



VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontespice | |
| 9 (9/1998) | Spider-Gtv | | Index | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 9 (9/1998) | Spider-Gtv | 55 | 12 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 12/1 to 12/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 16 | |
| 9 (9/1998) | Spider-Gtv | 55 | 21 to 22 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 22/1 to 22/2 |
| 7 (4/1997) | Spider-Gtv | 55 | 25 | |
| 8 (3/1998) | Spider-Gtv | 55 | 26 | |
| 8 (3/1998) | Spider-Gtv | 55 | | 26/1 |
| 9 (9/1998) | Spider-Gtv | 55 | 26/2 | |
| 9 (9/1998) | Spider-Gtv | 55 | 27 to 30 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 30/1 to 30/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 31 | |
| 8 (3/1998) | Spider-Gtv | 55 | 34 to 35 | |
| 7 (4/1997) | Spider-Gtv | 55 | 37 | |
| 8 (3/1998) | Spider-Gtv | 55 | 38 to 39 | |
| 9 (9/1998) | Spider-Gtv | 55 | 40 to 44 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 45 to 46 |
| 6 (9/1996) | Spider-Gtv | 55 | Index I | |
| 6 (9/1996) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |

| UPDATE CARD | | | | |
|------------------|------------|---------|----------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 10 (11/1999) | Spider-Gtv | 55-20 | 1 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | 2 to 9 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | | 10 to 12 ANNULLED |
| 6 (9/1996) | Spider-Gtv | 55-23 | 13 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | | 2/1 to 2/2 |
| 6 (9/1996) | Spider-Gtv | 55-27 | 3 to 4 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |

(continued)

UPDATE CARD



VOLUME III

REPAIR INSTRUCTIONS

(continued)

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |
| (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | Index | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | | 1 to 13 |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | | 1 to 6 |

| UPDATE CARD | | | | |
|----------------------------------|----------------|---------|---------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | | 1 to 5 |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | | 1 to 12 |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | | 1 to 17 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | | 1 to 12 |
| VOLUME III SECTION II | | | | |
| 8 (3/1998) | Spider-Gtv | - | | Frontespice |
| 7 (4/1997) | Spider-Gtv '97 | - | | Index |
| 7 (4/1997) | Spider-Gtv '97 | 55-1 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-2 | | 1 to 13 |
| 7 (4/1997) | Spider-Gtv '97 | 55-3 | | 1 to 15 |
| 7 (4/1997) | Spider-Gtv '97 | 55-4 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-5 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-6 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-7 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-8 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-9 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-10 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-11 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-12 | | 1 to 7 |
| 7 (4/1997) | Spider-Gtv '97 | 55-13 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv '97 | 55-14 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-15 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-17 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-19 | | 1 to 6 |
| 10 (11/1999) | Spider-Gtv '97 | 55-20 | 1 to 4 | |
| 7 (4/1997) | Spider-Gtv '97 | 55-20 | | 5 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-21 | | 1 to 5 |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | 1 to 12 | |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | | 13 to 16 ANNULLED |
| 7 (4/1997) | Spider-Gtv '97 | 55-24 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-25 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-26 | | 1 to 28 |
| 7 (4/1997) | Spider-Gtv '97 | 55-27 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-28 | | 1 to 24 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29B | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29C | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29D | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-31 | | 1 to 11 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A1 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A2 | | 1 to 78 |

(continued)



VOLUME III

REPAIR INSTRUCTIONS

UPDATE CARD

(continued)

| UPDATE CARD | | | | |
|---------------|----------------|---------|----------|------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 10 (11/1999) | Spider-Gtv '98 | | Index | |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 3 |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | | 4/1 to 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-1 | 5 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 1 to 3 |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | | 4/1 to 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | 5 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | | 6/1 to 6/2 |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 7 to 10 |
| 10 (11/1999) | Spider-Gtv '98 | 55-2 | 11 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 12 |
| 9 (9/1998) | Spider-Gtv '98 | 55-3 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | 3 to 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | | 4/1 to 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | 5 to 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-3 | | 10 to 12 |
| 10 (11/1999) | Spider-Gtv '98 | 55-3 | 13 to 14 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-4 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-4 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-4 | | 3 to 5 |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-5 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | 3 to 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-5 | | 5 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-6 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | 3 to 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-6 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-7 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-7 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-7 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-7 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-8 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-8 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-8 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-8 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-9 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-9 | | 7 to 8 |
| 9 (9/1998) | Spider-Gtv '98 | 55-10 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-10 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-10 | | 3 |
| 10 (11/1999) | Spider-Gtv '98 | 55-10 | 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-11 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-11 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-11 | | 3 to 5 |
| 9 (9/1998) | Spider-Gtv '98 | 55-12 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-12 | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-12 | | 5 to 7 |

| UPDATE CARD | | | | |
|---------------|----------------|---------|----------|------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 9 (9/1998) | Spider-Gtv '98 | 55-13 | | 1 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-13 | 7 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-13 | | 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-13 | 9 to 11 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-13 | | 12 to 13 |
| 10 (11/1999) | Spider-Gtv '98 | 55-13 | | 14 |
| 10 (11/1999) | Spider-Gtv '98 | 55-14 | 1 to 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-14 | | 4 |
| 10 (11/1999) | Spider-Gtv '98 | 55-14 | | 4/1 to 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-14 | 5 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-14 | | 6 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-15 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-15 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-15 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-15 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-17 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | 3 to 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-17 | | 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-18 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18 | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18 | | 5 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 1 to 7 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18A | 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 9 |
| 10 (11/1999) | Spider-Gtv '98 | 55-18A | 10 to 16 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-18A | | 17 |
| 10 (11/1999) | Spider-Gtv '98 | 55-19 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-19 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-19 | 3 to 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-19 | | 7 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-20 | 1 to 8 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-20 | | 9 to 10 |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | 1 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-21 | | 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | 3 to 5 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-21 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-22 | 1 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-22A | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-22A | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-22B | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-22B | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-23 | | 2 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 7 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-23 | 8 to 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | 10 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-23 | | 11 |
| 9 (9/1998) | Spider-Gtv '98 | 55-24 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-24 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-24 | | 3 to 4 |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 2 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 4 |

UPDATE CARD

*Spider
Gtv*

VOLUME III

REPAIR
INSTRUCTIONS

(continued)

| UPDATE CARD | | | | |
|------------------|----------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | | 4/1 to 4/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 5 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | | 6/1 to 6/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 7 to 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 9 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 10 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | | 10/1 to 10/2 |
| 9 (9/1998) | Spider-Gtv '98 | 55-26 | | 11 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 12 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | | 12/1 to 12/2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-26 | 13 to 18 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-27 | | 1 to 4 |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-28 | 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 4 |
| 10 (11/1999) | Spider-Gtv '98 | 55-28 | 5 to 9 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-28 | | 10 to 12 |
| 9 (9/1998) | Spider-Gtv '98 | 55-29A | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 2 to 3 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-29A | | 4 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 5 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-29A | | 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-29A | 7 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29A | 8 | |

| UPDATE CARD | | | | |
|------------------|----------------|---------|---------|----------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 9 (9/1998) | Spider-Gtv '98 | 55-29B | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29B | 2 to 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29B | | 4 to 6 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29B | 7 to 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29C | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29C | 2 to 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29C | | 5 to 8 |
| 10 (11/1999) | Spider-Gtv '98 | 55-29C | 9 to 10 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-29D | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29D | 2 to 3 | |
| 8 (3/1998) | Spider-Gtv '98 | 55-29D | | 4 to 5 |
| 9 (9/1998) | Spider-Gtv '98 | 55-29D | 6 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-29D | 7 to 8 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-31 | | 1 |
| 10 (11/1999) | Spider-Gtv '98 | 55-31 | 2 to 3 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-31 | | 4 to 5 |
| 9 (3/1998) | Spider-Gtv '98 | 55-32 | 1 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-32 | 2 | |
| 9 (3/1998) | Spider-Gtv '98 | 55-32 | 3 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-32 | 4 | |
| 9 (9/1998) | Spider-Gtv '98 | 55-A1 | | 1 to 2 |
| 10 (11/1999) | Spider-Gtv '98 | 55-A1 | 3 to 4 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-A2 | 1 to 83 | |
| 10 (11/1999) | Spider-Gtv '98 | 55-A2 | | 84 to 94 |



VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontespice | |
| 9 (9/1998) | Spider-Gtv | | Index | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 9 (9/1998) | Spider-Gtv | 55 | 12 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 12/1 to 12/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 16 | |
| 9 (9/1998) | Spider-Gtv | 55 | 21 to 22 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 22/1 to 22/2 |
| 7 (4/1997) | Spider-Gtv | 55 | 25 | |
| 8 (3/1998) | Spider-Gtv | 55 | 26 | |
| 8 (3/1998) | Spider-Gtv | 55 | | 26/1 |
| 9 (9/1998) | Spider-Gtv | 55 | 26/2 | |
| 9 (9/1998) | Spider-Gtv | 55 | 27 to 30 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 30/1 to 30/2 |
| 9 (9/1998) | Spider-Gtv | 55 | 31 | |
| 8 (3/1998) | Spider-Gtv | 55 | 34 to 35 | |
| 7 (4/1997) | Spider-Gtv | 55 | 37 | |
| 8 (3/1998) | Spider-Gtv | 55 | 38 to 39 | |
| 9 (9/1998) | Spider-Gtv | 55 | 40 to 44 | |
| 9 (9/1998) | Spider-Gtv | 55 | | 45 to 46 |
| 6 (9/1996) | Spider-Gtv | 55 | Index I | |
| 6 (9/1996) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | 2 to 9 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | | 10 to 12 ANNULLED |
| 6 (9/1996) | Spider-Gtv | 55-23 | 13 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | | 2/1 to 2/2 |
| 6 (9/1996) | Spider-Gtv | 55-27 | 3 to 4 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |

(continued)



VOLUME III

REPAIR INSTRUCTIONS

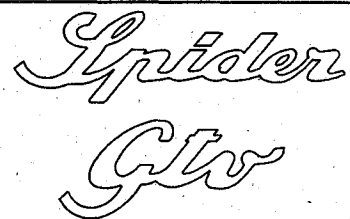
UPDATE CARD

(continued)

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |
| (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | Index | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | | 1 to 13 |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | | 1 to 6 |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | | 1 to 3 |

| UPDATE CARD | | | | |
|----------------------------------|----------------|---------|---------|-------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | | 1 to 5 |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | | 1 to 12 |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | | 1 to 17 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | | 1 to 12 |
| VOLUME III SECTION II | | | | |
| 8 (3/1998) | Spider-Gtv | - | | Frontespice |
| 7 (4/1997) | Spider-Gtv '97 | - | | Index |
| 7 (4/1997) | Spider-Gtv '97 | 55-1 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-2 | | 1 to 13 |
| 7 (4/1997) | Spider-Gtv '97 | 55-3 | | 1 to 15 |
| 7 (4/1997) | Spider-Gtv '97 | 55-4 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-5 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-6 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-7 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-8 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-9 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-10 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-11 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-12 | | 1 to 7 |
| 7 (4/1997) | Spider-Gtv '97 | 55-13 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv '97 | 55-14 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-15 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-17 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-19 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-20 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-21 | | 1 to 5 |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | 1 to 12 | |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | | 13 to 16 |
| ANNULLED | | | | |
| 7 (4/1997) | Spider-Gtv '97 | 55-24 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-25 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-26 | | 1 to 28 |
| 7 (4/1997) | Spider-Gtv '97 | 55-27 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-28 | | 1 to 24 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29B | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29C | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29D | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-31 | | 1 to 11 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A1 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A2 | | 1 to 78 |
| Index | | | | |
| 9 (9/1998) | Spider-Gtv '98 | | | 1 to 6 |
| 9 (9/1998) | Spider-Gtv '98 | 55-1 | | 1 to 12 |
| 9 (9/1998) | Spider-Gtv '98 | 55-2 | | 1 to 14 |
| 9 (9/1998) | Spider-Gtv '98 | 55-3 | | 1 to 5 |
| 9 (9/1998) | Spider-Gtv '98 | 55-4 | | 1 to 5 |

(continued)



VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|------------|----------------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontspice | |
| 8 (3/1998) | Spider-Gtv | | Index | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 7 (4/1997) | Spider-Gtv | 55 | 25 | |
| 8 (3/1998) | Spider-Gtv | 55 | 26 | |
| 8 (3/1998) | Spider-Gtv | 55 | | 26/1 to 26/2 |
| 8 (3/1998) | Spider-Gtv | 55 | 34 to 35 | |
| 7 (4/1997) | Spider-Gtv | 55 | 37 | |
| 8 (3/1998) | Spider-Gtv | 55 | 38 to 39 | |
| 8 (3/1998) | Spider-Gtv | 55 | 41 | |
| 3 (3/1995) | Spider-Gtv | 55 | 42 | |
| 7 (4/1997) | Spider-Gtv | 55 | 43 to 44 | |
| 6 (9/1996) | Spider-Gtv | 55 | Index I | |
| 6 (9/1996) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | 2 to 9 | |
| 8 (3/1998) | Spider-Gtv | 55-23 | | 10 to 12 ANNULLED |

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-23 | 13 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | | 2/1 to 2/2 |
| 6 (9/1996) | Spider-Gtv | 55-27 | 3 to 4 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |

(continued)

Spider

Gtv

VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

(continued)

| UPDATE CARD | | | | |
|---------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |
| (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | Index | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | 1 to 13 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | 1 to 3 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | 1 to 4 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | 1 to 6 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | 1 to 3 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | 1 to 5 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | 1 to 12 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | 1 to 4 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | 1 to 3 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | 1 to 17 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | 1 to 4 | |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | 1 to 12 | |

| UPDATE CARD | | | | |
|----------------------------------|----------------|---------|---------|-------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III SECTION II | | | | |
| 8 (3/1998) | Spider-Gtv | - | | Frontespice |
| 7 (4/1997) | Spider-Gtv '97 | - | | Index |
| 7 (4/1997) | Spider-Gtv '97 | 55-1 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-2 | | 1 to 13 |
| 7 (4/1997) | Spider-Gtv '97 | 55-3 | | 1 to 15 |
| 7 (4/1997) | Spider-Gtv '97 | 55-4 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-5 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-6 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-7 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-8 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-9 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-10 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-11 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-12 | | 1 to 7 |
| 7 (4/1997) | Spider-Gtv '97 | 55-13 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv '97 | 55-14 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-15 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-17 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-18A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-19 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-20 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-21 | | 1 to 5 |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | 1 to 12 | |
| 8 (3/1998) | Spider-Gtv '97 | 55-23 | | 13 to 16 |
| ANNULLED | | | | |
| 7 (4/1997) | Spider-Gtv '97 | 55-24 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-25 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv '97 | 55-26 | | 1 to 28 |
| 7 (4/1997) | Spider-Gtv '97 | 55-27 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv '97 | 55-28 | | 1 to 24 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29B | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29C | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv '97 | 55-29D | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv '97 | 55-31 | | 1 to 11 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A1 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv '97 | 55-A2 | | 1 to 78 |
| 8 (3/1998) | Spider-Gtv '98 | | | Index |
| 8 (3/1998) | Spider-Gtv '98 | 55-23 | | 1 to 10 |
| 8 (3/1998) | Spider-Gtv '98 | 55-26 | | 1 to 3 |
| 8 (3/1998) | Spider-Gtv '98 | 55-29A | | 1 to 7 |
| 8 (3/1998) | Spider-Gtv '98 | 55-29D | | 1 to 5 |
| 8 (3/1998) | Spider-Gtv '98 | 55-32 | | 1 to 3 |

UPDATE CARD

Spider
Gtv

**VOLUME III
REPAIR
INSTRUCTIONS**

| UPDATE CHART | | | | |
|------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 1 (12/1994) | Spider-Gtv | - | Frontespice | |
| 1 (12/1994) | Gtv V6TB | - | | Index |
| 1 (12/1994) | Gtv V6TB | 55 | | 2-1 to 2-4 |
| 1 (12/1994) | Gtv V6TB | 55 | | 3-1 to 3-3 |
| 1 (12/1994) | Gtv V6TB | 55 | | 13-1 to 13-3 |
| 1 (12/1994) | Gtv V6TB | 55 | | 26-1 to 26-3 |
| 1 (12/1994) | Gtv V6TB | 55 | | 28-1 to 28-3 |
| 1 (12/1994) | Gtv V6TB | 55 | | 30-to 30-10 |

UPDATE CARD

Spider
Gtv

VOLUME III
REPAR
INSTRUCTIONS

| UPDATE CARD | | | | |
|------------------|-------------|---------|-------------|----------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 1 (12/1994) | Spider- Gtv | - | Frontespice | |
| 3 (3/1995) | Spider- Gtv | 55 | 42 | |
| 3 (3/1995) | Spider- Gtv | 55-1 | 2 | |
| 3 (3/1995) | Spider- Gtv | 55-1 | 6 | |
| 3 (3/1995) | Spider- Gtv | 55-3 | 14 | |
| 3 (3/1995) | Spider- Gtv | 55-4 | 4 | |
| 3 (3/1995) | Spider- Gtv | 55-18 | 2 | |
| 3 (3/1995) | Spider- Gtv | 55-23 | 3 | |
| 3 (3/1995) | Spider- Gtv | 55-23 | 5 to 6 | |
| 3 (3/1995) | Spider- Gtv | 55-23 | 15 | |
| 3 (3/1995) | Spider- Gtv | 55-28 | 15 | |
| 3 (3/1995) | Spider- Gtv | 55-29 | 1 to 2 | |
| 3 (3/1995) | Spider- Gtv | 55-29 | 7 to 8 | |
| 3 (3/1995) | Spider- Gtv | 55-29 | 11 | |
| 3 (3/1995) | Spider- Gtv | 55-29 | 17 | |
| 3 (3/1995) | Spider- Gtv | 55-29 | | 18 |
| 3 (3/1995) | Spider- Gtv | 55-30 | 1 | |
| 3 (3/1995) | Spider- Gtv | 55-30 | | 17 to 18 |
| 3 (3/1995) | Spider- Gtv | 55-A2 | 22 | |
| 3 (3/1995) | Spider- Gtv | 55-A2 | 34 | |
| 3 (3/1995) | Spider- Gtv | 55-A2 | 52 | |
| 3 (3/1995) | Spider- Gtv | 55-A2 | 55 | |
| 3 (3/1995) | Spider- Gtv | 55-A2 | 57 | |
| 3 (3/1995) | Gtv V6TB | - | Index | |
| 3 (3/1995) | Gtv V6TB | 55 | | 1 to 8 |
| 1 (12/1994) | Gtv V6TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6TB | 55-3 | 1 to 3 | |
| 3 (3/1995) | Gtv V6TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6TB | 55-13 | 1 | |
| 1 (3/1994) | Gtv V6TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6TB | 55-26 | 1 | |
| 1 (3/1994) | Gtv V6TB | 55-26 | | 2 to 3 |
| 3 (3/1995) | Gtv V6TB | 55-28 | 1 | |
| 1 (3/1994) | Gtv V6TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6TB | 55-30 | 1 | |
| 1 (3/1994) | Gtv V6TB | 55-30 | | 2 to 4 |
| 3 (3/1995) | Gtv V6TB | 55-30 | 5 to 10 | |
| 3 (3/1995) | Gtv V6TB | 55-30 | | 11 to 17 |
| 3 (3/1995) | Gtv V6TB | 55-A1 | | 1 to 4 |
| 3 (3/1995) | Gtv V6TB | 55-A2 | | 1 to 9 |



VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|----------|
| UPDATE. (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBSTITUTED | ADDED |
| 1 (12/1994) | Spider-Gtv | - | Frontespice | |
| 3 (3/1995) | Spider-Gtv | 55 | 42 | |
| 4 (5/1995) | Spider-Gtv | 55 | Index I | |
| 4 (5/1995) | Spider-Gtv | 55 | Index II | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 6 | |
| 3 (3/1995) | Spider-Gtv | 55-3 | 14 | |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 3 (3/1995) | Spider-Gtv | 55-18 | 2 | |
| 4 (5/1995) | Spider-Gtv | 55-18A | | 1 to 9 |
| 3 (3/1995) | Spider-Gtv | 55-23 | 3 | |
| 3 (3/1995) | Spider-Gtv | 55-23 | 5 to 6 | |
| 3 (3/1995) | Spider-Gtv | 55-23 | 15 | |
| 3 (3/1995) | Spider-Gtv | 55-23 | 15 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 17 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | | 18 |
| 3 (3/1995) | Spider-Gtv | 55-29 | 1 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | | 17 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 22 | |
| 3 (3/1995) | Spider-Gtv | 55-A2 | 34 | |
| 3 (3/1995) | Spider-Gtv | 55-A2 | 52 | |
| 3 (3/1995) | Spider-Gtv | 55-A2 | 55 | |
| 3 (3/1995) | Spider-Gtv | 55-A2 | 57 | |
| 3 (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-26 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | | 2 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 10 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | | 11 to 17 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 1 to 9 |

Spider Gtv

VOLUME III

REPAIR INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|------------|
| UPDATE. (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBSTITUTED | ADDED |
| 1 (12/1994) | Spider-Gtv | - | Frontespice | |
| 3 (3/1995) | Spider-Gtv | 55 | 42 | |
| 4 (5/1995) | Spider-Gtv | 55 | Index I | |
| 4 (5/1995) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 6 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 14 to 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 3 (3/1995) | Spider-Gtv | 55-23 | 3 | |
| 3 (3/1995) | Spider-Gtv | 55-23 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-23 | 12 to 14 | |
| 3 (3/1995) | Spider-Gtv | 55-23 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-23 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-26 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-26 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-26 | 10 to 12 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 16 to 18 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17 to 18 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |

(continued)

*Spider
Gtv*

**REPAIR
INSTRUCTIONS**

UPDATE CARD

(continued)

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|--------------|
| UPDATE. (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBSTITUTED | ADDED |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 23 to 24 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 26 to 28 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 30 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 44 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 to 51 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 52 | |
| 3 (12/1995) | Spider-Gtv | 55-A2 | 55 | |
| 3 (12/1995) | Spider-Gtv | 55-A2 | 67 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 60 | |
| 3 (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |



VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | - | Frontespice | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 3 (3/1995) | Spider-Gtv | 55 | 42 | |
| 6 (9/1996) | Spider-Gtv | 55 | I | |
| 6 (9/1996) | Spider-Gtv | 55 | II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 6 (9/1996) | Spider-Gtv | 55-23 | 3 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-27 | | 2/1 to 2/2 |
| 6 (9/1996) | Spider-Gtv | 55-27 | 3 to 4 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 1 to 2 | |

| UPDATE CARD | | | | |
|------------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |

Spider
Gtv

VOLUME III
REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|------------------|-----------|---------|---------|----------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 3 (3/1995) | Gtv V6 TB | - | | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | | 1 to 13 |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | | 1 to 6 |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | | 1 to 5 |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | | 1 to 12 |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | | 1 to 17 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | | 1 to 12 |

*Spider**Gtv*

VOLUME III

REPAIR
INSTRUCTIONS

UPDATE CARD

| UPDATE CARD | | | | |
|-------------------|------------|---------|-------------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| VOLUME III | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontespice | |
| 6 (9/1996) | Spider-Gtv | 55 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55 | | 5/1 to 5/6 |
| 6 (9/1996) | Spider-Gtv | 55 | | 10/1 to 10/6 |
| 7 (4/1997) | Spider-Gtv | 55 | 25 | |
| 7 (4/1997) | Spider-Gtv | 55 | 37 to 38 | |
| 3 (3/1995) | Spider-Gtv | 55 | 42 | |
| 7 (4/1997) | Spider-Gtv | 55 | 43 to 44 | |
| 6 (9/1996) | Spider-Gtv | 55 | Index I | |
| 6 (9/1996) | Spider-Gtv | 55 | Index II | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 9 | |
| 3 (3/1995) | Spider-Gtv | 55-1 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-1 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-1 | 6 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-2 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-2 | 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 2 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 5 to 6 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 7 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 11 | |
| 6 (9/1996) | Spider-Gtv | 55-3 | 14 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | 15 | |
| 5 (12/1995) | Spider-Gtv | 55-3 | | 16 |
| 3 (3/1995) | Spider-Gtv | 55-4 | 4 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-8 | 5 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 6 to 7 | |
| 5 (12/1995) | Spider-Gtv | 55-13 | 12 to 13 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-14 | 6 to 8 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-15 | 4 | |
| 6 (9/1996) | Spider-Gtv | 55-16 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-16 | 10 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-18 | | 2/1 to 2/2 |
| 5 (12/1995) | Spider-Gtv | 55-18 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | 1 to 9 | |
| 5 (12/1995) | Spider-Gtv | 55-18A | | 10 to 17 |
| 6 (9/1996) | Spider-Gtv | 55-23 | 1 | |
| 6 (9/1996) | Spider-Gtv | 55-23 | 3 to 20 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 3 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 6 to 7 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 7/1 to 7/2 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 8 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | | 10/1 to 10/4 |
| 6 (9/1996) | Spider-Gtv | 55-26 | 11 to 13 | |
| 6 (9/1996) | Spider-Gtv | 55-26 | 15 to 17 | |

| UPDATE CARD | | | | |
|------------------|------------|---------|----------|--------------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 6 (9/1996) | Spider-Gtv | 55-28 | 7 to 8 | |
| 3 (3/1995) | Spider-Gtv | 55-28 | 15 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | 16 | |
| 6 (9/1996) | Spider-Gtv | 55-28 | | 16/1 to 16/2 |
| 6 (9/1996) | Spider-Gtv | 55-28 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-28 | 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29 | 1 | |
| 5 (3/1995) | Spider-Gtv | 55-29 | 2 to 4 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 7 | |
| 3 (3/1995) | Spider-Gtv | 55-29 | 8 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-29 | 17a 18 | |
| 6 (9/1996) | Spider-Gtv | 55-29A | | 1 to 18 |
| 3 (3/1995) | Spider-Gtv | 55-30 | 1 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 2 to 3 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 11 | |
| 3 (3/1995) | Spider-Gtv | 55-30 | 17 | |
| 5 (12/1995) | Spider-Gtv | 55-30 | 18 | |
| 5 (12/1995) | Spider-Gtv | 55-A1 | 2 to 4 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 2 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 3 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 6 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 6/1 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 7 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 10 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 11 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 12 to 16 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 19 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 21 to 23 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 24 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 26 to 28 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 28/1 to 28/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 29 to 30 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 31 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 32 to 33 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 33/1 to 33/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 34 to 35 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 36 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 36/1 to 36/4 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 37 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 39 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 40 | |
| 5 (12/1995) | Spider-Gtv | 55-A2 | | 40/1 to 40/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 41 to 43 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 44 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 44/1 to 44/2 |
| 5 (12/1995) | Spider-Gtv | 55-A2 | 47 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 48 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 48/1 to 48/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 49 to 54 | |
| 6 (9/1996) | Spider-Gtv | 55-A2 | | 54/1 to 54/2 |
| 6 (9/1996) | Spider-Gtv | 55-A2 | 55 to 60 | |

(continued)

UPDATE CARD

Spider

Gtv

VOLUME III

REPAIR
INSTRUCTIONS

(continued)

| UPDATE CARD | | | | |
|----------------------------------|------------|---------|-------------|----------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 3 (3/1995) | Gtv V6 TB | - | Index | |
| 3 (3/1995) | Gtv V6 TB | 55 | | 1 to 8 |
| 3 (3/1995) | Gtv V6 TB | 55-2 | | 1 to 4 |
| 3 (3/1995) | Gtv V6 TB | 55-3 | 1 to 2 | |
| 5 (12/1995) | Gtv V6 TB | 55-3 | 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-3 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-13 | | 4 to 5 |
| 3 (3/1995) | Gtv V6 TB | 55-26 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-26 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | 1 | |
| 3 (3/1995) | Gtv V6 TB | 55-28 | | 2 to 3 |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 1 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 2 to 4 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 5 to 6 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 7 | |
| 3 (3/1995) | Gtv V6 TB | 55-30 | 8 to 10 | |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 11 | 12 to 16 |
| 5 (12/1995) | Gtv V6 TB | 55-30 | 17 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 4 |
| 3 (3/1995) | Gtv V6 TB | 55-A1 | | 1 |
| 5 (12/1995) | Gtv V6 TB | 55-A2 | 2 to 3 | |
| 3 (3/1995) | Gtv V6 TB | 55-A2 | | 4 to 9 |
| 6 (9/1996) | Gtv 3.0V6 | - | Index | |
| 6 (9/1996) | Gtv 3.0V6 | 55 | | 1 to 13 |
| 6 (9/1996) | Gtv 3.0V6 | 55-1 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-2 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-3 | | 1 to 6 |
| 6 (9/1996) | Gtv 3.0V6 | 55-10 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-13 | | 1 to 5 |
| 6 (9/1996) | Gtv 3.0V6 | 55-26 | | 1 to 12 |
| 6 (9/1996) | Gtv 3.0V6 | 55-27 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-28 | | 1 to 3 |
| 6 (9/1996) | Gtv 3.0V6 | 55-30 | | 1 to 17 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A1 | | 1 to 4 |
| 6 (9/1996) | Gtv 3.0V6 | 55-A2 | | 1 to 12 |
| VOLUME III SECTION II | | | | |
| 7 (4/1997) | Spider-Gtv | - | Frontespice | |
| 7 (4/1997) | Spider-Gtv | - | Index | |
| 7 (4/1997) | Spider-Gtv | 55-1 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-2 | | 1 to 13 |
| 7 (4/1997) | Spider-Gtv | 55-3 | | 1 to 15 |
| 7 (4/1997) | Spider-Gtv | 55-4 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv | 55-5 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv | 55-6 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv | 55-7 | | 1 to 6 |

| UPDATE CARD | | | | |
|------------------|------------|---------|--------|---------|
| UPDATE (DATE) | MODEL | SECTION | PAGE | |
| | | | SUBST. | ADDED |
| 7 (4/1997) | Spider-Gtv | 55-8 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-9 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-10 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv | 55-11 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv | 55-12 | | 1 to 7 |
| 7 (4/1997) | Spider-Gtv | 55-13 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv | 55-14 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv | 55-15 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-17 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv | 55-18 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-18A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv | 55-19 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-20 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv | 55-21 | | 1 to 5 |
| 7 (4/1997) | Spider-Gtv | 55-23 | | 1 to 16 |
| 7 (4/1997) | Spider-Gtv | 55-24 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv | 55-25 | | 1 to 6 |
| 7 (4/1997) | Spider-Gtv | 55-26 | | 1 to 28 |
| 7 (4/1997) | Spider-Gtv | 55-27 | | 1 to 8 |
| 7 (4/1997) | Spider-Gtv | 55-28 | | 1 to 24 |
| 7 (4/1997) | Spider-Gtv | 55-29A | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv | 55-29B | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv | 55-29C | | 1 to 17 |
| 7 (4/1997) | Spider-Gtv | 55-29D | | 1 to 18 |
| 7 (4/1997) | Spider-Gtv | 55-31 | | 1 to 11 |
| 7 (4/1997) | Spider-Gtv | 55-A1 | | 1 to 4 |
| 7 (4/1997) | Spider-Gtv | 55-A2 | | 1 to 78 |

INTRODUCTION

The "Spider-Gtv - Repair Instructions" Manual is composed of three volumes as follows:

- Volume I - Technical Data;
 - Engines;
 - Mechanical Groups.
- Volume II - Heating-Ventilation;
 - Bodywork.
- Volume III - Electric system;
 - Electrical system diagnosis.

For overhauling engines and mechanical groups refer to the following manuals:

- PA493600000000 REPAIR INSTRUCTIONS - ENGINE OVERHAUL.
- PA494200000000 REPAIR INSTRUCTIONS - OVERHAULING MECHANICAL GROUPS.

In order to facilitate consultation, the structure of the manual mirrors the functional groups already defined for the "Repair Flat-rate Manual" in use by Alfa Romeo Authorized Service Network.

The characteristic data and the tables for vehicles identification are contained in the "Technical Data" at the beginning of Volume I.

The "Model identification" tables should be consulted before carrying out repair work in order to identify the model of the vehicle, the engine size and the groups which form the vehicle.

How to use this manual

The aim of this manual is to supply the Alfa Romeo Service Personnel with a tool enabling them to rapidly identify faults and to render the corrective interventions precise and efficient.

The manual shows the procedures relative to the removal and refitting and dismantling operations and the checks relative to the various groups forming the vehicle.

The procedures are illustrated in detail as are the procedures for using the tools. An appropriate symbology and explanatory texts next to the fundamental technical drawings make a complete and rapid consultation of the manual possible.

The procedures illustrate complete component disassembly procedures and should only be carried out in their entirety when absolutely unavoidable. The procedures for "assembly" and "refitting" are normally obtained by reversing the procedure followed for disassembly or removal in reverse and only the reassembly procedures which are significantly different are illustrated.

For information relative to the electrical systems on-board the vehicle refer to section 55 "ELECTRIC SYSTEM" and to the successive 55 "ELECTRIC SYSTEM DIAGNOSIS" which gives the wiring diagrams and the description of each function, the connector tables, the location of the components, the tables for fault diagnosis and the technical data for checking the components.


All the information contained in this manual is updated at the time of publication.

Alfa Romeo reserves the right to make any modifications to its products that it deems necessary without warning. However the technical information and updates to this manual will be supplied as soon as possible.

Symbology

A specific symbology has been used in this manual to permit a rapid identification of the main technical information supplied.

The list of symbols is given below.

| | | | | |
|---|------------------------|---|--|--------------------------------|
|  | removal/disassembly |  |  | exhaust |
|  | refitting/re-assembly |  |  | Lubricate only with engine oil |
|  | tighten to the torque | |  | left-hand thread |
|  | caulk nut | |  | torque for tightening in oil |
|  | adjustment/regulation | |  | engine r.p.m. |
|  | visual check | |  | ovalization |
|  | lubricate | |  | taper |
|  | weight difference | |  | eccentricity |
|  | angular value | |  | flatness |
|  | pressure | |  | diameter |
|  | temperature | |  | linear dimension |
|  | brake system air purge | |  | parallelism |
|  | surfaces to be treated | |  | service with grease |
|  | interference | |  | heating temperature |
|  | play | |  | seal |
|  | intake | |  | service with engine oil |
| | | |  | grease |
| | | |  | CAUTION! |
| | | |  | WARNING! |

Warnings for the operator

All the operations must be carried out with the greatest care to prevent damage occurring to the vehicle or persons.

- The use of Alfa Romeo specific tools are indicated for some procedures. These tools must be used to ensure safety and to avoid damaging parts involved in the procedure.
- To free parts which are solidly stuck together, tap with an aluminium or lead mallet if the parts are of metal. Use a wooden or resin mallet for light alloy parts.
- When dismantling ensure parts are marked correctly if required.
- When refitting lubricate the parts, if necessary, to prevent seizing and binding during the initial period of operation.
- Using adhesive paper or clean rags cover those parts of the engine which, following disassembly, present openings which may allow dust or foreign material to enter.
- When refitting, the tightening torques and adjustment data must be respected.
- When substituting the main component(s) the seal rings, oil seals, flexible washers, safety plates, self-locking nuts and all worn parts must also be replaced.
- Avoid marking the internal coverings in the passenger compartment.

Substitution of groups or disconnected parts must be carried out using original spare parts only. Only in this way can the suitability and perfect operation of each organ be guaranteed.

- The words **CAUTION** and **WARNING** accompany those procedures where particular care should be taken to prevent damage occurring to people or vehicle parts.



CAUTION:
used when insufficient care could cause damage to people



WARNING:
used when insufficient care could cause damage to the vehicle or its component parts.

- The safety regulations applied to workshops should be respected. Where necessary the manual also lists the specific precautions to be taken to prevent dangerous situations from arising.



When using chemical products follow the safety indications given on the safety cards which the supplier is obliged to deliver to the user (in Italy in compliance with D.M. n.46/1992).

NOTE:

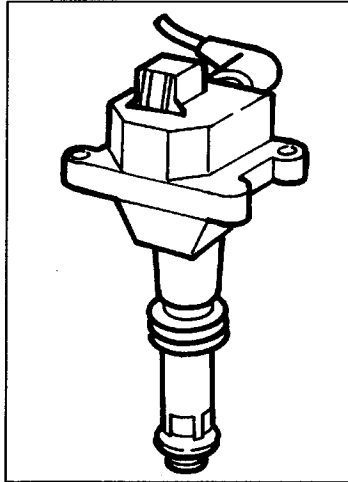
It is possible that for certain subjects were not completed in time for printing. However these subjects are given and highlighted in the indices of the single groups. It is the duty of the Technical Services to supply documentation regarding these subjects as soon as possible through updates or "Technical Bulletins".

INDEX

| | | | |
|--|------|---|------|
| IGNITION | | INSTRUMENT CLUSTER | |
| - Ignition coils (1970 c.c. Engine) | 1 | - Main panel | 25 |
| - Ignition coils (2959 c.c. Engine) | 1 | - Auxiliary panel | 26/1 |
| - Spark plugs (1970 c.c. Engine) | 2 | CONTROLS AND SWITCHES | |
| - Spark plugs (2959 c.c. Engine) | 3 | - Steering column lever unit | 28 |
| STARTING | | - Hazard warning lights control switch (to '97 versions) | 28 |
| - Starter motor | 4 | - Hazard light / fog light / rear fog light switches ('98 versions) | 28 |
| CHARGING | | - Sets of switches at side of panel | 29 |
| - Battery | 6 | - Power window switches | 29 |
| - Alternator | 7 | - Sun roof control switch (Gtv) | 30/1 |
| LIGHTING | | - Top control switches (Spider) | 30/1 |
| - Upper front light clusters | 11 | - Double door mirror adjustment switch | 31 |
| - Headlamp aiming switch | 12 | ALARM SYSTEM | |
| - Headlamp aiming | 12/1 | - Control unit-siren | 32 |
| - Lower front light clusters | 13 | - Remote control receiver unit | 32 |
| - Tail light cluster | 14 | - Bonnet open detection switch | 33 |
| - Number plate lights | 15 | AIR BAG CONTROL UNIT | |
| - Direction indicator side repeaters | 15 | - General description | 34 |
| - Third stop light - Spider | 15 | - System components | 35 |
| - Third stop light - Gtv | 16 | - Air Bag control unit | 37 |
| - Third brake light Gtv on rear spoiler ('98 versions) | 16 | - Driver's seat Air Bag | 38 |
| - Passenger compartment roof lamp | 16 | - Clock spring device | 39 |
| - Glove box light | 17 | - Passenger's side Air Bag | 40 |
| - Dashboard light | 17 | - Passenger side airbag disable switch | 42 |
| - Door light | 18 | - Front seat belt pre-tensioners | 42 |
| - Luggage compartment light | 19 | - Scrapping an airbag module or pre-tensioner | 43 |
| - Bulb table | 19 | ELECTRONIC CONTROL UNITS | |
| VARIOUS DEVICES | | - Injection-ignition control unit | 44 |
| - Fusebox | 20 | - ABS control unit | 44 |
| - Ignition switch | 20 | - Alarm system control unit | 44 |
| - Windscreen wiper unit | 21 | - Air Bag and pre-tensioner control unit | 44 |
| - Windscreen washer pump | 21 | - Power window control unit | 44 |
| - Horns | 22 | - ALFA ROMEO code control unit | 45 |
| - Cigar lighter | 22/1 | - ALFA ROMEO Code aerial ('98 versions) | 45 |
| - Sound system ('98 versions) | 22/1 | - Climate control unit | 46 |
| - Speakers | 23 | | |
| - Electric aerial | 24 | | |

**IGNITION COILS
(1970 c.c. Engine)**

The ignition system includes two spark plugs per cylinder in an asymmetrical position which differ in size. This static distribution system with lost spark has four coils, each of which supplies the spark plug of the cylinder below and simultaneously that of the paired cylinder (1-4) (2-3).

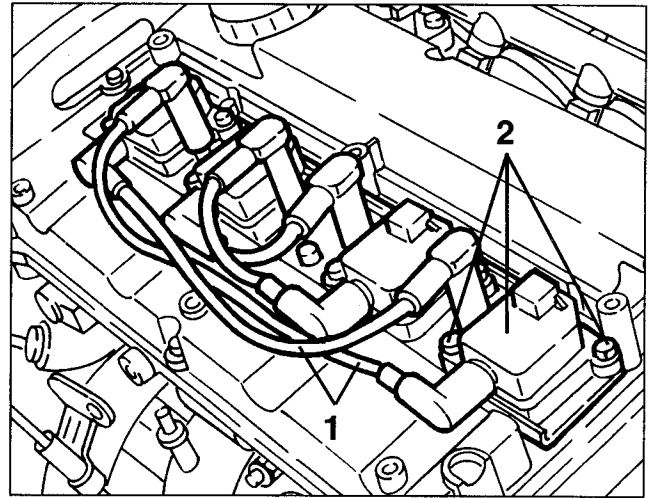


This system is a sophisticated evolution of the T.Spark ignition system.

T.Spark ignition, originally developed with two distributors (75 - 164), has been improved with more advanced injection systems which comprise static ignition (155 - 164 Super).

This new system offers further advantages, such as:
- limited high voltage cable routing thereby achieving increased reliability and lowering electrical interferences;
- the position and length of the cables makes it impossible to invert the connection of the cables to the corresponding spark plugs during servicing operations.

1. Remove the high voltage cables.
 2. Slacken the fastening screws and remove the ignition coils.
- If necessary, slacken the fastening screws and remove the ignition coil support bracket.



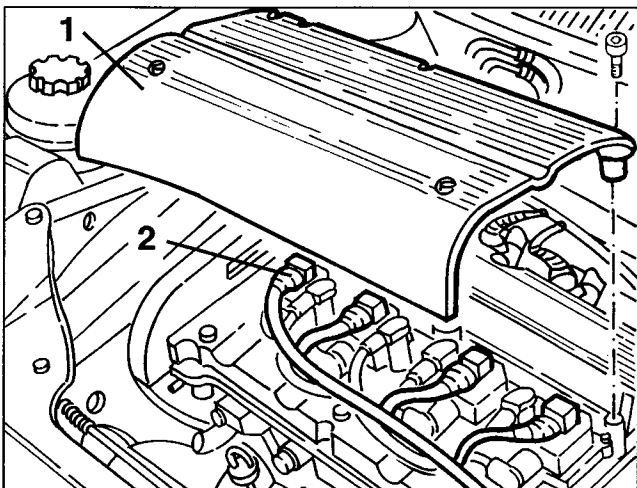
CHECKS AND INSPECTIONS

- Check that the ignition coil characteristics are within the specified limits. If not, change the coils.

| Specifications | |
|------------------------------|-------------|
| Primary winding resistance | 0,3 Ω ± 12% |
| Secondary winding resistance | 7k Ω ± 12% |

REMOVAL/REFITTING

- Disconnect the battery (-) terminal.
1. Slacken the fastening screws and remove the ignition coils cover.
 2. Disconnect the electrical connections from the ignition coils.

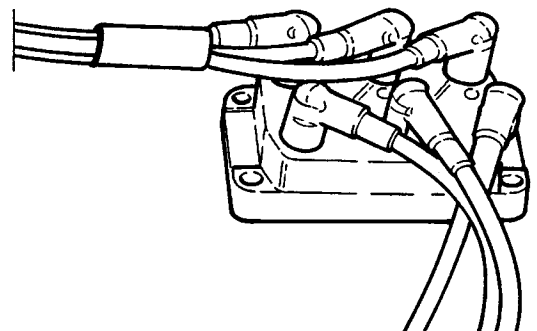


**IGNITION COILS
(2959 c.c. Engine)**

This ignition system with static distribution and lost spark has three coils.

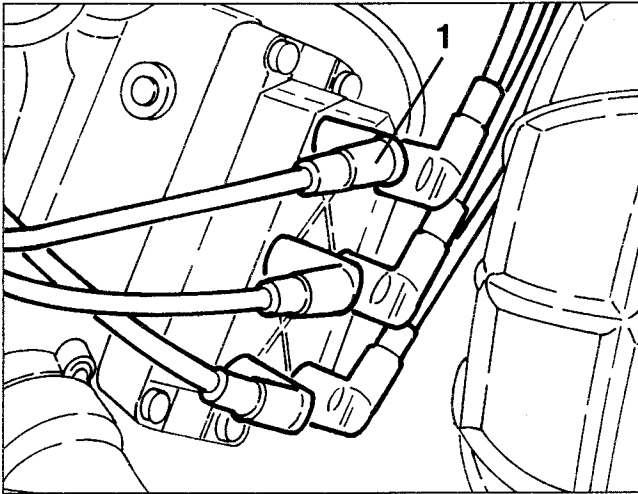
This solution makes it possible to eliminate rotary components and does not produce sparks, thus reducing the risk of interferences; it also reduces the number of high voltage cables and connections as the power modules for controlling the primary windings of the coil are located inside the control unit.

The paired cylinders in this engine are 1-5, 6-2 and 3-4.

