

Chapter 11

Bodywork and fittings

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Degrees of difficulty

Easy, suitable for novice with little experience



Fairly easy, suitable for beginner with some experience



Fairly difficult, suitable for competent DIY mechanic



Difficult, suitable for experienced DIY mechanic



Very difficult, suitable for expert DIY or professional



Specifications

Torque wrench settings

	Nm	lbf ft
Bonnet-to-hinge bolts	8	6
Door hinge-to-body bolts	35	26

1 General information

The bodyshell is composed of pressed-steel sections which are welded together, although some use of structural adhesives is made. In addition, the front wings are bolted on.

The bonnet, door and some other panels vulnerable to corrosion are fabricated from zinc-coated metal. A coating of anti-chip primer, applied prior to paint spraying provides further protection.

Extensive use is made of plastic materials, mainly in the interior, but also in exterior components. The outer sections of the front and rear bumpers are injection-moulded from a synthetic material which is very strong, and yet light. Plastic components such as wheel arch liners are fitted to the underside of the vehicle, to improve the body's resistance to corrosion.

2 Maintenance - bodywork and underframe



The general condition of a vehicle's bodywork is the one thing that significantly affects its value. Maintenance is easy, but needs to be regular. Neglect, particularly after minor damage, can lead quickly to further deterioration and costly repair bills. It is important also to keep watch on those parts of the vehicle not immediately visible, for instance the underside, inside all the wheel arches, and the lower part of the engine compartment.

The basic maintenance routine for the bodywork is washing - preferably with a lot of water, from a hose. This will remove all the loose solids which may have stuck to the vehicle. It is important to flush these off in such a way as to prevent grit from scratching the finish. The wheel arches and underframe need washing in the same way, to remove any

accumulated mud, which will retain moisture and tend to encourage rust. Paradoxically enough, the best time to clean the underframe and wheel arches is in wet weather, when the mud is thoroughly wet and soft. In very wet weather, the underframe is usually cleaned of large accumulations automatically, and this is a good time for inspection.

Periodically, except on vehicles with a wax-based underbody protective coating, it is a good idea to have the whole of the underframe of the vehicle steam-cleaned, engine compartment included, so that a thorough inspection can be carried out to see what minor repairs and renovations are necessary. Steam-cleaning is available at many garages, and is necessary for the removal of the accumulation of oily grime, which sometimes is allowed to become thick in certain areas. If steam-cleaning facilities are not available, there are some excellent grease solvents available which can be brush-applied; the dirt can then be simply hosed off. Note that these methods should not be used

on vehicles with wax-based underbody protective coating, or the coating will be removed. Such vehicles should be inspected annually, preferably just prior to Winter, when the underbody should be washed down, and any damage to the wax coating repaired. Ideally, a completely fresh coat should be applied. It would also be worth considering the use of such wax-based protection for injection into door panels, sills, box sections, etc., as an additional safeguard against rust damage, where such protection is not provided by the vehicle manufacturer.

After washing paintwork, wipe off with a chamois leather to give an unspotted clear finish. A coat of clear protective wax polish will give added protection against chemical pollutants in the air. If the paintwork sheen has dulled or oxidised, use a cleaner/polisher combination to restore the brilliance of the shine. This requires a little effort, but such dulling is usually caused because regular washing has been neglected. Care needs to be taken with metallic paintwork, as special non-abrasive cleaner/polisher is required to avoid damage to the finish. Always check that the door and ventilator opening drain holes and pipes are completely clear, so that water can be drained out. Brightwork should be treated in the same way as paintwork. Windscreens and windows can be kept clear of the smeary film which often appears, by the use of proprietary glass cleaner. Never use any form of wax or other body or chromium polish on glass.

3 Maintenance - upholstery and carpets

Mats and carpets should be brushed or vacuum-cleaned regularly, to keep them free of grit. If they are badly stained, remove them from the vehicle for scrubbing or sponging, and make quite sure they are dry before refitting. Seats and interior trim panels can be kept clean by wiping with a damp cloth. If they do become stained (which can be more apparent on light-coloured upholstery), use a little liquid detergent and a soft nail brush to scour the grime out of the grain of the material. Do not forget to keep the headlining clean in the same way as the upholstery. When using liquid cleaners inside the vehicle, do not over-wet the surfaces being cleaned. Excessive damp could get into the seams and padded interior, causing stains, offensive odours or even rot.

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If the inside of the vehicle gets wet accidentally, it is worthwhile taking some trouble to dry it out properly, particularly where carpets are involved. Do not leave oil or electric heaters inside the vehicle for this purpose.