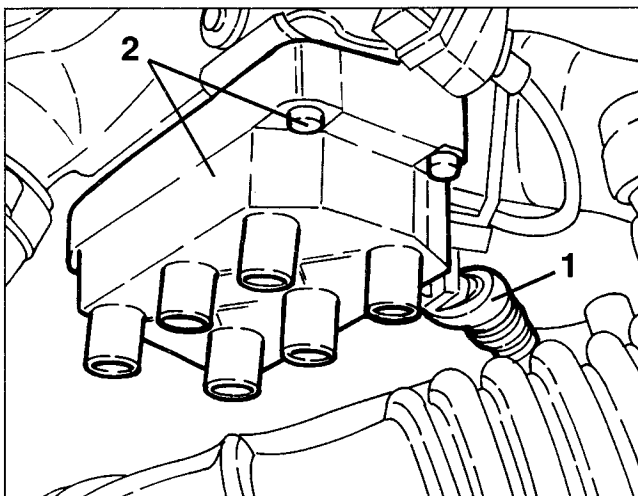


REMOVAL/REFITTING

- Disconnect the battery (-) terminal.
- 1. Disconnect the high voltage cables from the ignition coils.



- 1. Disconnect the electrical connection from the ignition coils.
- 2. Slacken the four fastening screws and remove the ignition coils.



CHECKS AND INSPECTIONS

Check that the ignition coil characteristics are within the specified limits. If not, change the coils.

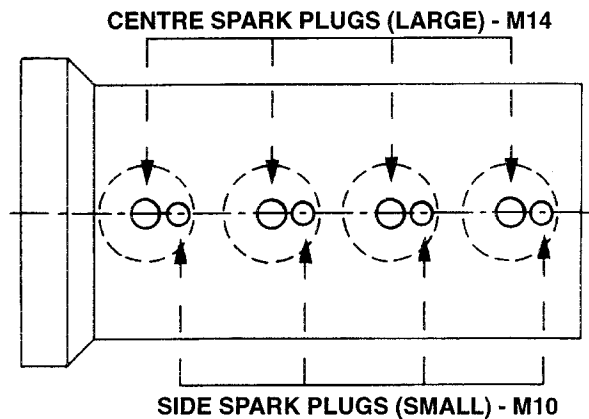
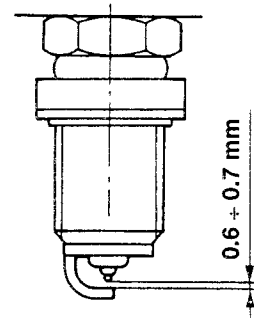
| Specifications | |
|------------------------------|---------|
| Primary winding resistance | 0,5 Ω |
| Secondary winding resistance | 13,3 kΩ |

SPARK PLUGS (1970 c.c. Engine)

The standard spark plugs are of the type with surface discharge with one point and a centre electrode.

In order to operate correctly a precise gap must be maintained between the electrodes.

The spark plugs are positioned asymmetrically in the bursting chamber and they differ in size as shown in the following diagram.



| |
|---------------------|
| Firing order |
| 1 - 3 - 4 - 2 |

CHECKING AND REPLACEMENT

- With the engine cold, remove the spark plugs blowing inside to remove any traces of dirt.
- Check for dirt or breaks on the ceramic insulation. In which case change the spark plugs.

CAUTION:

The use of spark plugs of a different type or size than those specified can cause serious damage to the engine and alter the level of harmful emissions at the exhaust.

CAUTION:

A dirty or burnt out spark plug is often symptomatic of a fault in the engine supply system. For example:

- Traces of carbon powder: incorrect mixture, air cleaner very dirty;
- Oil stains: oil seepage from the piston rings;
- Formation of ash: presence of aluminium material, especially in the oil;

- Melted electrodes: overheating due to unsuitable combustion, valve defects;
- Highly worn electrode: damaging additives in the fuel or oil, pinging or overheating;
- Etc.

- When fitting, tighten the spark plugs to the following torque:

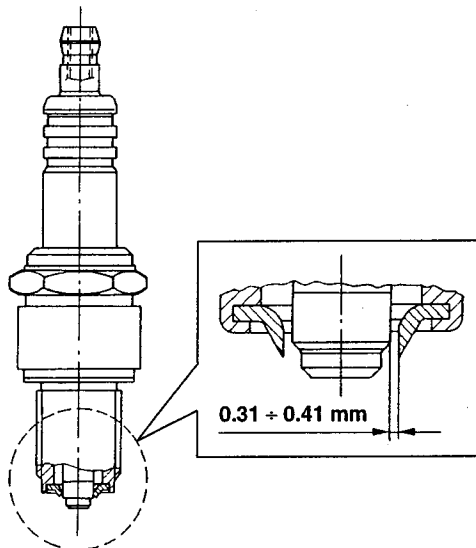


| | |
|----------------------------|-----------------------------|
| Centre spark plugs (large) | 25 ÷ 35 Nm 2.6 ÷ 3.6 kgm |
| Side spark plugs (small) | 10 ÷ 12 Nm 1 ÷ 1.2 kgm |

SPARK PLUGS (2959 c.c. Engine)

The standard spark plugs are of the type with surface discharge with four peripheral points and one centre electrode.

In order to operate correctly, a precise gap must be maintained between the peripheral points and the centre electrode.



Firing order

1 - 4 - 2 - 5 - 3 - 6

CHECKING AND REPLACEMENT

- With the engine cold, remove the spark plugs blowing inside to remove any traces of dirt.
- Check for dirt or breaks on the ceramic insulation. In which case change the spark plugs.

CAUTION:

The use of spark plugs of a different type or size than those specified can cause serious damage to the engine and alter the level of harmful emissions at the exhaust.

CAUTION:

A dirty or burnt out spark plug is often symptomatic of a fault in the engine supply system. For example:

- Traces of carbon powder: incorrect mixture, air cleaner very dirty;
- Oil stains: oil seepage from the piston rings;
- Formation of ash: presence of aluminium material, especially in the oil;
- Melted electrodes: overheating due to unsuitable combustion, valve defects;
- Highly worn electrode: damaging additives in the fuel or oil, pinging or overheating;
- Etc.

- When fitting, tighten the spark plugs to the following torque:

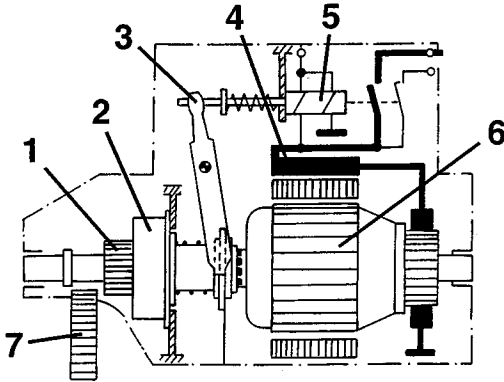


27 ÷ 34 Nm
2.8 ÷ 3.5 kgm

STARTER MOTOR

Overcoming the inertia and frictions the starter motor cranks the engine to set a number of revolutions in order to begin the formation of the mixture necessary for combustion and subsequent autonomous movement of the engine.

The motion is transmitted by a direct current electric motor, powered by the battery, through a coupling pinion which turns the ring gear on the flywheel.



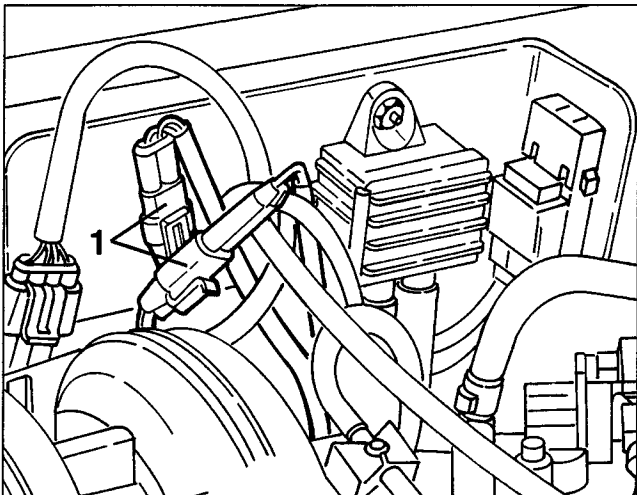
- | | |
|--------------------------|-----------------------|
| 1. Pinion | 5. Relay |
| 2. Roller type freewheel | 6. Rotor |
| 3. Coupling lever | 7. Flywheel ring gear |
| 4. Excitation coil | |

Due to a freewheel coupling, the pinion disengages when the main engine turns faster than the motor. A relay energized by the motor current engages the pinion through a fork.

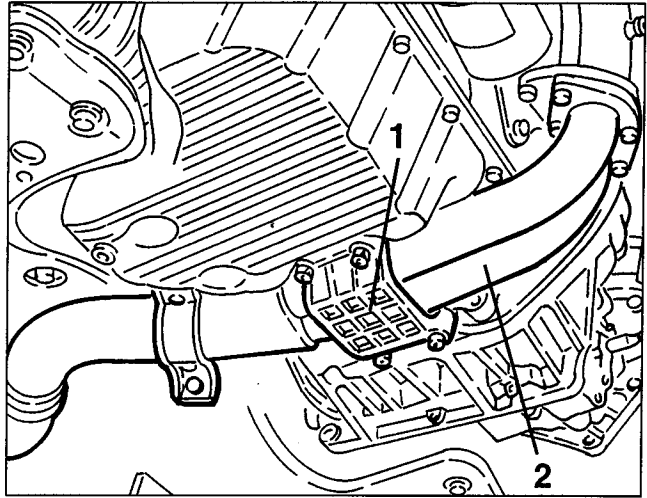
The starter motor installed is of the translating screw pinion type, with relay housed directly above the starter motor.

REMOVAL/REFITTING
(1970 c.c. Engine)

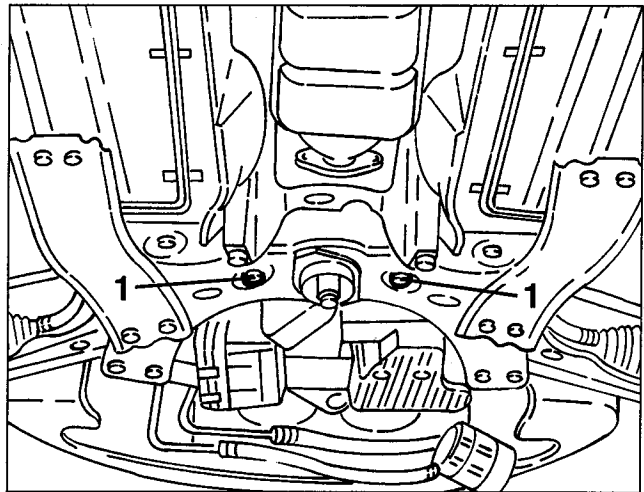
- Set the car on a lift.
- Disconnect the battery (-) terminal.
- 1. Disconnect the electrical connections of the lambda sensor.



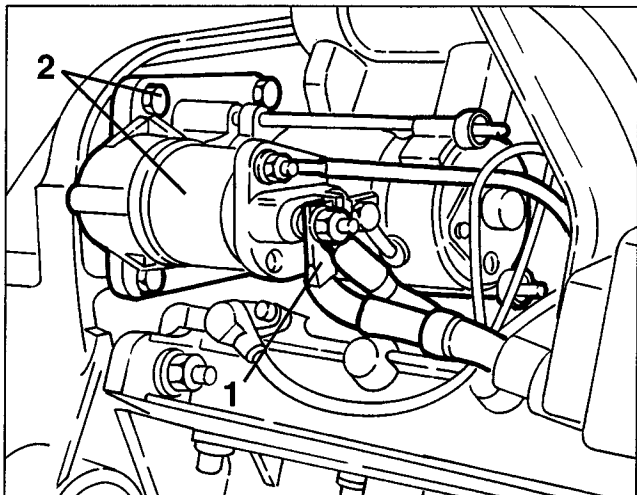
- 1. Remove the reinforcement bracket.
- 2. Remove the front section of the exhaust pipe complete with lambda sensor after slacken the fastenings.



- 1. Slacken the screws fastening the power steering box to the suspension crossmember.

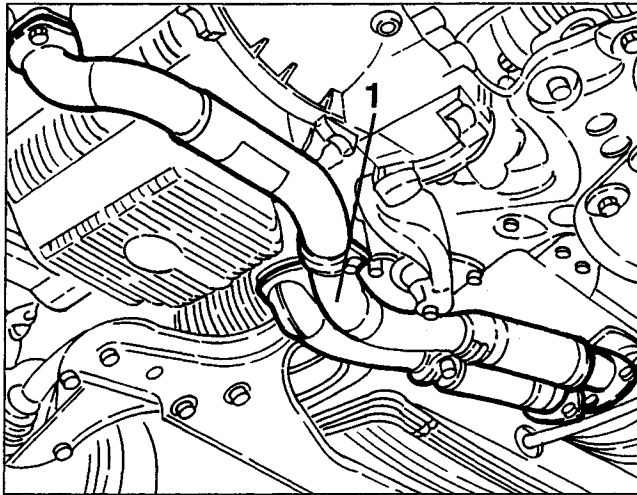


- 1. Disconnect the electrical connections from the starter motor.
- 2. Slacken the three fastening screws and remove the starter motor.

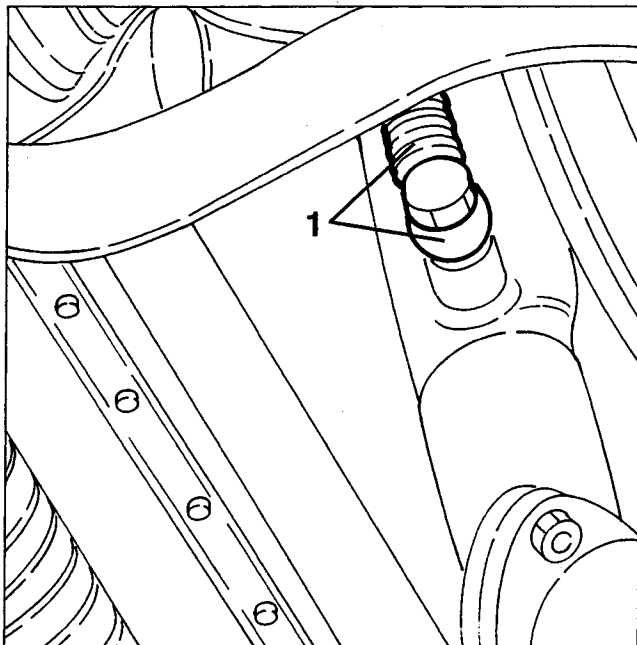


**REMOVAL/REFITTING
(2959 c.c. Engine)**

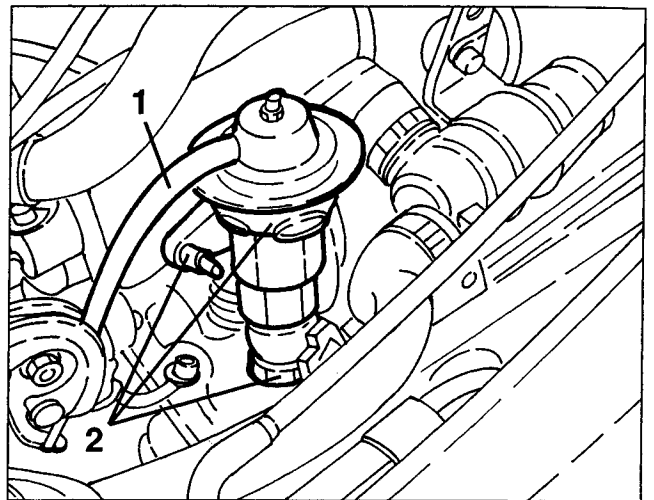
- Set the car on a lift.
- Disconnect the battery (-) terminal.
- 1. Raise the car and remove the front section of the exhaust pipe after slackening the fastenings.



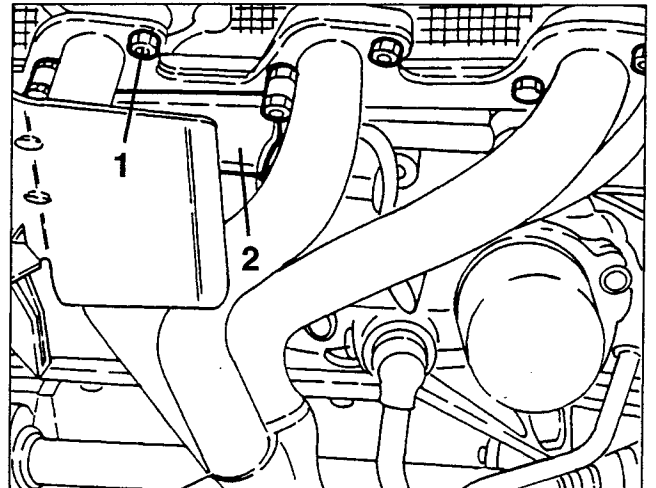
- 1. Disconnect the exhaust gas takeoff pipe for the E.G.R. valve from the manifold.



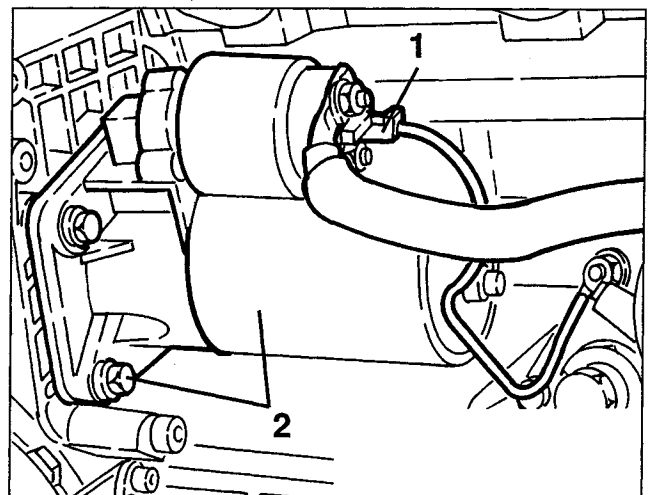
- Lower the car.
- 1. Disconnect the modulated vacuum pipe leading from the solenoid valve from the E.G.R. valve.
- 2. Slacken the two fastening nuts and remove the E.G.R. valve complete with exhaust gas takeoff pipe.



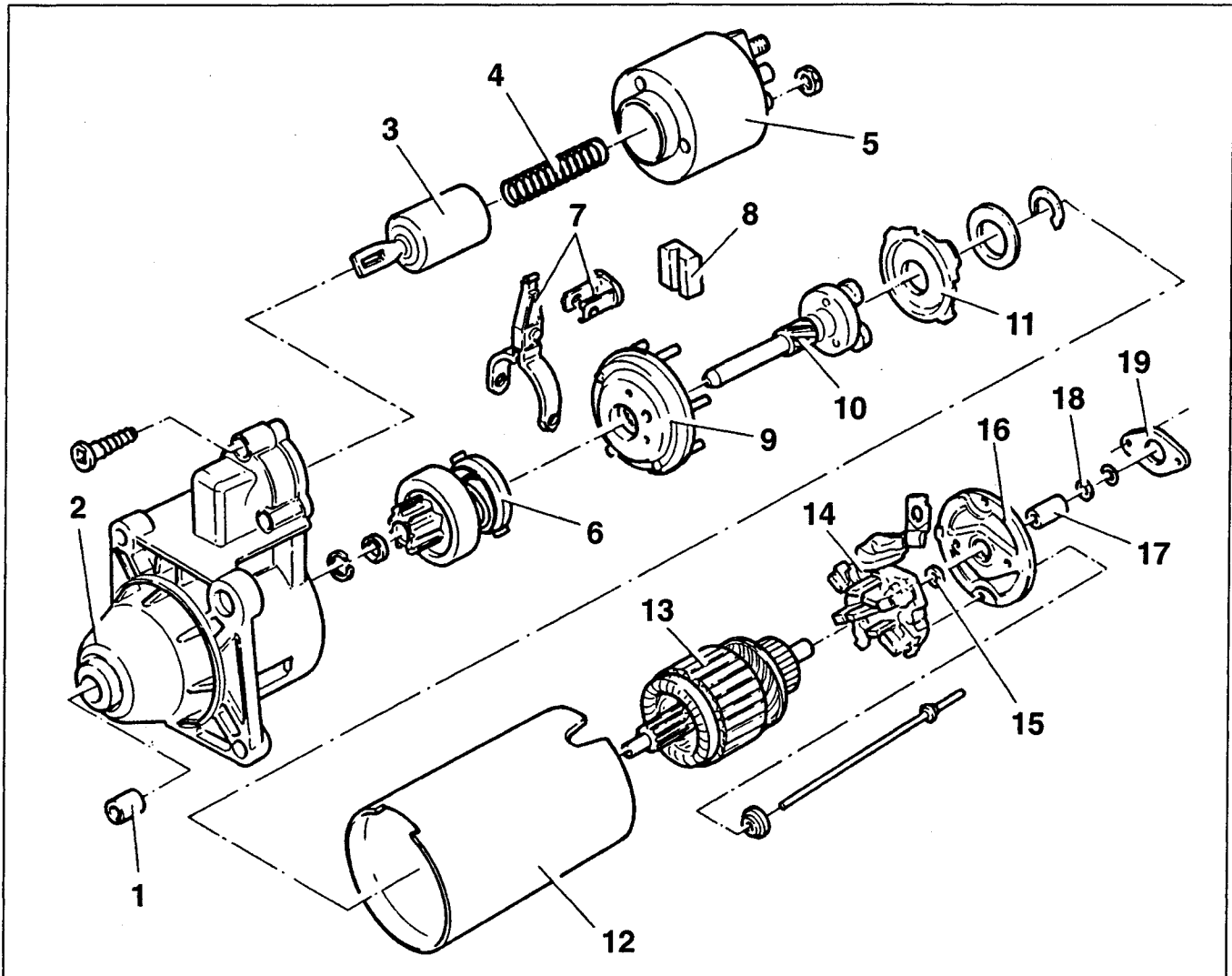
- Remove the seal.
- 1. Slacken the nuts fastening the exhaust manifold to the right-hand cylinder head.
- 2. Retrieve the starter motor heat shields.



- 1. Disconnect the electrical connections from the starter motor.
- 2. Raise the car, move the exhaust manifold to one side, then slacken the three fastening screws and remove the starter motor, bringing it out from under the car.



DIS-ASSEMBLY
(2959 c.c. Engine)



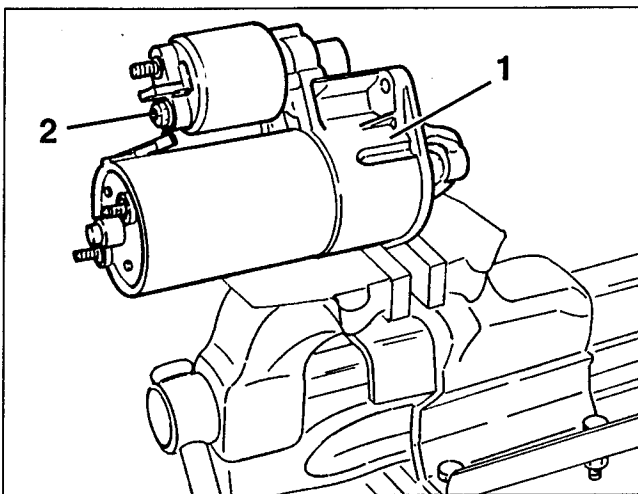
- 1. Bush
- 2. Support on drive side
- 3. Coupling relay rotor
- 4. Return spring
- 5. Coupling relay
- 6. Starting coupling
- 7. Fork levers
- 8. Rubber pad
- 9. Differential bcontrol gear
- 10. Inverter

- 11. Protection plate
- 12. Pole frame
- 13. Rotor
- 14. Brush holder plate
- 15. Felt ring
- 16. Collector side support
- 17. Bush
- 18. Compensation washer
- 19. Dust guard

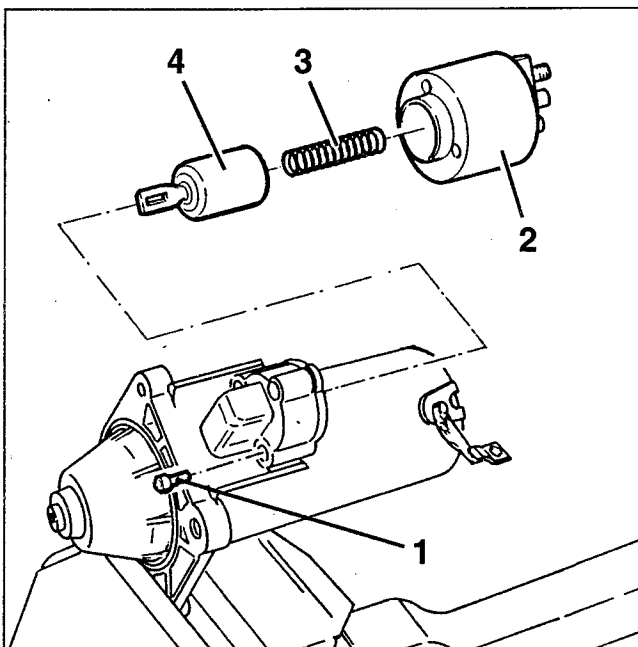


CAUTION:
Because of their structure these starter motors are more sensitive to knocks, blows and squashing than the previous versions.
Consequently, they must be fastened only locking them in the clamp on the flange (not on the pole frame).

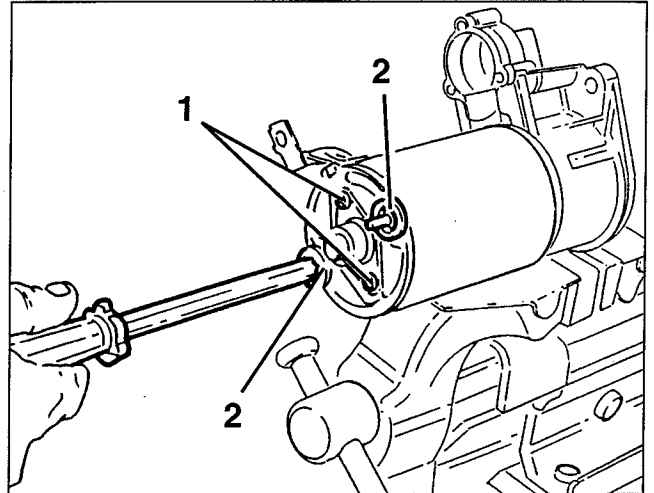
1. Fasten the starter motor on a vice with protective clamps as shown in the figure.
2. Slacken the nut fastening the terminal to the coupling relay.



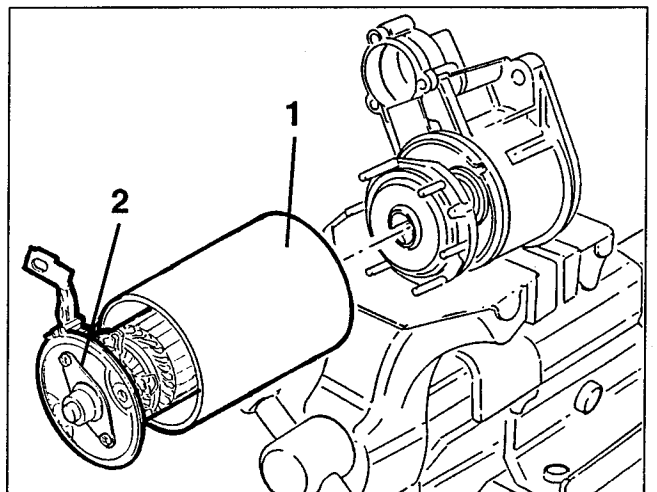
1. Slacken the three screws fastening the coupling relay to the drive side support.
2. Remove the coupling relay.
3. Retrieve the return spring.
4. Remove the coupling relay rotor.



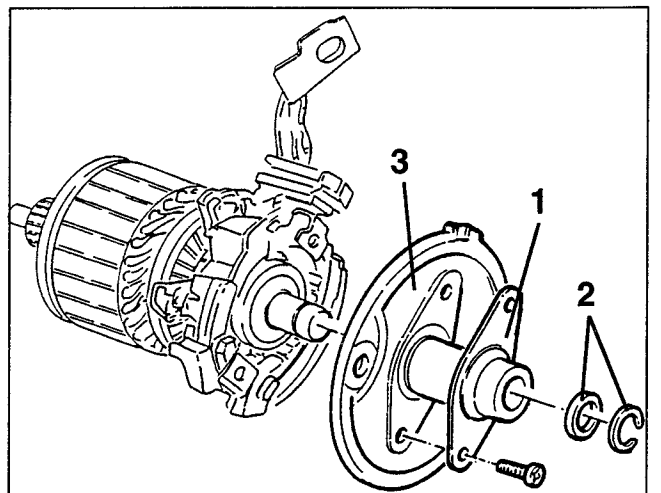
1. Slacken the two screws fastening the dust cover without removing them.
2. Slacken and remove the two thru screws.



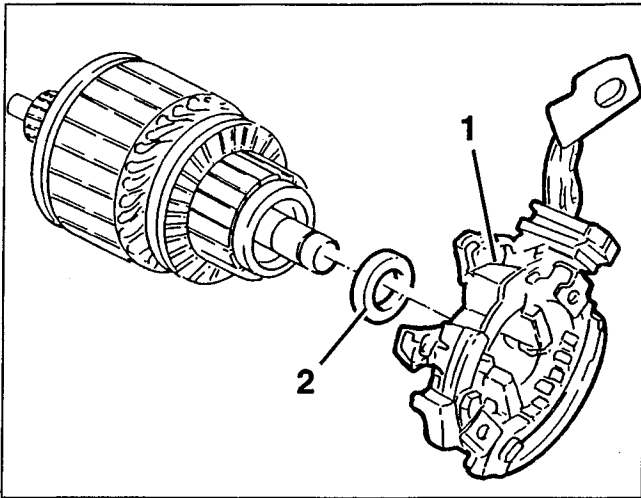
1. Remove the pole frame complete with rotor and collector side support.
2. Press the rotor carefully from the pole frame and at the same time push the seal out of the clamp.



1. Completely slacken the fastening screws and remove the dust guard.
2. Remove the rest and compensation washers.
3. Remove the collector side support.



1. Remove the brush holder plate from the rotor.
2. Remove the felt seal.



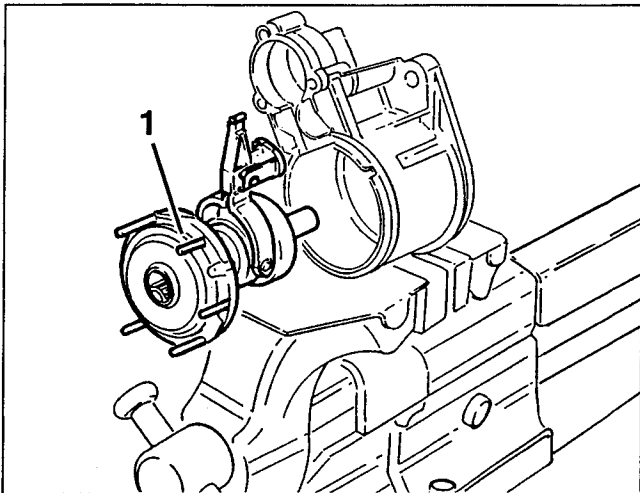
1. Using suitable pliers remove the split ring.
2. Remove the stop ring.
3. Remove the starter coupling from the reversing shaft.



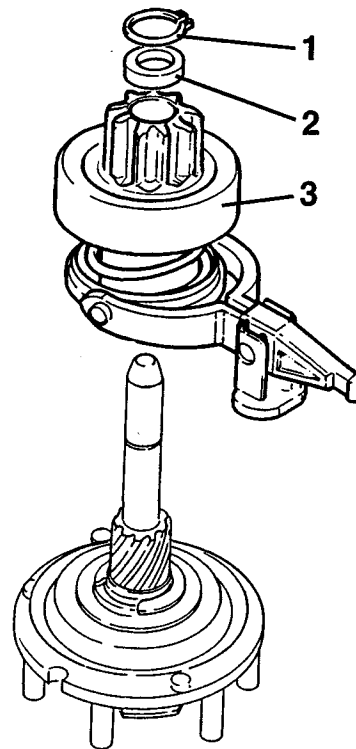
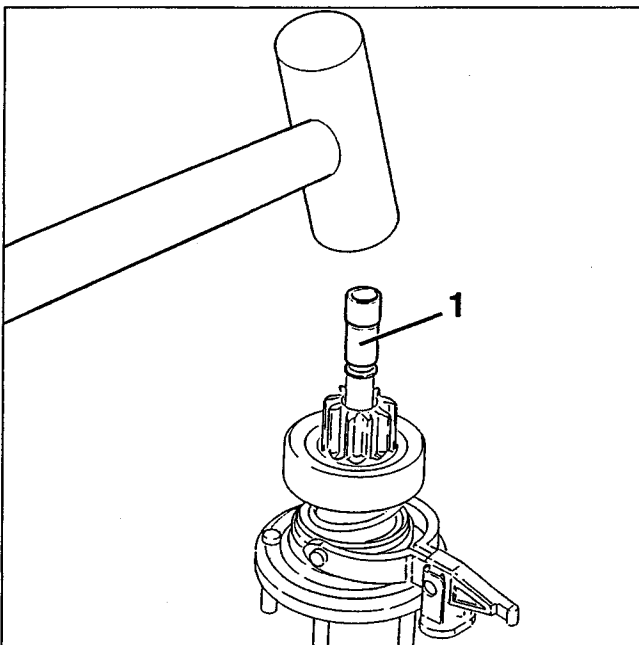
CAUTION:

Avoid damaging the reversing shaft when removing the split ring. If necessary, accurately deburr the reversing shaft groove, otherwise the gear bush will be damaged.

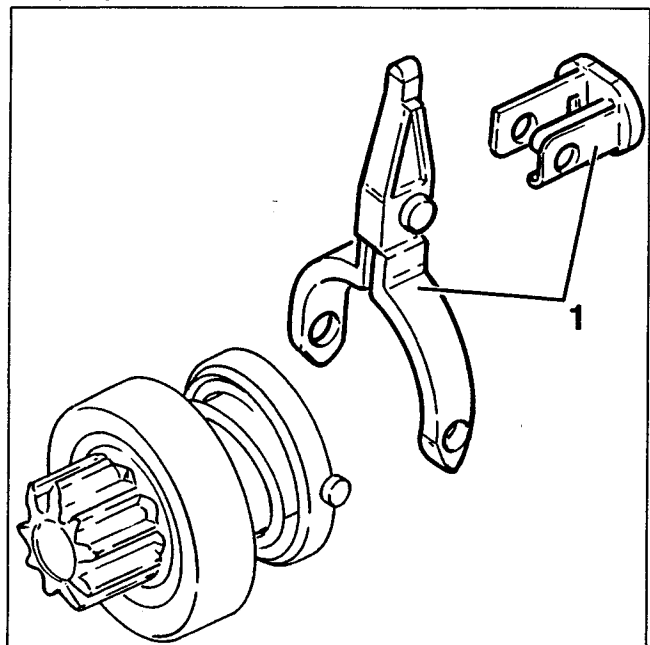
- Remove the rubber pad using a screwdriver.
1. From the drive side support remove the spur gear with transmission and fork levers.



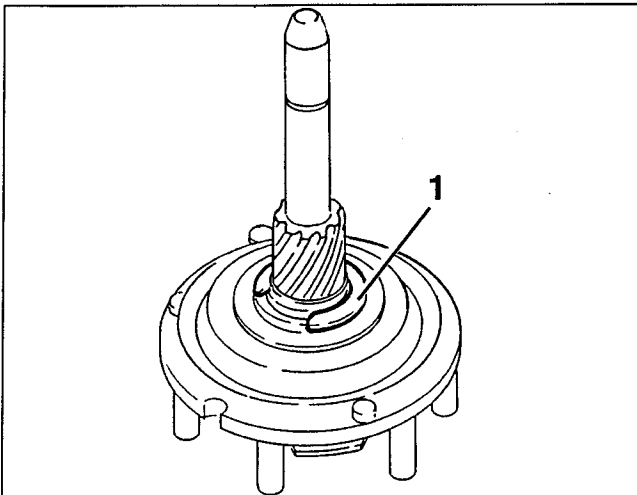
1. Hammer the starter coupling stop ring with a suitable bush and rubber mallet.



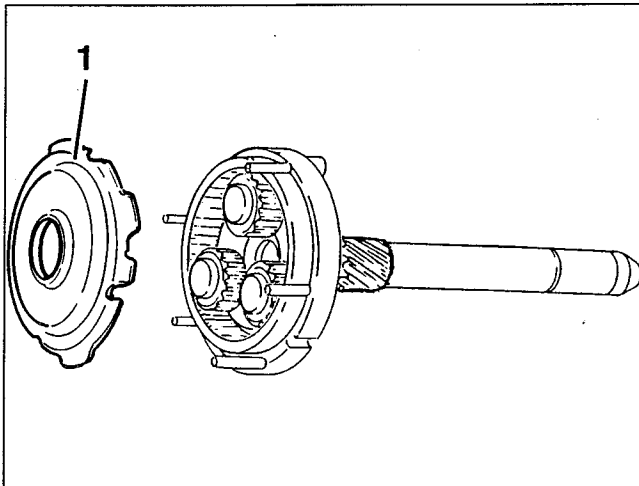
1. If necessary, remove the fork levers from the starter coupling.



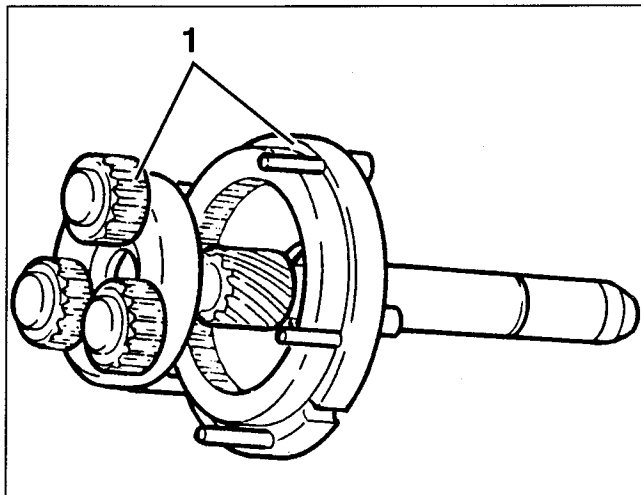
1. Remove the split ring fastening the reversing gear.



1. Remove the protection plate from the differential drive gear.



1. Separate the differential drive gear from the reversing gear.



- If necessary, using special punches replace the bushes on the collector side support and drive side support.

CHECKS AND INSPECTIONS

- Clean the rotor, ring gear with internal teeth, the gear with transmission and the relay using only compressed air (max 4 bar) and a clean cloth. Never use liquid detergents. The other parts, such as for example screws and the rotor shaft may be washed with non inflammable liquid detergents to be found normally in commerce.



CAUTION:
Carefully dry any washed parts, otherwise they might form explosive gases inside the sealed starter motor.

Checking the outside of the collector

- Check for any worn points; if necessary, proceed as follows:

- Tighten the rotor on the collector side and drive side support taking care not to damage the rotor shaft.



CAUTION:
When turning do not tighten the rotor shaft in the chuck.

- Turn the collector using suitable tools ensuring that its diameter is within the specified measurements.



| |
|-----------------------------------|
| Minimum collector diameter |
| 31.2 mm |

- Also check that the eccentricity of the collector and of the pack of plates is within the specified values.



| | |
|---------------------------------------|-----------|
| Collector eccentricity | ≤ 0.01 mm |
| Eccentricity of pack of plates | ≤ 0.05 mm |

- If there are annealed points or interruptions on the collector, change the rotor.

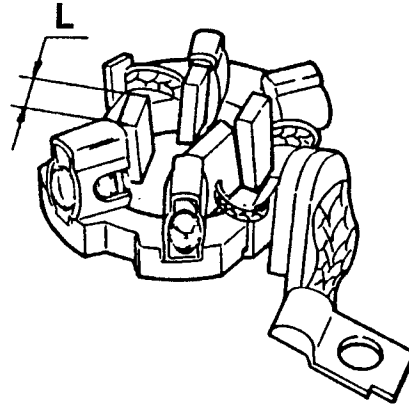
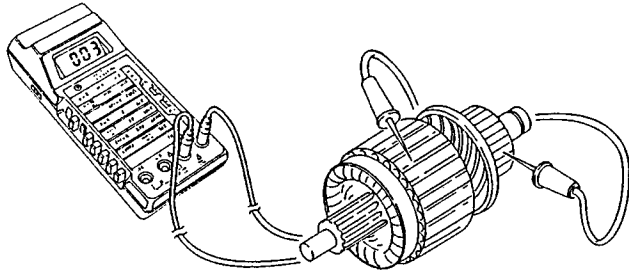
Collector continuity test

- Place the tester prods on the collector blades and check that the tester indicates the passage of current. In the lack of continuity, change the rotor.
- Repeat the above-mentioned operations for all the corresponding pairs of blades.

- Check that the length of the brushes is within the specified values and that they are not damaged; if necessary, change the whole brush holder plate.



| |
|-----------------------------|
| Minimum brush length |
| L = 8 mm |



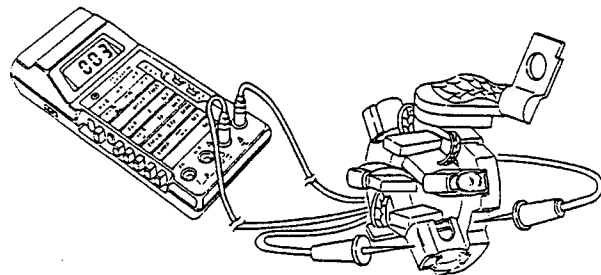
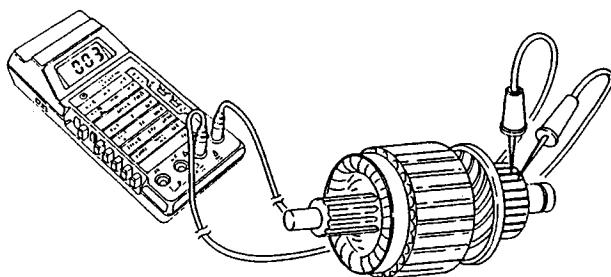
Rotor insulation test

- Place one tester prod on the collector and the other on the blade pack or on the shaft and check that the tester does not indicate the passage of current. If insulation is lacking (short circuit), change the rotor.
- Repeat the above-mentioned tests for all the collector blades.

- Also check that the brush springs are not strained and are stiff enough to warrant good contact of the brushes on the collector.

Brush holder insulation test

- Connect one prod of the tester to the brush holder support plate and the other on a positive brush holder and check that the tester does not indicate the passage of current.
- Repeat the test for the other positive brush holder.
- If insulation is lacking, change the brush holder plate.

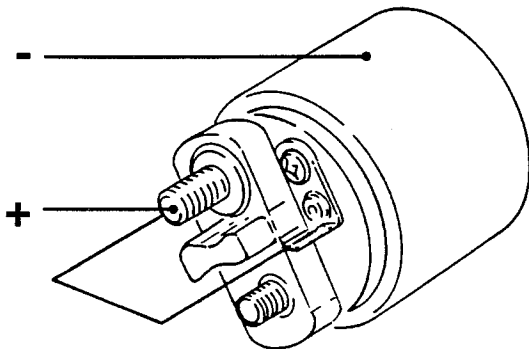


Checking brush wear

- To check the brushes, release the brush holder from its plate.

Checking the efficiency of the coupling relay

- Set the coupling relay on the test bench and power the bench surface negatively (alternatively connect the relay frame to the battery (-) terminal).
- Connect the positive terminal of the test bench or of the battery to the positive terminal of the short circuited relay with the starter pin.
- The prod of the coupling relay that actuates the starter control fork must be triggered; if not, change the electromagnet.

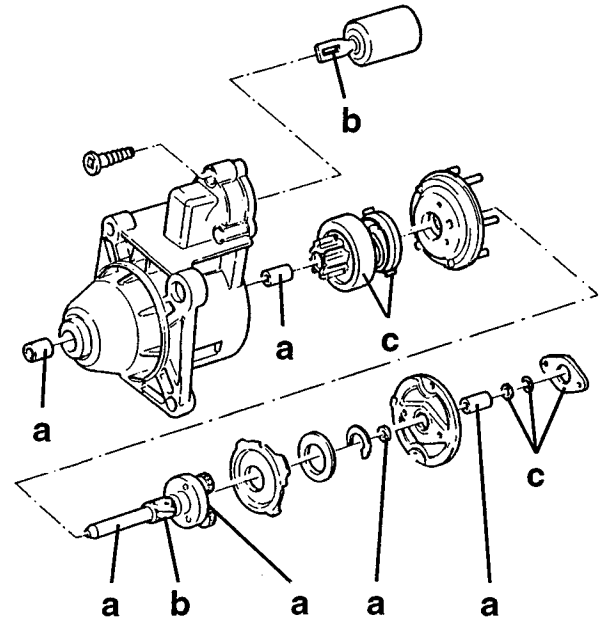


Checking the bush wear

- Check that the two bushes, the first one on the drive side support and the second on the collector side support are not excessively or unevenly worn.
- If necessary change them using special punches.

RE-ASSEMBLY

- Re-assemble the starter reversing the sequence followed for dis-assembly.
- Lubricate the components shown in the following figure with the products described.



- a. Oil
- b. Grease
- c. Silicone grease

BATTERY

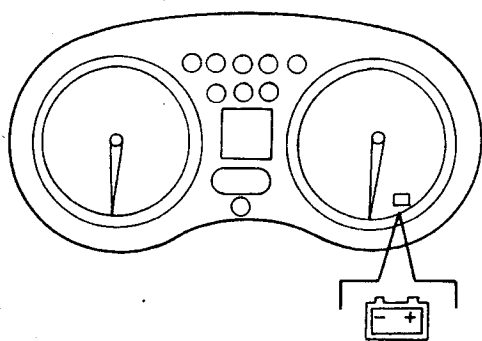
The battery has been designed to ensure that the engine starts in the shortest time possible. For this reason a high torque and a predefined engine rpm are required. This is ensured by the optimal sizing of the 6 elements contained inside the battery, each of which delivers a voltage of ~ 2 V (12 V in all).

It maintains the charge much longer and also contains diluted sulphuric acid; for this reason it is necessary to keep it in the upright position even when it is not installed in the car. The battery body also has small ventilation holes to minimise the formation of gas during charging. Due to the reduction of the of gas produced, there is no corrosion and good contact at the terminals is ensured.

The advantages of this battery are:

- highly reduced water consumption due to the new type of alloy used in the manufacture of the grills and plates, for which reason topping up is no longer necessary;
- excellent starting capacity, as a result of very low self- discharging of up to seven months thus enabling long term storage (at temperatures below 28°C).

When the vehicle is travelling the alternator recharges the battery; whenever the charge is insufficient or the connection between the alternator and the battery is cut off, a warning light on the instrument cluster turns on to indicate a circuit failure.



If the battery appears to be flat, check the charge measuring the loadless voltage on the terminals using a Voltmeter.

If the voltage is below 12.30 V it is 50% charged; if it reaches 12.48 V it is 75% charged; and at 12.66 V it is 100% charged.

CAUTION:

If the electrolyte level in one or more cells of the battery has fallen below the minimum mark on the plastic container, carefully open the cap cover and add distilled de-ionized water, as with ordinary batteries.

NOTE: It is highly inadvisable to recharge the battery quickly at voltages above 15.5 V.

When recharging use a normal 12 V battery charger, connecting the positive cable (red) to the battery (+) terminal and the negative cable (black) to the battery (-) terminal.

If the battery of the vehicle is connected temporarily to an external battery, connect the positive terminal to the positive terminal and the negative terminal to the negative terminal.

CAUTION:

- Do not connect or disconnect the battery to or from the electrical system of the car when the engine is running.
- Do not invert the terminal connections (even for a moment) as this would damage the alternator rectifier.
- When connecting the battery charger to the battery, firstly connect the cables and then start the battery charger.
- If it becomes necessary to start the engine with temporary cables and with an auxiliary battery, the voltage of the latter must not exceed 12 V.
- Before recharging the battery the clamp should be removed from the negative terminal.
- When charging make sure that the temperature of the electrolyte does not exceed 45°C.
- Do not touch the positive and negative terminals at the same time with the hands.
- Keep all naked flames away from the battery when recharging.

When replacing the battery follow the directions for use.

If the charge of the replacement battery is potentially higher than that of the old one, the higher voltage might cause melting of the starter motor induction coil, or damage to the pinion or ring gear.

MAINTENANCE

The capacity of the battery to start the engine depends on the charge within it; it is therefore necessary to check it regularly and carry out any maintenance, especially in winter due to the greater load exerted on the starter motor and the reduced battery capacity at low temperatures.

Clean the surface of the battery, the terminals and clamps with a solution of water and sodium bicarbonate.

Before reconnecting the terminals, coat them with a layer of grease.

CAUTION:

Do not let any of the fluid used for cleaning get into the battery as it will react with the electrolyte. The electrolyte fluid is an acid, therefore dangerous for the eyes, hands and clothes.

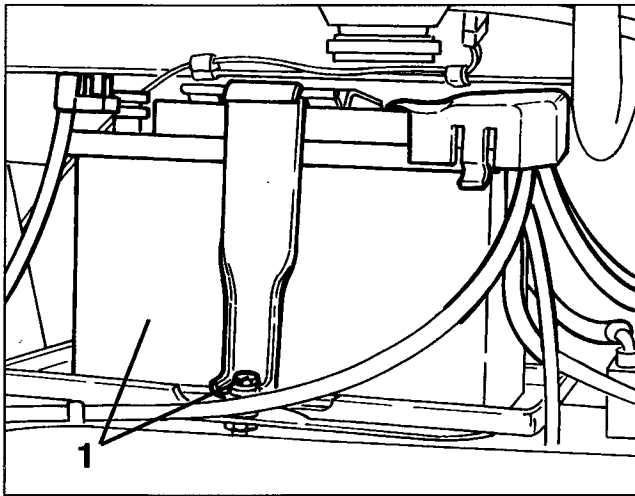
NOTE:

Batteries stored in a warehouse or installed on cars left unused for long periods will slowly lose their charge, so it will be necessary to recharge them before use.

**REMOVAL/REFITTING
(GTV)**

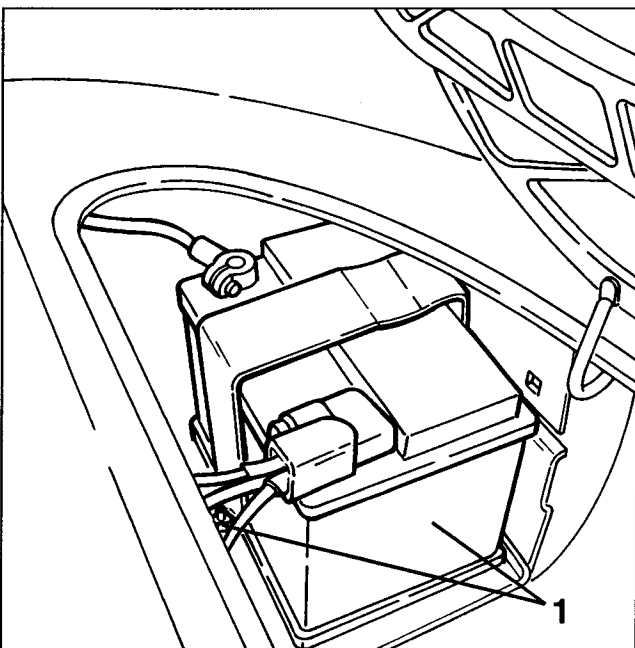
- Working from the boot, remove the spare wheel and the luggage compartment front panel.

1. Firstly disconnect the battery (-) terminal and then the (+) terminal, then remove it after slackening the fastening clamp screw.

**REMOVAL/REFITTING
(SPIDER)**

- Working from the top, open the battery compartment cover.

1. Firstly disconnect the battery (-) terminal and then the (+) terminal, then remove it after slackening the fastening clamp screw.

**ALTERNATOR**

When the engine is running the alternator supplies electrical energy to the electronic control units and to the various services which can be operated at all times.

It also charges the accumulator (battery), so that it can deliver current when the engine is stationary.

The electric current is produced by a stator which "cuts" the magnetic field generated by a rotary coil (rotor). The rotor is integral with a pulley operated directly by the crankshaft through a belt.

The contact brushes supply the rotor with the excitation current.

The alternate current generated by the alternator is rectified by the diodes and adjusted by the voltage regulator located on the alternator body.

The electronic voltage regulator used is compact in size and it warrants constant voltage in all fields of operation of the engine, regardless of the changes in load and rpm.

A cooling fan turns together with the pulley to prevent the alternator from reaching dangerous temperatures that might adversely affect its operation.

The alternator installed is of the type with claw terminals and collector rings; it is very light and compact.

CAUTION:

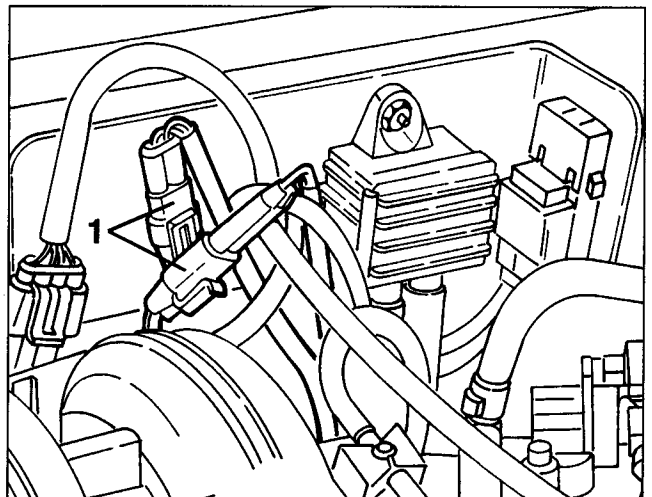
The fan will correctly cool the alternator if it turns clockwise (seen from pulley side).

**REMOVAL/REFITTING
(1970 c.c. Engine)**

- Set the car on a lift.

- Disconnect the battery (-) terminal.

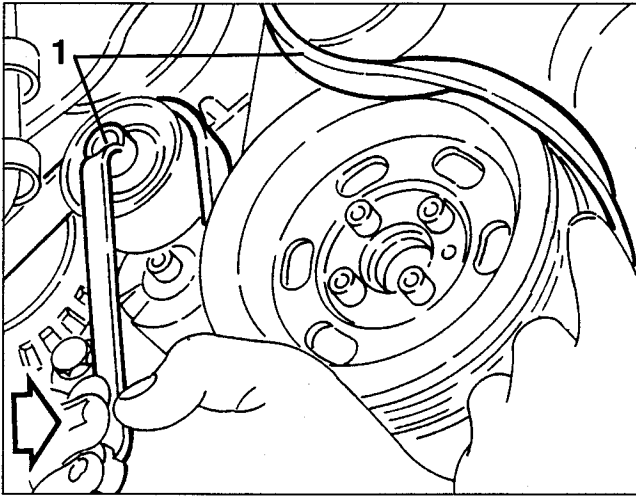
1. Disconnect the lambda sensor electrical connections.



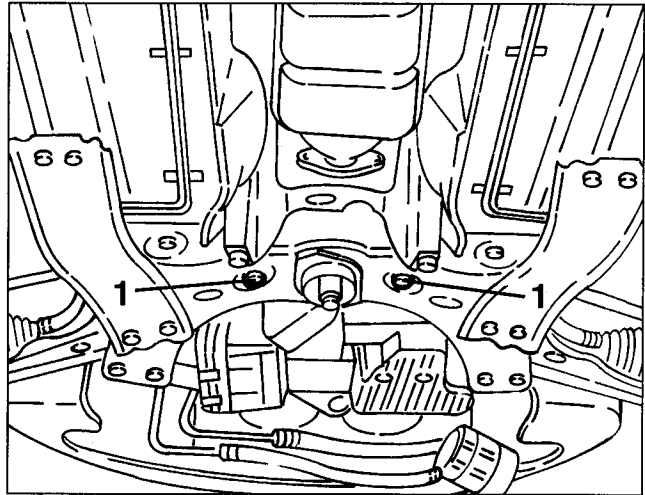
- Raise the car.

- Remove the right front wheel and mud flaps.

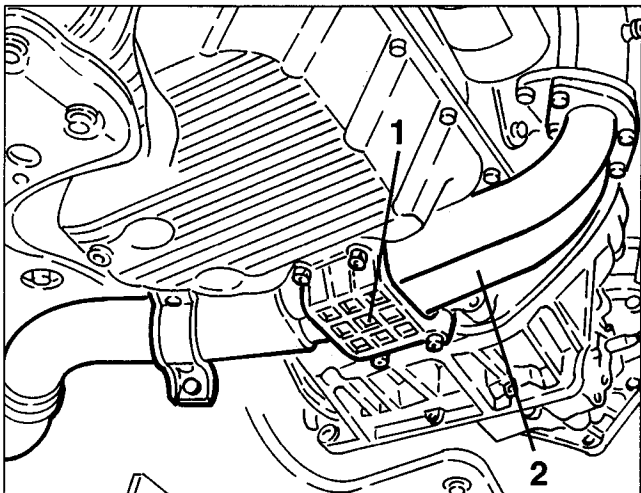
1. Working as shown on the guide pulley, slacken the tension of the auxiliary components drive pulley and remove it.



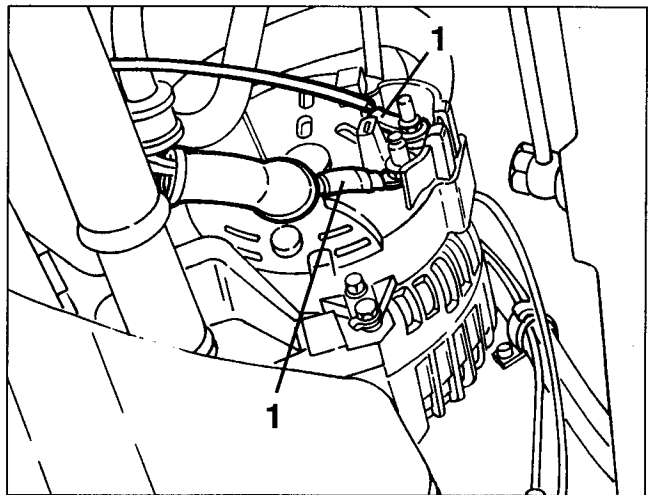
1. Slacken the screws fastening the power steering box to the suspension crossmember.



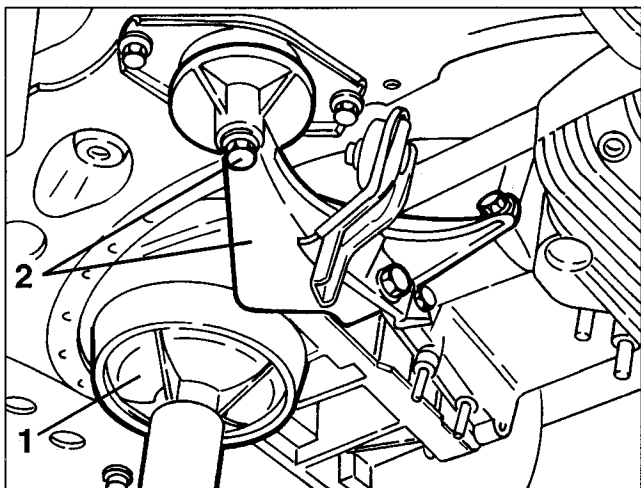
1. Remove the reinforcement bracket.
2. Remove the front section of the exhaust pipe complete with lambda sensor after slackening the fastenings.



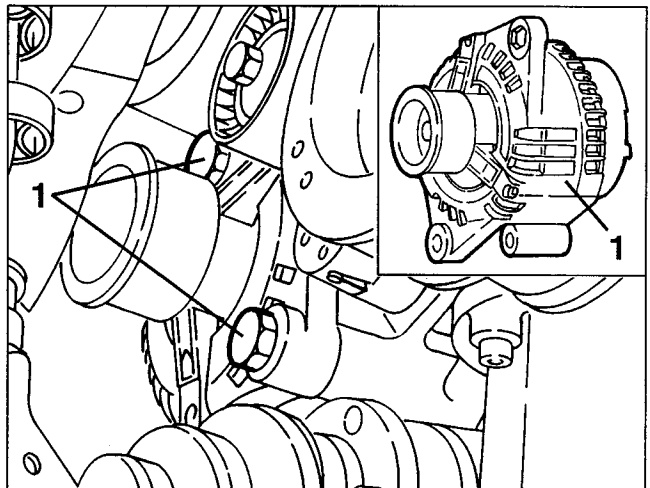
1. Disconnect the electrical connections from the alternator.



1. Set a hydraulic jack under the gearbox as illustrated.
2. Slacken the fastening screws and remove the rear power unit support.

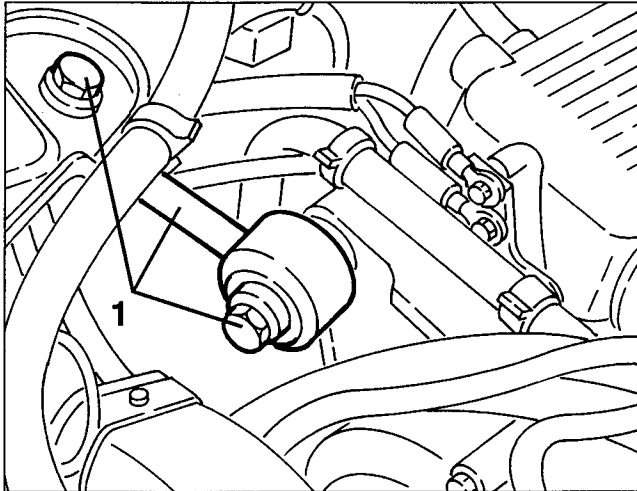


1. Slacken the two fastening bolts and remove the alternator retrieving it from under the car pulling it out of the opening obtained by removing the power unit rear support.

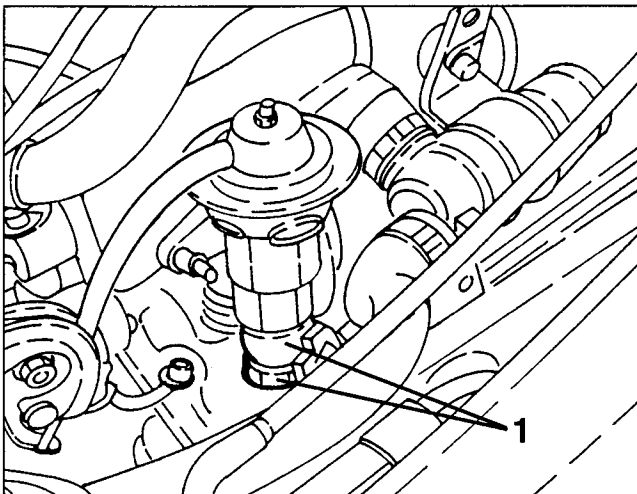


REMOVAL/REFITTING
(2959 c.c. Engine)

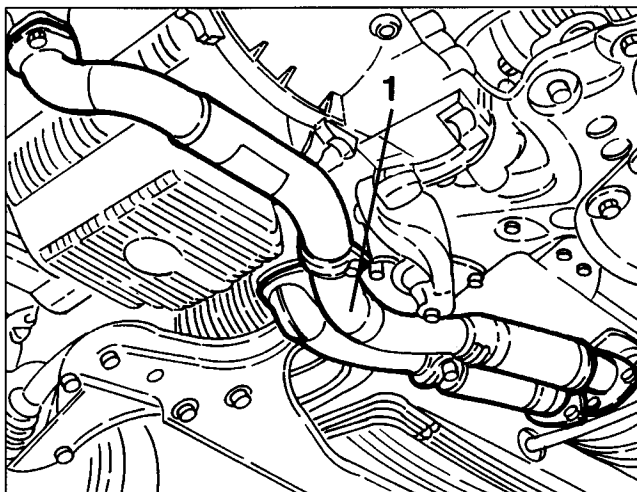
- Set the car on a lift.
 - Disconnect the battery (-) terminal.
 - Remove the right front wheel and mud flaps.
1. Slacken the fastening screws and remove the engine stay rod.



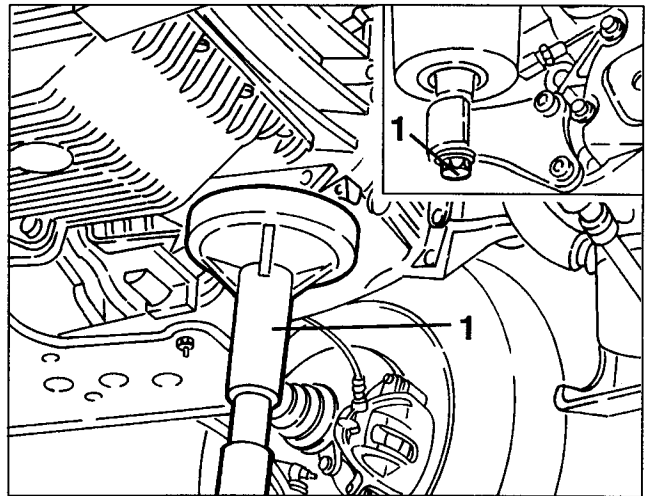
1. Disconnect the exhaust gas takeoff pipe from the E.G.R. valve.



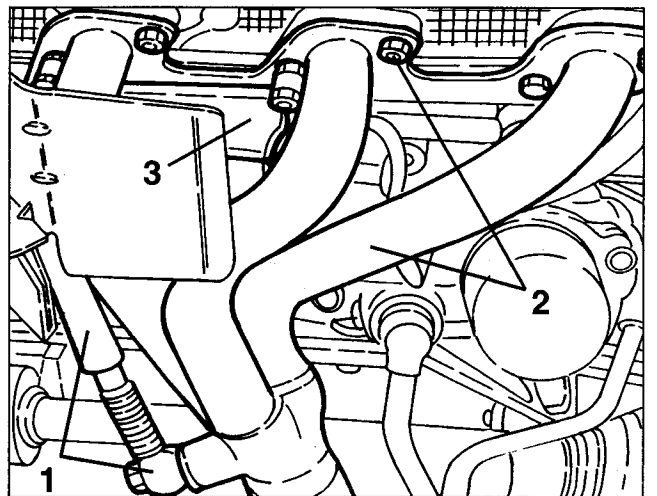
1. Raise the car and remove the front section of the exhaust pipe slackening the fastenings.



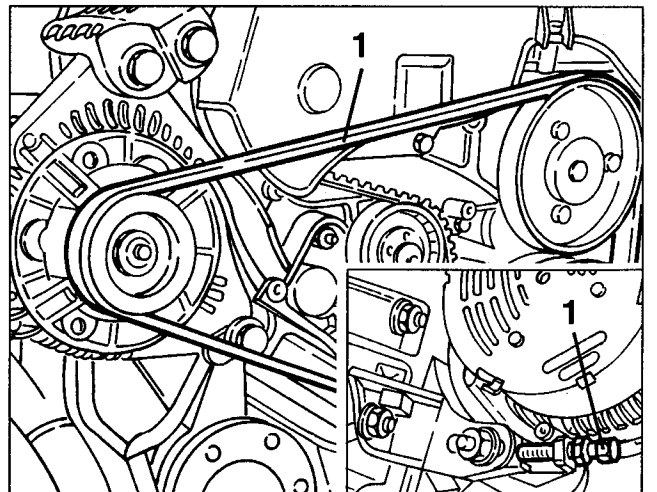
1. Set a hydraulic jack under the gearbox, then slacken the power unit fastening screws on the gearbox side.



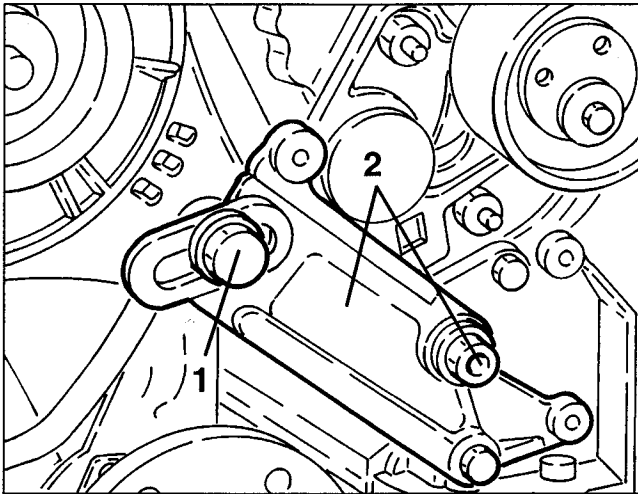
1. Disconnect the the exhaust gas takeoff pipe from the manifold and remove it.
2. Slacken the fastening nuts and remove the exhaust manifold from the right-hand cylinder head.
3. Remove the starter motor heat shields.



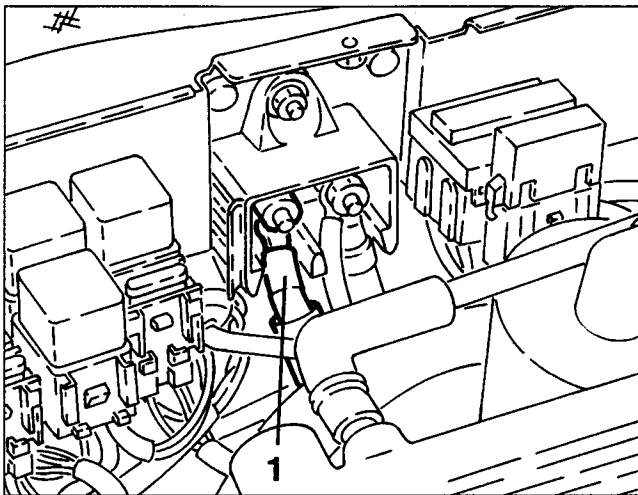
1. Lower the car, slacken the tension of the alternator-water pump drive belt, then remove it.



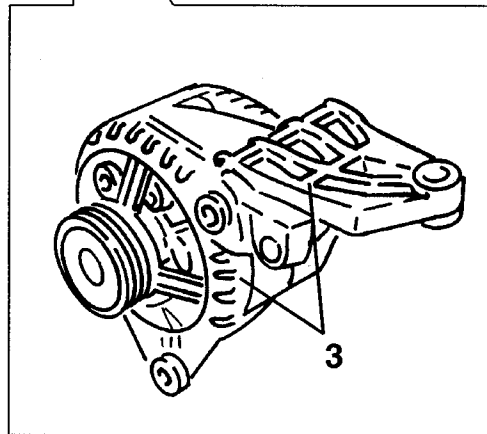
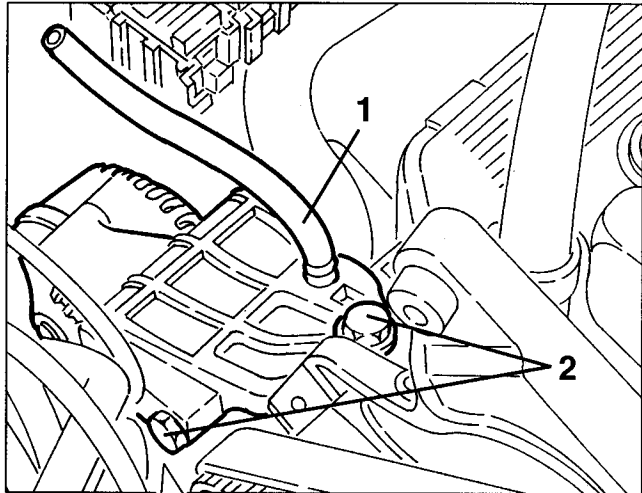
1. Slacken and remove the lower nut fastening the alternator to the support bracket.
2. Slacken the fastening screws and remove the alternator lower support bracket.



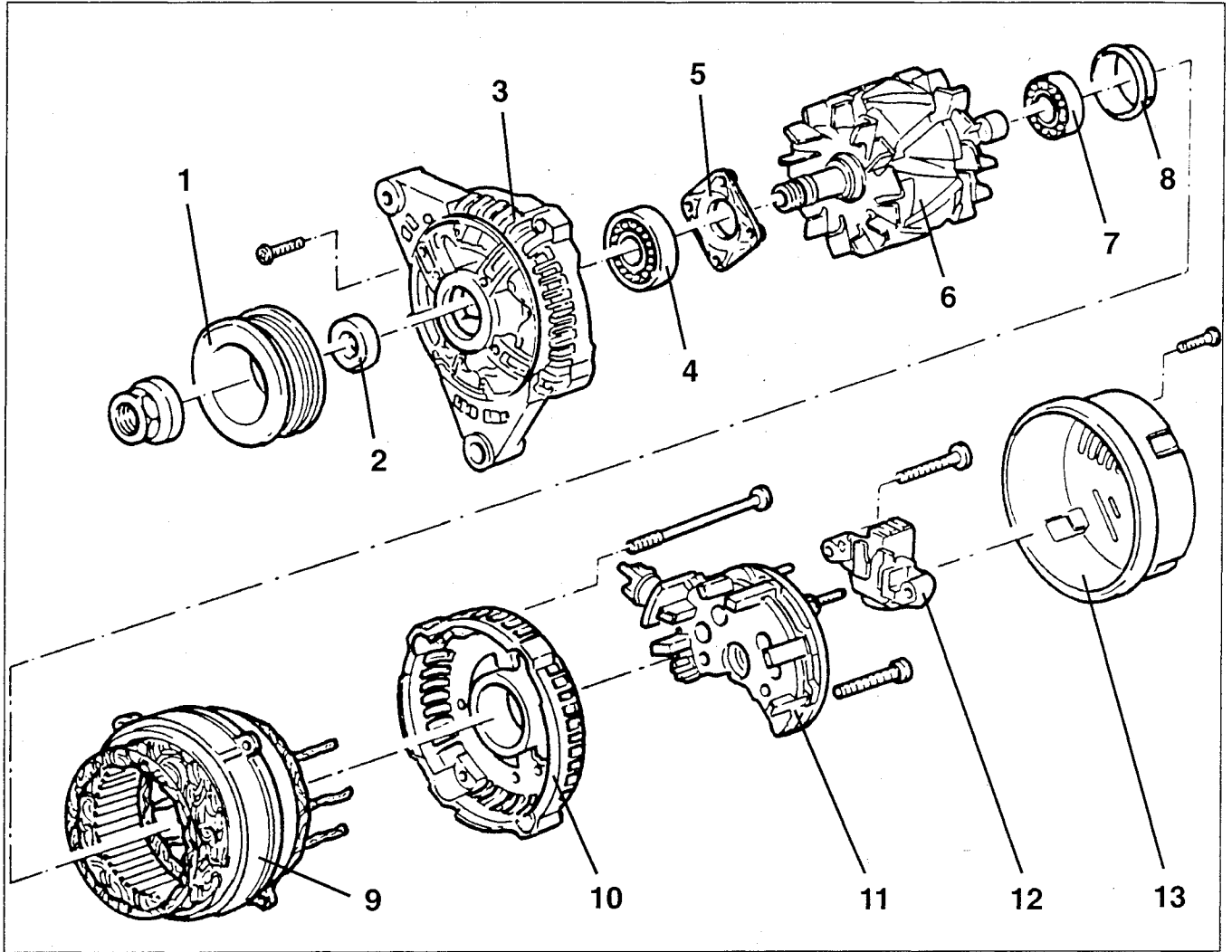
1. Disconnect the alternator supply cables from the branch box.



1. Disconnect the condensed oil recovery pipe from the alternator upper support bracket.
2. Slacken the two screws fastening the alternator upper support bracket to the cylinder head.
3. Remove the alternator complete with upper support bracket and dis-assemble them on the bench.



REMOVAL/REFITTING

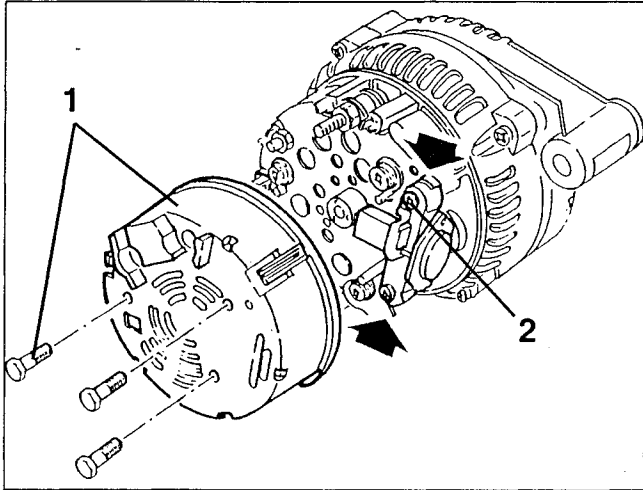


- 1. Pulley
- 2. Spacer
- 3. Drive side support
- 4. Drive side bearing
- 5. Cover plate
- 6. Rotor
- 7. Regulator side bearing

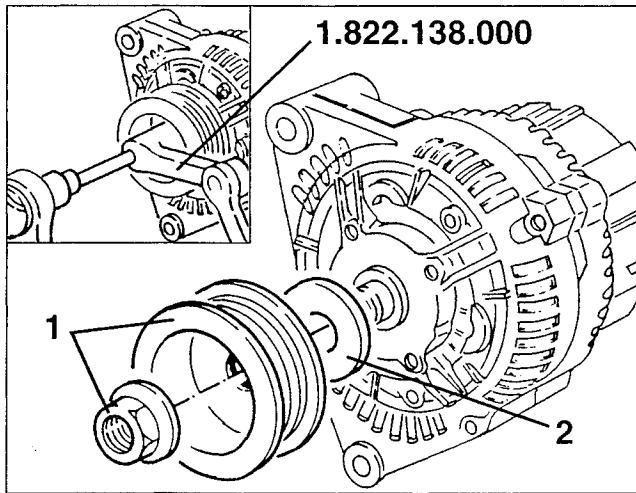
- 8. Centering ring
- 9. Stator
- 10. Support for collector rings
- 11. Rectifier unit
- 12. Voltage regulator - brush holder
- 13. Protection cap

- Fasten the alternator on a special support tool.

1. Slacken the three fastening screws and remove the protection cap releasing the lock clips.
2. Slacken the two screws fastenings the voltage regulator then remove it releasing it from the side catches.



1. Using tool No. 1.822.138.000 together with wrench USAG XZN M10L, slacken the nut fastening the alternator pulley and remove it.
2. Retrieve the spacer.

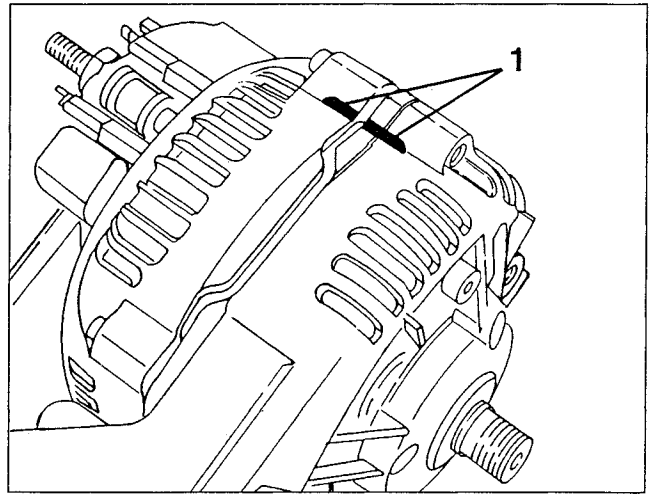


- When tightening the retaining nut with extension spanner N° 1.822.137.000, the torque values become:

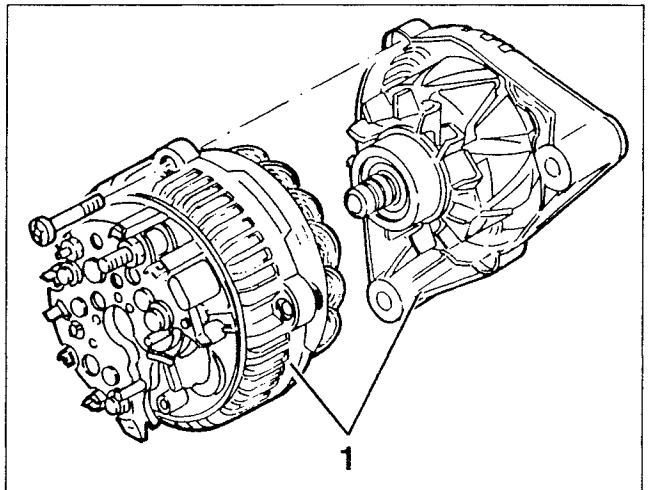


| | |
|---|-----------------------------|
| 300 mm for dynamometer spanner with arm | 65 ÷ 74 Nm 6.6 ÷ 7.5 kgm |
| 400 mm for dynamometer spanner with arm | 67 ÷ 76 Nm 6.9 ÷ 7.8 kgm |

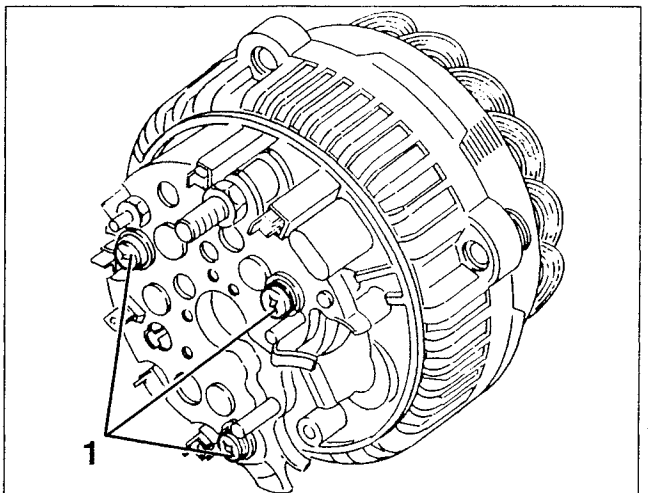
1. Make reference notches on the drive side support and on the connector ring support.



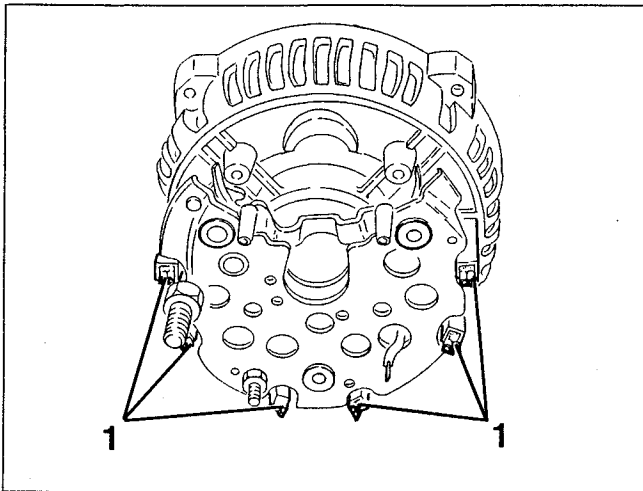
1. Slacken the four fastening screws and remove the drive side support with rotor from the collector ring support.



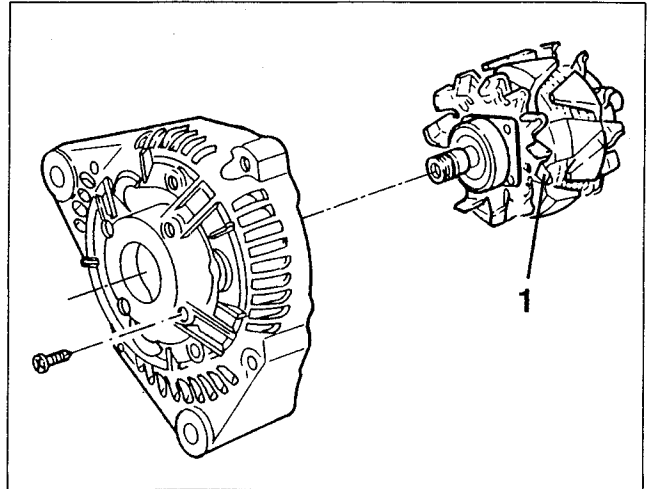
1. Slacken the three screws fastening the rectifier unit to the support.



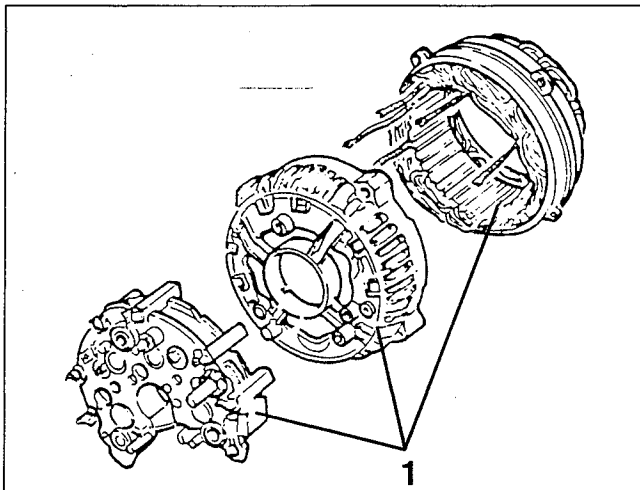
1. Using a screwdriver open the clamps fastening the stator wires.



1. Slacken the four fastening screws and remove the rotor complete with bearings from the drive side support.



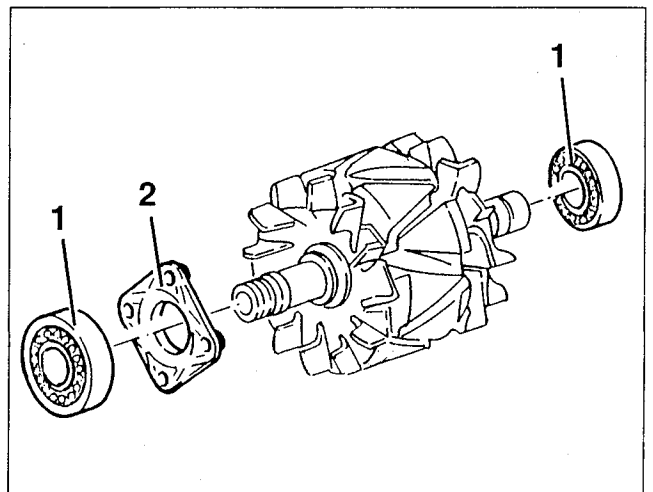
1. Separate the rectifier unit from the collector ring support and from the stator.



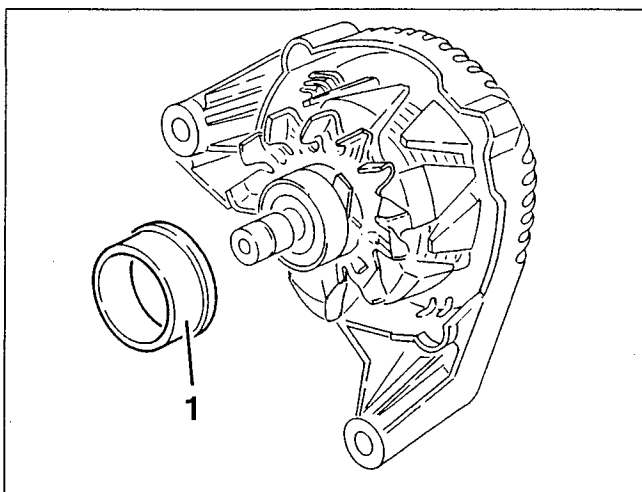
1. Using a suitable puller tool, remove the rotor bearings.
2. Retrieve the cover plate.

CAUTION:

When removing the regulator side bearing, do not use the shaft as a reference plane, as this is made from plastic and might be damaged.



1. Remove the centering ring from the bearing on the regulator side.



CHECKS AND INSPECTIONS


CAUTION:

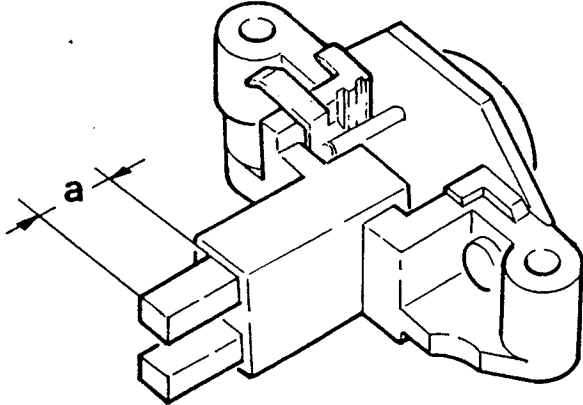
The alternators are fitted with long life storage condensers for the suppression of receivers and transmitting systems.

When washing parts of the alternator, the condenser can discharge in contact with the cleaning fluid and this may set fire to inflammable liquids.

Checking the brush wear

- Check the outside of the voltage regulator for damage.
- Change the regulator if the brushes are split or if the protrusion dimension "a" is below the specified value.

| | |
|--|-----------------------------|
|  | Minimum brush length |
| | a = 7 mm |

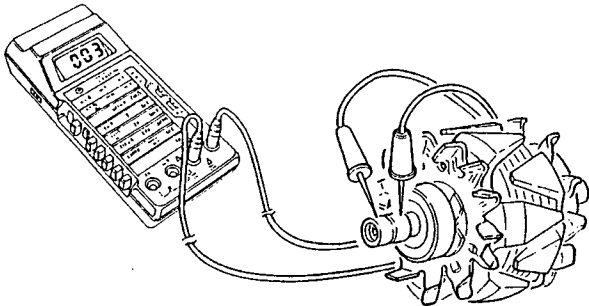


- Also check that the brushes run smoothly and that their springs are rigid enough to ensure good contact of the brushes on the collectors.

Continuity test of the rotor winding

- Check that the resistance of the rotor winding is within the specified ratings connecting the prods of the tester on the collector rings.

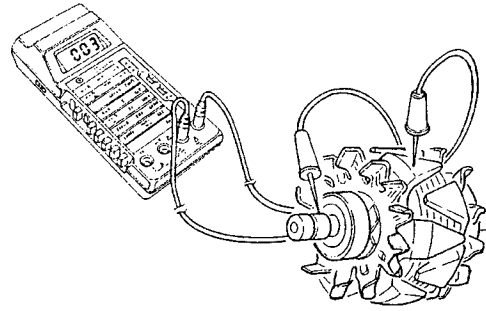
| |
|---------------------------------|
| Rotor winding resistance |
| 2.6 ÷ 2.8 Ω |



Rotor insulation test


- Place one tester prod on a collector ring and the other one on the rotor core, then check that the tester does not signal the passage of current.