4 Minor body damage - repair

Repairs of minor scratches in bodywork

If the scratch is very superficial, and does not penetrate to the metal of the bodywork, repair is very simple. Lightly rub the area of the scratch with a paintwork renovator, or a very fine cutting paste, to remove loose paint from the scratch, and to clear the surrounding bodywork of wax polish. Rinse the area with clean water.

Apply touch-up paint to the scratch using a fine paint brush; continue to apply fine layers of paint until the surface of the paint in the scratch is level with the surrounding paintwork. Allow the new paint at least two weeks to harden, then blend it into the surrounding paintwork by rubbing the scratch area with a paintwork renovator or a very fine cutting paste. Finally, apply wax polish.

Where the scratch has penetrated right through to the metal of the bodywork, causing the metal to rust, a different repair technique is required. Remove any loose rust from the bottom of the scratch with a penknife, then apply rust-inhibiting paint to prevent the formation of rust in the future. Using a rubber or nylon applicator, fill the scratch with bodystopper paste. If required, this paste can be mixed with cellulose thinners to provide a very thin paste which is ideal for filling narrow scratches. Before the stopper-paste in the scratch hardens, wrap a piece of smooth cotton rag around the top of a finger. Dip the finger in cellulose thinners, and quickly sweep it across the surface of the stopper-paste in the scratch; this will ensure that the surface of the stopper-paste is slightly hollowed. The scratch can now be painted over as described earlier in this Section.

Repairs of dents in bodywork

When deep denting of the vehicle's bodywork has taken place, the first task is to pull the dent out, until the affected bodywork almost attains its original shape. There is little point in trying to restore the original shape completely, as the metal in the damaged area will have stretched on impact, and cannot be reshaped fully to its original contour. It is better to bring the level of the dent up to a point which is about 3 mm below the level of the surrounding bodywork. In cases where the dent is very shallow anyway, it is not worth trying to pull it out at all. If the underside of the dent is accessible, it can be hammered out gently from behind, using a mallet with a wooden or plastic head. Whilst doing this, hold a suitable block of wood firmly against the outside of the panel, to absorb the impact from the hammer blows and thus prevent a large area of the bodywork from being 'belled-out'.

Should the dent be in a section of the bodywork which has a double skin, or some other factor making it inaccessible from behind, a different technique is called for. Drill several small holes through the metal inside the area - particularly in the deeper section. Then screw long self-tapping screws into the holes, just sufficiently for them to gain a good purchase in the metal. Now the dent can be pulled out by pulling on the protruding heads of the screws with a pair of pliers.

The next stage of the repair is the removal of the paint from the damaged area, and from an inch or so of the surrounding 'sound' bodywork. This is accomplished most easily by using a wire brush or abrasive pad on a power drill, although it can be done just as effectively by hand, using sheets of abrasive paper. To complete the preparation for filling, score the surface of the bare metal with a screwdriver or the tang of a file, or alternatively, drill small holes in the affected area. This will provide a really good 'key' for the filler paste.

To complete the repair, see the Section on filling and respraying.

Repairs of rust holes or gashes in bodywork

Remove all paint from the affected area, and from an inch or so of the surrounding 'sound' bodywork, using an abrasive pad or a wire brush on a power drill. If these are not available, a few sheets of abrasive paper will do the job most effectively. With the paint removed, you will be able to judge the severity of the corrosion, and therefore decide whether to renew the whole panel (if this is possible) or to repair the affected area. New body panels are not as expensive as most people think, and it is often quicker and more satisfactory to fit a new panel than to attempt to repair large areas of corrosion.

Remove all fittings from the affected area, except those which will act as a guide to the original shape of the damaged bodywork (eg headlight shells etc). Then, using tin snips or a hacksaw blade, remove all loose metal and any other metal badly affected by corrosion. Hammer the edges of the hole inwards, in order to create a slight depression for the filler paste.

Wire-brush the affected area to remove the powdery rust from the surface of the remaining metal. Paint the affected area with rust-inhibiting paint, if the back of the rusted area is accessible, treat this also.

Before filling can take place, it will be necessary to block the hole in some way. This can be achieved by the use of aluminium or plastic mesh, or aluminium tape.

Aluminium or plastic mesh, or glass-fibre matting, is probably the best material to use for a large hole. Cut a piece to the approximate size and shape of the hole to be filled, then position it in the hole so that its edges are below the level of the surrounding bodywork. It can be retained in position by

several blobs of filler paste around its periphery.

Aluminium tape should be used for small or very narrow holes. Pull a piece off the roll, trim it to the approximate size and shape required, then pull off the backing paper (if used) and stick the tape over the hole; it can be overlapped if the thickness of one piece is insufficient. Burnish down the edges of the tape with the handle of a screwdriver or similar, to ensure that the tape is securely attached to the metal underneath.