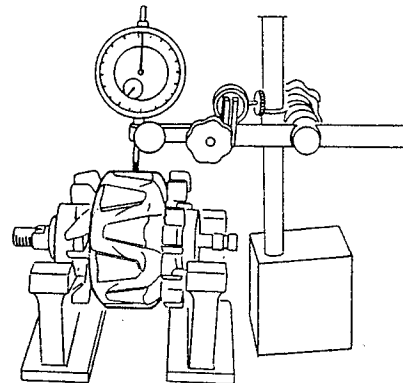
- Repeat the operation for the second collector ring.




Measuring the concentricity of the rotor and collector rings

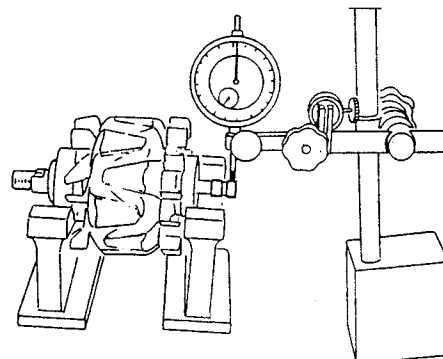
- Set the rotor on special supports and using a dial gauge on a magnetic support base, check that the eccentricity of the rotor outside diameter does not exceed the specified value.

| | |
|---|---|
|  | Eccentricity of rotor outside diameter |
| | ≤ 0.05 mm |



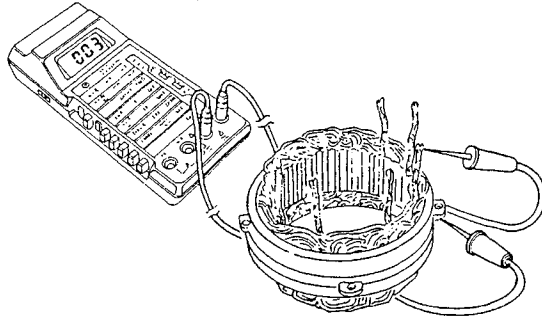
- In the same way, check that the difference on the collector rings does not exceed the specified value. If necessary, turn the outsides of the collector rings.

| | |
|---|--|
|  | Eccentricity of collector rings |
| | ≤ 0.03 mm |

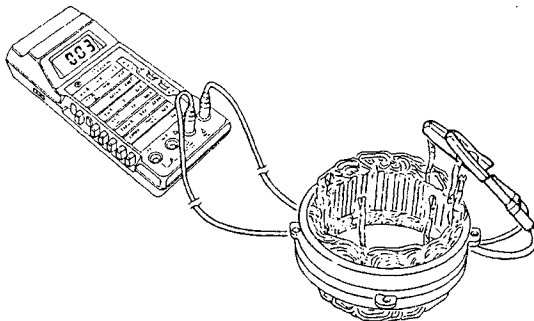


Insulation test for stator windings

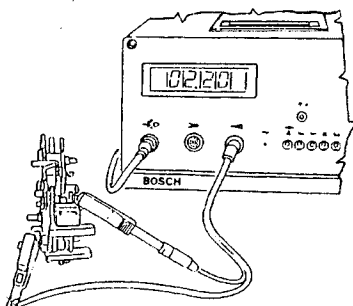
- Place one prod of the tester on the stator pack and the other on the terminals of the first phase, then of the second and third. Check that the tester does not signal the passage of current. Change the stator if insulation is insufficient.

**Continuity test of stator windings**

- Check the tester terminals respectively on the terminals of phases 1-2, 1-3 and 2-3 and check that in all three cases the tester signals the passage of current. In the lack of continuity in the windings, change the stator.

**Checking the anti-disturbance condenser on the rectifier**

- Slacken the antidisturbance condenser connection tab (-) on the rectifier.
- Connect the tester to B+ of the rectifier and to the slackened connection tab of the condenser and check that the electrical capacity is 1.8 ± 2.6 microfarad.



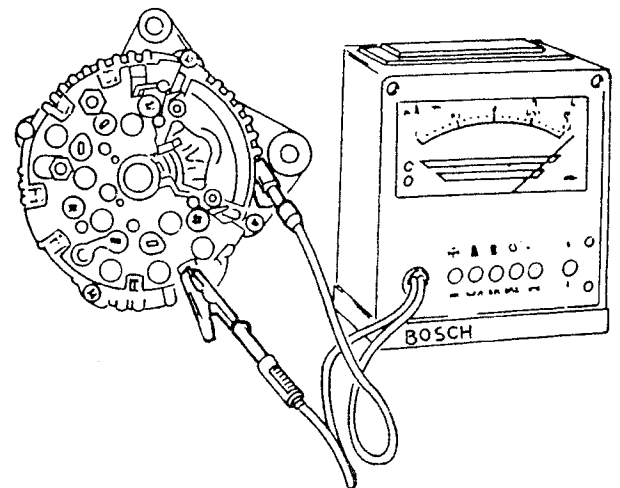
- If not, change the rectifier complete with anti-disturbance condenser.

CAUTION:

After this check, discharge the condenser by short circuit to prevent the liquid detergent from setting on fire when cleaning the components.

Checking the rectifier

- Check that the wired rectifier is working properly using special equipment.
- Connect the terminals of the test equipment to the following points of measurement:
 - a) Stator frame and connection weldings.
 - b) B+ and stator connection welding point.
 - c) D+ stator connection welding point.
 The rectifier is in order if the tester dial is in the sector of both measurements. If one or more dodes are faulty, change the complete rectifier.



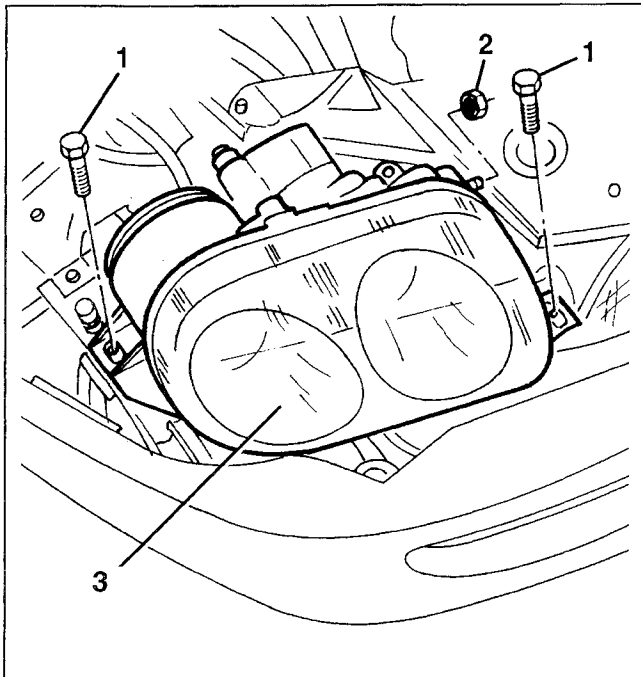
WHITE

LIGHTING

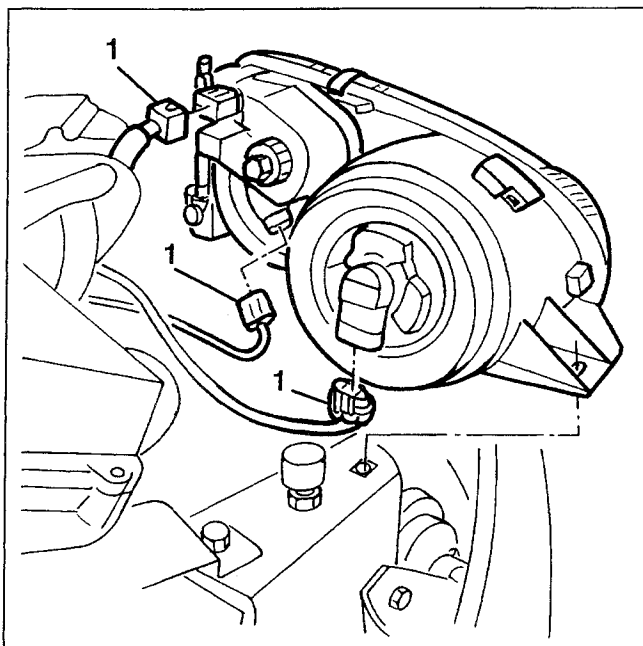
UPPER FRONT LIGHT CLUSTERS

REMOVAL/REFITTING

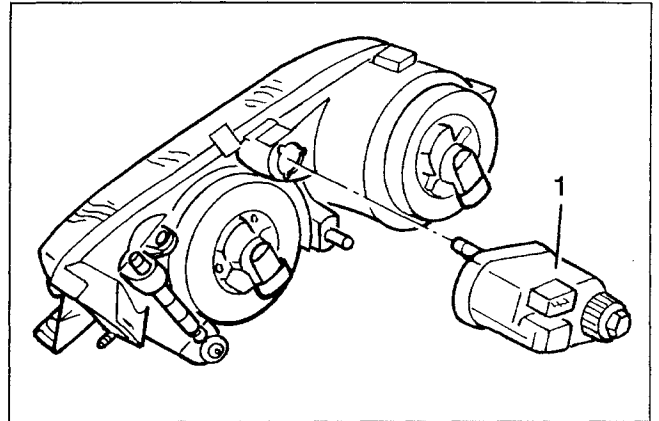
- Disconnect the battery and open the bonnet.
- Remove the engine compartment cover (see Group 70).
- 1. Slacken the two screws.
- 2. Unscrew the nut.
- 3. Move the light cluster.



1. Move the light cluster forward just enough to disconnect the electrical connections, then remove the light cluster.



1. Remove the headlamp aiming device motor from the light cluster turning and sloping it to release the ball.



When refitting push the motor arm out completely and, after removing the high beam lamp cover, push the parabola downwards to ensure that the ball catches correctly.

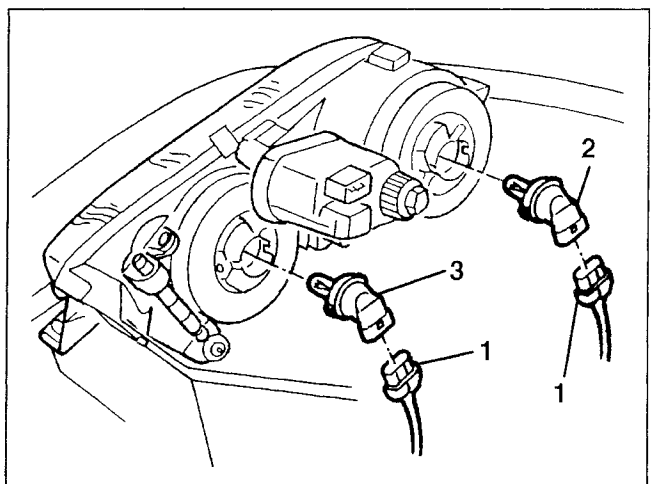
After refitting check that the light clusters are correctly in place with the bonnet closed.

If necessary, adjust the position working on the slots of the connection clamps.

Carry out the headlamp aiming procedure.

BULB REPLACEMENT

- Disconnect the battery.
- 1. Working from the engine compartment, disconnect the two electrical connections.
- 2. Twist and remove the low beam lamp bulb holder.
- 3. Twist and remove the high beam lamp bulb holder.

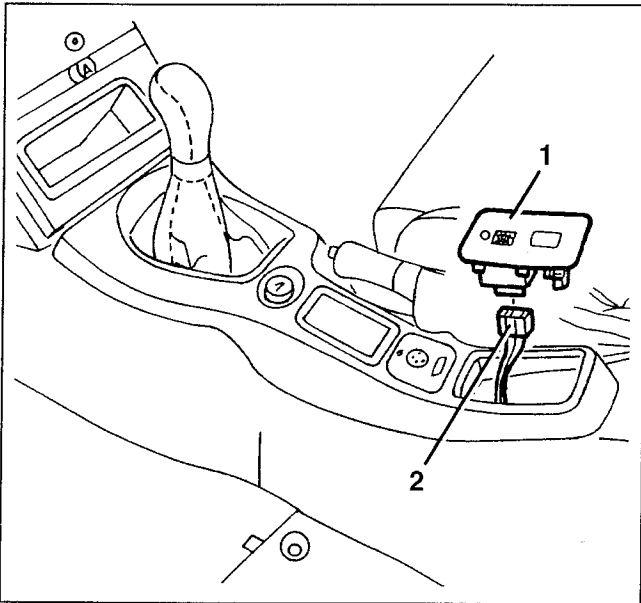


WARNING: The bulbs are integrated with the bulb holder. Do not touch the headlamp bulb glass with the hands; if so, clean with spirit.

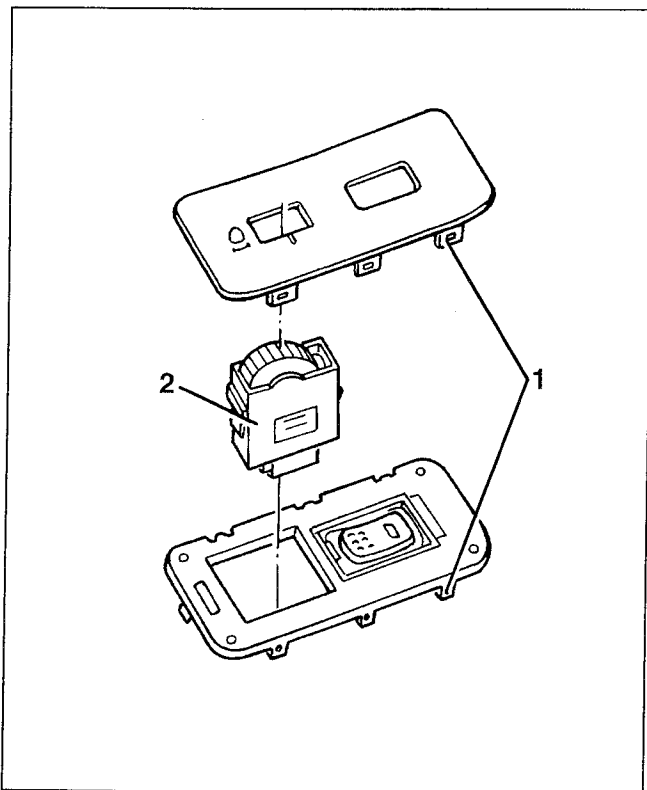
HEADLAMP AIMING SWITCH

REMOVAL/REFITTING (to '97 versions)

- Disconnect the battery
- 1. Remove the headlamp aiming switch panel from its housing on the centre tunnel.
- 2. Disconnect the electrical connection and retrieve the panel.

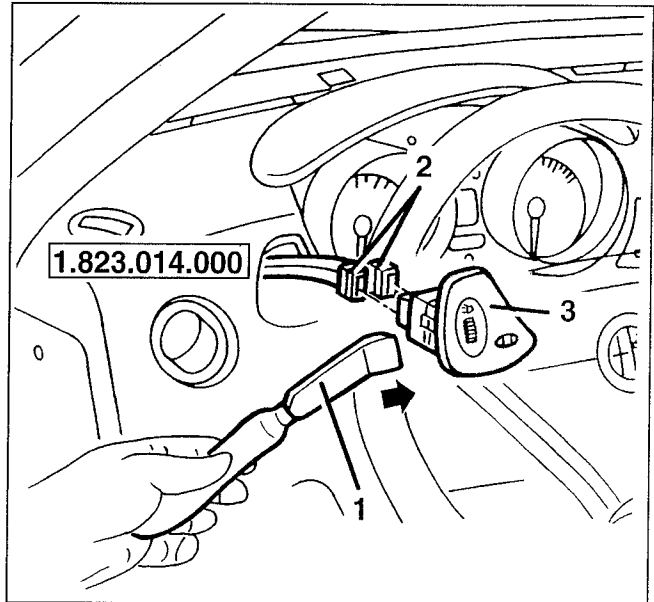


1. Release the side tabs and separate the outer plate.
2. Retrieve the headlamp aiming switch.



REMOVAL/REFITTING ('98 versions)

- Disconnect the battery
- 1. Use tool 1.823.014.000 to remove the switch board.
- 2. Disconnect the electrical connections.
- 3. Take the switch board.



1. Press the side tabs and remove the external plate.
2. Take the headlight slant switch.

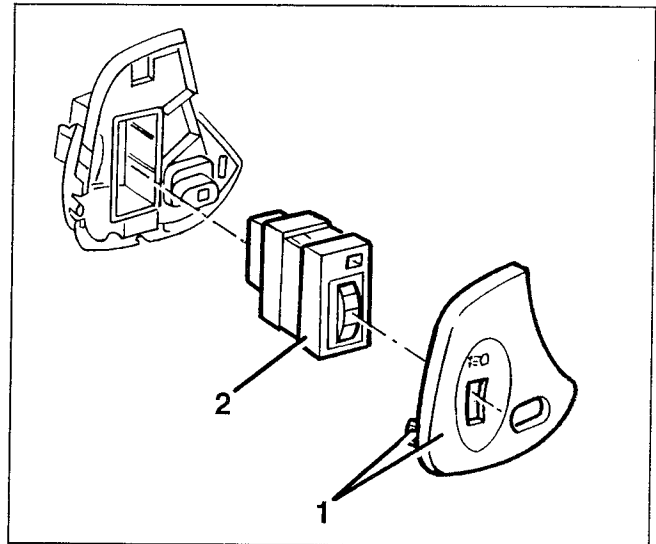
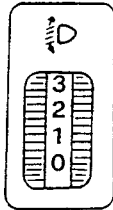


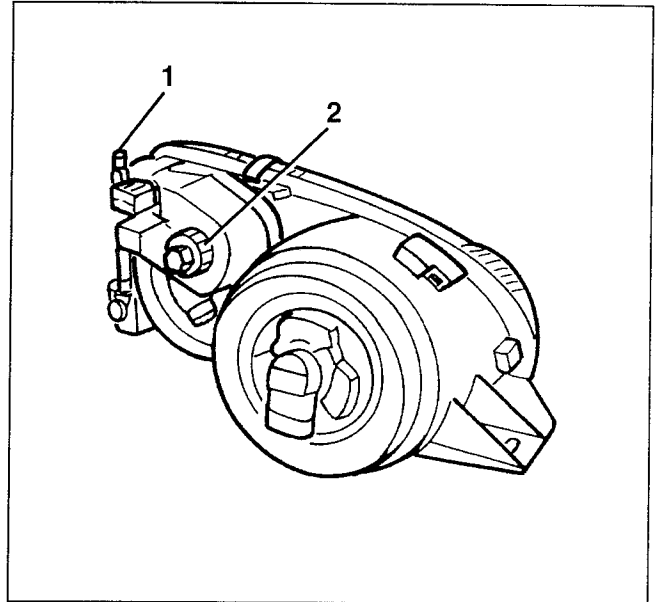
Table of positions of headlamp aiming switch

|  | |
|---|--|
| Position of knob | Vehicle load |
| 0 | driver only or driver and passenger on front seat |
| 1 | all seats occupied |
| 2 | all seats occupied plus load in luggage compartment (up to reaching maximum permissible load on rear axle) |
| 3 | driver plus load in luggage compartment (up to reaching maximum permissible load on rear axle) |

HEADLAMP AIMING

There are the following two possibilities for aiming the upper light clusters:

1. Horizontal adjustment screw.
2. Ring nut for vertical adjustment.



WARNING:

Before aiming the headlamps make sure that the light clusters are perfectly aligned with the bonnet closed. If necessary adjust the light cluster slotted fastenings.

Vehicle preparation

The vehicle must be complete with spare wheel, tool kit, oil fluids and fuel, the tyre pressure should be as specified for normal service with the driver on board.

Set the vehicle on a level surface with the headlight cluster glass 10 m from a screen or opaque surface on which the following lines have been traced:

V - V: vertical corresponding to the trace of the plane of symmetry of the vehicle.

C - C: corresponding to the traces of the vertical planes passing through the centres of reference of the light clusters.

HC - HC: horizontal corresponding to the height from the ground of the centres of reference of the light clusters.

AC - AC: horizontal below line Hc - Hc by 14 cm (value for new cars), 11 cm (value for other than new cars).

Aim the light clusters on the low beam. Acting on the headlamp aiming device as follows.

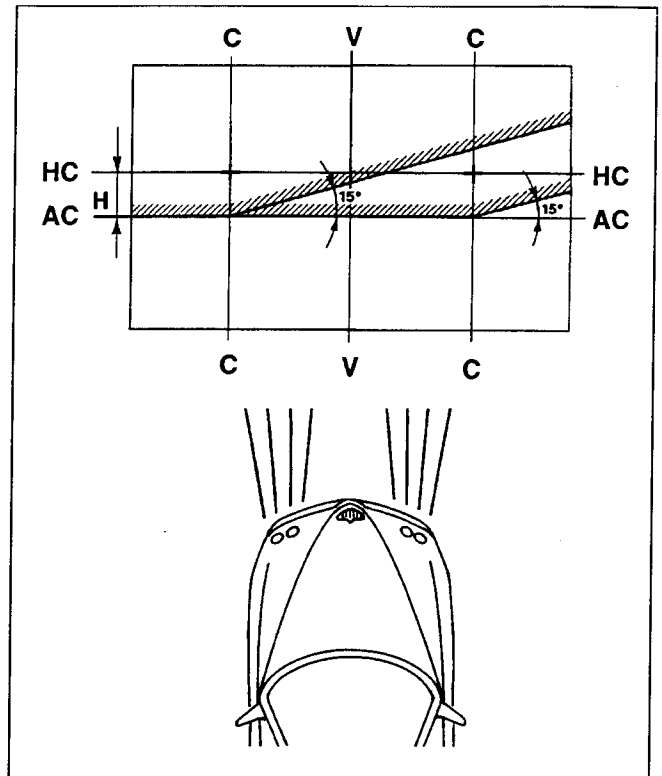
NOTE: For cars fitted with headlamp aiming device adjust with the device at position "0".

Vertical aiming

Make the horizontal section of the line of demarcation between the dark zone and the illuminated zone coincide with line Ac - Ac traced on the screen.

Horizontal aiming

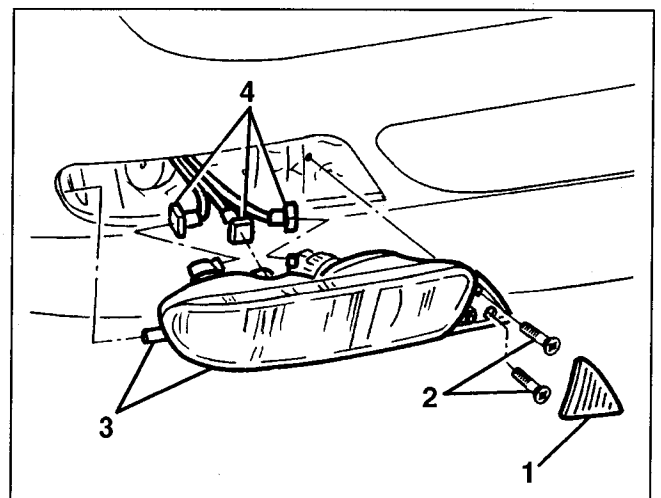
Make the crossing point of the horizontal and sloping lines of demarcation coincide with the respective crossing point of lines C - C and Ac - Ac of the screen. If the screen needs to be set nearer to the car, this value must be reduced proportionately (eg: if the screen is at half the distance, it must be halved).



LOWER FRONT LIGHT CLUSTERS

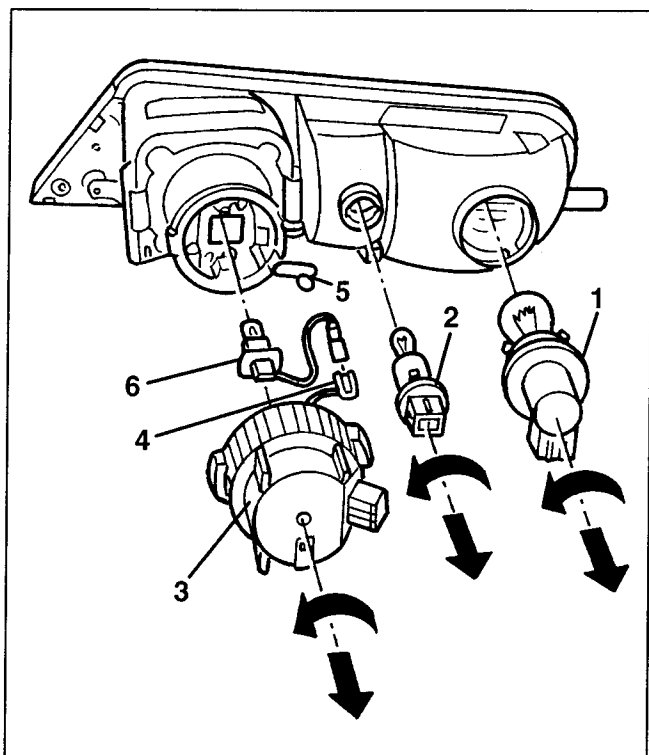
REMOVAL/REFITTING

- Disconnect the battery.
- 1. Remove the triangular trim.
- 2. Slacken the two screws.
- 3. Remove the light cluster releasing the outer pin.
- 4. Disconnect the electrical connections and remove the light cluster.

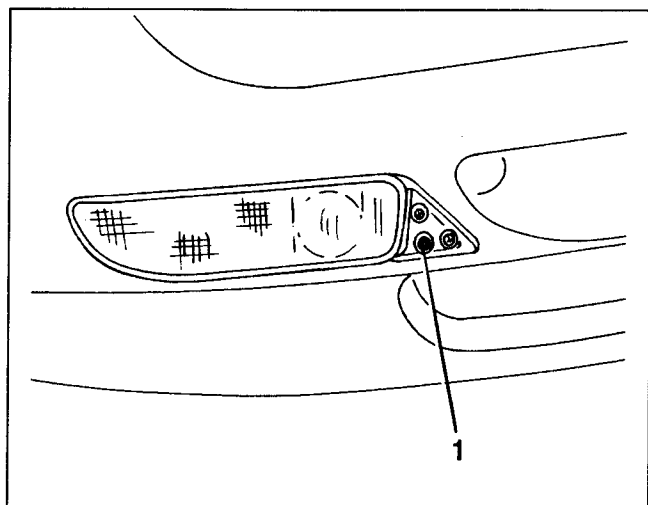


BULB REPLACEMENT

1. Twist and remove the direction indicator bulb holder and remove the bulb from the bulb holder.
2. Twist and remove the sidelights bulb holder and remove the bulb from the bulb holder.
3. Twist and remove the fog lamp cover.
4. Disconnect the connection.
5. Release the fastening clip.
6. Remove the fog lamp bulb.



1. If necessary, when refitting adjust the height of the foglamp beam using the special screw.

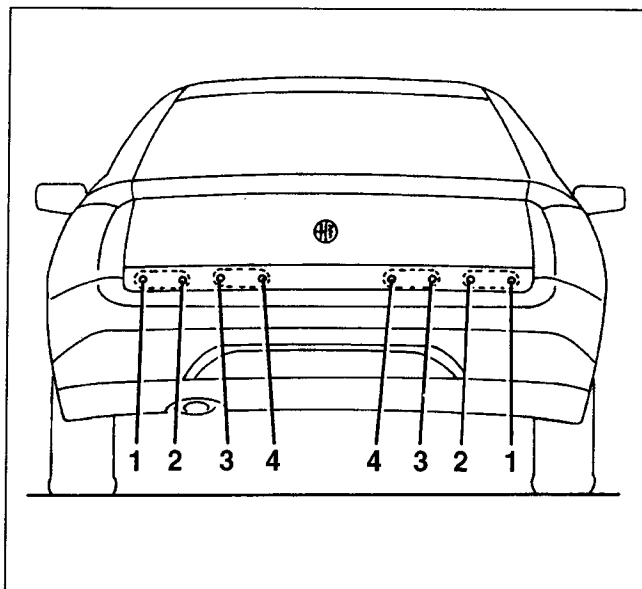


TAIL LIGHT CLUSTER

REMOVAL/REFITTING

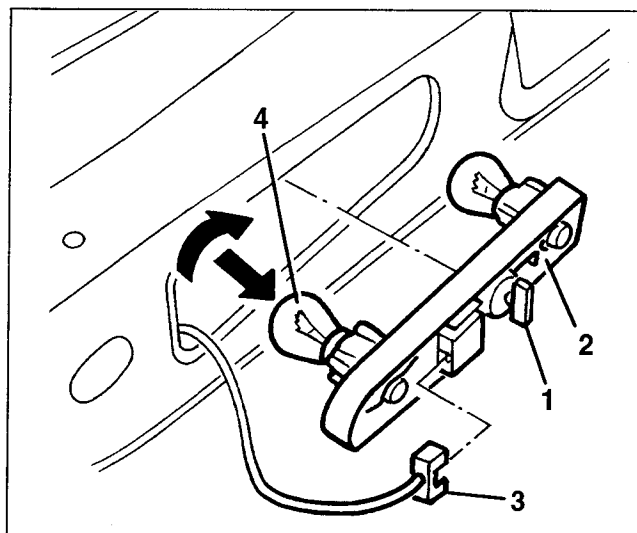
NOTE

The tail lights are gathered together in the tail light strip and comprise four autonomous units with two bulbs each. The diagram below shows the position of the different bulbs, seen from the outside of the car.



1. Direction indicator
2. Sidelight - stop light
3. Reversig light
4. Rear fog guard

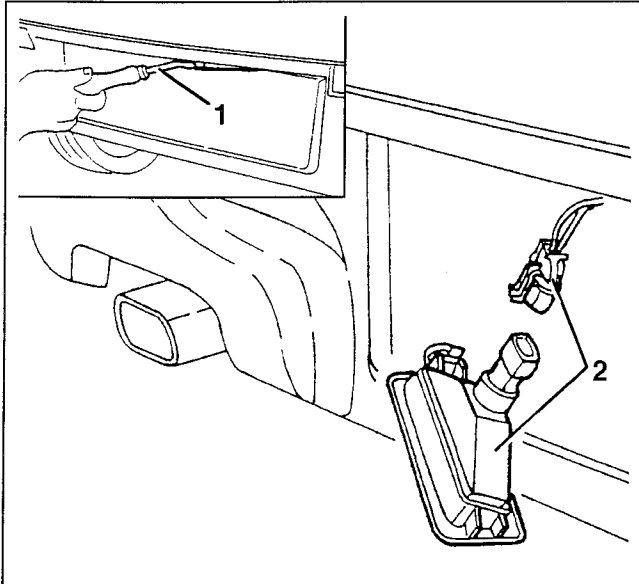
- Disconnect the battery.
 - Remove the rear luggage compartment trim (see group 70)
1. Twist the bayonet connection.
 2. Remove the bulb holder unit.
 3. Disconnect the electrical connection.
 4. If necessary, remove the bulbs from the bulb holder pressing and turning them counter-clockwise.



NUMBER PLATE LIGHTS

REMOVAL/REFITTING

- Disconnect the battery.
- 1. Remove the number plate lights from their housing on the bumpers, working as illustrated.
- 2. Disconnect the electrical connection from the number plate light and remove it.

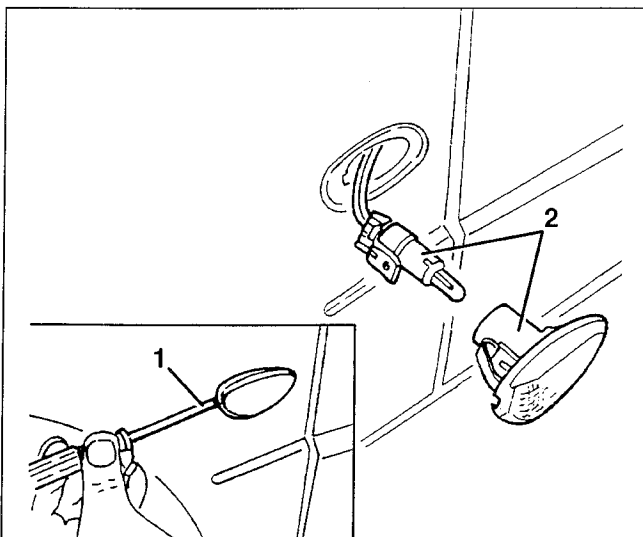


- If necessary, remove the "all glass" bulb.

DIRECTION INDICATOR SIDE REPEATERS

REMOVAL/REFITTING

- 1. Working as illustrated, remove the side direction indicator repeater from its housing.
- 2. Turn the bulb holder counter-clockwise and remove the side direction indicator repeater.

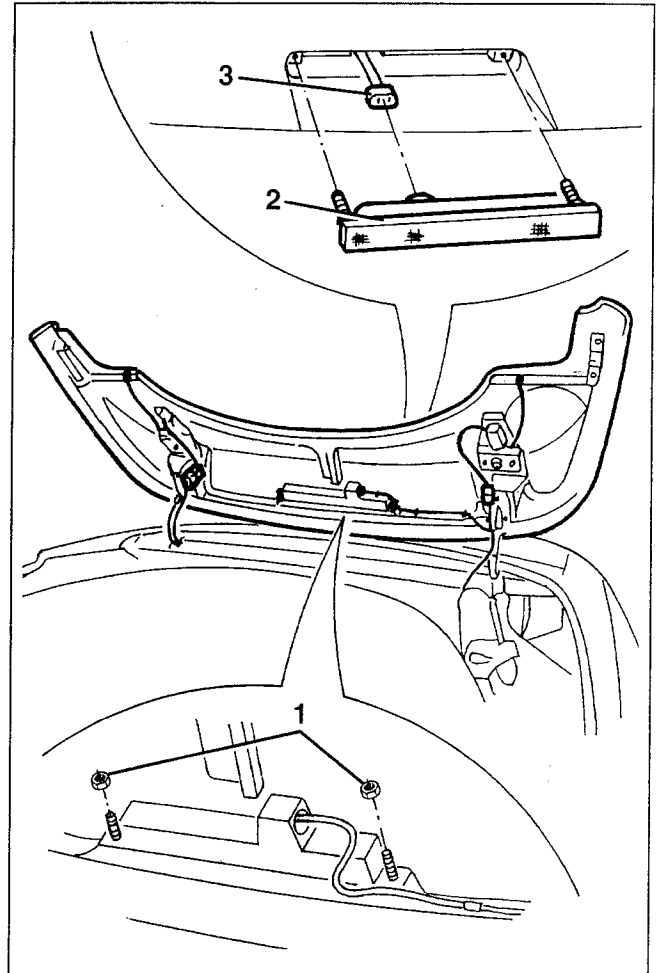


- If necessary, remove the "all-glass" bulb.

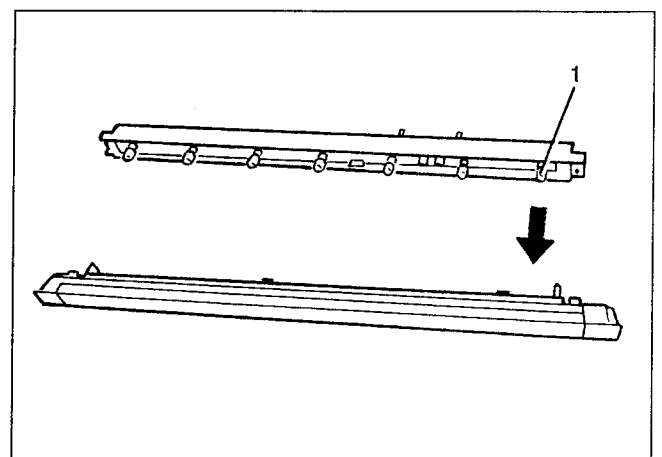
THIRD STOP LIGHT - SPIDER

REMOVAL/REFITTING

- Open the top cover and disconnect the battery.
- 1. Slacken the two nuts.
- 2. Remove the third stop light.
- 3. Disconnect the electrical connection.



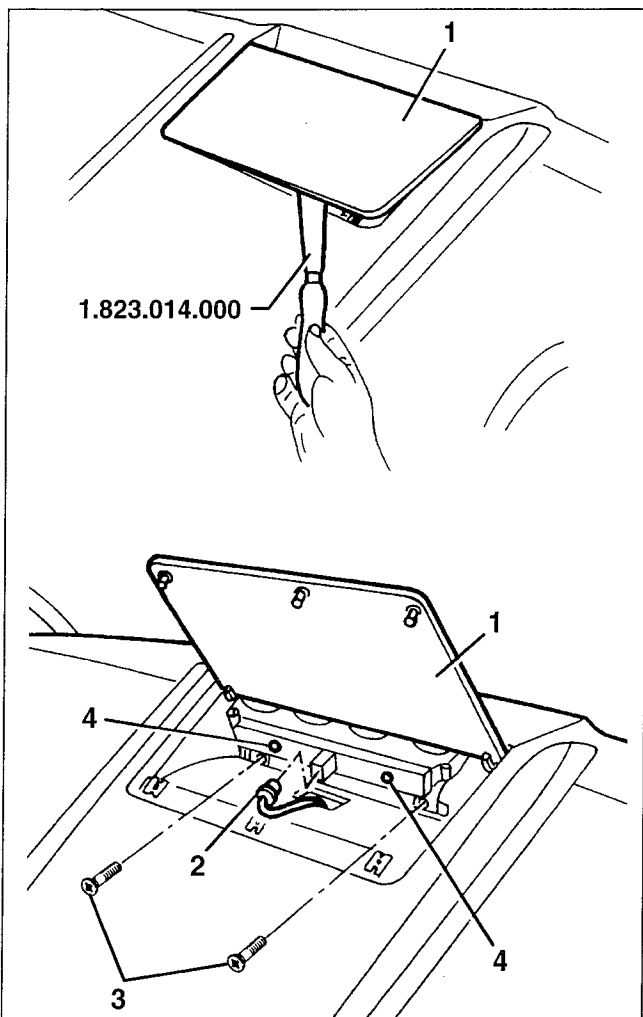
- 1. If necessary, open the third stop light and remove the bulbs, pressing and turning them counter-clockwise.



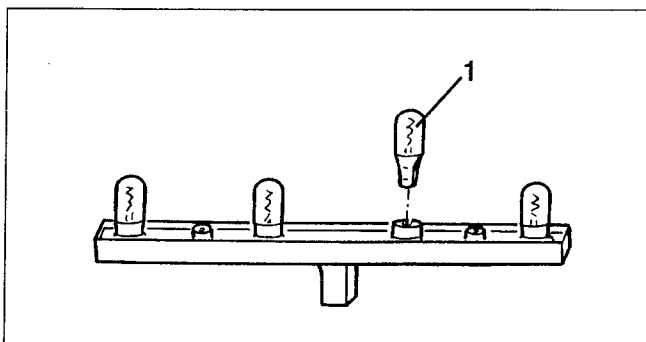
THIRD STOP LIGHT - GTV

REMOVAL/REFITTING

- Disconnect the battery.
- 1. Using tool 1.823.014.000 raise the third stop light cover.
- 2. Disconnect the electrical connection.
- 3. If necessary, slacken the two screws and remove the complete unit.
- 4. Slacken the two screws and remove the bulb holder panel.



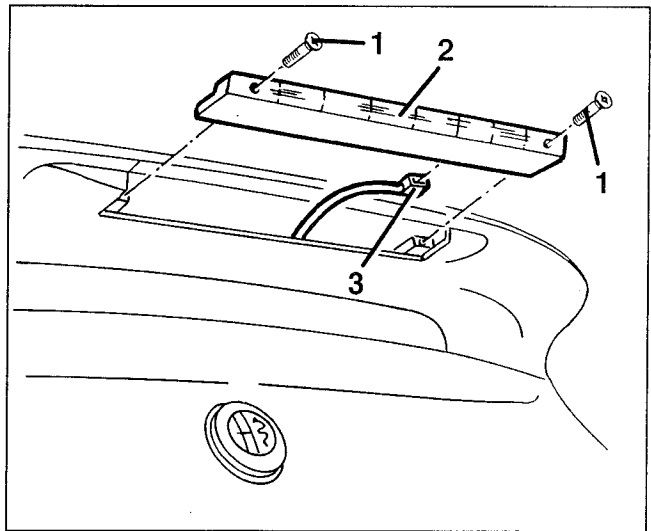
- 1. If necessary, remove the "all-glass" bulbs.



THIRD BRAKE LIGHT GTV ON REAR SPOILER ('98 versions)

REMOVAL/REFITTING

- Disconnect the negative battery terminal.
- 1. Loosen the supplementary brake light fastening screws.
- 2. Move the supplementary brake light aside.
- 3. Disconnect the electrical connection and take the supplementary brake light.

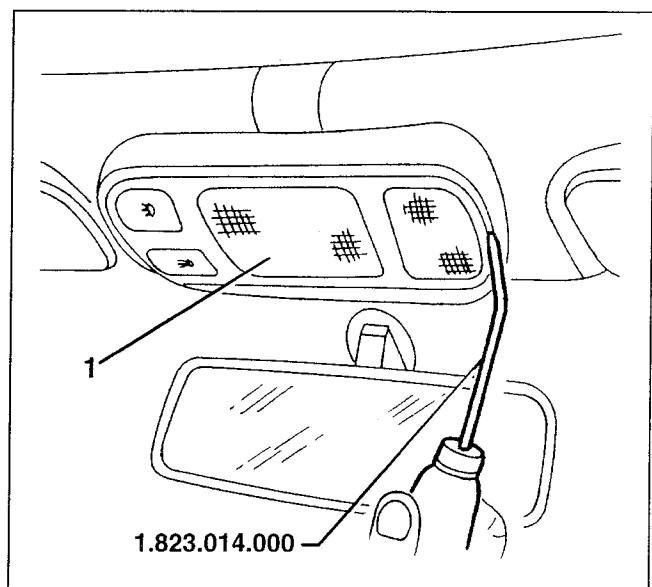


Refit the supplementary brake light by reversing the removal sequence.

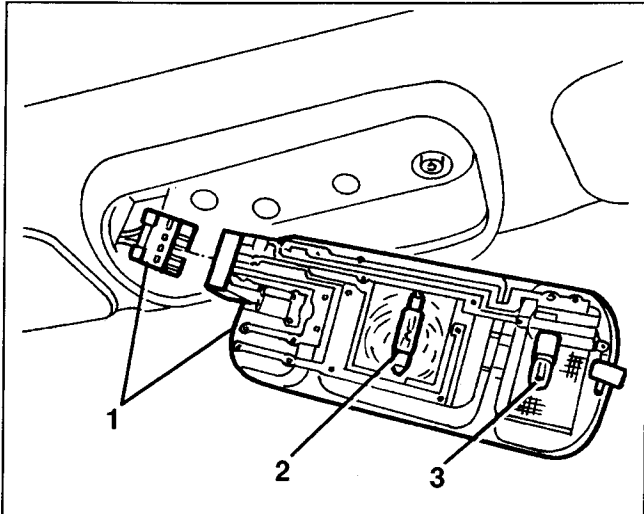
PASSEGER COMPARTMENT ROOF LAMP

REMOVAL/REFITTING

- Disconnect the battery.
- 1. Using tool 1.823.014.000 inserted in the side slit, remove the roof lamp from its frame.



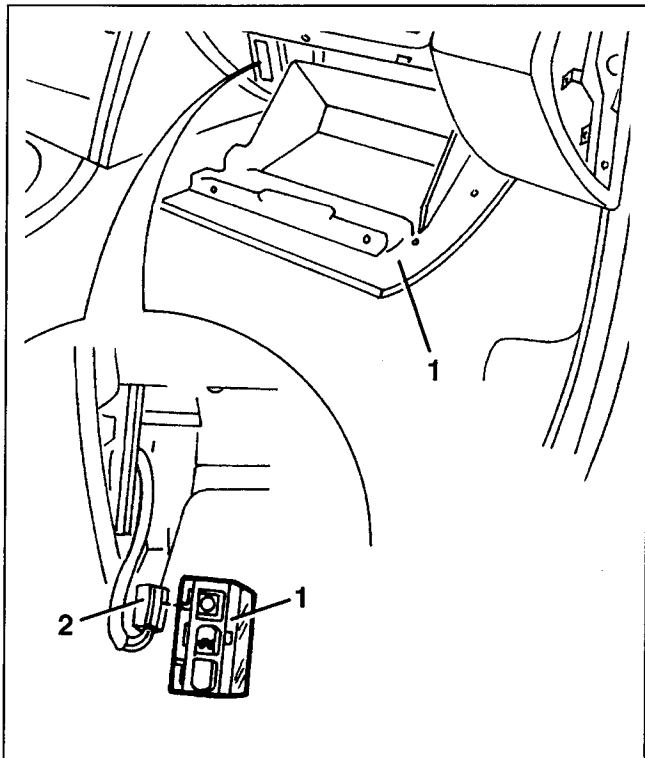
1. Disconnect the electrical connection and remove the roof lamp.
2. If necessary, remove the roof lamp bulb pulling it outwards.
3. If necessary, remove the reading lamp bulb.



GLOVE BOX LIGHT

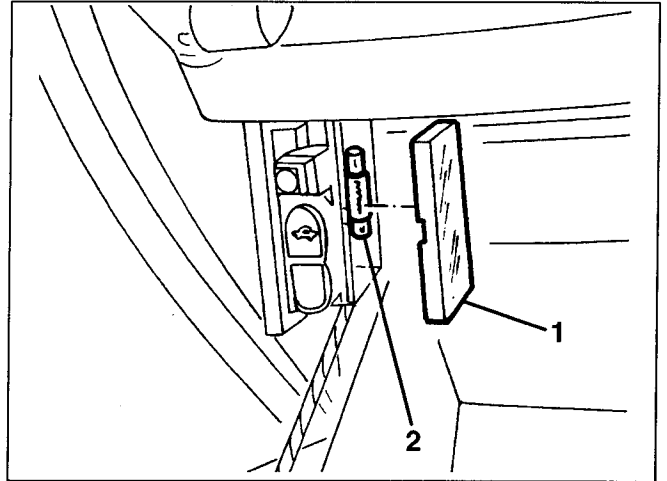
REMOVAL/REFITTING

- Disconnect the battery
1. Open the glove box and remove the complete light unit.
 2. Disconnect the electrical connection.



BULB REPLACEMENT

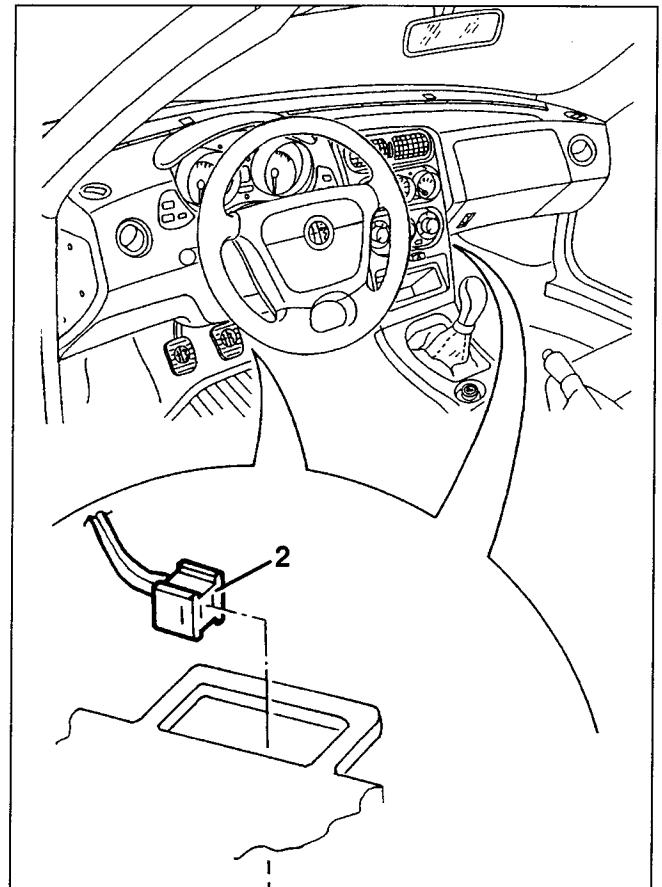
- Open the glovebox.
1. Remove the transparent cover.
 2. Remove the bulb pulling it outwards and releasing it from the contacts.



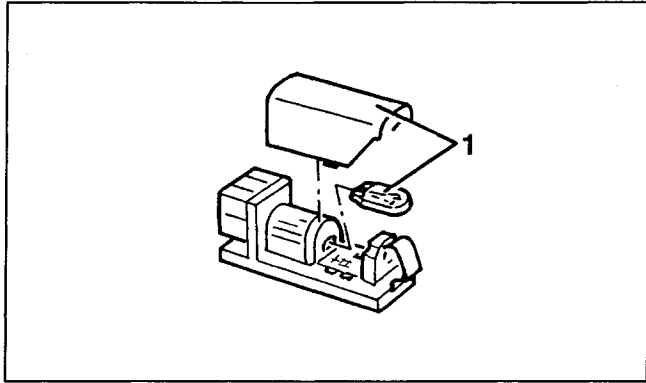
DASHBOARD LIGHT

REMOVAL/REFITTING

- Disconnect the battery
- Working under the dashboard:
1. Remove the lamp taking it out from below.
 2. Disconnect the electrical connection.

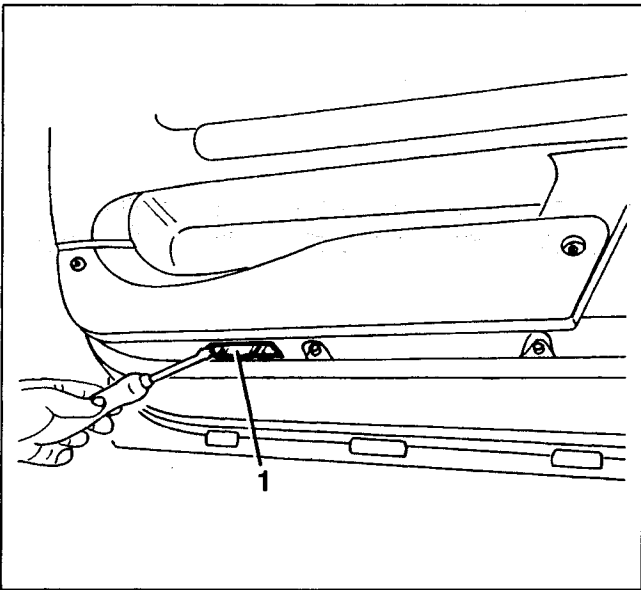


1. If necessary, remove the cover and change the bulb.

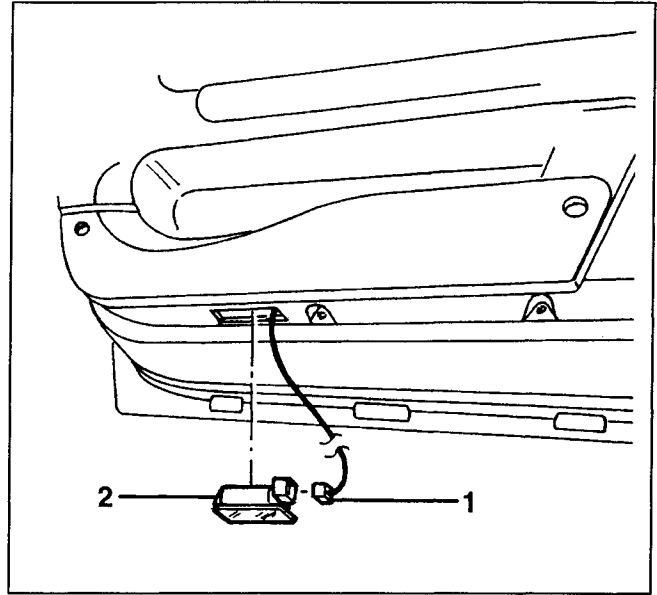


DOOR LIGHT
REMOVAL/REFITTING

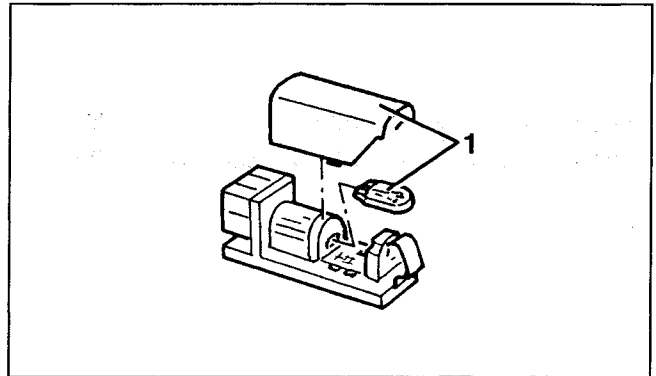
- Disconnect the battery.
1. Open the door and, working from the lower side of the door panel, remove the light from its housing.



1. Disconnect the connection.
2. Retrieve the light.



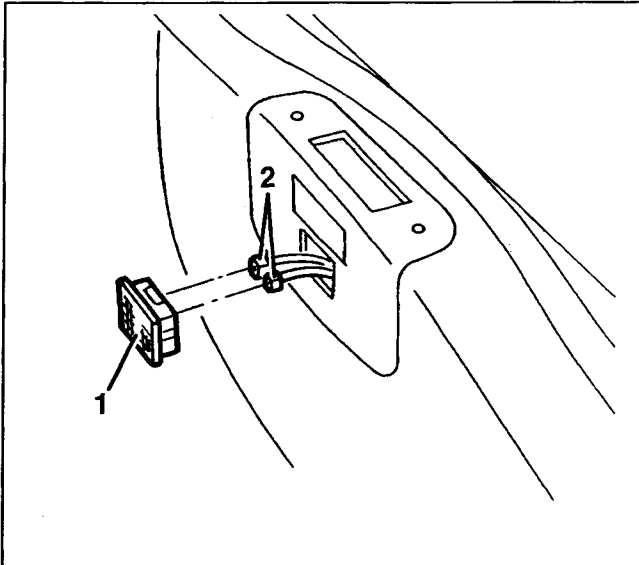
1. If necessary, remove the cover and change the bulb.



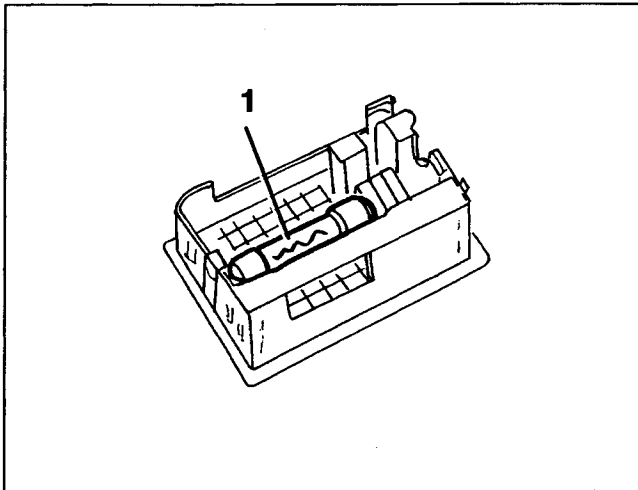
LUGGAGE COMPARTMENT LIGHT

REMOVAL/REFITTING

- Open the boot and disconnect the battery.
- 1. Remove the light from its housing.
- 2. Disconnect the two electrical connections.



- 1. If necessary, remove the bulb pulling it outwards and releasing it from the side contacts.



BULB TABLE

| Service | Power rating (W) | Type |
|-----------------------------------|------------------|------|
| High beam | 55 | A |
| Low beam | 55 | A |
| Front sidelight | 5 | B |
| Front direction indicator | 21 | C |
| Foglamp | 55 | E |
| Side direction indicator repeater | 5 | B |
| Rear direction indicator | 21 | C |

| Service | Power rating (W) | Type |
|----------------------------------|------------------|------|
| Rear stop/side lights | 21/5 | C |
| Third stop - Spider | 2.1 | C |
| Third stop - Gtv | 5 | B |
| Reversing light | 5 | C |
| Rear fog guard | 21 | C |
| Number plate light | 5 | C |
| Passenger compartment roof light | 5 | D |
| Reading lamp | 5 | C |
| Dashboard and door lights | 5 | B |
| Glovebox light | 5 | D |
| Luggage compartment light | 10 | D |
| Climate controls lighting | 1.2 | B |



WARNING:

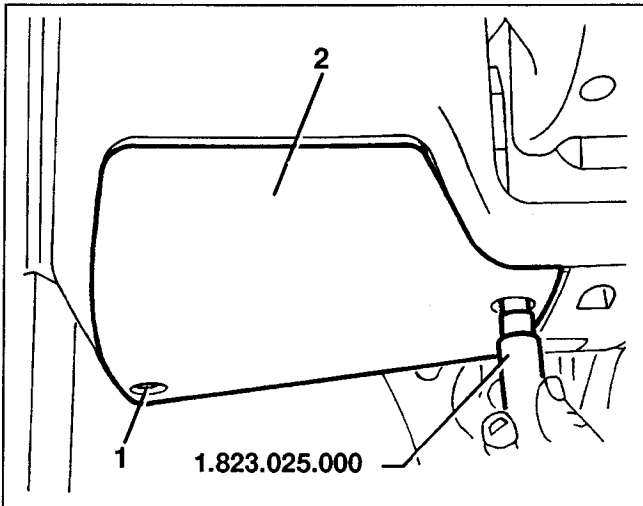
When changing a bulb always replace it with one of the same type.

TYPES OF BULBS

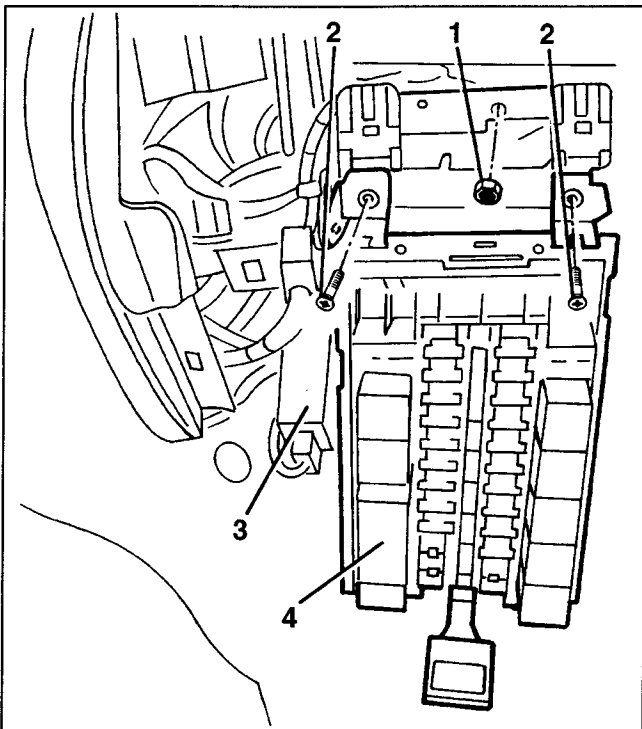
| Type | Description |
|------|---|
| A | Bulbs with "integral" bulb holder. Replace the bulb complete with bulb holder. |
| B | "All-glass" bulbs. These are pressed on. Pull to remove. |
| C | Bayonet bulbs. To remove from the bulb holder: press the bulb, turn it counter-clockwise, then remove it. |
| D | Cylindrical bulbs. To remove these, release from the side contacts. |
| E | Halogen bulbs. To remove the bulb, release the clip fastening the bulb from its housing. |

VARIOUS DEVICES**FUSEBOX****REMOVAL/REFITTING**

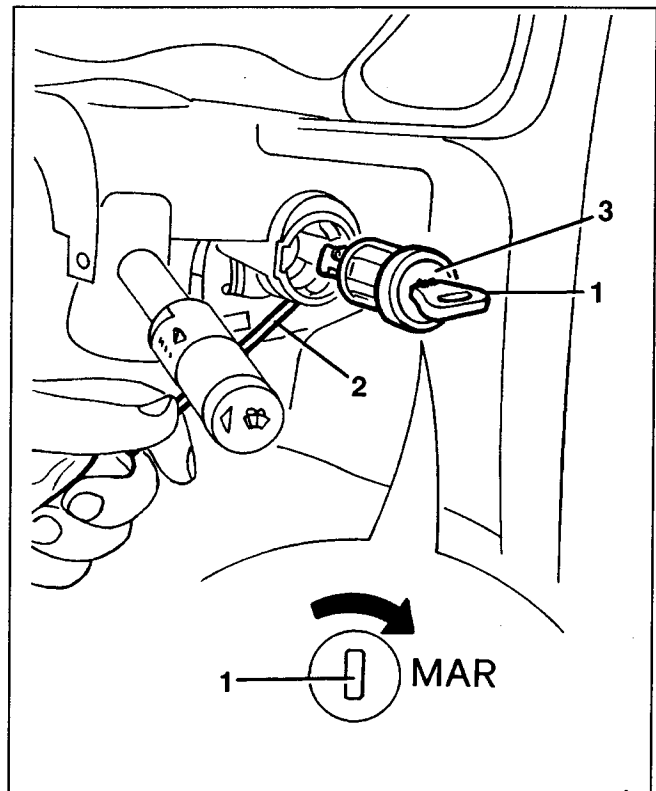
- Disconnect the battery
- 1. Using tool 1.823.025.000 turn the three bayonet pins fastening the fusebox cover.
- 2. Remove the fusebox cover.



1. Slacken the centre screw of the fusebox bracket.
2. Slacken the bolts of the fusebox catches.
3. Release the various relays from the fusebox bracket.
4. Release the fusebox, disconnect the various connectors and retrieve the fusebox.

**IGNITION SWITCH****REMOVAL/REFITTING**

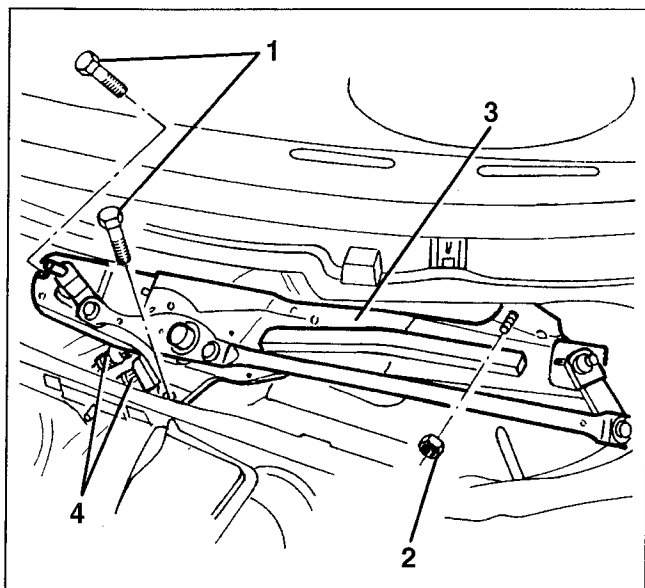
- Remove the lower steering column cover half (see Group 41)
- 1. Engage the key and set it to the "MAR" position.
- 2. Work on the fastening clamp with a punch through the special slot.
- 3. Remove the ignition switch.



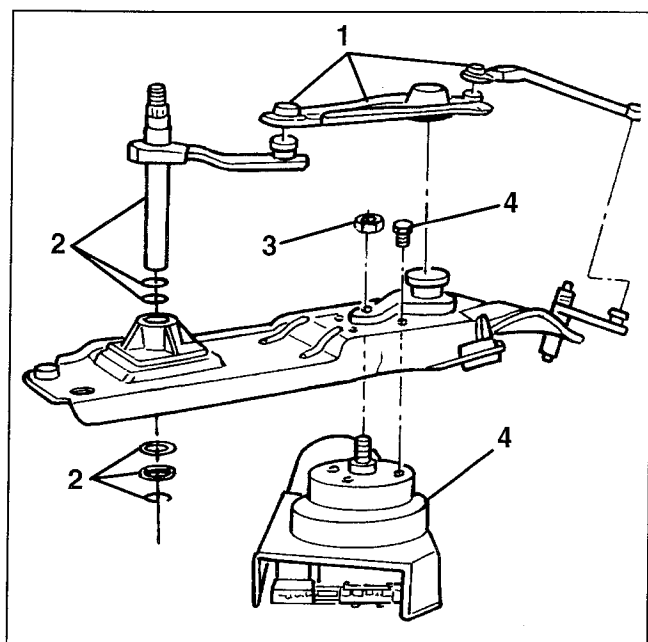
WINDSCREEN WIPER UNIT

REMOVAL/REFITTING

- Disconnect the battery.
- Remove the air intake grille (see GROUP 70).
- 1. Slacken the two screws.
- 2. Slacken the nut.
- 3. Raise the windscreen wiper unit.
- 4. Disconnect the two electrical connections and retrieve the unit.



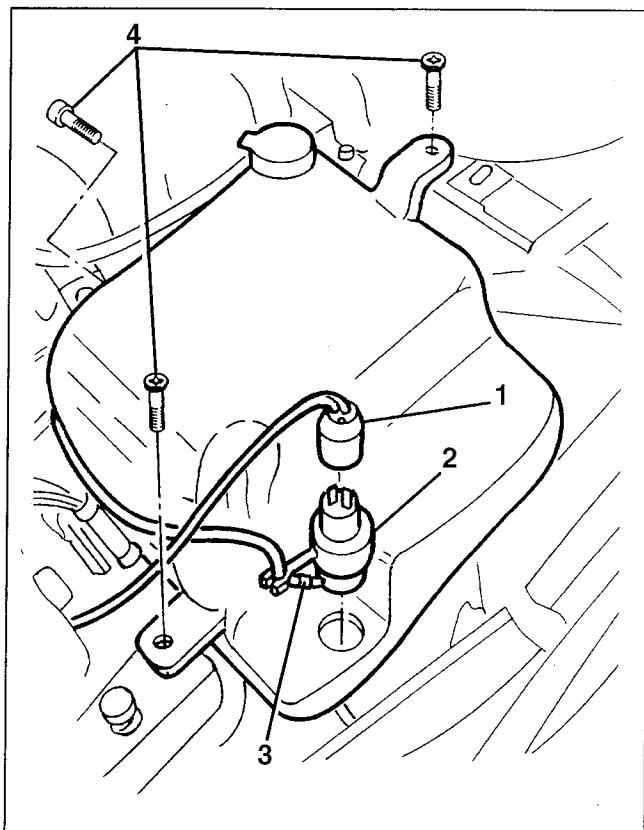
1. If necessary, disconnect the joints and retrieve the rods.
2. If necessary, remove the retainer ring and disassemble the windscreen wiper pins.
3. If necessary, slacken the nut connecting the lever to the motor.
4. Slacken the screws and remove the motor unit.



WINDSCREEN WASHER PUMP

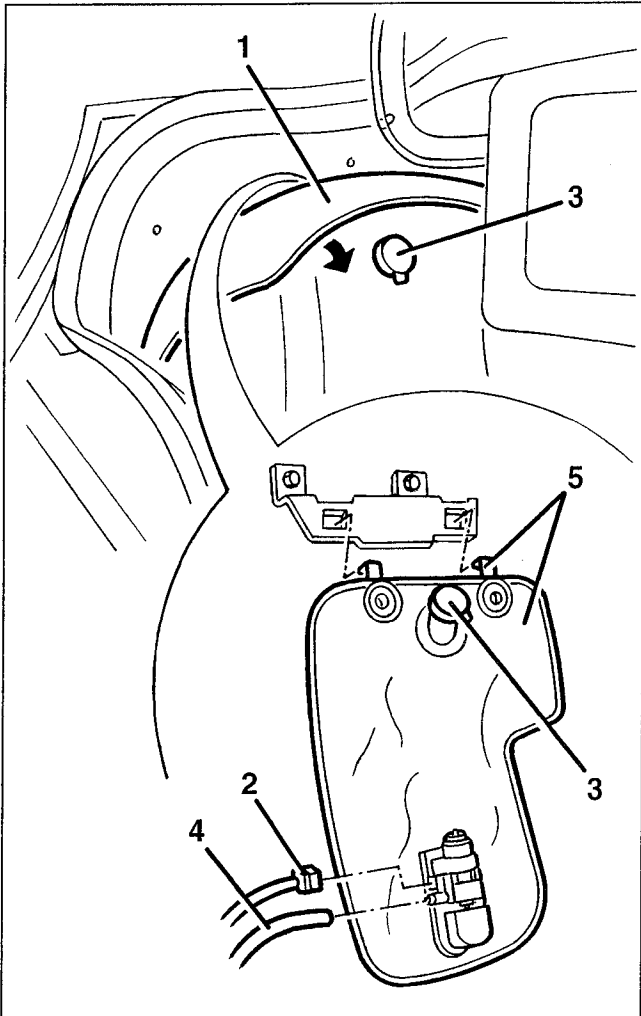
REMOVAL/REFITTING

- Empty the windscreen washer fluid reservoir.
- Disconnect the battery.
- 1. Disconnect the electrical connection of the pump.
- 2. Remove the pump from its housing.
- 3. Disconnect the pipe.
- 4. If necessary, slacken the three screws and remove the reservoir.

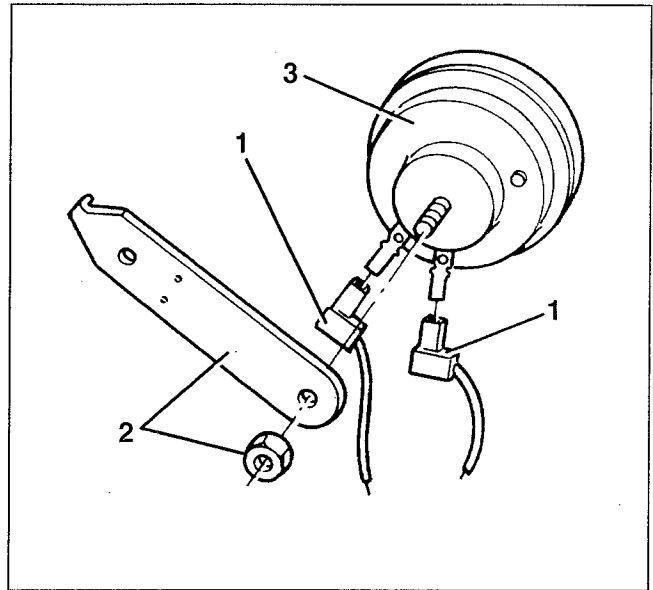


REMOVAL/REFITTING (2.0 V6 TB '98 version)

- Disconnect the battery.
- Open the boot.
- 1. Lift and lower the left-hand side boot panel.
- 2. Disconnect the pump electrical connection.
- 3. Drain the windscreen fluid reservoir.
- 4. Disconnect the pipe.
- 5. Release the retainers from the bracket and take the reservoir and pump.



1. Disconnect the two electrical connections.
2. Slacken the nut and remove the bracket.
3. Retrieve the horn.



REMOVAL/REFITTING ('98 versions)

- Disconnect the battery.
- Open the bonnet.

 1. Loosen the horn fastening nut.
 2. Disconnect the electrical connections.
 3. Remove the horns.



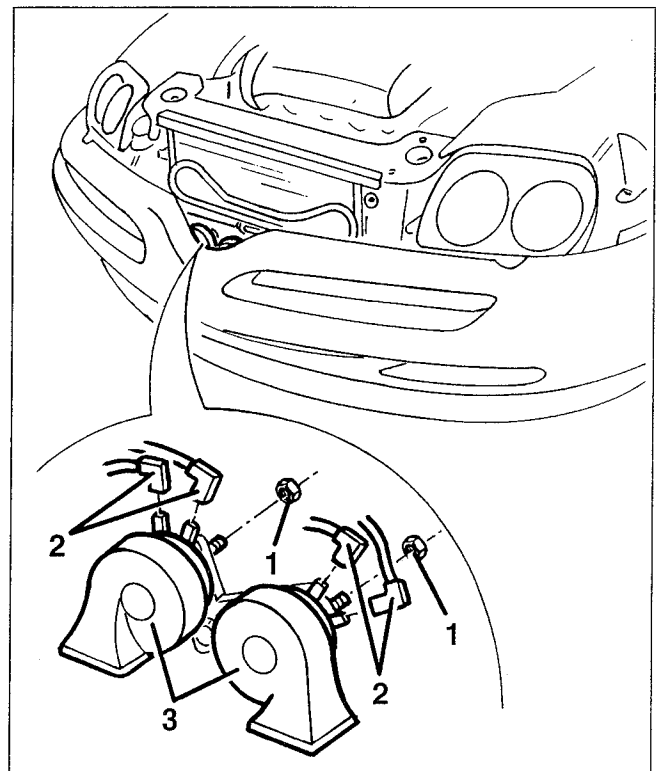
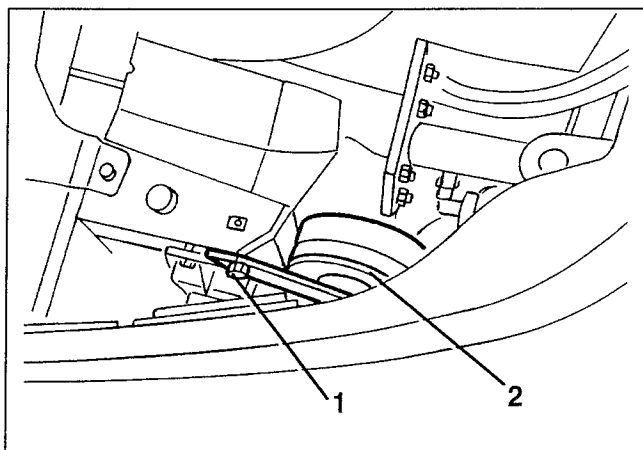
Refit the reservoir and pump by reversing the removal sequence.

HORNS

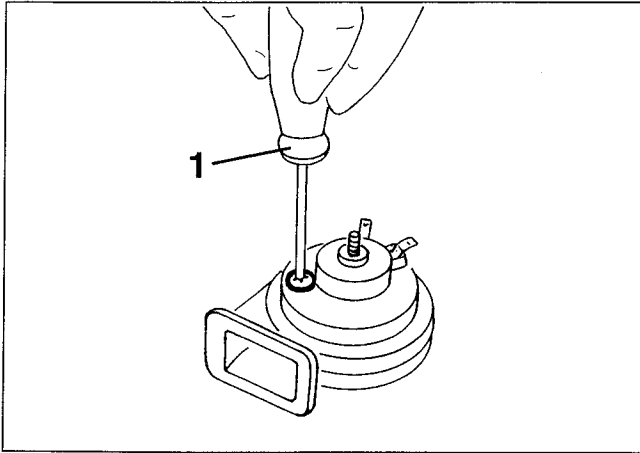
REMOVAL/REFITTING

- Disconnect the battery.
- Open the bonnet and remove the upper light cluster (see specific paragraph).

 1. Slacken the fastening screw.
 2. Remove the horn complete with bracket.



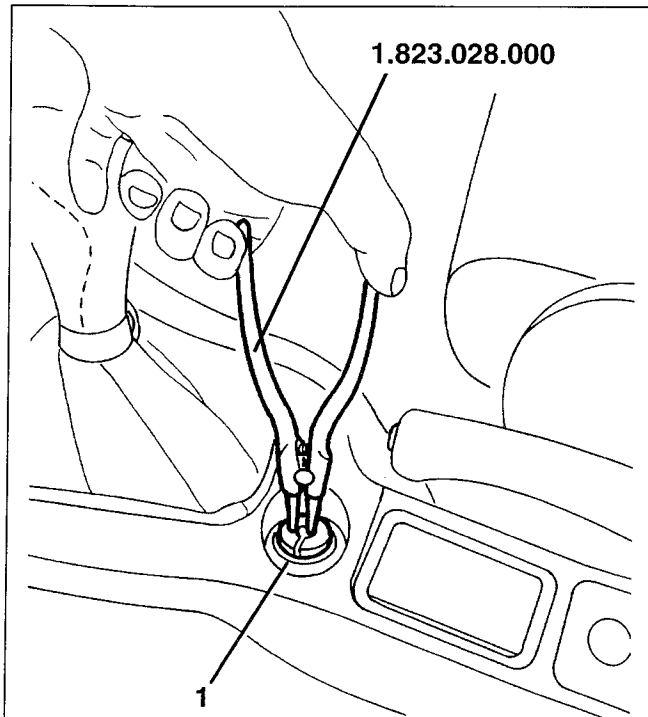
1. Adjust horn tone by means of the specific screw, if required.



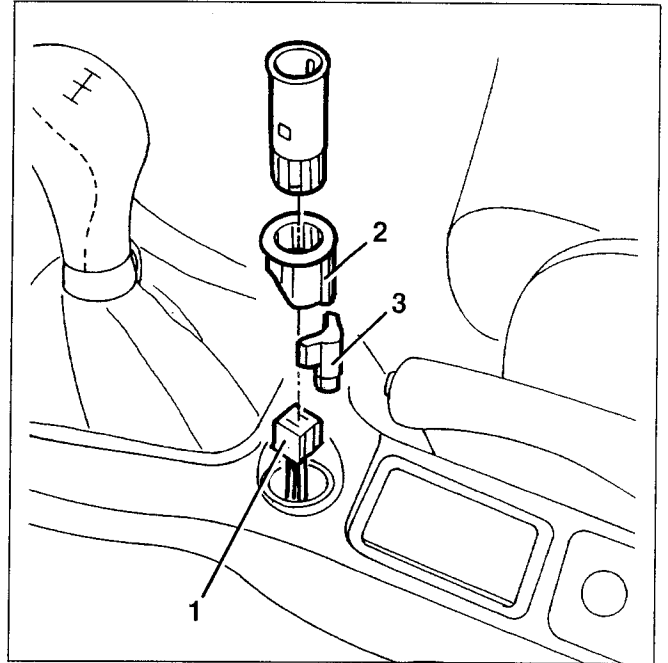
Refit the horns by reversing the removal sequence.

CIGAR LIGHTER REMOVAL/REFITTING

1. Using tool 1.823.028.000 remove the cigar lighter body



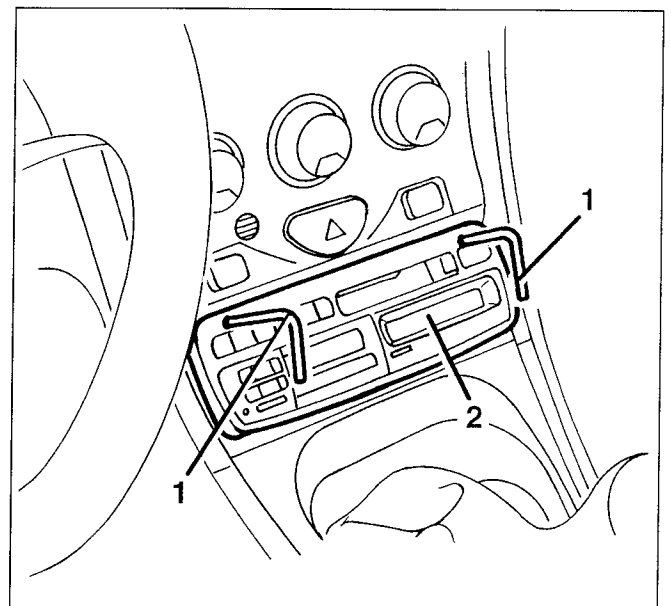
1. Disconnect the electrical connection.
2. Remove the bulb holder.
3. If necessary, remove the bracket and take out the bulb.



SOUND SYSTEM ('98 versions)

REMOVAL - REFITTING

- Disconnect the battery.
1. Fully insert the sound system detachment pins in their seats.
 2. Remove the sound system.

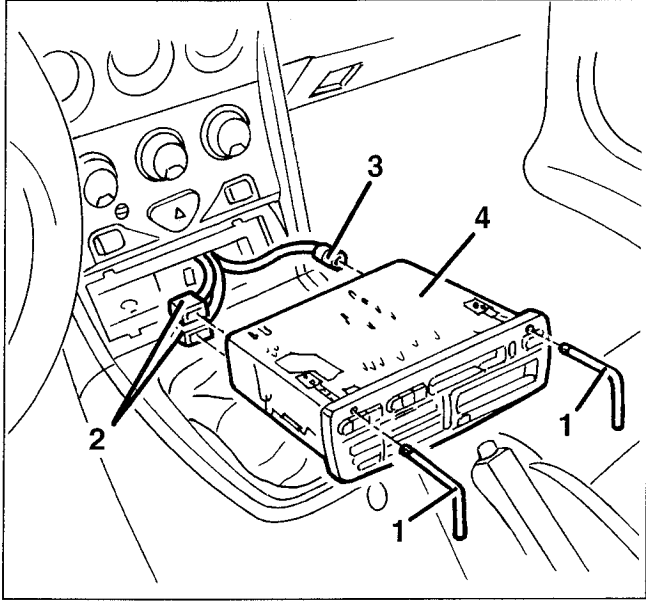


1. Remove the sound system pins.
2. Disconnect the electrical connections.
3. Disconnect the aerial wire connection.
4. Take the sound system.



Refit the sound system by reversing the removal sequence.

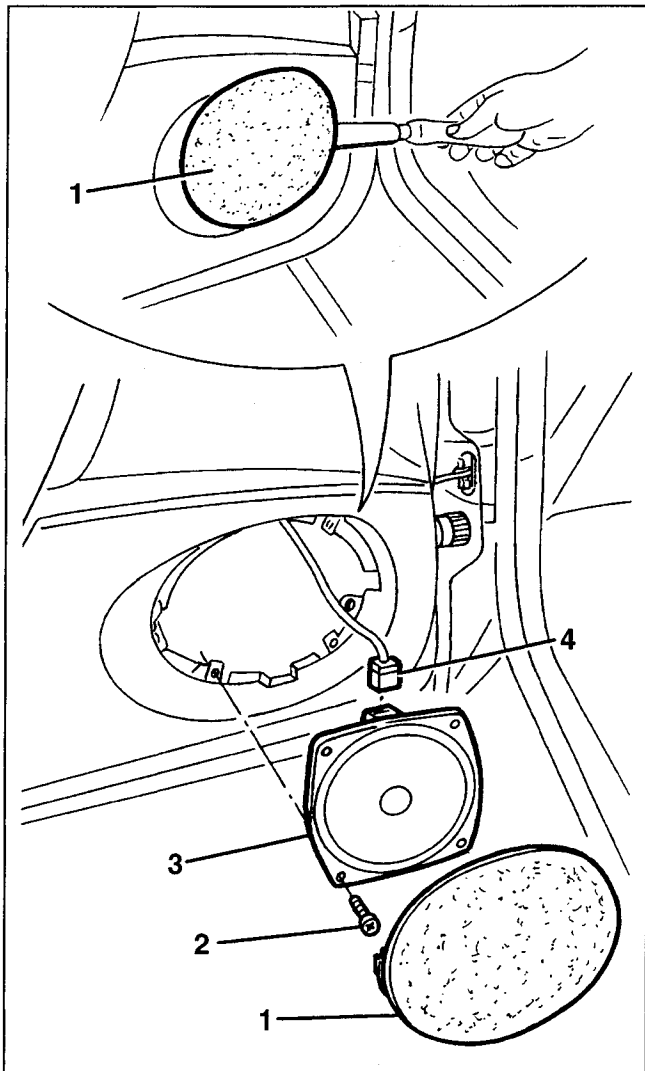
NOTE: The pins are not required for refitting the sound system.



SPEAKERS

REMOVAL/REFITTING FRONT SPEAKERS

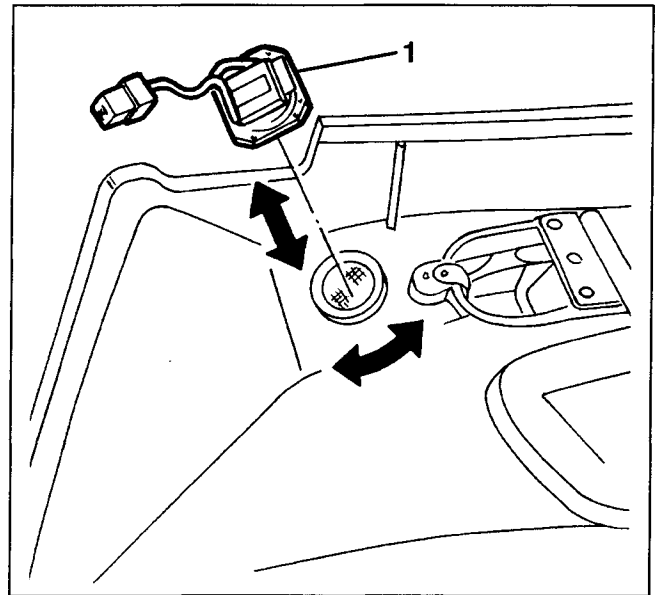
1. Prise and remove the speaker cover.
2. Slacken the 4 screws.
3. Remove the speaker.
4. Disconnect the electrical connection and retrieve the speaker.



Refit the speaker reversing the sequence described for removal.

REMOVAL/REFITTING FRONT TWEETERS

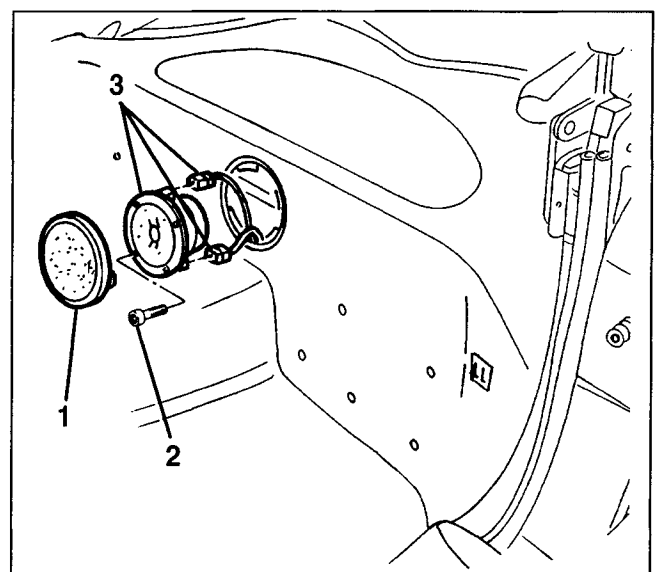
- Remove the door panel (see specific paragraph).
- 1. Rotate and remove the complete speaker.



Refit the speaker reversing the sequence described for removal.

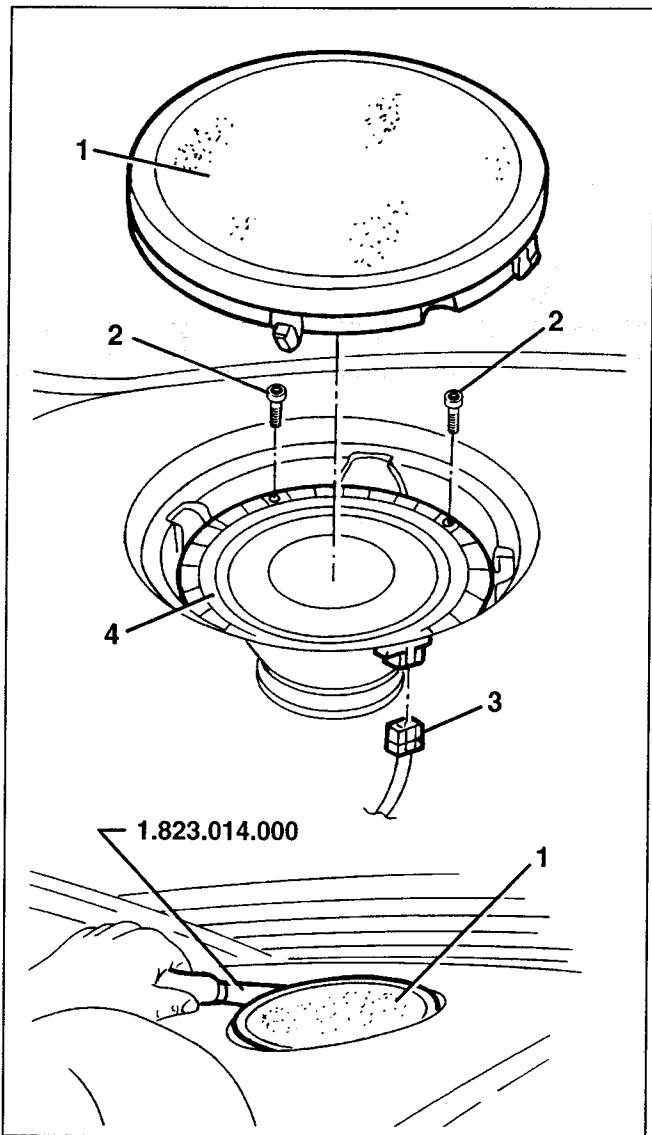
REMOVAL/REFITTING REAR "SUBWOOFER" (Spider)

1. Prise and remove the speaker cover.
2. Slacken the four fastening screws.
3. Remove the speaker just enough to disconnect the electrical connections, then remove it completely.

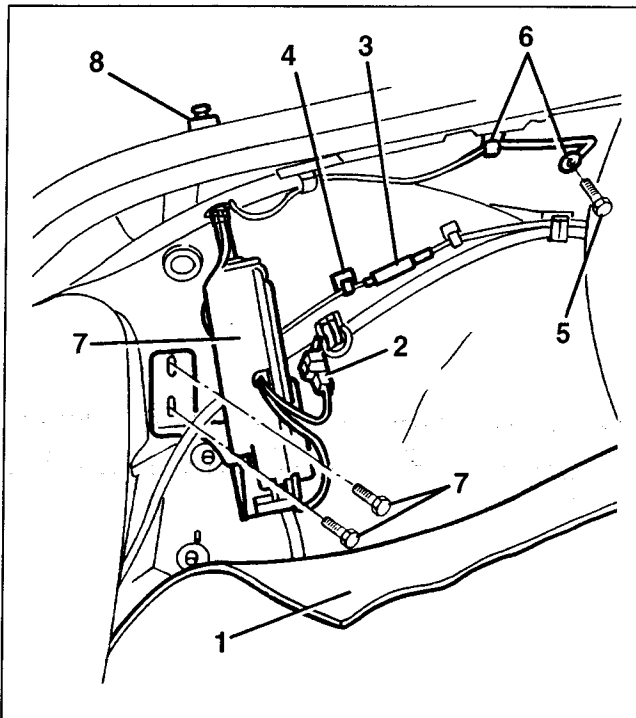


REMOVAL/REFITTING REAR SPEAKERS (GTV)

- Disconnect the battery.
- 1. Using tool 1.823.014.000 prise the speaker cover.
- 2. Slacken the four screws and raise the speaker.
- 3. Disconnect the electrical connection.
- 4. Retrieve the speaker.