Bodywork repairs - filling and respraying

Before using this Section, see the Sections on dent, deep scratch, rust holes and gash repairs.

Many types of bodyfiller are available, but generally speaking, those proprietary kits which contain a tin of filler paste and a tube of resin hardener are best for this type of repair. A wide, flexible plastic or nylon applicator will be found invaluable for imparting a smooth and well-contoured finish to the surface of the filler.

Mix up a little filler on a clean piece of card or board - measure the hardener carefully (follow the maker's instructions on the pack), otherwise the filler will set too rapidly or too slowly. Using the applicator, apply the filler paste to the prepared area; draw the applicator across the surface of the filler to achieve the correct contour and to level the surface. As soon as a contour that approximates to the correct one is achieved, stop working the paste - if you carry on too long, the paste will become sticky and begin to 'pick-up' on the applicator. Continue to add thin layers of filler paste at 20-minute intervals, until the level of the filler is just proud of the surrounding bodywork.

Once the filler has hardened, the excess can be removed using a metal plane or file. From then on, progressively-finer grades of abrasive paper should be used, starting with a 40-grade production paper, and finishing with a 400-grade wet-and-dry paper. Always wrap the abrasive paper around a flat rubber, cork, or wooden block - otherwise the surface of the filler will not be completely flat. During the smoothing of the filler surface, the wet-and-dry paper should be periodically rinsed in water. This will ensure that a very smooth finish is imparted to the filler at the final stage.

At this stage, the dent should be surrounded by a ring of bare metal, which in turn should be encircled by the finely 'feathered' edge of the good paintwork. Rinse the repair area with clean water, until all of the dust produced by the rubbing-down operation has gone.

Spray the whole area with a light coat of primer - this will show up any imperfections in the surface of the filler. Repair these imperfections with fresh filler paste or bodystopper, and once more smooth the surface with abrasive paper. Repeat this

spray-and-repair procedure until you are satisfied that the surface of the filler, and the feathered edge of the paintwork, are perfect. Clean the repair area with clean water, and allow to dry fully.



If bodystopper is used, it can be mixed with cellulose thinners to form a really thin paste which is ideal for filling small holes.

The repair area is now ready for final spraying. Paint spraying must be carried out in a warm, dry, windless and dust-free atmosphere. This condition can be created artificially if you have access to a large indoor working area, but if you are forced to work in the open, you will have to pick your day very carefully. If you are working indoors, dousing the floor in the work area with water will help to settle the dust which would otherwise be in the atmosphere. If the repair area is confined to one body panel, mask off the surrounding panels; this will help to minimise the effects of a slight mis-match in paint colours. Bodywork fittings (eg chrome strips, door handles etc) will also need to be masked off. Use genuine masking tape, and several thicknesses of newspaper, for the masking operations.

Before commencing to spray, agitate the aerosol can thoroughly, then spray a test area (an old tin, or similar) until the technique is mastered. Cover the repair area with a thick coat of primer; the thickness should be built up using several thin layers of paint, rather than one thick one. Using 400-grade wet-and-dry paper, rub down the surface of the primer until it is really smooth. While doing this, the work area should be thoroughly doused with water, and the wet-and-dry paper periodically rinsed in water. Allow to dry before spraying on more paint.

Spray on the top coat, again building up the thickness by using several thin layers of paint. Start spraying at one edge of the repair area, and then, using a side-to-side motion, work until the whole repair area and about 2 inches of the surrounding original paintwork is covered. Remove all masking material 10 to 15 minutes after spraying on the final coat of paint.

Allow the new paint at least two weeks to harden, then, using a paintwork renovator, or a very fine cutting paste, blend the edges of the paint into the existing paintwork. Finally, apply wax polish.

Plastic components

With the use of more and more plastic body components by the vehicle manufacturers (eg bumpers, spoilers, and in some cases major body panels), rectification of more serious damage to such items has become a matter of either entrusting repair work to a specialist in this field, or renewing complete components. Repair of such damage by the

DIY owner is not really feasible, owing to the cost of the equipment and materials required for effecting such repairs. The basic technique involves making a groove along the line of the crack in the plastic, using a rotary burr in a power drill. The damaged part is then welded back together, using a hot-air gun to heat up and fuse a plastic filler rod into the groove. Any excess plastic is then removed, and the area rubbed down to a smooth finish. It is important that a filler rod of the correct plastic is used, as body components can be made of a variety of different types (eg polycarbonate, ABS, polypropylene).

Damage of a less serious nature (abrasions, minor cracks etc) can be repaired by the DIY owner using a two-part epoxy filler repair material. Once mixed in equal proportions, this is used in similar fashion to the bodywork filler used on metal panels. The filler is usually cured in twenty to thirty minutes, ready for sanding and painting.