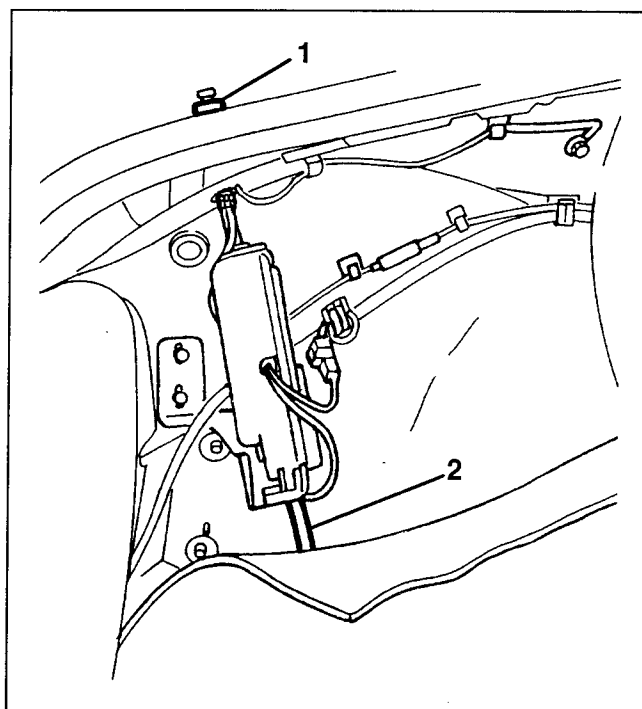


- 5. Slacken the screw fastening the earth braid.
- 6. Release the earth braid from the clamps.
- 7. Slacken the screws, lower and retrieve the aerial unit
- 8. Retrieve the seal.



Refit reversing the sequence described for removal and adhering to the following instructions:

- 1. Lubricate the aerial and seal coupling area with vaseline.
- 2. Insert the water drain tube in the hole.



ELECTRIC AERIAL
REMOVAL/REFITTING

- Disconnect the battery, with the aerial down.
- 1. Move aside the left-hand luggage compartment trim.
- 2. Disconnect the electrical connection of the aerial motor.
- 3. Disconnect the connection of the coaxial cable.
- 4. Release the coaxial cable from the clamp.

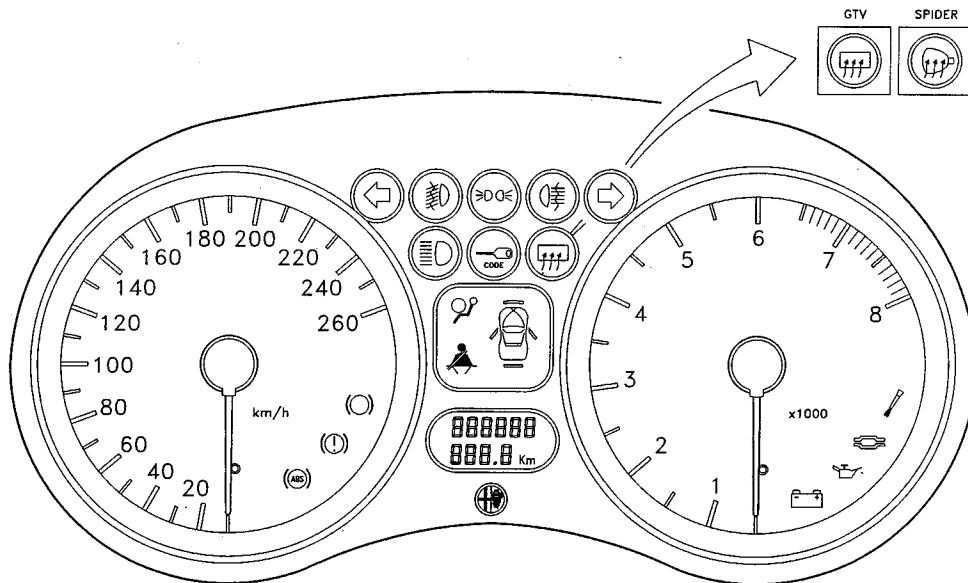
INSTRUMENT CLUSTER




















MAIN PANEL

GENERAL DESCRIPTION

The main panel provides all the indications and information concerning the conditions of the vehicle which are indispensable for safe driving.

The cluster is of the analogue type with two generously- sized indicators for the speedometer and rev counter and a series of plainly visible warning lights which complete the information given to the driver.



- | | | | |
|---|---|---|---|
|  | LH direction indicator |  | seat belts |
|  | fog lamps |  | doors |
|  | side lights |  | ABS system failure |
|  | rear fog guard |  | handbrake and brake fluid level, EBD system failure (*) |
|  | RH direction indicator |  | brake pad wear |
|  | high beams |  | generator |
|  | electronic key system |  | minimum oil pressure |
|  | rearscreen and door mirror defrosting (GTV) |  | catalyst temperature (only for certain markets) |
|  | door mirror defrosting (Spider) |  | injection fault (Check Engine) |
|  | Air Bag system fault | | |

(*) Present from '97 version

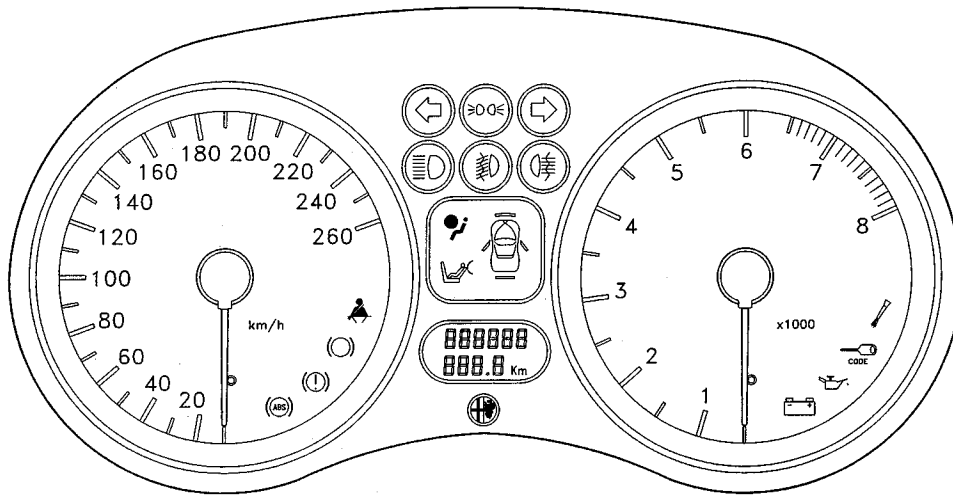
INSTRUMENT CLUSTER M.Y. '98


















MAIN PANEL

GENERAL DESCRIPTION

The main panel provides all the indications and information concerning the conditions of the vehicle which are indispensable for safe driving.

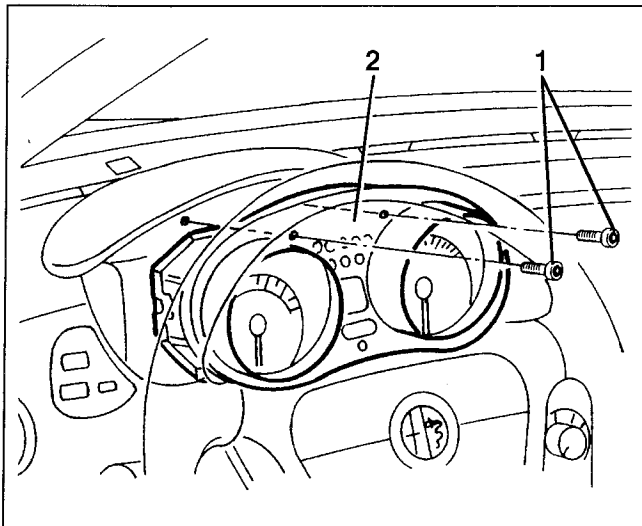
The cluster is of the analogue type with two generously- sized indicators for the speedometer and rev counter and a series of plainly visible warning lights which complete the information given to the driver.



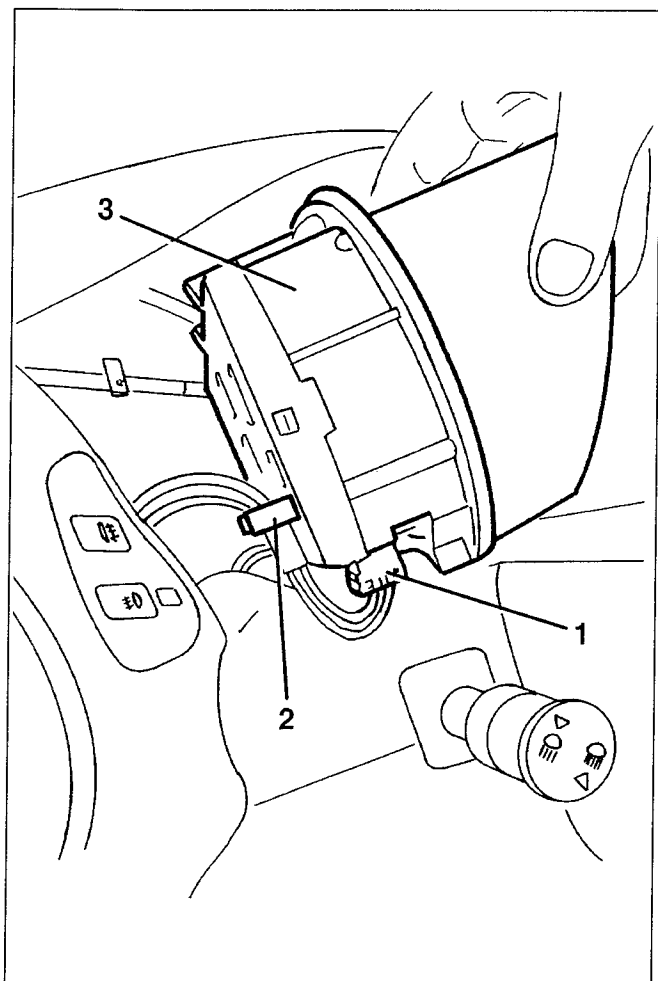
- | | | | |
|--|-------------------------------|---|----------------------------------|
|  | LH direction indicator |  | ABS system failure |
|  | side/taillights |  | hand brake and brake fluid level |
|  | RH direction indicator |  | brake shoe wear |
|  | main beam highlights |  | seat belts |
|  | foglights |  | generator |
|  | rear foglight |  | oil pressure gauge |
|  | Airbag failure system |  | electronic key system (CODE) |
|  | passenger airbag deactivation |  | injection failure (Check Engine) |
|  | open doors and lids | | |

REMOVAL/REFITTING

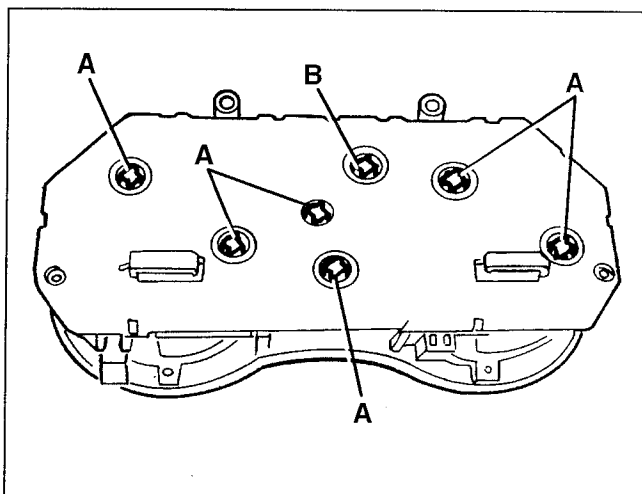
- Disconnect the battery
- 1. Slacken the two screws.
- 2. Remove the panel releasing the lower clamps.



- 1. Disconnect the two electrical connections.
- 2. Release the wirings from the retainer brackets.
- 3. Retrieve the instrument cluster.



- If necessary change the bulbs withdrawing the bulb holder from the cluster and removing the bulbs.



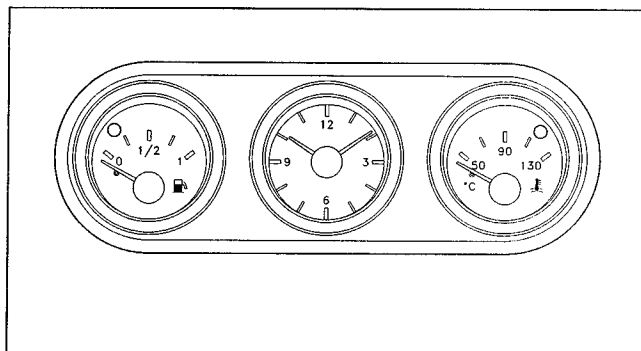
A - Cluster light bulbs
B - High beam warning light

AUXILIARY PANEL

GENERAL DESCRIPTION

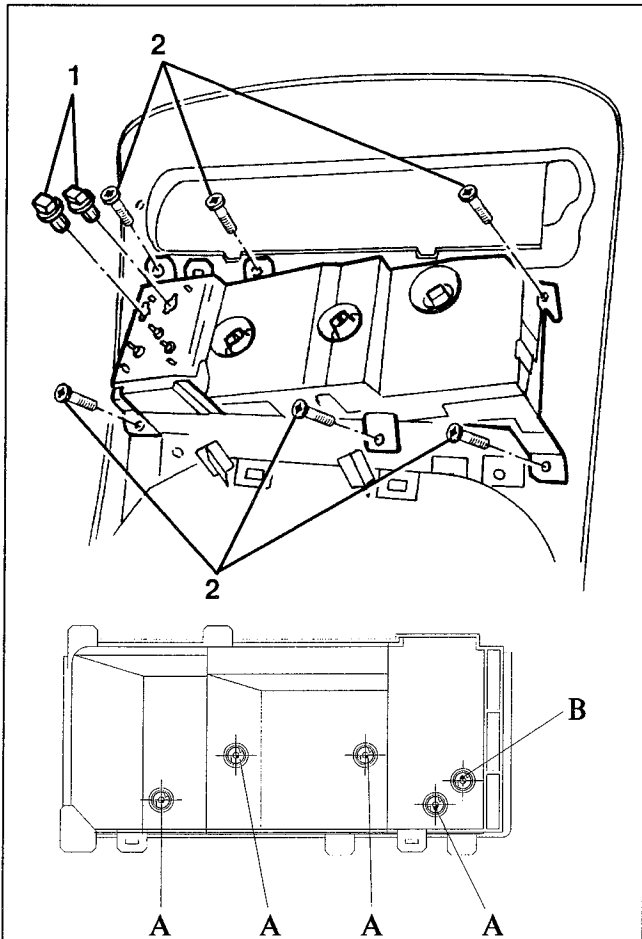
The auxiliary panel is located in the centre of the dashboard and contains the coolant temperature gauge and the fuel level gauge with the associated warning lights.

It is completed by an analogue clock.



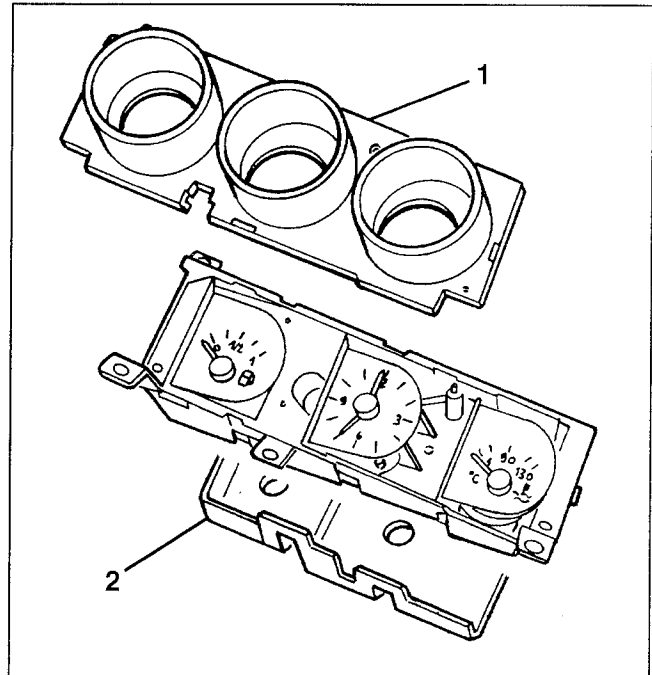
REMOVAL/REFITTING (to '97 versions)

- Remove the centre console (see Group 70)
- 1. If necessary change the bulbs withdrawing the bulb holder from the cluster and removing the bulbs.
- 2. Slacken the six screws and remove the auxiliary panel.



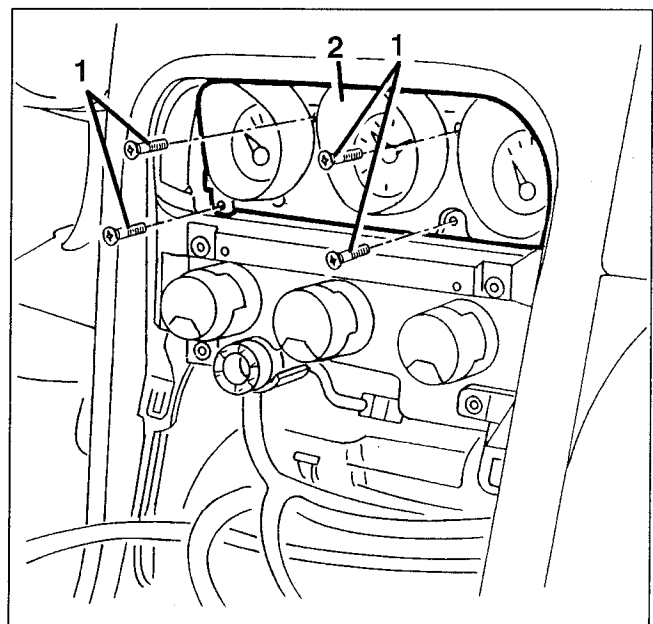
A - Panel lighting bulbs
B - Max. coolant temperature warning light

1. Levering on the retainer tabs, remove the front panel.
2. Levering on the retainer tabs, remove the rear cover.

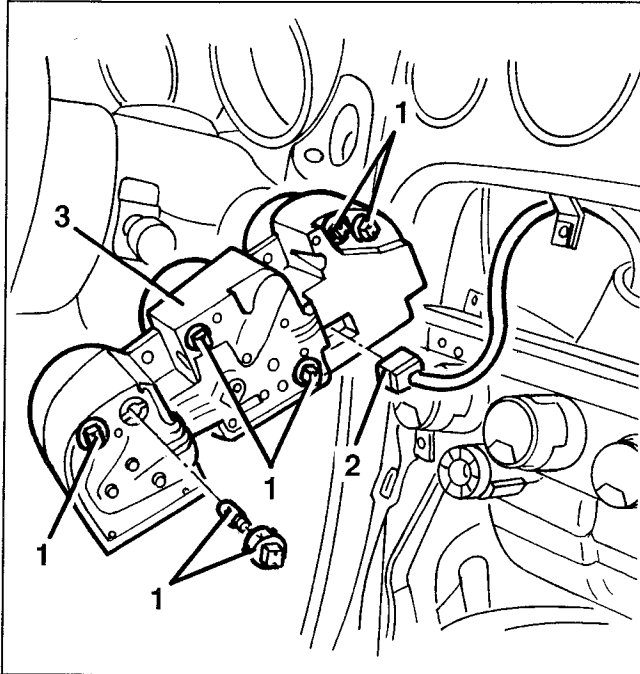


REMOVAL/REFITTING ('98 versions)

- Remove the central unit (see specific paragraph).
- 1. Loosen the screws.
- 2. Move the auxiliary instrument panel slightly aside.

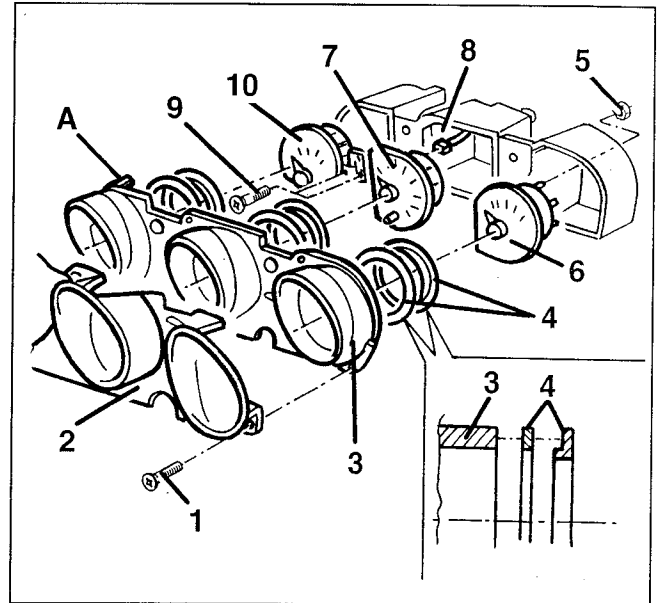


1. If required, turn the concerned bulb holder and extract it; remove the bulb from the bulb holder (clipped in).
2. Disconnect the electrical connection.
3. Take the auxiliary instrument panel.



Auxiliary instrument panel disassembly (if required)

1. Loosen the screws.
2. Remove the lens.
3. Loosen the three retainers (A) and remove the plate.
4. Remove the seals.
5. Loosen the three nuts .
6. Remove the coolant temperature gauge.
7. Slightly extract the clock.
8. Disconnect the electrical connection and take the instrument.
9. Loosen the screws.
10. Remove the fuel level gauge.



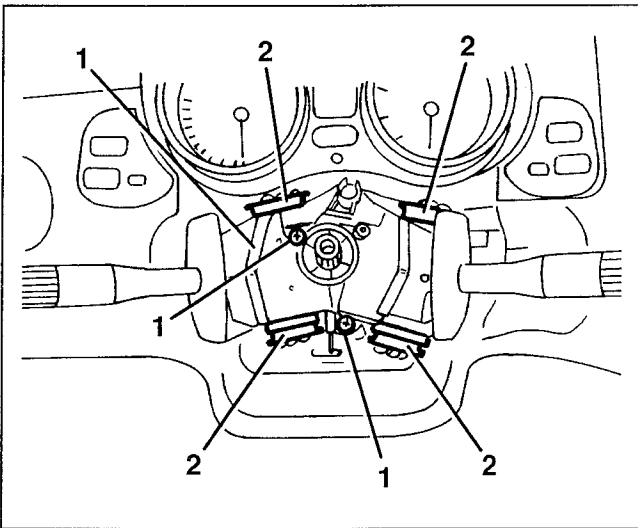
Reassemble (if disassembled) and refit the auxiliary instrument panel by reversing the removal sequence.

CONTROLS AND SWITCHES

STEERING COLUMN LEVER UNIT

REMOVAL/REFITTING

- Disconnect the battery.
- Remove the steering wheel and steering column covers (see Group 41).
- 1. Slacken the two screws.
- 2. Withdraw the lever unit and disconnect the electrical connections.
- 3. Retrieve the lever unit complete.

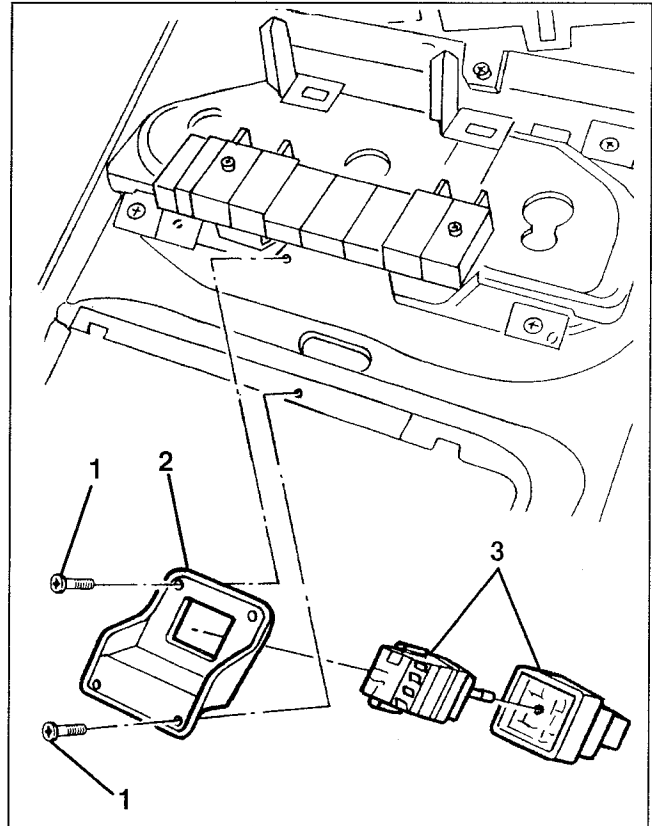


Refit the lever unit reversing the sequence followed for removal.

HAZARD WARNING LIGHTS CONTROL SWITCH (to '97 versions)

REMOVAL/REFITTING

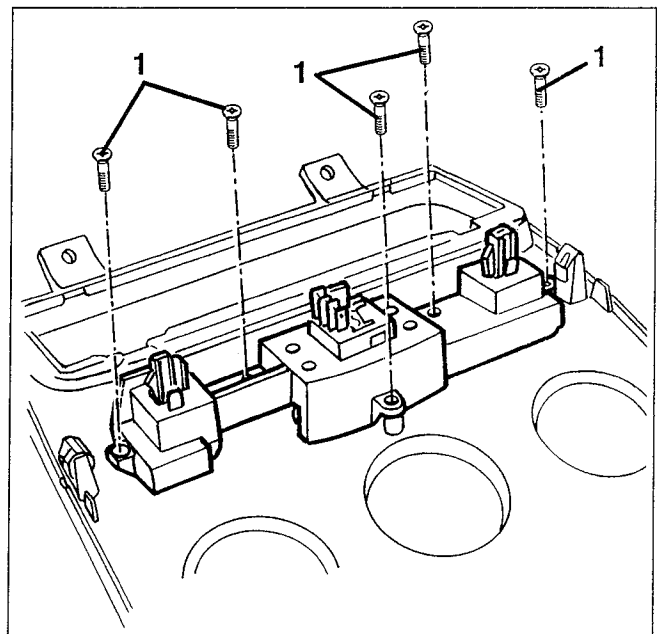
- Remove the centre console (see Group 70).
- 1. Slacken the two screws.
- 2. Remove the connection bracket.
- 3. Retrieve the hazard warning lights control switch.



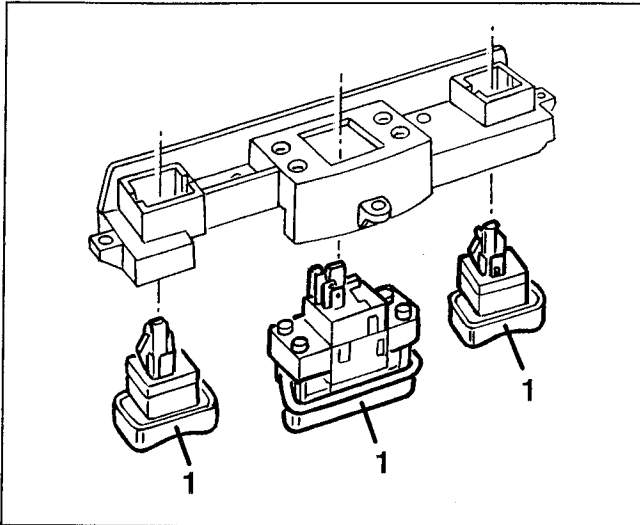
HAZARD LIGHT / FOG LIGHT / REAR FOG LIGHT SWITCHES ('98 versions)

REMOVAL - REFITTING

- Remove the central unit (see specific paragraph).
- 1. Loosen the switch assembly fastening screws.
- 2. Remove the switch assembly.



1. Remove the switches from the bracket.

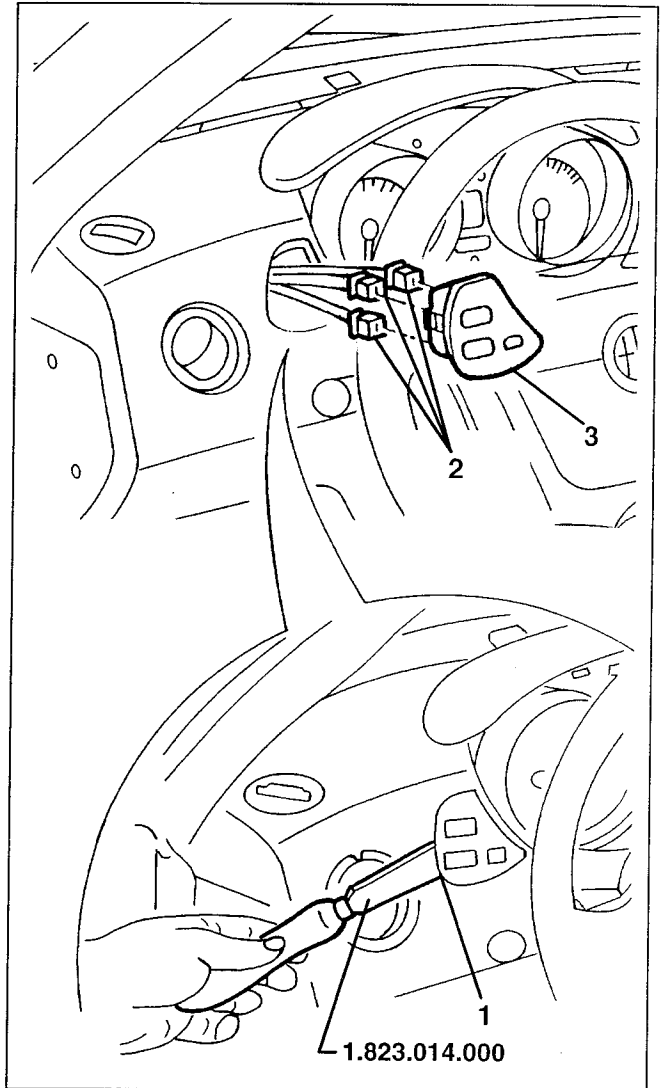


Refit the switches by reversing the removal sequence.

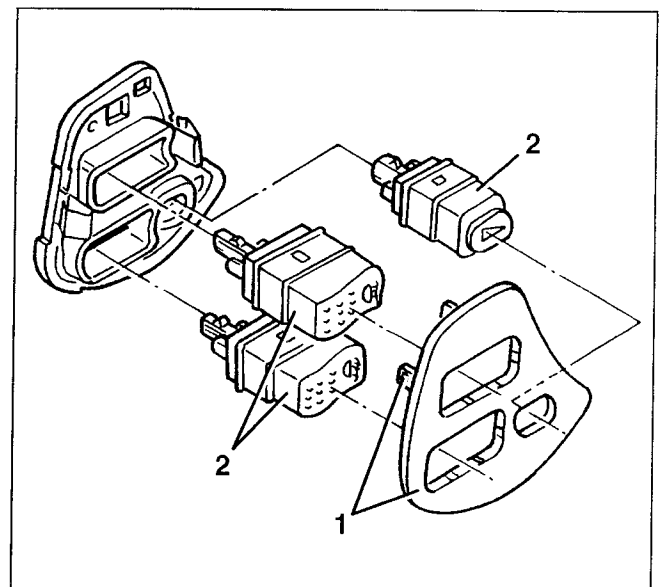
SETS OF SWITCHES AT SIDE OF PANEL

REMOVAL/REFITTING (to '97 versions)

- Disconnect the battery.
- 1. Using tool 1.823.014.000 prise the switch panel.
- 2. Disconnect the electrical connections.
- 3. Retrieve the switch panel.

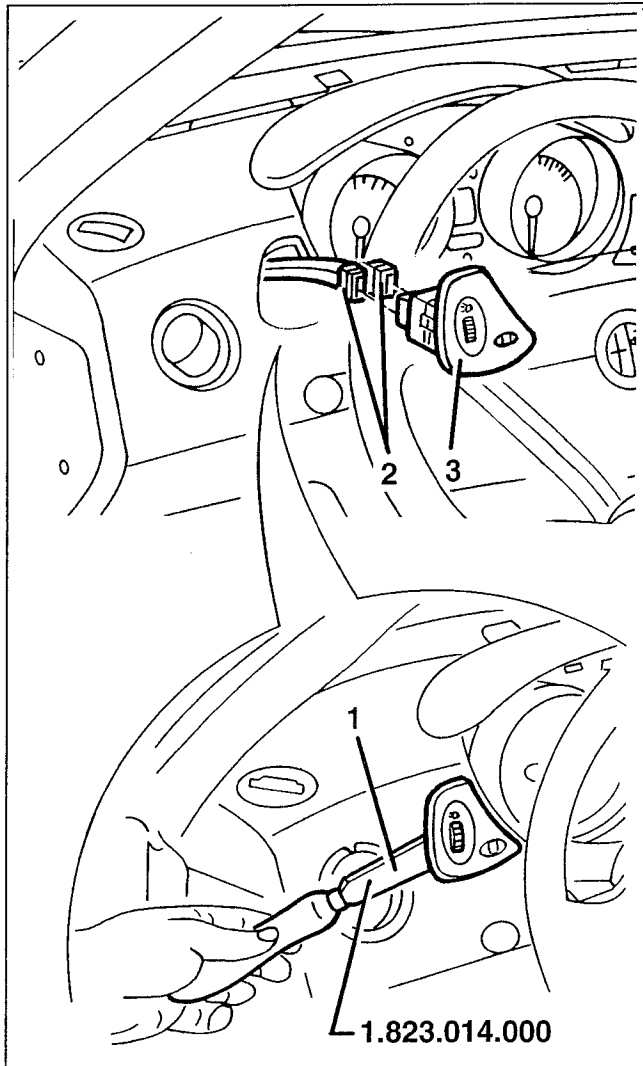


1. Working on the tabs prise the outer cover.
2. Retrieve the switches.

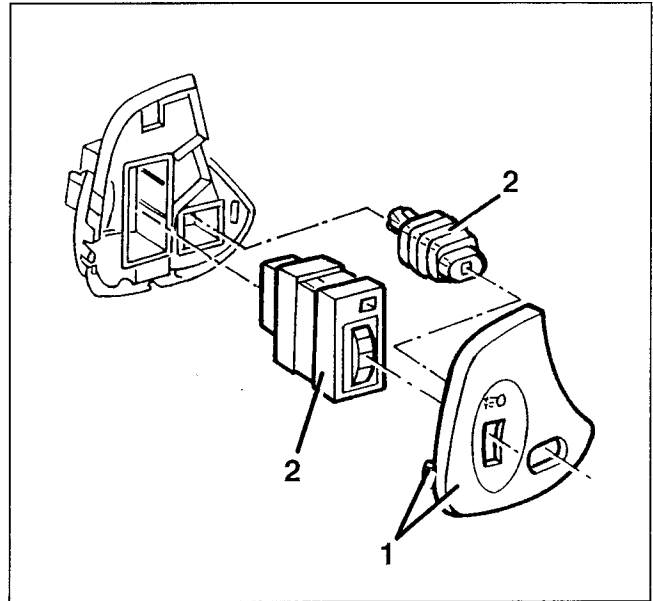


REMOVAL/REFITTING (to '98 versions)

- Disconnect the battery.
- 1. Use tool 1.823.014.000 to lift the switch board.
- 2. Disconnect the electrical connections.
- 3. Take the switch board.



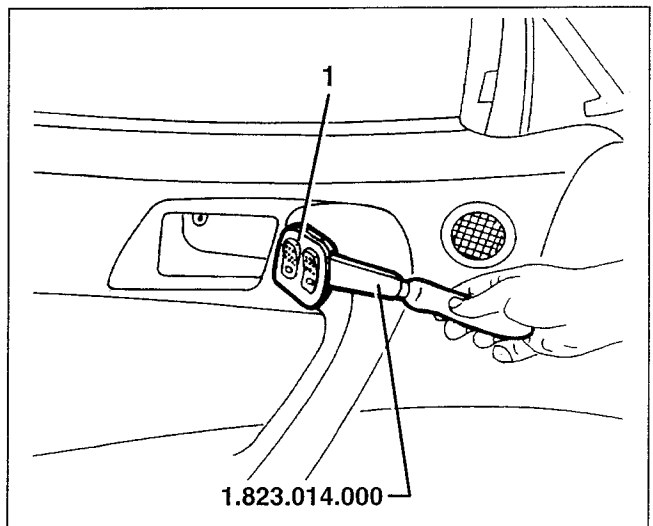
- 1. Press the tabs and remove the external plate.
- 2. Take the switch and variator.



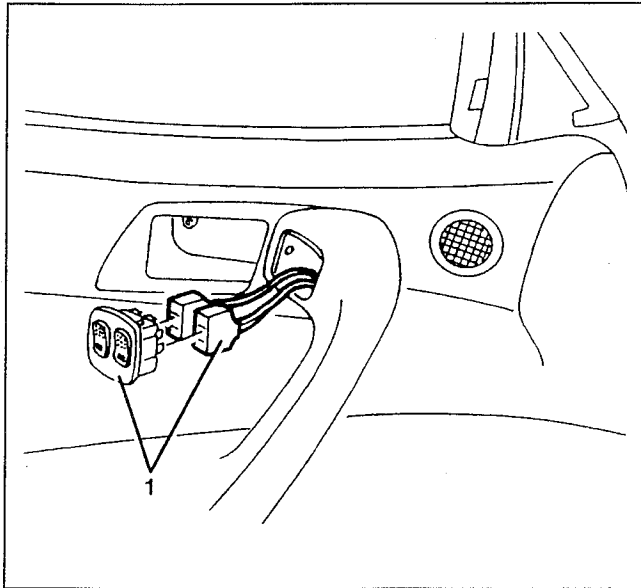
POWER WINDOW SWITCHES

REMOVAL/REFITTING

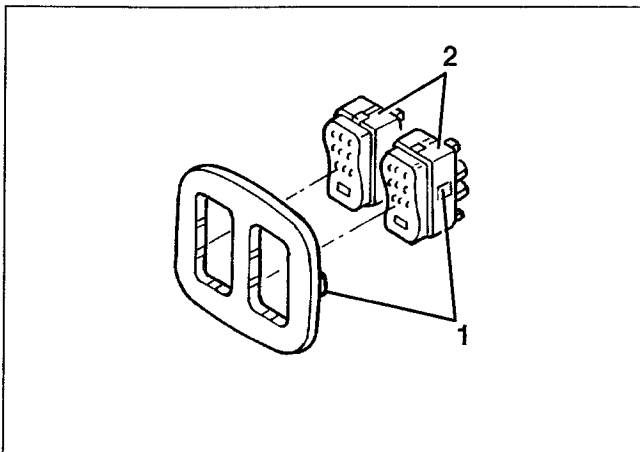
- Disconnect the battery
- 1. Using tool 1823.014.000 prise the switch plate off the door panel.



1. Disconnect the electrical connections from the power window switches and remove the plates.



1. Working on the tabs prise off the outer plate.
2. Retrieve the switches.



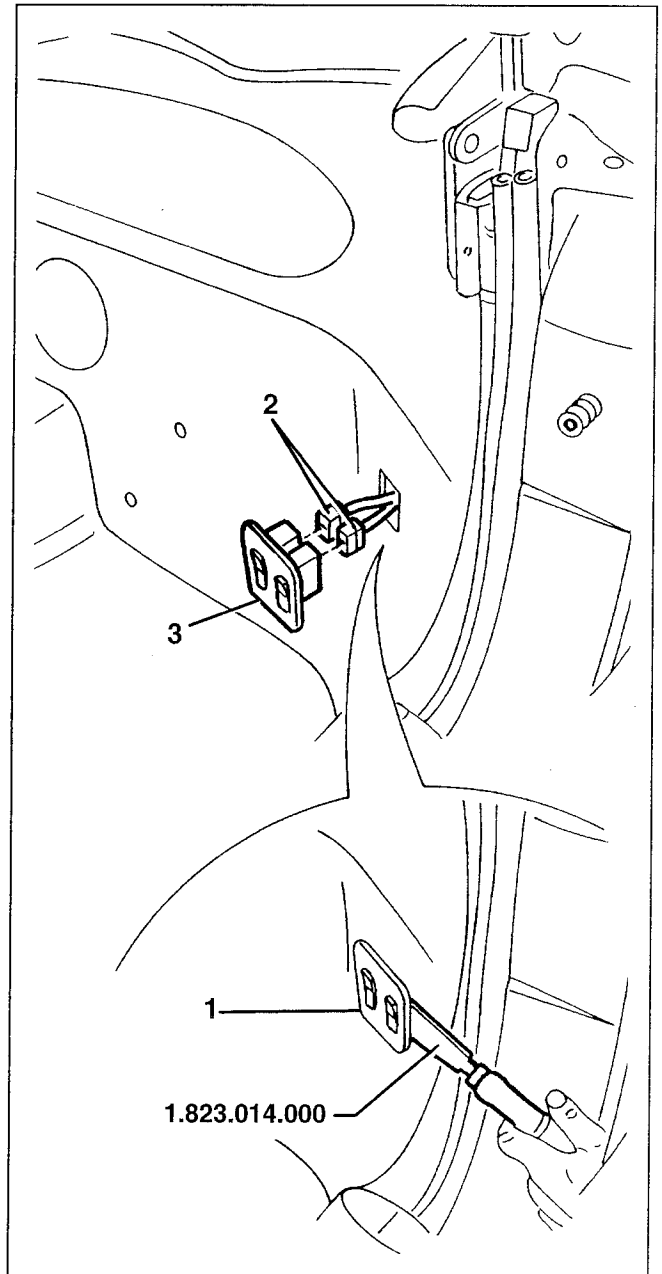
SUN ROOF CONTROL SWITCH (GTV)

Operate as listed for the headlamp aiming switch (see specific paragraph).

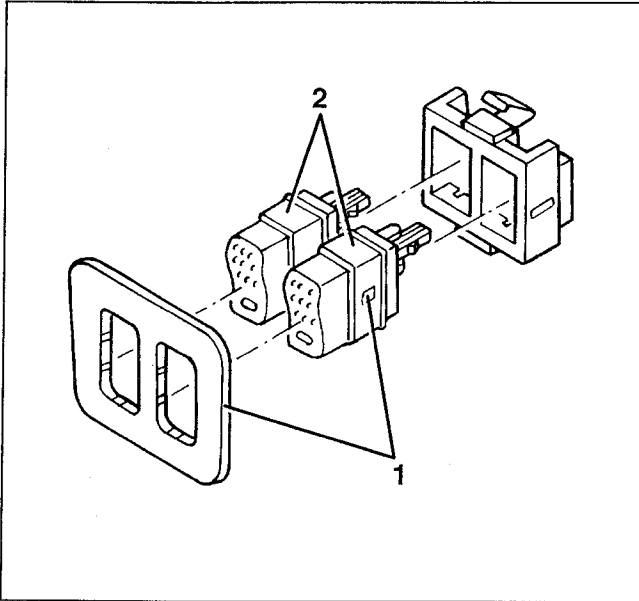
TOP CONTROL SWITCHES (SPIDER)

REMOVAL/REFITTING

- Disconnect the battery
1. Prise the switch panel using tool 1.823.014.000
 2. Disconnect the electrical connections.
 3. Retrieve the switch panel.



1. Working on the tabs prise the outer plate.
2. Retrieve the switches.

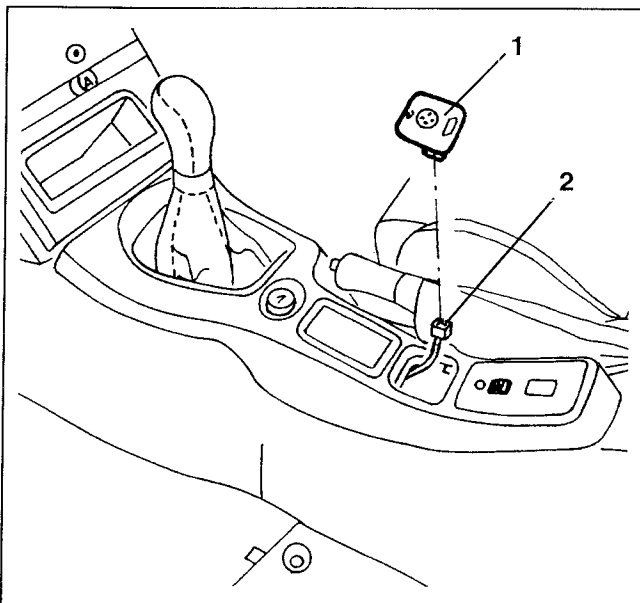


**DOUBLE DOOR MIRROR
ADJUSTMENT SWITCH**

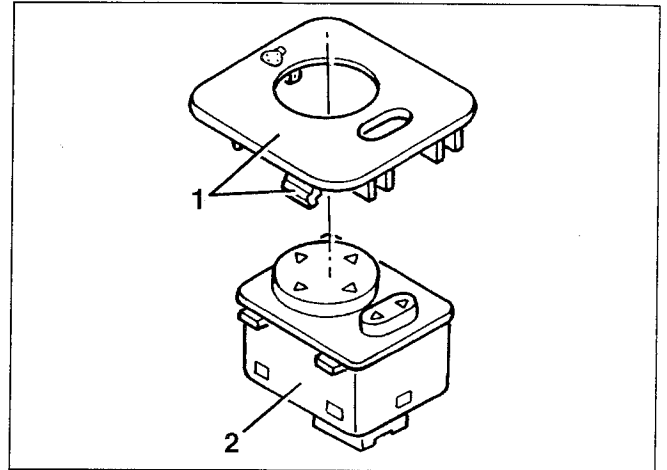
REMOVAL/REFITTING (to '97 versions)

- Disconnect the battery

 1. Prise the switch panel off its housing on the centre tunnel
 2. Disconnect the electrical connection and retrieve the panel.