If the owner is renewing a complete component himself, or if he has repaired it with epoxy filler, he will be left with the problem of finding a suitable paint for finishing which is compatible with the type of plastic used. At one time, the use of a universal paint was not possible, owing to the complex range of plastics encountered in body component applications. Standard paints, generally speaking, will not bond to plastic or rubber satisfactorily. However, it is now possible to obtain a plastic body parts finishing kit which consists of a pre-primer treatment, a primer and coloured top coat. Full instructions are normally supplied with a kit, but basically, the method of use is to first apply the pre-primer to the component concerned, and allow it to dry for up to 30 minutes. Then the primer is applied, and left to dry for about an hour before finally applying the special-coloured top coat. The result is a correctly-coloured component, where the paint will flex with the plastic or rubber, a property that standard paint does not normally possess.

5 Major body damage - repair

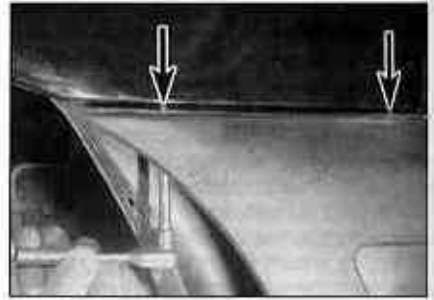
Where serious damage has occurred, or large areas need renewal due to neglect, it means that complete new panels will need welding-in, and this is best left to professionals. If the damage is due to impact, it will also be necessary to check completely the alignment of the bodyshell, and this can only be carried out accurately by a Fiat dealer using special jigs. If the alignment of the bodyshell is not corrected, the car's handling may be seriously affected. In addition, excessive stress may be imposed on the steering, suspension, tyres or transmission, causing abnormal wear or even complete failure.



6.3a Remove the screws ...



6.3b ... and lower the front section of the plastic wheel arch liners away from the bodywork

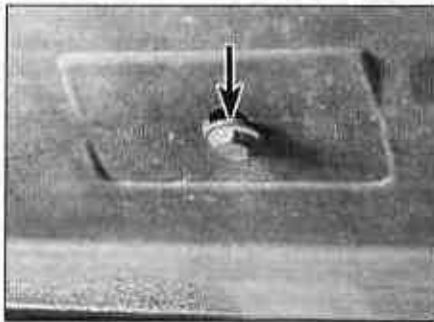


6.4 Remove the retaining screws (arrowed) from the trailing edges of the bumper moulding

6 Front bumper - removal and refitting

Removal

- 1 Access to the front bumper mountings may be improved by raising the front of the vehicle and resting it securely on axle stands (see *Jacking and vehicle support*).
- 2 Remove the direction indicator units from both front wings, as described in Chapter 12, Section 6.
- 3 Remove the screws and lower both plastic wheel arch liners away from the bodywork (see illustrations).
- 4 Reach inside the wheel arch and remove the retaining screws from the trailing edges of the bumper moulding (see illustration).
- 5 Slacken and withdraw the four screws from



6.5 Slacken and withdraw the four screws from the lower edge of the bumper



6.6 Remove the retaining bolts (arrowed) from either side of the headlight units

- the lower edge of the bumper (see illustration).
- 6 Support the bumper moulding, then remove the four retaining bolts from the upper edge of the bumper (located either side of the headlight units) (see illustration).

- 7 Where applicable, unplug the wiring from the rear of the foglamp units.
- 8 Unclip any electrical cabling secured to the rear side of the bumper and then carefully draw the bumper away from the front of the vehicle.

Refitting

- 9 The bumper is refitted by following the removal procedure in reverse.



7.2 Lower the rear wheel arch plastic liners away from the bodywork



7.3 Remove the retaining screws from the leading edges of the bumper moulding



7.4 Slacken and withdraw the four screws from the lower edge of the bumper



7.5 Remove the four retaining bolts from the upper edge of the bumper

7 Rear bumper - removal and refitting

Removal

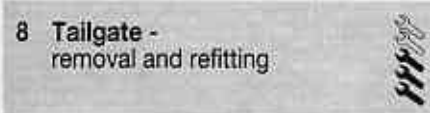
- 1 Access to the rear bumper mountings may be improved by raising the rear of the vehicle and resting it securely on axle stands (see *Jacking and vehicle support*).
- 2 After removing the retaining screws and nuts, lower both rear wheel arch plastic liners away from the bodywork (see illustration).
- 3 Reach inside the rear wheel arches and remove the retaining screws from the leading edges of the bumper moulding (see illustration).
- 4 Slacken and withdraw the four screws from the lower edge of the bumper (see illustration).
- 5 Support the bumper moulding, then remove the four retaining bolts from the upper edge of the bumper (see illustration).
- 6 Unclip any electrical cabling that may be secured to the inside of the bumper, then carefully draw the bumper off its guide brackets and away from the rear of the vehicle.



8.2 Release the fixings and lower the trim panel away from the tailgate

Refitting

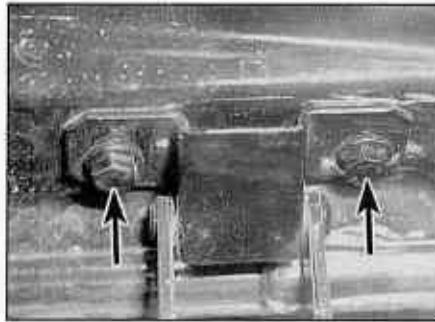
7 The bumper is refitted by following the removal procedure in reverse.



8 Tailgate - removal and refitting

Removal

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Release the press stud fixings and extract the screws, then lower the trim panel away from the tailgate (see illustration).
- 3 Working inside the tailgate, disconnect all wiring harness connectors and unbolt the earth leads. Check for any other wiring connectors which must be disconnected to facilitate tailgate removal. **Note:** Carefully label each wiring harness connector to aid correct refitting.
- 4 Tie a length of cord to the wiring harness, then bind the loose ends of the cabling together using PVC tape. Prise the wiring harness grommets from the upper edge of the tailgate, then feed the wiring through the aperture in the tailgate. Untie the cord from the harness; but leave it in place in the tailgate, to aid refitting later.
- 5 Where applicable, remove the fluid hose from the tailgate washer nozzle, as described in Chapter 12, Section 16, then tie a length of



8.8 Slacken and unscrew the bolts (arrowed) securing the hinges to the tailgate

cord to the hose and draw it out of the tailgate, using the same procedure carried out on the wiring harness.

- 6 Have an assistant support the tailgate in the open position.
- 7 Detach the upper ends of the support struts from the tailgate as described in Section 9.
- 8 Slacken and unscrew the bolts securing the hinges to the tailgate (see illustration), then lift the tailgate from the vehicle.

Refitting

- 9 Refitting is a reversal of removal, bearing in mind the following points.
 - a) Tie the cord to the wiring harness and use it to pull the harness through the aperture and into the tailgate. Where applicable, repeat the procedure on the washer fluid hose.
 - b) Do not fully tighten the hinge bolts until the tailgate adjustment has been checked, as described in the following paragraphs.

Adjustment

10 Close the tailgate carefully, in case the alignment is incorrect, which may cause scratching on the tailgate or the body as the tailgate is closed, and check for alignment with the adjacent panels. If necessary, slacken the bolts that secure the hinges to the bodywork and re-align the tailgate to suit. Once the tailgate is correctly aligned, tighten the hinge bolts securely.



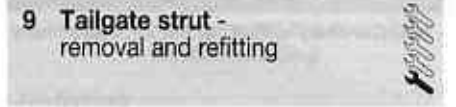
9.2a Lever off the balljoint spring clip ...



9.2b ... and then prise strut balljoint from the stud on the tailgate

11 Check that the tailgate fastens and releases in a satisfactory manner. If adjustment is necessary, slacken the striker plate retaining bolts, and adjust the position of the lock to suit (see Section 10). Once the lock is operating correctly, securely tighten the striker plate retaining bolts.

12 If necessary, adjust the protrusion of the rubber buffers at the lower edge of the tailgate, by screwing them in or out as appropriate.



Removal

- 1 Open the tailgate and support it using suitable wooden props.
- 2 At the upper end of each strut, lever off the balljoint spring clip. Compress the strut slightly by hand and then prise strut balljoint from the stud on the tailgate (see illustrations).

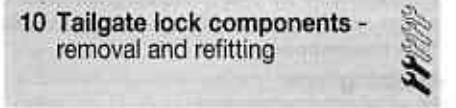


Warning: The strut may still be under tension and could extend suddenly once detached from its mountings.

- 3 At the lower end of the strut, unbolt the joint from the bodywork.

Refitting

- 4 Refitting is a reversal of removal.



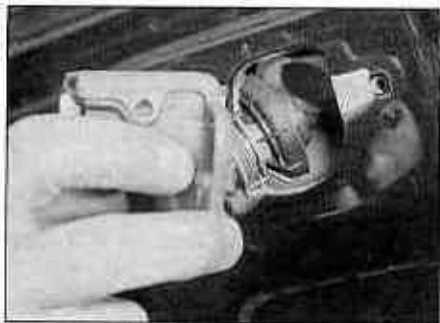
Lock and cylinder assembly

Removal

- 1 With the tailgate held in the fully open position, slacken and unscrew the bolts securing the lock assembly to the lower edge of the tailgate (see illustration).
- 2 Carefully withdraw the lock assembly, together with the lock cylinder (see illustration).