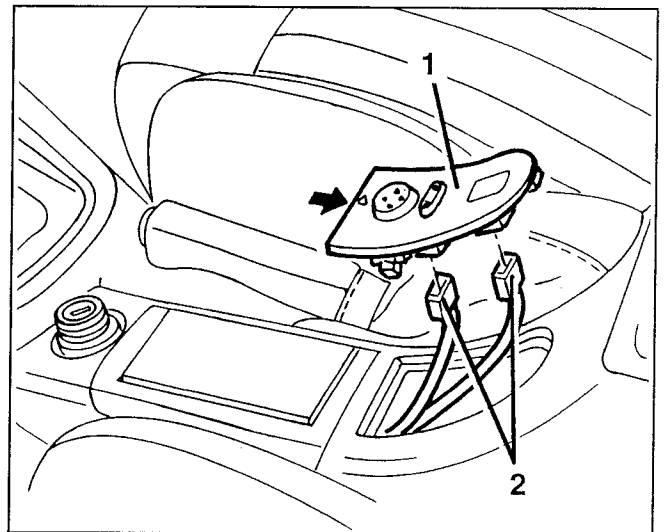
1. Work on the side tabs and separate the panel.
2. Retrieve the switch.



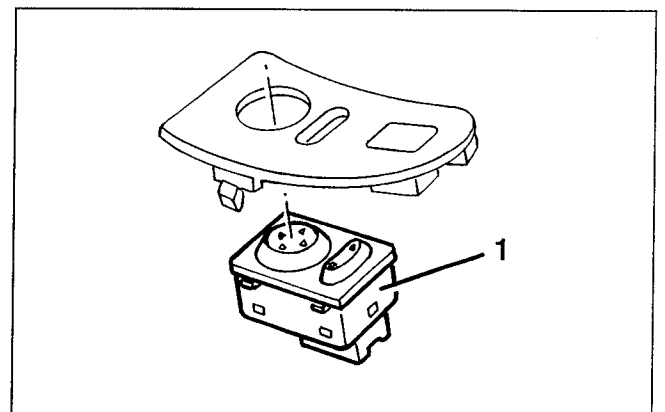
REMOVAL/REFITTING ('98 versions)

- Disconnect the battery.

 1. Lift the rearview mirror/electrical hood switch plate from its seat on the central tunnel from the side shown by the arrow.
 2. Disconnect the electrical connections and take the plate and switches.



1. Remove the switch from the plate.



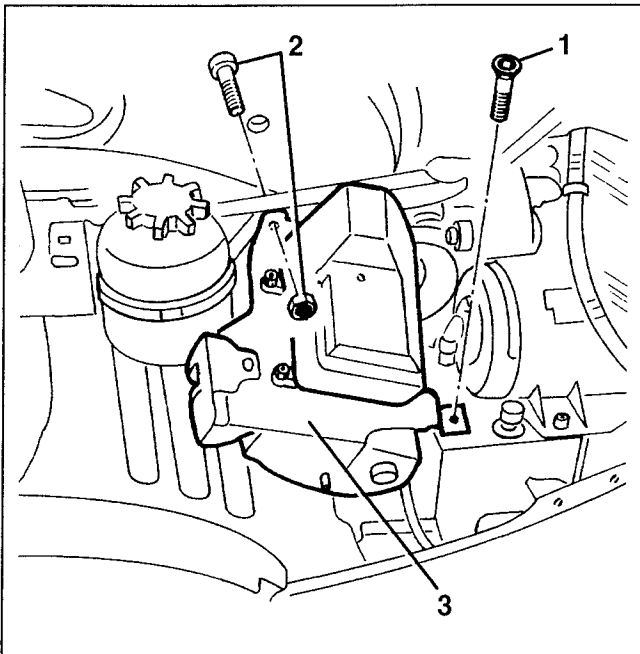
ALARM SYSTEM

For the description and diagnosis of this system refer to "Group 55 - ELECTRIC SYSTEM DIAGNOSIS - Section "Alarm System".

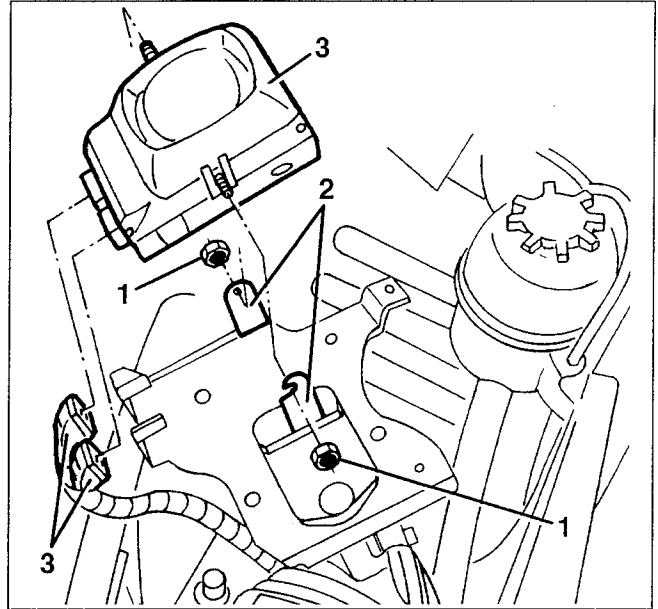
CONTROL UNIT-SIREN

REMOVAL/REFITTING

- With the alarm deactivated, disconnect the battery.
- Open the bonnet and remove the engine compartment right-hand cover (see Group 70).
- 1. Slacken the screw fastening the bracket supporting the climate control unit and the alarm system control unit-siren.
- 2. Slacken the bolt.
- 3. Remove the bracket complete.



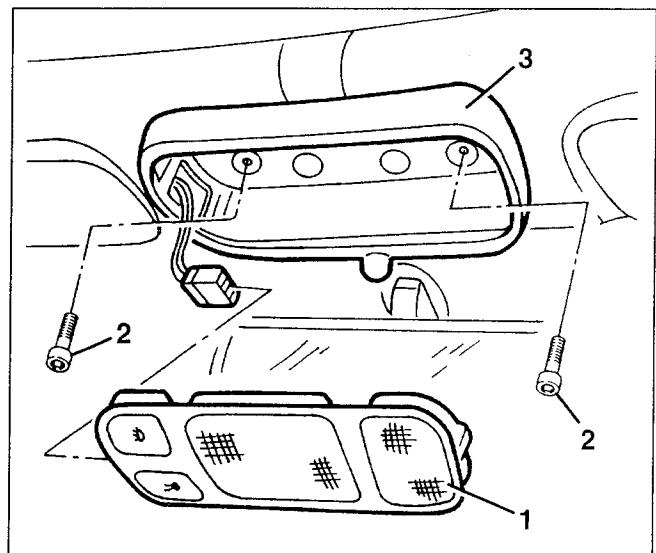
- Overturn the bracket.
- 1. Slacken the nuts.
- 2. Open the support tabs and remove the control unit-siren group.
- 3. Disconnect the connections and retrieve the group.



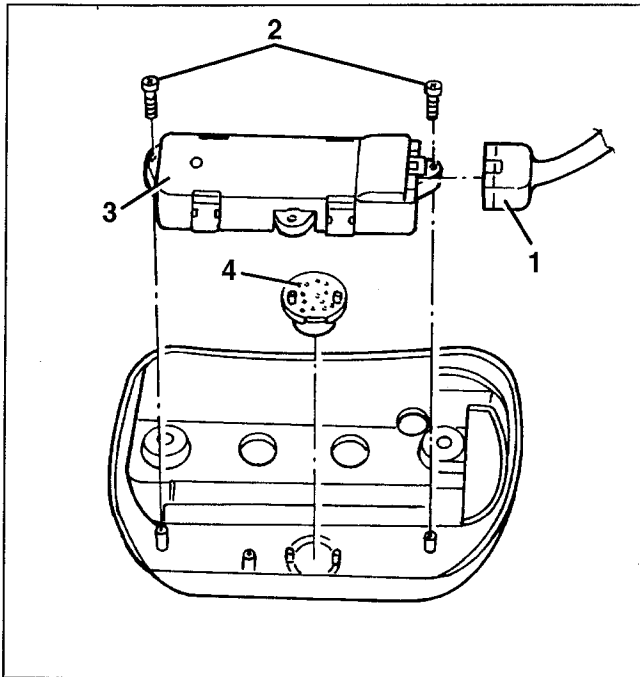
Refit the control unit-siren group reversing the sequence followed for removal.

REMOTE CONTROL RECEIVER UNIT

- Disconnect the battery.
- 1. Remove the passenger compartment roof lamp (see specific paragraph).
- 2. Slacken the two screws fastening the frame.
- 3. Remove the frame.



1. Disconnect the electrical connection.
2. Slacken the three screws.
3. Remove the receiver unit base.
4. Retrieve the receiver element below.

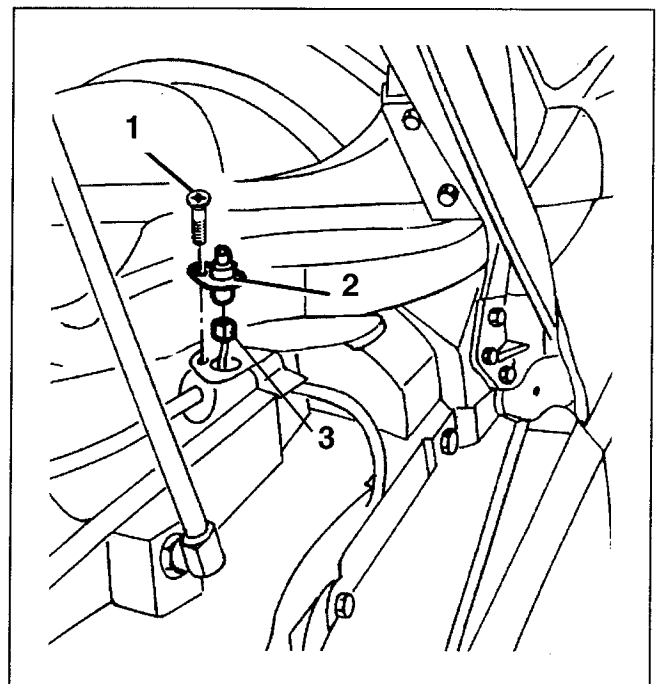


Refit the receiver unit reversing the sequence followed for removal.

BONNET OPEN DETECTION SWITCH

REMOVAL/REFITTING

- With the alarm deactivated, disconnect the battery and open the bonnet.
- 1. Slacken the fastening screw.
- 2. Raise the switch.
- 3. Disconnect the connection and retrieve the switch.



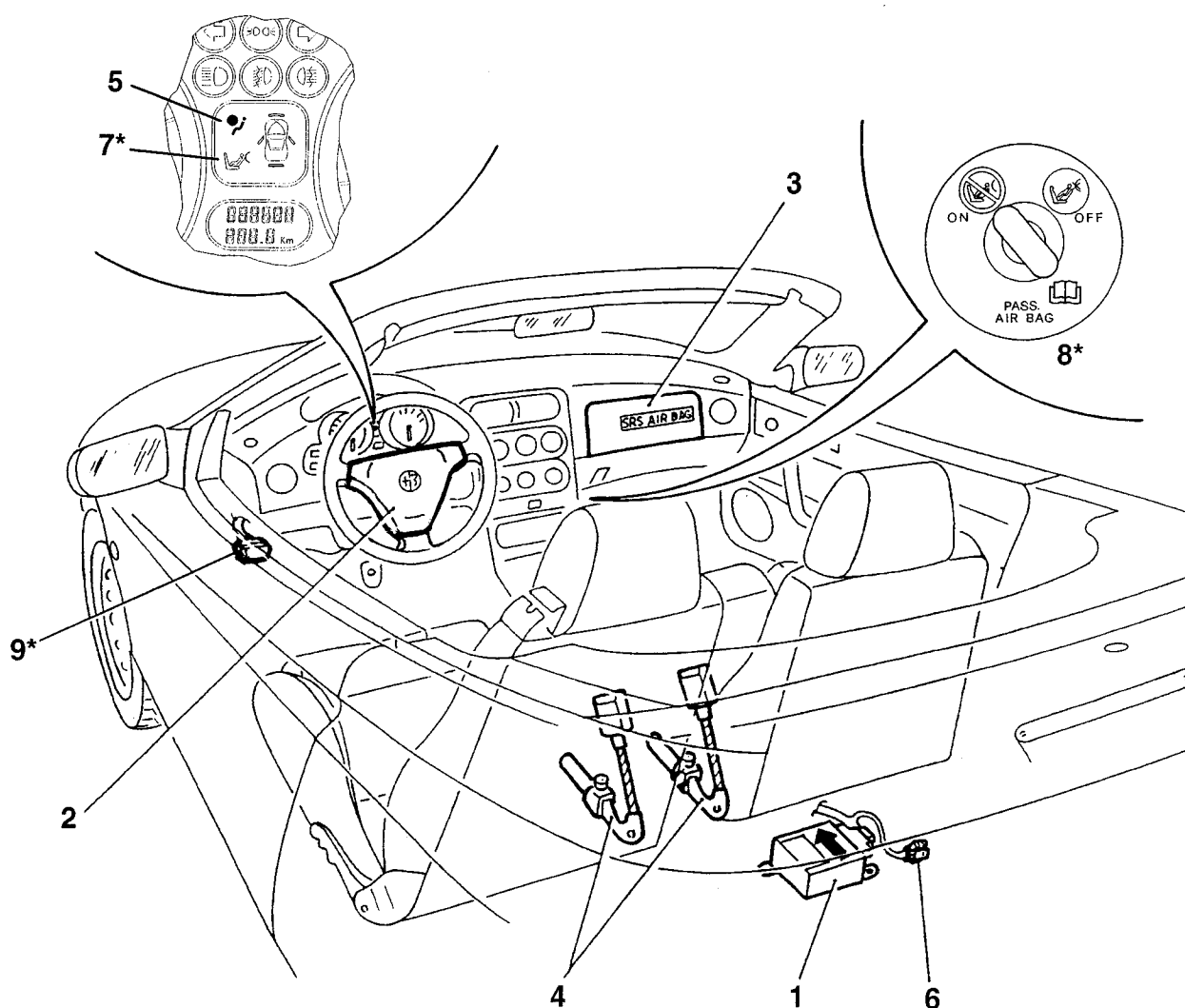
AIR BAG AND PRETENSIONERS**GENERAL DESCRIPTION**

This car is fitted with an electronic safety system which, in the event of an impact, operates one or two Air Bags and two safety belt pretensioners.

The **AIR BAG** is a passive safety device formed of one or two cushions which automatically inflate between the body of the occupants of the front seats of the vehicle and the front structures of the passenger compartment, in the event of a head-on crash.

The safety belts **PRETENSIONER** is a pyrotechnic device integrated in the safety belt buckle, which operates in the event of a head-on collision taking up the inevitable slack in the belts caused by the action of the weight of the body or its adherence to the seat back.

The system as a whole comprises the following components:



1. ECU.
2. Driver side airbag module.
3. Passenger side airbag module.
4. Seat belt pretensioners.
5. System failure and diagnostic code warning light on instrument panel
6. ALFA TESTER connector

7. Passenger side airbag deactivated warning light on instrument panel (*)
8. Passenger side airbag deactivating device on instrument panel (*)
9. Combined diagnostic connector (*)

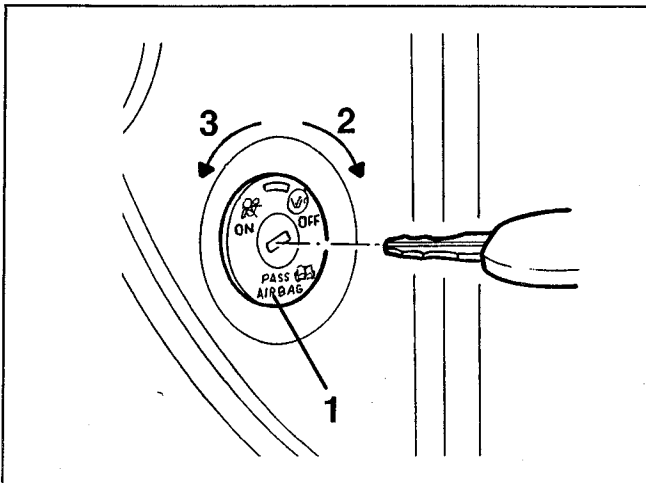
(*) with effect from Model Year '98

The electronic control unit is equipped with suitably calibrated deceleration sensors, through which it detects a collision situation and triggers the reaction of a chemical compound which produces nitrogen through two electric detonators. The gas inflates the two synthetic fibre cushions respectively housed at the centre of the steering wheel and in a compartment of the dashboard in front of the passenger.

Simultaneously, the control unit triggers the pretensioners which prevent the belts from unreeling by a piston operated by a gas generator which pulls the steel cable fastening the buckle.

PASSENGER SIDE AIRBAG DEACTIVATION

The passenger side airbag can be deactivated voluntarily or temporarily by means of the vehicle key. The control switch is located on the side cabinet panel on passenger side and activates (ON) or deactivates (OFF) the passenger side airbag. In this case, the ECU excludes passenger side airbag activation but enables normal operation of the respective pretensioner. This ensures that if a passenger is on board and the switch has been left OFF by mistake, the airbag will not be triggered but at least the pretensioner will operate normally. When the key on OFF, the ECU will also activate the respective "Passenger side air bag deactivated" warning light on the instrument panel.



- 1 Key switch
- 2 OFF: Passenger side airbag deactivated
- 3 ON: Passenger side airbag activated

For further details see "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS - Section "Air Bag and Pretensioners".

SYSTEM COMPONENTS

ELECTRONIC CONTROL UNIT

(see "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS")

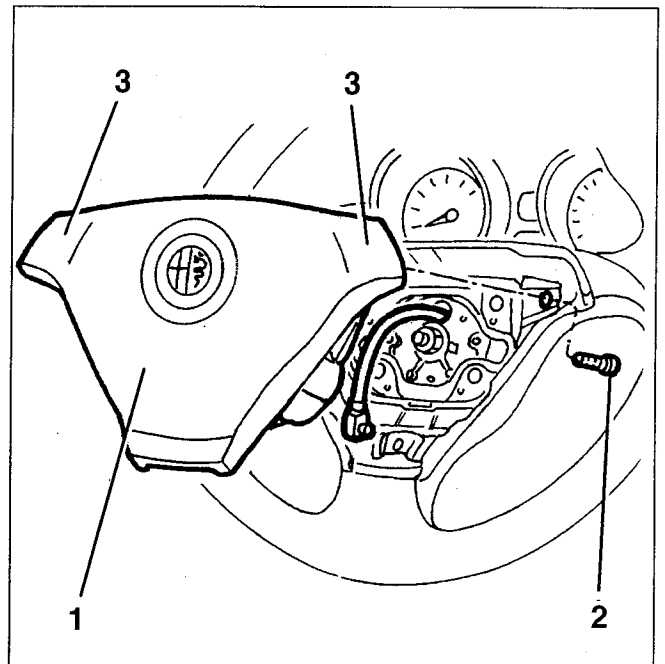
DRIVER'S SIDE AIR BAG MODULE

The specifically designed steering wheel is fitted with side controls (3) for the horns and the central part is used to accommodate the actual Air Bag module.

It is fastened by two special screws (2) to the rear of the steering wheel.

The module (1) consists of a steel plate covered by a plastic container which forms the centre of the steering wheel. The container encloses the suitably folded cushion and the inflating device. The inflating device contains an electrically activated detonator and a chemical compound (Sodium azide) to produce gas (Nitrogen).

The rear of the cushion has holes which are sized to allow the cushion to deflate immediately after deployment.



The upper part of the module has pre-breakage lines which allow the inflated cushion to come out quickly leaving the module fixed on the steering wheel without the pre-established detached parts.

CLOCK SPRING DEVICE

The Clock Spring device (1) is installed on the steering column lever unit and allows the Air Bag module connection cables and the electric horn connection to follow the rotation of the steering wheel without breakage or damage.

The device comprises two plates:

- the lower one is fastened to the steering wheel lever unit by an internal grooved profile;
- The upper one is made integral with the steering wheel by a torsion spring (2) which also has a safety purpose.

The spring (2) allows rotation of the spiral cable with the steering wheel.

When the spring (2) is removed, pin (3) comes out and prevents rotation between the steering wheel and the device; in fact the upper plate, no longer restrained to the steering wheel, might turn and and unwind or wind the spiral cable incorrectly, and this might result in breakage of the cable itself.

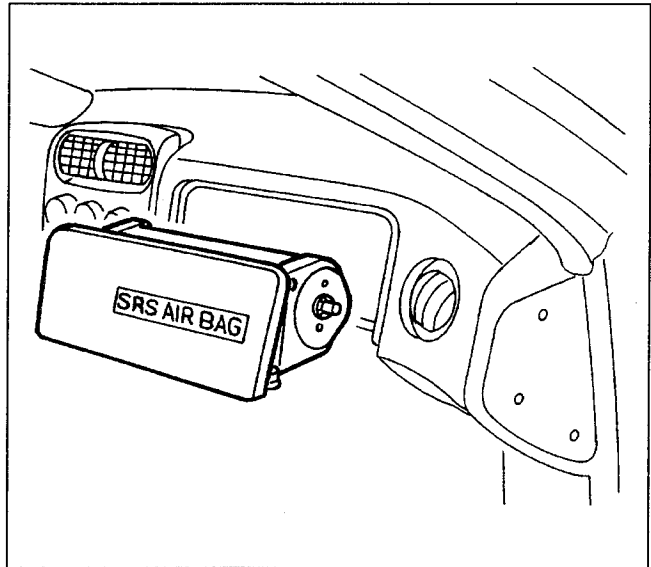
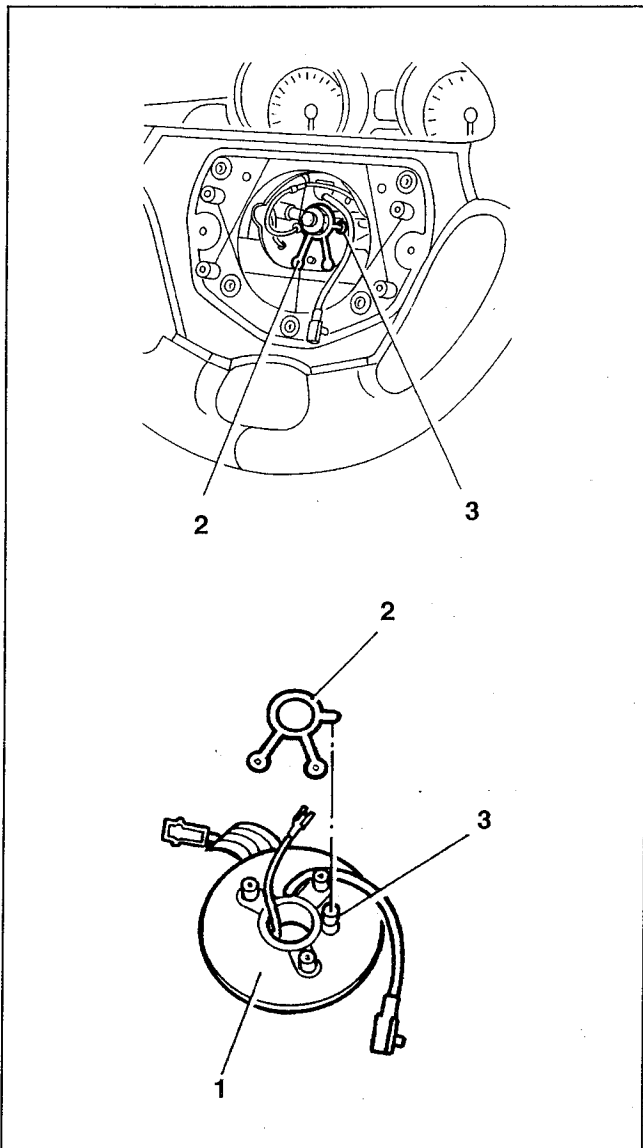
WARNING : when the device has been removed, if for any reason the upper plate is rotated with respect to the lower one - for example pin (3) pressed inadvertently - it becomes impossible to ascertain their exact respective position.

In this case the two plates must be turned to their ends - pressing pin (3) - and the cable should be rewound for 3.5 turns: this position corresponds to half of the winding, therefore the device must then be refitted on the car with the wheels exactly in the straightahead position.

PASSENGER'S SIDE AIR BAG MODULE

The passenger Air Bag module is also enclosed in a container which is fastened on a metal frame inside the dashboard above the glovebox.

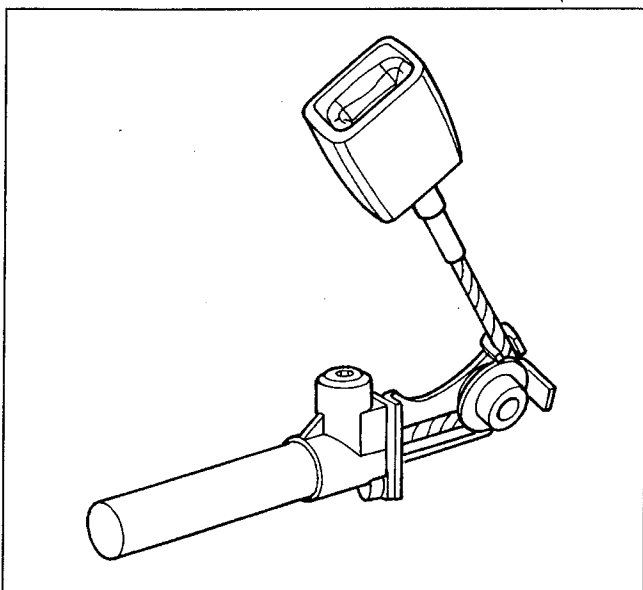
The composition and operating principle are the same as for the driver's side module.



SEAT BELT PRETENSIONERS

The seat belt pretensioner is a pyrotechnic device integrated in the buckle that hooks onto the belt which, in the event of a head-on collision takes up the inevitable slack in the belt caused by the action of the weight of the body and keeps it as close to the seat as possible.

In fact, if the belt is kept in close contact with the body, it can gradually absorb the kinetic energy generated during a collision.



There are many reasons why a seat belt cannot keep a body fully against the seat back without the adoption of this device; the main ones are:

- time delay in the action of the inertial locking mechanism (locking of the reel);
- stretching of the belt fibres;
- "over-extension" of the belt from the reel;
- garments of a certain thickness which create a space between the belt and chest.

From the above, it can be deduced that in reality the belt would effectively begin to restrain its wearer only after a certain amount of movement forward of the body: this is why it is necessary to tension the belt at the time of the crash and thus prevent it from extending.

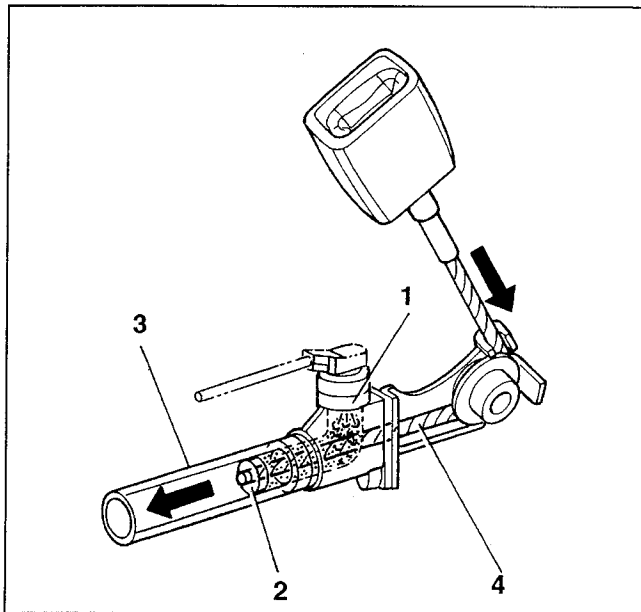
Operation

When an impact is detected, the control unit suitably commands the firing circuit which supplies the gas generator (1), in a similar manner as for the Air Bag module.

The pressure of the gas that develops is applied on the surface of the piston (2), and creates a force that pushes the piston into the cylinder (3).

A steel cable (4) is shrunk onto the piston (2) and the end of the cable is connected to the belt reel. The movement of piston (2), therefore, shortens the belt by a few centimetres (appr. 7-8 cm), taking up the slack mentioned previously.

NOTE: the pretensioner operating thresholds are lower than those of Air Bags, as mentioned previously, because even a slight impact can cause extension of the belts.



AIR BAG CONTROL UNIT

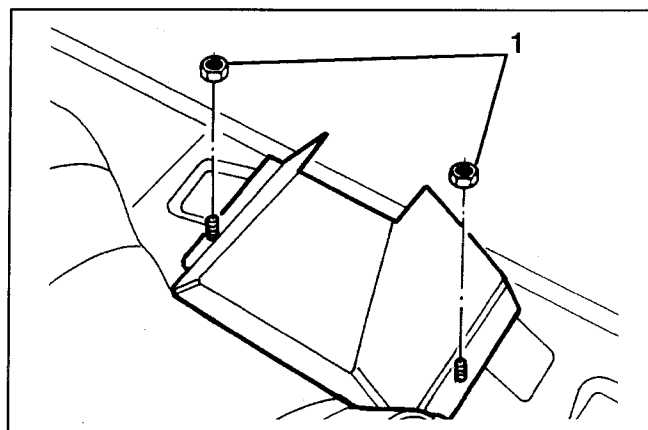
REMOVAL/REFITTING



Before doing any work on the system carefully adhere to the **SAFETY INSTRUCTIONS** given in "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS" Section "Air Bag and Pre-tensioners".

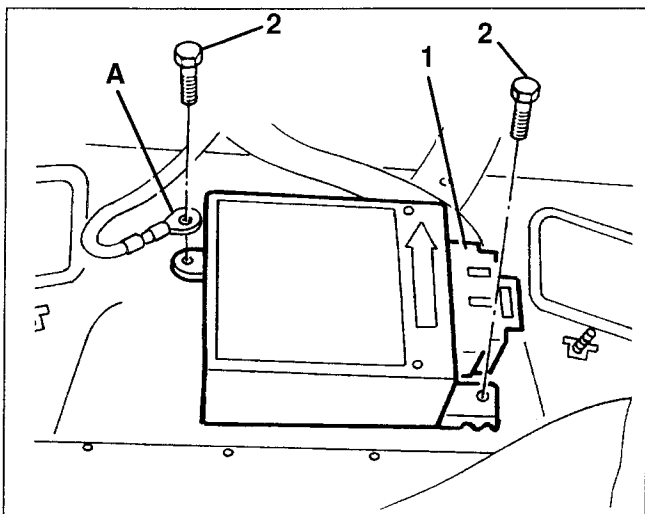
In particular disconnect both battery terminals, isolate them and wait for 10 minutes before doing any work.


- (only for SPIDER). Open the boot lid.
 - (only for GTV). Remove the rear seat (see Group 70).
1. Slacken the two fastening screws and remove the control unit cover.




BECKER Control unit (up to chassis No.6016879)

1. Disconnect the control unit connector.
2. Slacken the two fastening screws and remove the control unit.



 When refitting make sure that the earth ring (A) of the Air Bag wiring is fastened correctly (easily distinguished by the yellow sheath) on one of the two clamps of the control unit itself.

 **DO NOT CONNECT THE BATTERY IF THE ASSEMBLY HAS NOT BEEN COMPLETED CORRECTLY.**

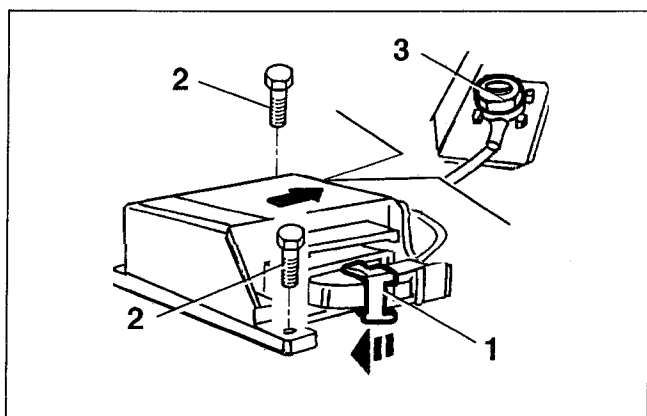
NOTE: After the intervention, check system efficiency by means of a **TESTER** or other diagnostic tool.


TRW Control unit (from chassis No.6016879)

1. Disconnect the control unit connector.

NOTE: To remove the connector, turn the stopper lever in the direction of the arrow.


2. Slacken the two fastening screws.
3. Slacken the nut fastening the earth ring and remove the control unit.



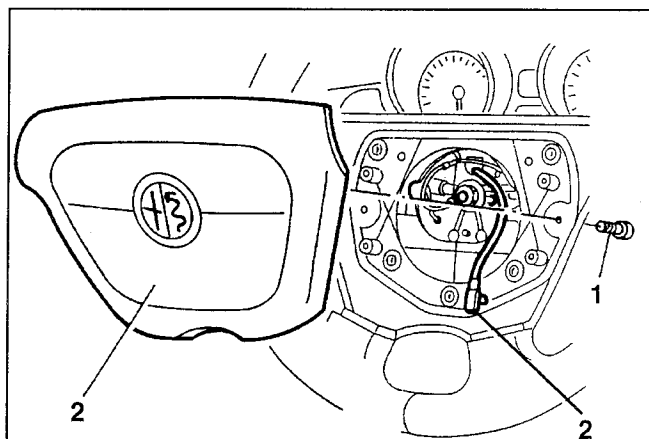
 When refitting take care to fasten the earth ring correctly

DRIVER'S SIDE AIR BAG

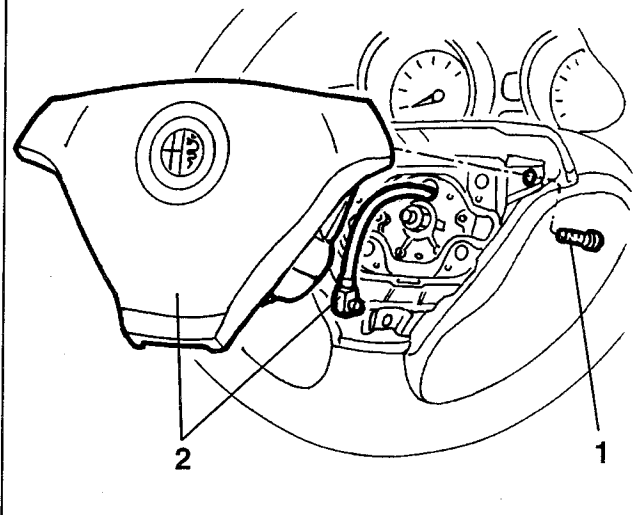
REMOVAL/REFITTING

-  Before doing any work on the system carefully adhere to the **SAFETY INSTRUCTIONS** given in "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS" Section "Air Bag and Pre-tensioners".
In particular disconnect both battery terminals, isolate them and wait for 10 minutes before doing any work.
- Should system diagnosis using the **ALFA TESTER** be necessary, disconnect the Air Bag module and replace it with the special dummy resistance (see "Group 55 - ELECTRIC SYSTEM DIAGNOSIS" - Section "Air Bag and Pre-tensioners").

1. Slacken the two screws fastening the Air Bag module to the steering wheel. (N.B. a special Torx type wrench must be used).
2. Disconnect the electrical connection and remove the module.



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DO NOT CONNECT THE BATTERY IF THE ASSEMBLY HAS NOT BEEN COMPLETED CORRECTLY.

NOTE: After the intervention, check system efficiency by means of a **TESTER** or other diagnostic tool.

CLOCK SPRING DEVICE

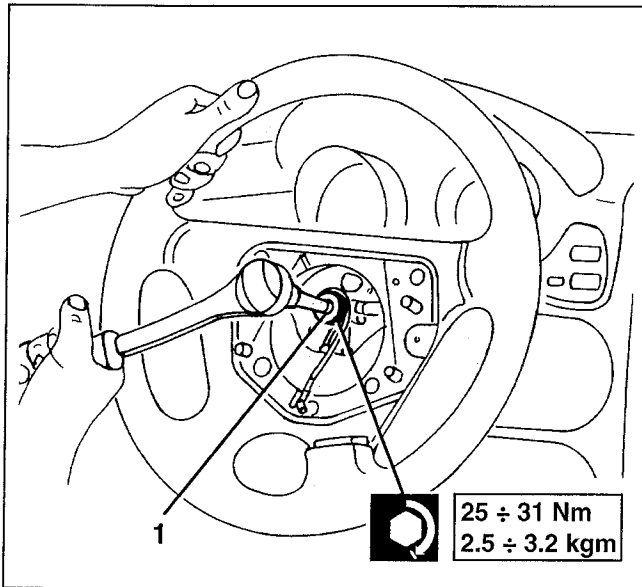
REMOVAL/REFITTING



Also for the clock spring device it is necessary to carefully follow the **SAFETY INSTRUCTIONS** given in "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS", Section "Air Bag and Pre-tensioners".

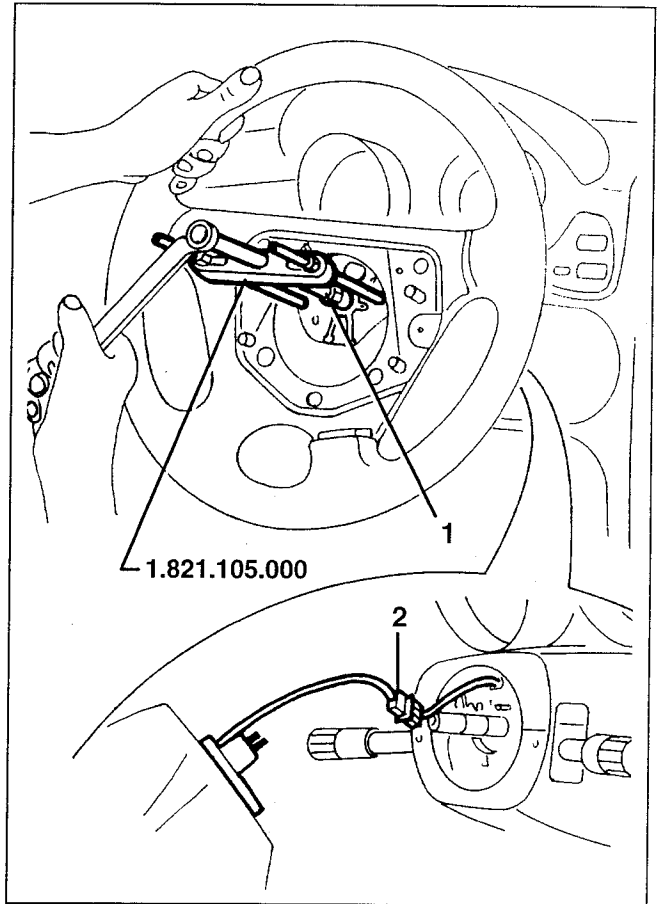
– Remove the Air Bag module.

1. Remove the steering wheel centre fastening nut.



NOTE: before carrying out this operation make sure that the wheels are perfectly straight ("spoked" steering wheel).

1. Using tool 1.821.105.000 remove the steering wheel from the steering column.
2. Disconnect the connection of the clock spring.

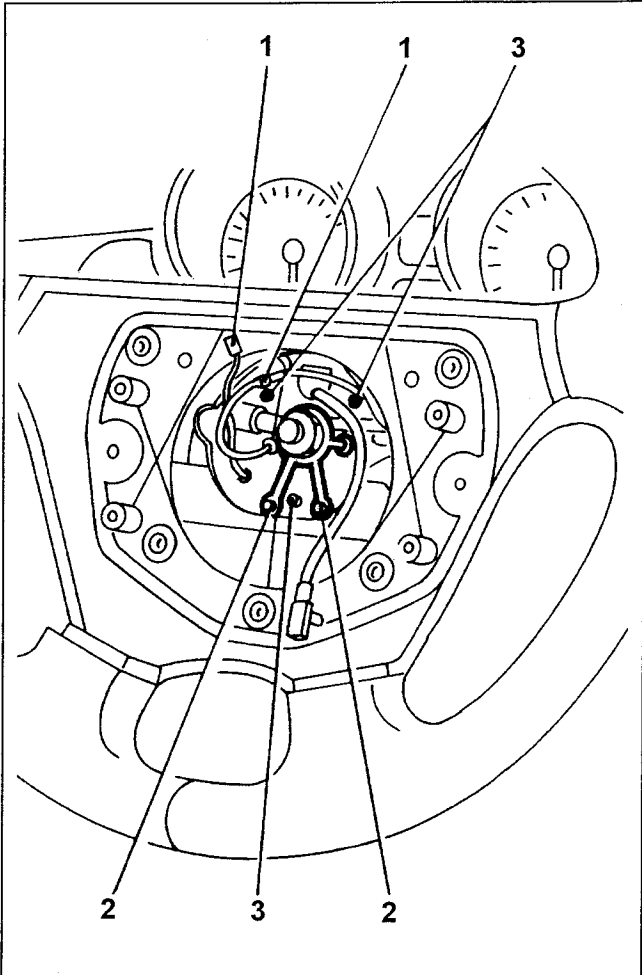


WARNING:

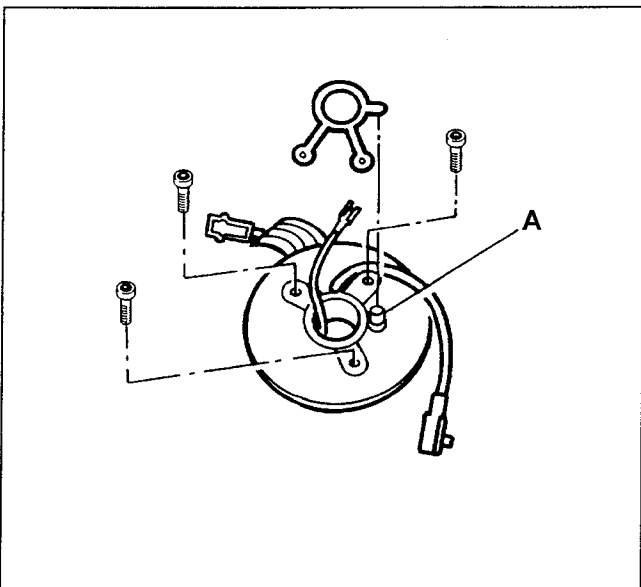
At this stage be very careful not to turn the clock spring in relation to the steering wheel, as the device is locked only when it is separated from the steering wheel (see next step).

It is therefore advisable to stick the clock spring on the steering wheel with adhesive tape.

1. Disconnect the connections of the horns.
2. Slacken the two screws and remove the safety catch.
3. Slacken the three screws and remove the clock spring.



NOTE: After removing the safety catch, the clock spring is locked in its possible rotations as safety pin A comes out.



If the clock spring is replaced by a **new** one, the new device is supplied already locked in the correct position by a **clamp**.

Assemble it on the steering wheel as described previously, then remove the clamp and assemble the steering wheel on the steering column **after making sure that the wheels are perfectly straight**.

When the device has been removed, if for any reason whatsoever the upper plate is turned in relation to the lower one - for instance if the pin is pressed inadvertently - it is no longer possible to distinguish the position between the two plates.

In this case, it is necessary to rotate the two plates to the end - pressing the pin - then rewind the cable **3.5 turns**: this position corresponds to half of the winding and makes it possible to assemble the device with the wheels perfectly straight.

If in doubt, change the device.

PASSENGER'S SIDE AIR BAG

REMOVAL/REFITTING (to '97 versions)

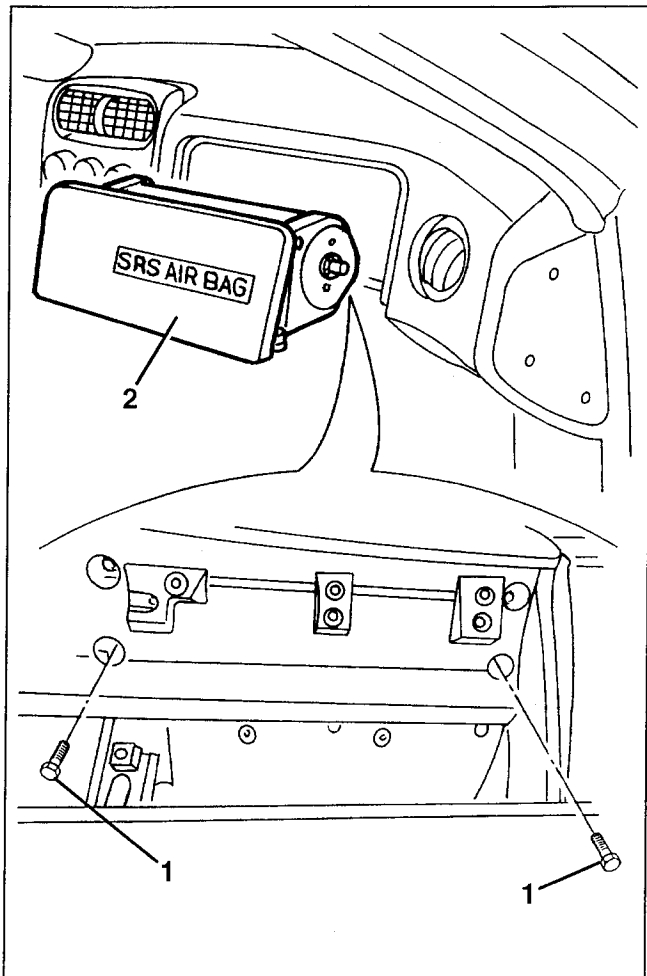


- Before doing any work on the system carefully adhere to the **SAFETY INSTRUCTIONS** given in "GROUP 55 - ELECTRIC SYSTEM DIAGNOSIS" Section "Air Bag and Pre-tensioners".