10.1 Unscrew the bolts (arrowed) securing the lock assembly to the lower edge of the tailgate



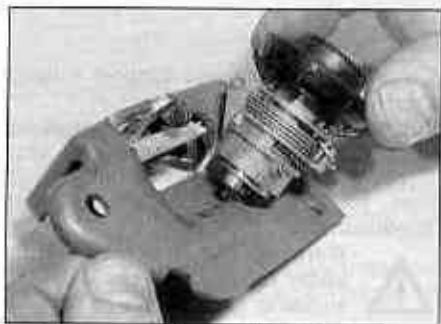
10.2 Carefully withdraw the lock assembly



10.3a Unclip the plastic shield ...



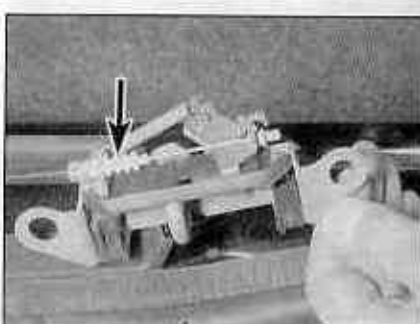
10.3b ... remove the screw ...



10.3c ... and lift off the lock cylinder



10.6 Slacken and unscrew the bolts (arrowed) securing the striker plate to the bodywork



10.8 Adjust the release cable by altering the position of the cable outer sheath within its bracket (arrowed)

3 The lock cylinder may be separated from the assembly by first unclipping the plastic shield and then removing the securing screw (see illustrations).

Refitting

4 Refitting is the reversal of removal.

Striker plate

Removal

5 With the tailgate held in the fully open position, mark the position of the striker plate in relation to the bodywork using a pencil or marker pen, to aid accurate refitting.

6 Slacken and unscrew the bolts securing the striker plate to the bodywork (see illustration).

7 Remove the striker plate from its aperture, to expose the remote release cable.

8 The release cable may be adjusted by altering the position of the cable outer sheath within its retaining bracket (see illustration)

Refitting

9 Refitting is a reversal of removal. Use the markings made during removal to give the correct alignment.

10 Check that the tailgate fastens and releases in a satisfactory manner. If adjustment is necessary, slacken the striker plate retaining bolts, and adjust the position of the plate to suit. Once the lock is operating correctly, securely tighten the striker plate retaining bolts.

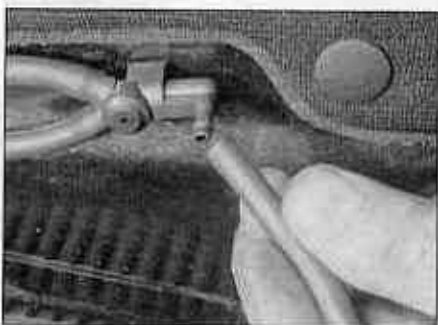
11 Bonnet - removal and refitting

Removal

1 Open the bonnet and prop it up with a stout pole.

2 Disconnect the washer jet hoses at the three way joint (see illustration).

3 Mark the relationship between the hinges and the edge of the bonnet using a soft pencil or marker pen. Slacken and unscrew the bolts; have an assistant support the bonnet as the last bolts are removed (see illustration).



11.2 Disconnect the washer jet hoses at the three way joint

4 With the help of an assistant, lift off the bonnet and set it down on its edge, using a dust sheet to protect the paintwork.

Refitting

5 Refit the bonnet by reversing the removal process, using the markings made during removal to achieve the correct alignment. Note that the bolt mounting holes are slotted to allow adjustment if required. On completion, tighten the bolts to the specified torque.

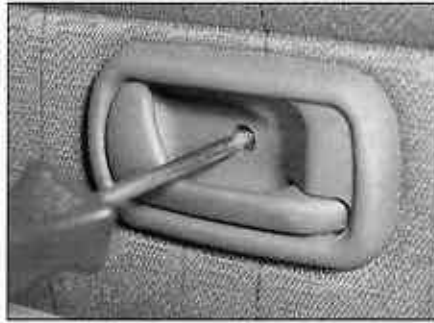
6 Check that the bonnet fastens and releases in a satisfactory manner. If necessary, adjust the bonnet lock components, as described in Section 12.



11.3 Slacken and unscrew the bonnet hinge bolts



12.4 Adjusting the extension of the bonnet pin



14.3a Remove the screw ...



14.3b ... then prise out the door grab handle moulding

12 Bonnet lock components - removal and refitting



Latch and release lever assembly

Removal

- 1 Secure the bonnet in the fully open position using the stay. Mark the relationship between the latch and the surface of the bonnet using a soft pencil or marker pen.
- 2 Slacken and unscrew the bolts, then lower the latch assembly away from the bonnet.

Refitting

- 3 Refitting is a reversal of removal. Use the alignment markings made during removal to aid accurate refitting. Note that the mounting holes are slotted to allow adjustment if required. On completion, tighten the bolts securely.
- 4 The extension of the bonnet pin may be adjusted in necessary, by slackening the locknut and turning the pin with a flat-bladed screwdriver (see illustration).

Striker plate

Removal

- 5 Mark the relationship between the striker plate and the bodywork using a soft pencil or marker pen. The striker plate can then be removed by slackening and withdrawing the three securing bolts and unhooking the release cable from the operating lever.

Refitting

- 6 Refitting is a reversal of removal. Use the alignment markings made during removal to aid accurate refitting. Note that the mounting holes are slotted to allow adjustment if required. On completion, tighten the bolts securely.

Buffers

- 7 If necessary, adjust the protrusion of the rubber buffers on the front crossmember, (located above each headlamp unit) by screwing them in or out as appropriate. When the rubber buffers are correctly adjusted, there should be just enough free movement to

allow the bonnet to be closed and locked easily, without using excessive force, but not enough to allow the bonnet to rattle when secured in the locked position.

13 Bonnet release cable - removal and refitting



Removal

- 1 Secure the bonnet in the fully open position. With reference to Section 12, detach the bonnet release cable from the striker plate operating lever.
- 2 Unscrew the cable clip from above the right hand headlamp unit.
- 3 Working around the engine bay, extract the release cable from its securing clips.
- 4 In the drivers footwell, extract the fixings and lower the sound insulation panel (where fitted) away from the underside of the steering column/facia.
- 5 Push the bonnet release handle towards the bulkhead slightly, then free the release cable end fitting from its recess in the handle. Lift the cable inner up, pass the end fitting through the larger hole and withdraw it from the handle. Extract the release cable outer from the mounting bracket by carefully pulling down on the plastic collar.
- 6 Release the cable from the remaining clips under the facia, then carefully pull the entire cable through the bulkhead grommet into the engine bay.



14.4a Prise the electric window/mirror adjustment switch from the armrest ...

Refitting

7 Refit the cable by reversing the removal process. On completion, close the bonnet to check that it locks securely, then check the operation of the release mechanism. If adjustment is required, this can be achieved by repositioning the slotted plastic collar fitted to the cable outer sheath, in the mounting lug on the underside of the striker plate.

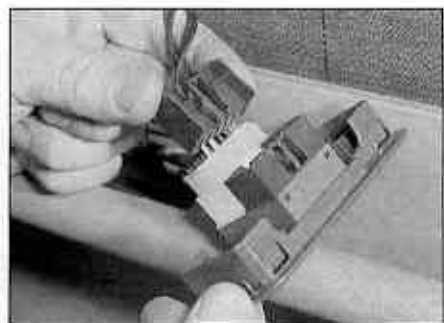
14 Door inner trim panel - removal and refitting



Removal

Note: This section describes the removal of the front door trim panel; the procedure for removing the rear door trim panel is essentially the same.

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 With reference to Section 17, remove the trim panel from the rear of the door mirror fixings.
- 3 Lift off the caps and remove the screw, then prise out the door grab handle moulding (see illustrations).
- 4 Prise the electric window/mirror adjustment switch from the armrest and unplug the wiring connector(s). Label them to aid correct refitting later (see illustrations).



14.4b ... and unplug the wiring connector



14.5a Unscrew the door panel securing screws, located on the edge of the armrest moulding . . .

5 Unscrew the door panel securing screws, located on the edge of the armrest moulding and around the outside edge of the door trim panel - note that some are concealed beneath plastic caps (see illustrations).

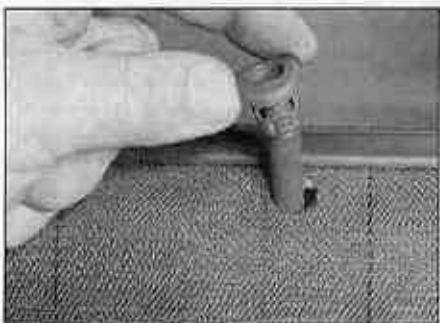
6 Using a suitable forked tool inserted between the door and the trim panel, release the press-stud clips located around the edge of the panel, then lift the trim panel upwards. Recover the locking knob trim collars (see illustrations).

7 Pull the panel from the door, noting that the lower window aperture weatherstrip is integral with the trim panel and must be released from the door as the panel is withdrawn.

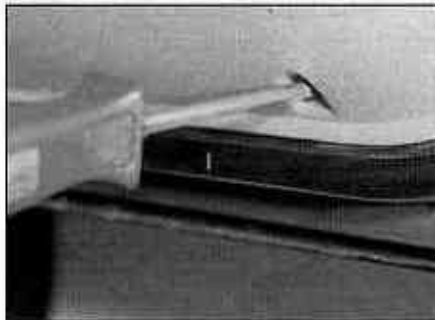
8 If work is to be carried out on the door internal components, it will be necessary to remove the plastic sealing sheet from the inside of the door. Start at one corner of the sheet and carefully peel it away, using a sharp blade to split the sealant bead (see illustration).



14.6a Release the press-stud clips located around the edge of the panel . . .



14.6c . . . and recover the locking knob trim collars from above . . .



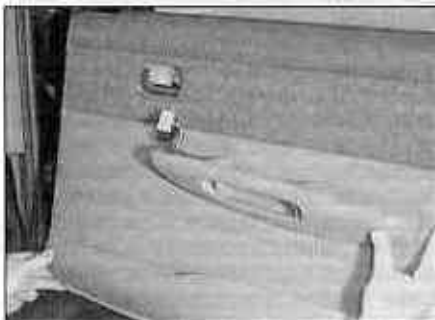
14.5b . . . and around the outside edge of the door trim panel

9 Store the detached sealing sheet such that it cannot become contaminated with dust; this will allow it to be re-used later.

Refitting

10 Refitting is a reversal of removal, bearing in mind the following points:

- a) Ensure that the sealing sheet is correctly refitted, press it on firmly to ensure that it is adequately sealed around its edges. It should be possible to use the original sealant, but if necessary, new sealant can be obtained from a Fiat dealer.
- b) Before refitting the trim panel, feed the electric window switch wiring through the aperture in the front of the panel.
- c) Make sure that the weatherstrip engages securely with the edge of the door as the panel is refitted.



14.6b . . . then lift the trim panel upwards . . .



14.6d . . . and below the panel

15 Door - removal and refitting

Note: This procedure is applicable both to the front and rear doors.

Removal

Note: A new door check strap roll-pin will be required on refitting.

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Unplug the multiway electrical connector from the inner edge of the door.

3 Have an assistant support the door, then unscrew the door hinges centre bolts, and lift the door from the vehicle.

Refitting

4 Refitting is a reversal of removal. On completion, tighten the hinge centre bolts securely.

Adjustment

5 Close the door carefully, in case the alignment is incorrect, which may cause scratching on the door or the body as the door is closed, and check the fit of the door with the surrounding panels.

6 If adjustment is required, loosen the hinge-to-body securing bolts (the bolt holes are elongated to allow for adjustment) and move the hinges as required to achieve satisfactory alignment. Tighten the securing bolts securely on completion.

7 Check the operation of the door lock. If necessary, slacken the securing bolts, and adjust the position of the lock striker on the body pillar to achieve satisfactory alignment. Tighten the bolts securely on completion.

16 Door handle and lock components - removal and refitting

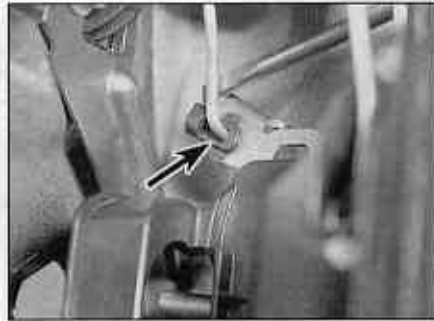
1 Ensure that the door window glass is in the fully closed position, then disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this



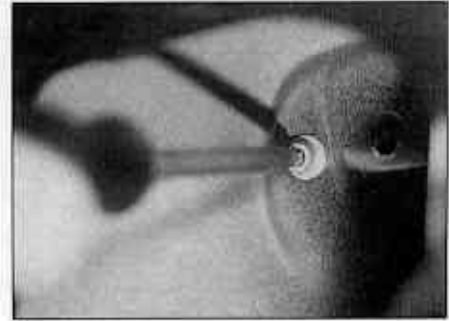
14.8 Carefully peel the sealing sheet away, using a sharp blade to split the sealant bead



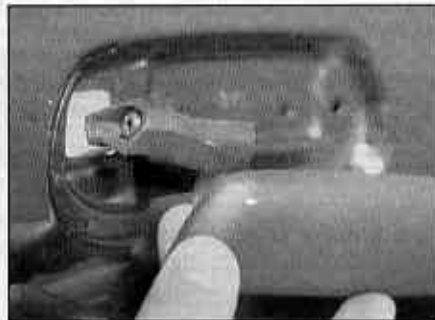
16.3 Unbolt and remove the anti-theft bracket from the rear of the door handle