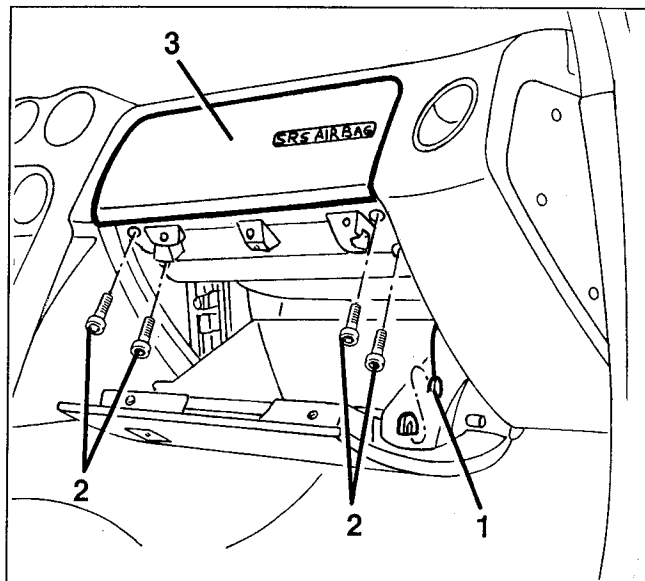
In particular disconnect both battery terminals, isolate them and wait for 10 minutes before doing any work.

- Should system diagnosis using the **ALFA TESTER** be necessary, disconnect the Air Bag module and replace it with the special dummy resistance (see "Group 55 - ELECTRIC SYSTEM DIAGNOSIS" - Section "Air Bag and Pre-tensioners").

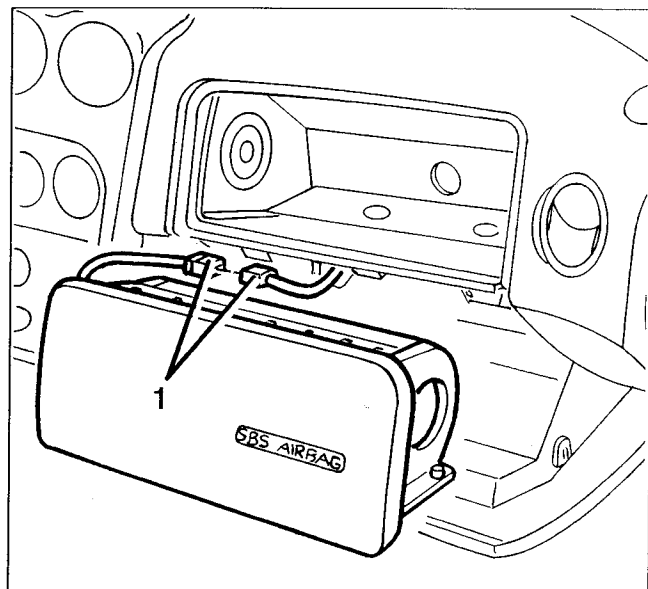
- Open the glovebox
- 1. Slacken the two screws fastening the Air Bag device.
- 2. Remove the Air Bag device, after disconnecting the electrical connection



1. Open the glove compartment and disconnect the retainer laces.
2. Loosen the airbag fastening screws.
3. Extract the airbag slightly.



1. Disconnect the airbag electrical connection.



DO NOT CONNECT THE BATTERY IF THE ASSEMBLY HAS NOT BEEN COMPLETED CORRECTLY.

NOTE: After the intervention, check system efficiency by means of a **TESTER** or other diagnostic tool.

REMOVAL/REFITTING ('98 versions)



- Before operating on this system, scrupulously attain to the **SAFETY RULES** illustrated in "Assembly 55 - ELECTRICAL SYSTEM DIAGNOSTICS", section "Air-bag and Pretensioners". In particular, disconnect both battery terminals, insulate them accurately and wait for 10 minutes before starting the operations.
- If a system test with **ALFA ROMEO TESTER** is required, disconnect the Airbag unit and replace it a specific simulation resistance (see "Assembly 55 - ELECTRICAL SYSTEM DIAGNOSTICS").



Refit the airbag by reversing the removal sequence.



DO NOT CONNECT THE BATTERY UNTIL ASSEMBLY IS COMPLETED CORRECTLY.

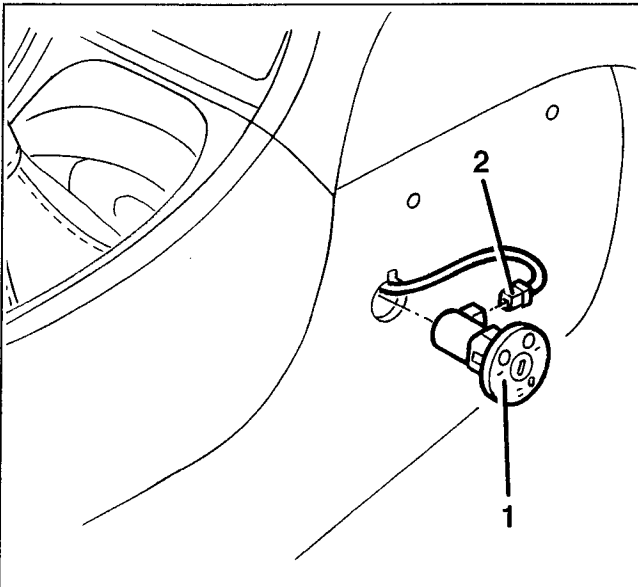
NOTE: After the intervention, check operation with the **TESTER** or other diagnostic tool.

PASSENGER SIDE AIRBAG DISABLE SWITCH

REMOVAL/REFITTING

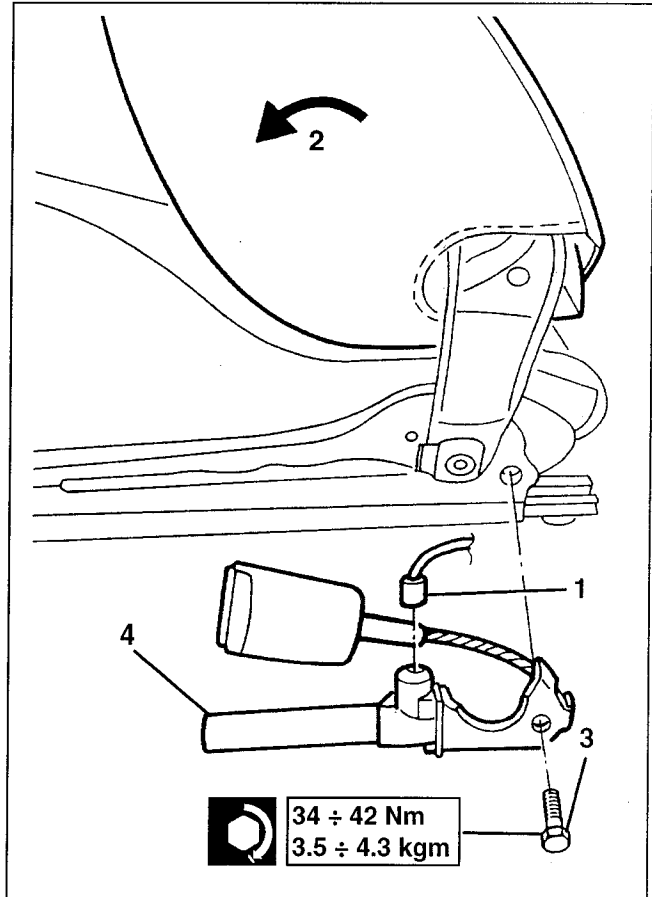
- X** Before removing and refitting the ECU, perform the following preliminary operations:
- Turn the ignition key to "STOP" and remove it;
 - Disconnect the battery.

1. Remove the switch.
2. Disconnect the electrical connection and take the switch.



- ↓** Refit the switch by reversing the removal sequence.

- Remove the seat (see specific paragraph).
1. Disconnect the connection of the pre-tensioner.
 2. Tilt the seat back forwards.
 3. Slacken the screw fastening the seat belt whip.
 4. Retrieve the whip complete with pre-tensioner, passing the belt buckle between seat back and cushion.



FRONT SEAT BELT PRE-TENSIONERS

REMOVAL/REFITTING

- X** **WARNING:**
Before doing any work on the system carefully adhere to the SAFETY INSTRUCTIONS given in "Group 55 - ELECTRIC SYSTEM DIAGNOSIS", Section "Air Bag and Pre-tensioners".
In particular disconnect both battery terminals, isolate them and wait for 10 minutes before doing any work.

- X** **WARNING:**
During both removal and refitting, avoid the use of pneumatic screwdrivers and always avoid knocking the pre-tensioner.

- ⚠** **DO NOT CONNECT THE BATTERY IF THE ASSEMBLY HAS NOT BEEN COMPLETED CORRECTLY.**

NOTE: After the intervention, check system efficiency by means of a TESTER or other diagnostic tool.

SCRAPPING AN AIRBAG MODULE OR PRE-TENSIONER



NEVER SCRAP A CAR WITH AN UNEXPLODED AIRBAG MODULE OR PRE-TENSIONER.

DEPLOYED COMPONENTS

Deployed components must never be repaired. They must always be replaced. Modules removed following all the safety procedures, can be split into steel, aluminium and whole plastic components and may be disposed of locally as special waste. As such, they should be entered in the waste register and sent to carriers and waste disposal units authorised for special wastes.

UNDEPLOYED COMPONENTS

Follow the instructions of the "Removing/Refitting paragraphs for removing the Air Bag and/or pre-tensioners from their housing and send this material to GECMA, Chivasso without carrying out any repair, neutralizing or triggering operations which involve specific risks and may only be carried out by skilled personnel authorized by the authorities concerned.

Therefore, for Italy, this material should be sent to GECMA of Chivasso, with the following wording on the delivery note:

"AIR-BAG/PRE-TENSIONER DEVICE CONTAINING PYROTECHNICAL CHARGE TO BE DE-ACTIVATED".

The devices must be sent to GECMA in the same packages in which the spares were received and, if these are not available, it is possible to ask the Volvera warehouse for the package only.

Obviously, in the case of replacement of Air Bag/Pre-tensioner devices, the original packing should be kept intact for returning the unexploded device to GECMA.

N.B.: FOREIGN MARKETS

The above instructions are only for Italy: For the other Markets the local laws in force are to be complied with.

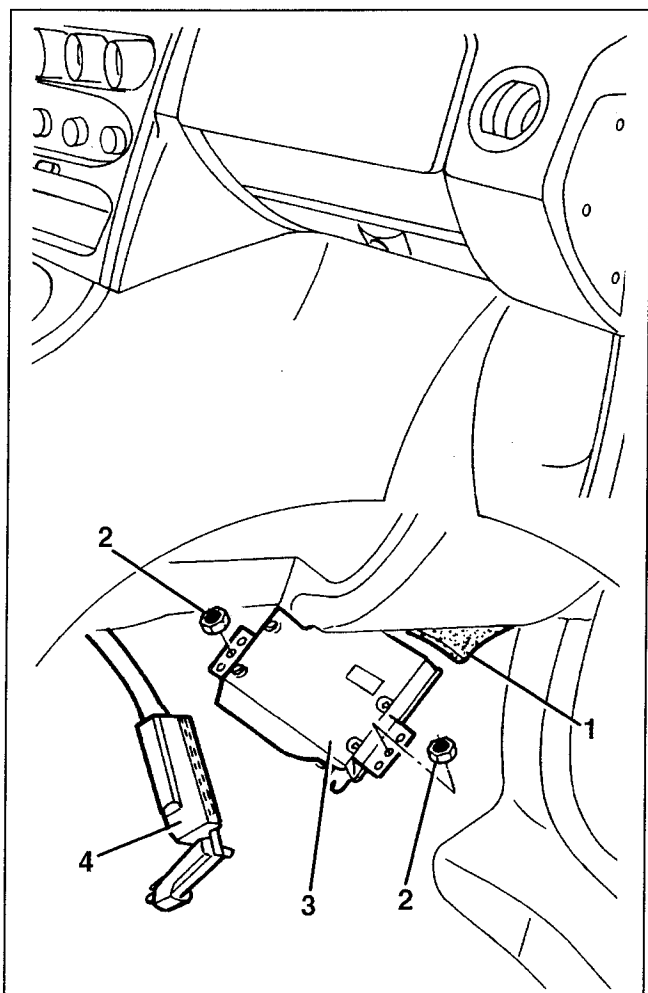
ELECTRONIC CONTROL UNITS**WARNING:**

The following pages describe the procedures necessary for removing and refitting the electronic control units fitted on the vehicle with the exception of some devices inserted directly in the fusebox.

For the location of the various devices (control units, relays, etc.) and for any other functional information see "Group 55 - ELECTRIC SYSTEM DIAGNOSIS".

INJECTION-IGNITION CONTROL UNIT**REMOVAL/REFITTING**

- Disconnect the battery
- Remove the glove box (see specific paragraph).
- 1. Working under the dashboard on the right-hand side panel of the passenger compartment, move the trim aside.
- 2. Slacken the two nuts
- 3. Detach the control unit from the side panel
- 4. Disconnect the combs and retrieve the control unit.

**ABS CONTROL UNIT**

The ABS control unit is integrated in the hydraulic unit of the ABS system.

For removal and refitting procedures see Group 33 - Brakes.

ALARM SYSTEM CONTROL UNIT

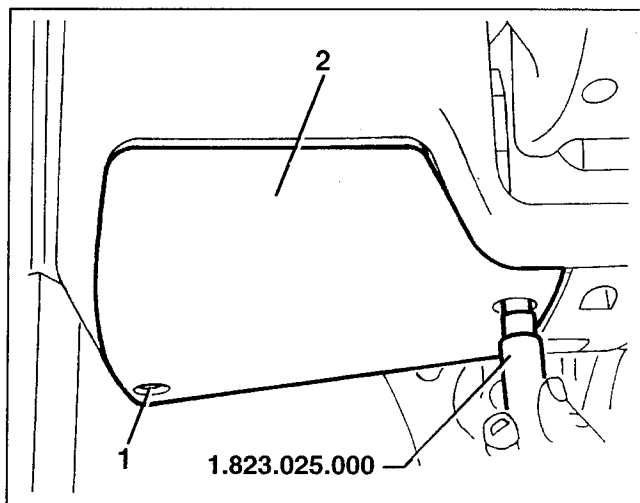
The alarm system control unit is integrated with the siren and cannot be removed separately. For removal and refitting procedures see specific paragraph "Alarm System".

AIR BAG AND PRE-TENSIONER CONTROL UNIT

For removal and refitting procedures see specific paragraph "Air Bag and pre-tensioners".

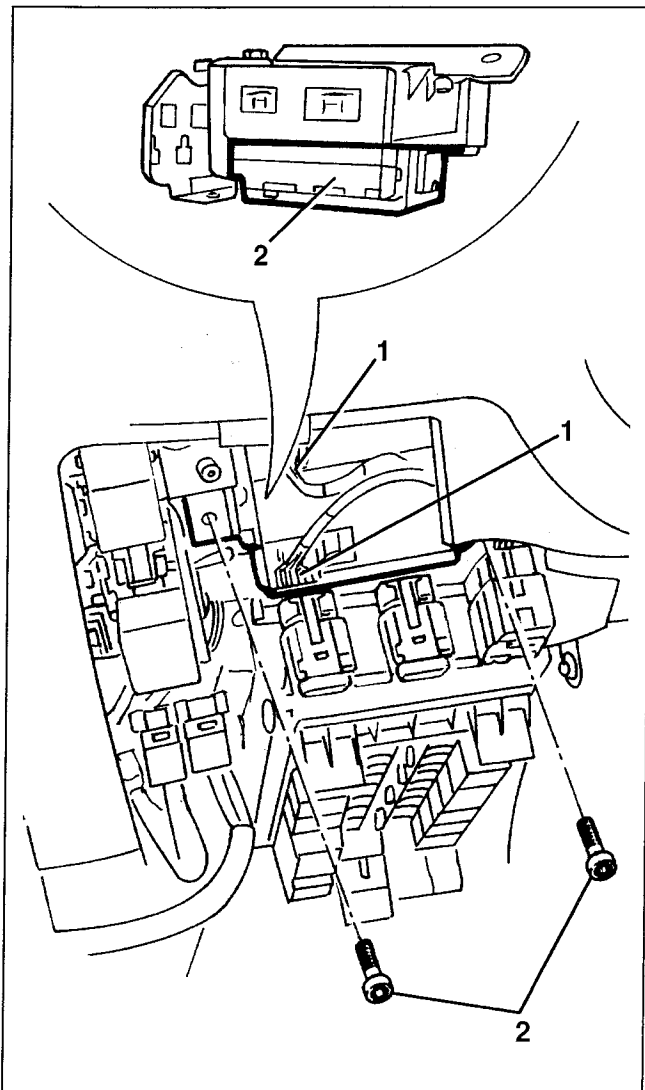
POWER WINDOW CONTROL UNIT (*)**REMOVAL/REFITTING**

- Disconnect the battery.
- 1. Using tool 1.823.025.000 rotate the three bayonet pins fastening the fusebox cover.
- 2. Remove the fusebox cover.



(*) From the '97 version the "integrated services" control unit has been replaced. The REMOVING/REFITTING procedure remains unchanged.

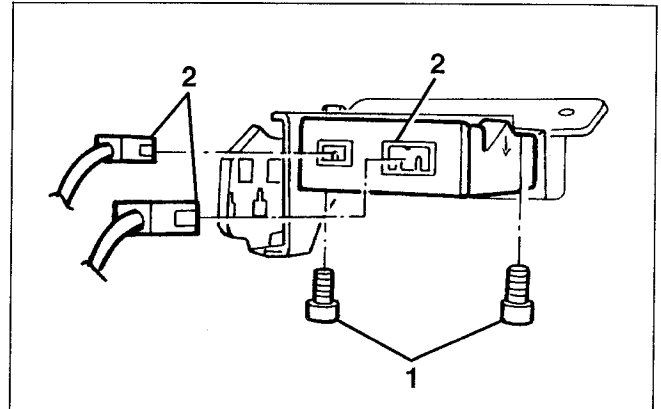
1. Disconnect the electrical connections.
2. Slacken the two screws and remove the power window control unit.



ALFA ROMEO CODE CONTROL UNIT

REMOVAL/REFITTING

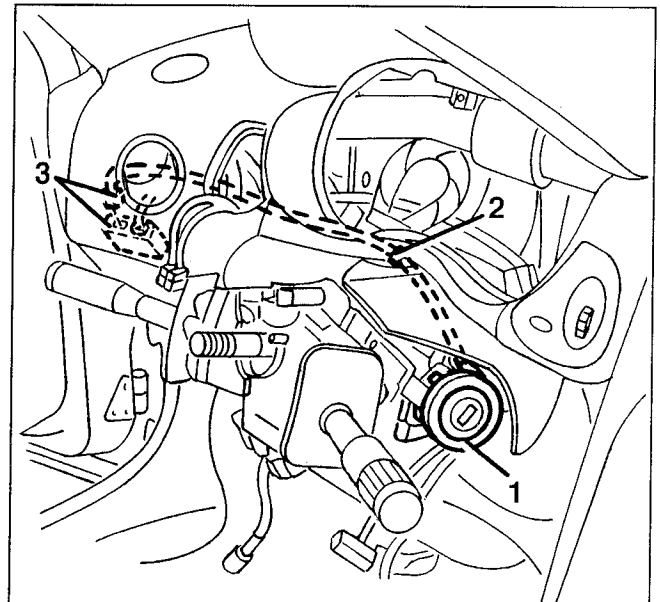
- Remove the power window control unit (see specific paragraph).
1. Slacken the two screws and lower the Alfa Romeo Code control unit below.
 2. Disconnect the electrical connections and retrieve the control unit.



ALFA ROMEO CODE AERIAL ('98 versions)

REMOVAL/REFITTING

- Remove the steering wheel and the half casings (See ASSEMBLY 41).
 - Remove the main instrument panel (See specific paragraph).
 - Remove the instrument panel left-hand side switch assembly (See specific paragraph).
1. Release the aerial from its retainers.
 2. Disconnect the aerial wire from the retainer clips.
 3. Disconnect the ECU electrical connection and take the complete aerial.

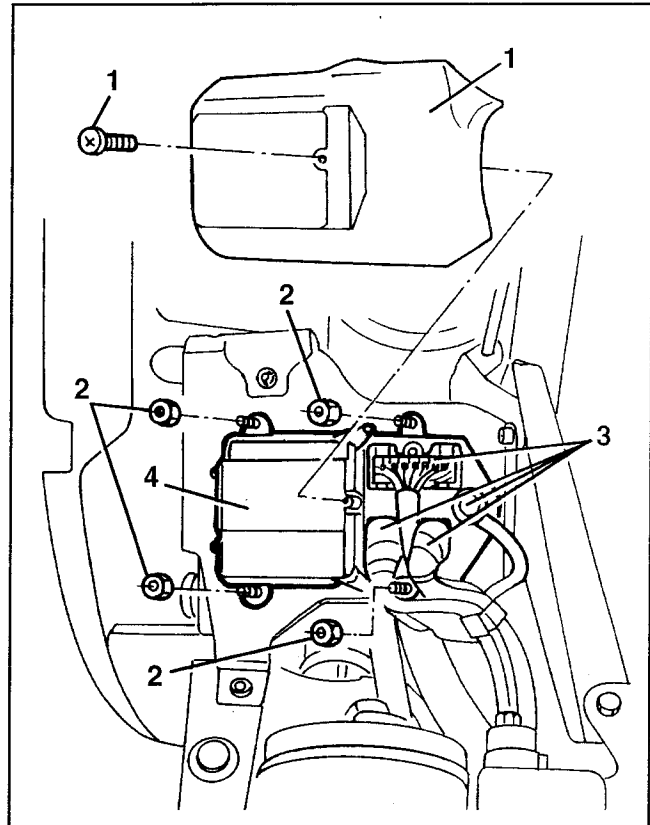


Refit the code aerial by reversing the removal sequence.

CLIMATE CONTROL UNIT (From chassis no. ___ present only on the 3.0 V6 version)

REMOVAL/REFITTING

- Disconnect the battery and open the bonnet.
- Remove the right-hand engine compartment cover (see Group 70).
- 1. Slacken the centre screw and retrieve the cover.
- 2. Slacken the four nuts.
- 3. Disconnect the electrical connections and the earth eyelet.
- 4. Retrieve the control unit.



INDEX

| | N° sect. | | N° sect. |
|--|----------|--|----------|
| INTRODUCTION | I | - Heated rearscreen (GTV only) and wing mirror defrosting and adjustment | 20 |
| - Electric system of the car - Power supply | 1 | - Headlamp aiming device | 21 |
| - Location of earths | 2 | - Towing arrangement | 22 |
| - Fusebox | 3 | - Safety system air bag and pretensioners | 23 |
| - Starting and charging | 4 | - Sunroof (GTV only) | 24 |
| - Side lights | 5 | - Heater | 25 |
| - High and low beam headlamps | 6 | - Air conditioner | 26 |
| - Fog lights and rear fog guards | 7 | - Engine cooling (versions with heater) | 27 |
| - Courtesy lights and timed lights | 8 | - ALFA ROMEO CODE | 28 |
| - Direction indicators and hazard warning lights .. | 9 | - Control system (2.0 T.SPARK 16 v engine): BOSCH Motronic M2.10.3 | 29 |
| - Stop lights and reversing lights | 10 | - Control system (2.0 T.SPARK 16 v engine): BOSCH Motronic M2.10.4 | 29A |
| - Horns, cigar lighter/current socket | 11 | - Control system (3.0 V6 engine): BOSCH Motronic M3.7 | 30 |
| - Windscreen wiper/washer | 12 | - ABS System BOSCH 2Si | 31 |
| - Indicators and warning lights | 13 | | |
| - Car radio | 14 | APPENDIX | |
| - Door locking system | 15 | Key to components | A1 |
| - Alarm system (V.A.S.) | 16 | Components and connectors | A2 |
| - Luggage compartment and fuel flap opening control | 17 | | |
| - Hood (SPIDER only) | 18 | | |
| - Automatically-operated hood | 18A | | |
| - Power windows | 19 | | |

An **ALPHABETICAL INDEX**, for rapid identification of a specific subject is given at the back.



ALPHABETICAL INDEX

| | | | |
|--|-----|---|----|
| ABS System BOSCH 2Si | 31 | Hood | 18 |
| Air bag | 23 | Horns | 11 |
| Air conditioner | 26 | Indicators | 13 |
| Alarm system (V.A.S.) | 16 | Key to components | A1 |
| ALFA ROMEO CODE | 28 | Location of earths | 2 |
| Automatically-operated hood | 18A | Low beam headlamps | 6 |
| BOSCH Motronic M2.10.3 | 29 | Luggage compartment opening control | 17 |
| BOSCH Motronic M2.10.4 | 29A | Power supply | 1 |
| BOSCH Motronic M3.7 | 30 | Power windows | 19 |
| Car radio | 14 | Pretensioners | 23 |
| Charging | 4 | Radio | 14 |
| Cigar lighter | 11 | Rear fog guards | 7 |
| Components and connectors | A2 | Relays | 3 |
| Control system (2.0 T.SPARK 16 v engine) | 29 | Reversing lights | 10 |
| Control system (3.0 V6 engine) | 30 | Safety system | 23 |
| Courtesy lights | 8 | Side lights | 5 |
| Current socket | 11 | Starting | 4 |
| Direction indicators | 9 | Stop lights | 10 |
| Door locking system | 15 | Sunroof | 24 |
| Earths | 2 | Timed lights | 8 |
| Electric system of the car | 1 | Towing arrangement | 22 |
| Engine cooling | 27 | V.A.S. | 16 |
| Fog lights | 7 | Warning lights | 13 |
| Fuel flap opening control | 17 | Windscreen washer | 12 |
| Fusebox | 3 | Windscreen wiper | 12 |
| Fuses | 3 | Wing mirror adjustment | 20 |
| Hazard warning lights | 9 | Wing mirror defrosting | 20 |
| Headlamp aiming device | 21 | | |
| Heated rearscreen | 20 | | |
| Heater | 25 | | |
| High beam headlamps | 6 | | |

INTRODUCTION

INDEX

| | |
|---|----|
| STRUCTURE OF THE MANUAL | 2 |
| WIRING DIAGRAMS | 4 |
| DESCRIPTION | 7 |
| LOCATION OF COMPONENTS | 7 |
| FAULT FINDING | 7 |
| FAULT-FINDING BY SELF-DIAGNOSIS | 8 |
| COMPONENTS AND CONNECTORS | 9 |
| ELEMENTARY CHECKS FOR ELECTRICAL LINES AND COMPONENTS | 10 |
| LINE CHECKS | 10 |
| TESTING COMPONENTS | 12 |
| TABLE OF FUSE COLOURS | 13 |
| GENERAL PRECAUTIONS AND SAFETY MEASURES | 15 |

This Group "55 - ELECTRIC SYSTEM DIAGNOSIS" contains all the necessary information regarding the **electric and electronic systems and circuits on these models.**

All the instruments which are useful in finding faults and failures that might occur in the above-mentioned systems are given particular attention.

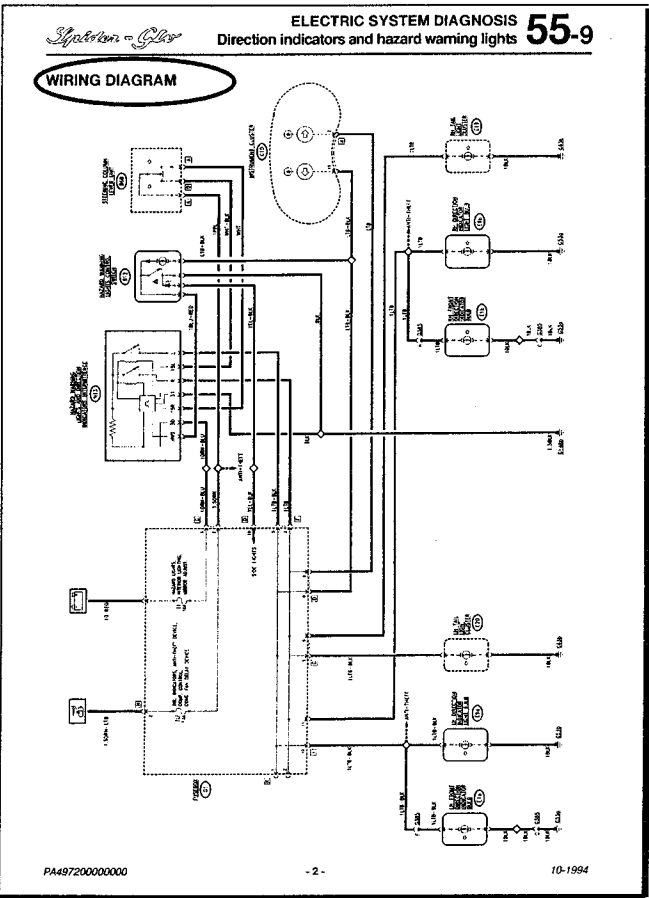
Each circuit is dealt with separately in a specific section in which the following can be found:

- operation and description of the circuit;
- wiring diagram;
- locating the main components;
- table for locating the more frequent faults with relative test procedures for the components.

STRUCTURE OF THE MANUAL

This manual is subdivided into sections, each dealing with and analyzing a single circuit. All the sections are identical in lay-out and comprise 5 parts:

A wiring diagram:



B general description (description of the circuit and its operation) and functional description (analytical illustration of the wiring system):

Spider - Glw **ELECTRIC SYSTEM DIAGNOSIS 55-9**
Direction indicators and hazard warning lights

GENERAL DESCRIPTION

The intermittent direction indicators and hazard warning lights delineate the vehicle clearance.

The right or left direction indicators are turned on raising or lowering the lever on the steering column lever unit; the hazard warning lights (right and left indicators activated simultaneously) are switched on from the switch on the centre console.

The direction indicators operate when the ignition key is engaged, for the obvious safety reasons, they are supplied directly by the battery.

Two intermittent warning lights on the instrument cluster flash while the right and left indicators are operating. The hazard warning light switch indicates that these are operating by illuminating when they are turned on.

The circuit of the direction indicators is protected by a special fuse of fusebox G1 while another fuse protects the circuit for the hazard warning lights.

FUNCTIONAL DESCRIPTION

The circuit is controlled by the hazard warning light and direction indicator flasher N13 to be found next to the fusebox.

The flasher, earthed at pin 31, is supplied at pin 30 directly from the battery via the line of fuse F1 of fusebox G1.

Pins 15R and 15L receive the signals (12V) from the lever unit B68 when the line protected by fuse F17 of G1 is "key-operated" for turning on the right indicator (pin 15R) and the left indicator (pin 15L).

Pin HWS receives a signal (earth) when the hazard warning light switch C16 is pressed.

Pins R and L send the intermittent supply signals for all the indicators: from pin R for those on the right, from pin L for those on the left, according to the following logic:

- only pin R (RH) if the signal reaches pin 15R
- only pin L (LH) if the signal reaches pin 15L
- both pins R and L if the signal reaches pin HWS.

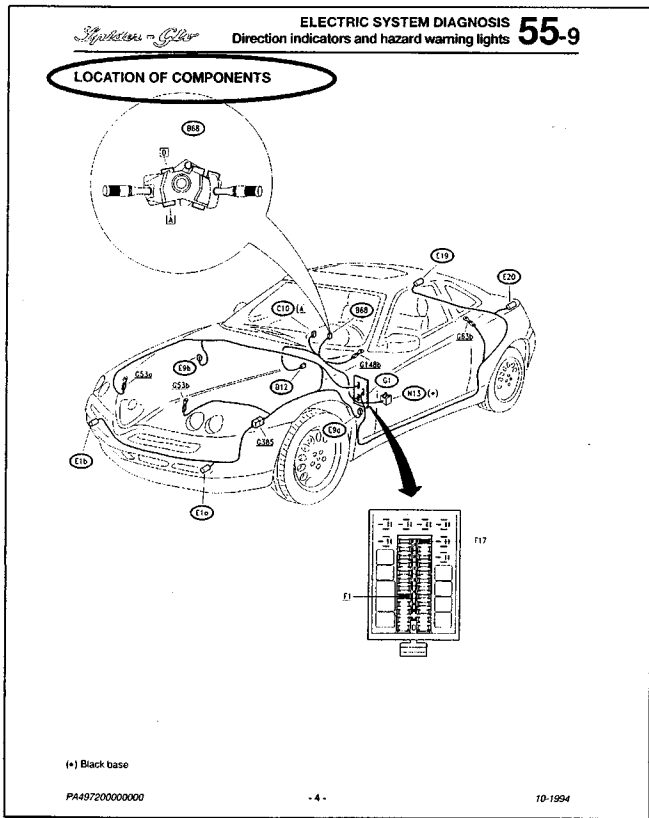
This way operating the stalk of the lever unit B68 turns on the righthand indicators (E1b, E9b and E19) or the left ones (E1a, E9a and E20) and simultaneously the corresponding warning light on the instrument cluster C10 is turned on.

When switch B12 is pressed, the right and left direction indicators are supplied contemporaneously, also the special light (pin D3) is supplied which lights up when the hazard warning lights are switched on. A led (pin A) illuminates the ideogram of the switch when the side lights are on.

PA49720000000 - 3 - 10-1994

Sometimes the general description is extensive and detailed, as important service information is given: in this case it precedes the wiring diagram to introduce the subject.

C location of the components on the car:



ELECTRIC SYSTEM DIAGNOSIS 55-9
Direction indicators and hazard warning lights

HAZARD WARNING LIGHT AND INDICATOR FLASHER (N13) TEST A

| TEST PROCEDURE | RESULT | CORRECTIVE ACTION |
|--|----------|--|
| A1 CHECK VOLTAGE - Disconnect the flasher N13 and on the base check for 12V at pin 30 of N13 | OK OK | Carry out step A2 Check fuse F1 from fusebox G1. If necessary replace connections between N13 and G1 |
| A2 CHECK EARTH - Check for 0V at pin 31 of N13 | OK OK | Carry out step A3 Restore the wiring between N13 and earth G148b |
| A3 CHECK INTERMITTENT VOLTAGE - With the ignition key turned, operate the RH indicator and check for 12V at pin 15R of N13; operate the LH indicator in the same way, check pin 15L of N13 | OK OK | Carry out step A4 Restore the wiring between N13 and lever unit B68 or replace the latter |
| A4 CHECK EARTH - Operate the hazard warning light switch and check for 0V at pin HWS of N13 | OK OK | Insert device N13 on its base and continue with step A5 Restore the wiring between N13 and switch B12, or change the latter |
| A5 CHECK INTERMITTENT VOLTAGE - Operate the RH indicator and check for intermittent 12V at pin R of N13; do the same operating the LH indicator at pin L and operating the hazard warning lights at both pin R and pin L | OK OK | DEVICE N13 IS WORKING PROPERLY. Check the connections with the other components CHANGE DEVICE N13 |

PA49720000000 - 6 - 10-1994

At the end of each section the following are given:

D trouble-shooting including "fault-finding tables", "checking components" and tests:

- key to components;
- tables of components and connectors, illustrated one by one completely (in alphabetical order);

ELECTRIC SYSTEM DIAGNOSIS 55-9
Direction indicators and hazard warning lights

FAULTFINDING TABLE

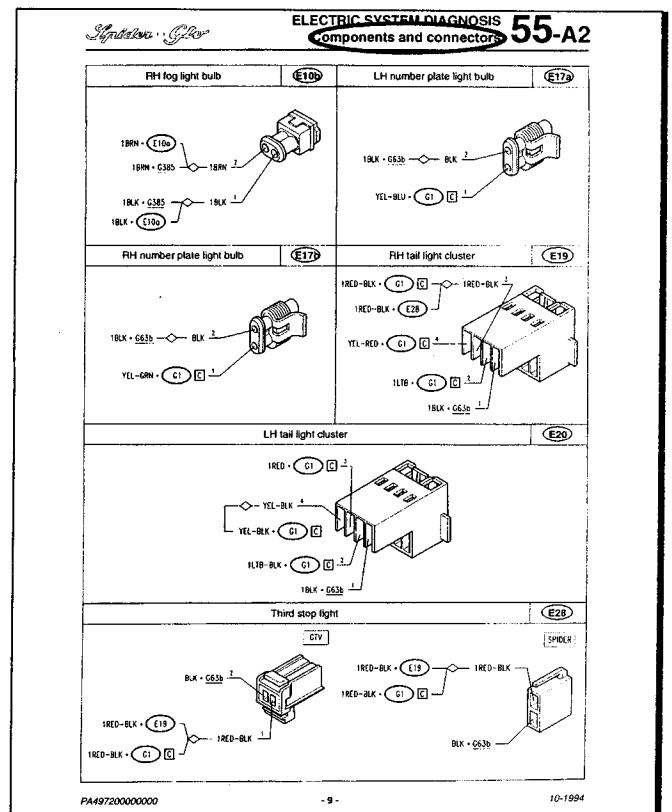
| Failure | Component to be checked | | | | | | | | | |
|--|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | E1 | E12 | E13 | E14 | E15 | E16 | E17 | E18 | E19 | E20 |
| All the direction indicators | * | * | | | | | | | | |
| Hazard warning lights | * | | | | | | | | | |
| All the RH direction indicators | | | | | | | | * | * | * |
| All the LH direction indicators | | | | | | | | * | * | * |
| RH front light | | | * | | | | | | | |
| RH side light | | | | | | | | | | |
| RH rear light | | | | | | | | | * | * |
| LH front light | | | * | | | | | | | |
| LH side light | | | | | | | | | * | * |
| LH rear light | | | | | | | | | * | * |
| RH indicator warning light | | | | | | | | | | * |
| LH indicator warning light | | | | | | | | | | * |
| Hazard warning light switch not illuminated with lights on | | | | | | | | | | * |

(1) The instrument cluster C10 cannot be repaired. Therefore in the event of a failure it is not possible to change the single warning light and a new complete cluster must be fitted.

CHECKING COMPONENTS
Hazard warning light and indicator flasher (N13)

Checking the device: see TEST A

PA49720000000 - 5 - 10-1994





WIRING DIAGRAMS


The wiring diagrams are made following the operation of the circuit in order to make it easier to understand them, therefore quicker to identify a fault.

The lay-out follows the "flow" of the current and signals, starting from the power source (always placed higher up) passing the components and reaching the earths located lower down.


The power supply is represented schematically with different symbols which vary depending on the position of the key in the ignition:

 - line under constant supply (directly connected to the battery)

 - line supplied when the ignition key is turned to "RUN" (first position of the key)

 - line supplied when the key is turned to "STARTING" (second position of the key which is disengaged when the key is released)

 - line supplied when the key is either in the "RUN" or "STARTING" position.

 - line supplied when the key is in the "PARKING" position (key turned in the opposite direction and withdrawn after pressing the special button).

A special section ("**Power Supply**") deals in detail with the power supply to all the lines and operation of the ignition switch.

The fusebox is not represented wholly in the single diagrams and only the components useful to the diagram under examination are given; a complete description of the whole fusebox is given in the specific section ("**Fusebox**").

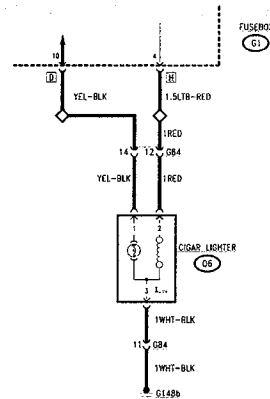
All the components and connectors are represented in the diagrams by an alphameric code (eg. A10). The initial letter of this code represents the type of component:

- A** STARTING - RECHARGING
- B** MANUAL ELECTRICAL CONTROLS
- C** INSTRUMENTATION
- D** WARNING LIGHTS
- E** EXTERIOR LIGHTS
- F** INTERIOR LIGHTS

- G** FUSEBOXES - CONNECTORS - EARTHS
- H** SWITCHES
- I** RELAYS
- L** SENDERS
- M** ELECTROMAGNETS - SOLENOID VALVES
- N** ELECTRONIC DEVICES - INTERMITTENCES - TIMERS
- O** SERVICES
- P** ELECTRIC MOTORS
- Q** HEATING/VENTILATION - AIR CONDITIONING
- R** SAFETY DEVICES
- S** ELECTRONIC INJECTION
- T** DIAGNOSIS

A complete key is given at the end of **all the wiring diagrams**.

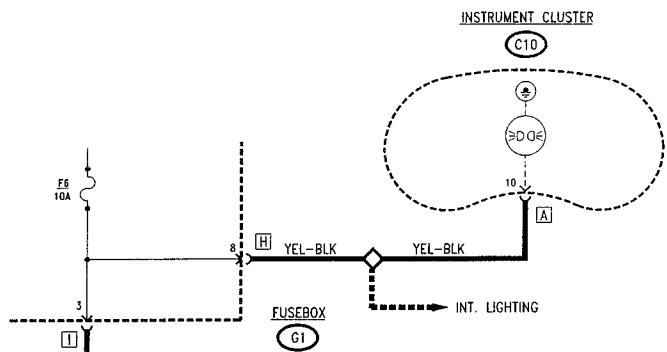
The names of the components are given in the charts and the codes are circled, but, for reasons of space, the codes for simple connectors (connections) are only underlined.



The components are always shown in their rest position: eg. the N.C. (normally closed) contacts are shown closed, the relays deactivated, etc..

The outline of a component is hatched to indicate that in the chart in question only part of it is shown; for example, the fusebox, due to the reasons mentioned above, will always be shown hatched.

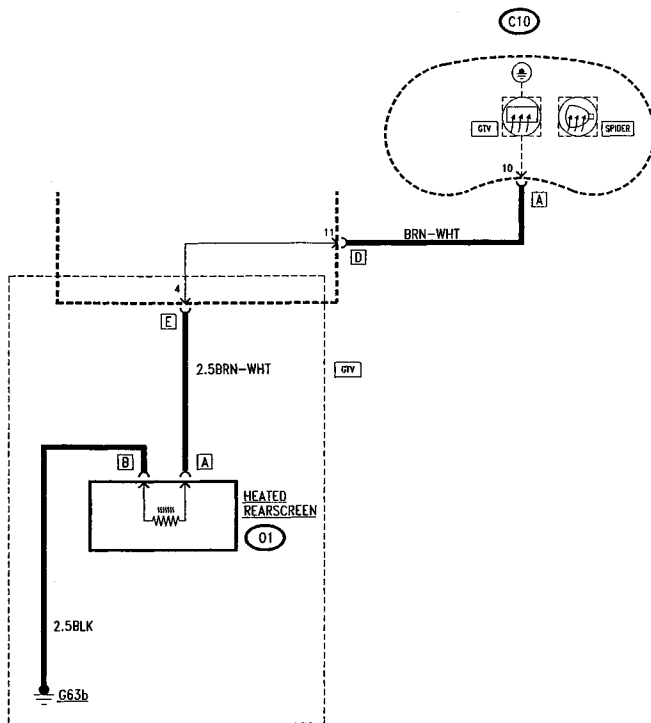
Wherever necessary, arrows indicate references to other relevant diagrams.



The earth lines only show the earth point (located in the lower part of the diagram) to which they are connected and not the other lines connected to it; A special section "Location of Earths" gives all the lines converging on each earthing point.

NOTE: these crossed references between the lines and on the earths make it possible to easily identify the faults in the event of failures in more than one circuit at the same time: for example, a faulty earth point will cause a failure to all the circuits which converge on it.

N.B.: the diagrams represent the vehicle in its most complete version (all the optional items installed) and they refer to all versions except when otherwise specified, for example SPIDER, GTV, different engines, etc.. Any variations are differentiated by a hatched line and the identification of the different versions.



NOTE: The versions with a smaller number of accessories might not have all the solderings to be found in the wirings of the complete versions.

CABLE IDENTIFICATION

Each cable shown in the diagrams is characterised by a code formed by numbers and letters: the numbers indicate the cable diameter in sq.mm (0.5 where not stated), while the letters indicate the colour according to the table given below:

CABLE IDENTIFICATION TABLE

| COLOUR | IDENTIFICATION LETTER |
|------------|-----------------------|
| Black | BLK |
| White | WHT |
| Light blue | LTB |
| Brown | BRN |
| Yellow | YEL |
| Red | RED |
| Green | GRN |
| Grey | GRY |
| Pink | PNK |
| Orange | ORN |
| Purple | PPL |
| Blue | BLU |

NOTE: for combinations the colours are simply coupled:

| | |
|------------------|---------|
| Light blue-white | LTB-WHT |
| Green-black | GRN-BLK |
| Blue-Red | BLU-RED |

ELECTRICAL COMPONENTS

The electrical components are represented in the diagrams by the most-frequently used and best-known international symbols.

The following table lists these symbols as they are shown in the diagrams: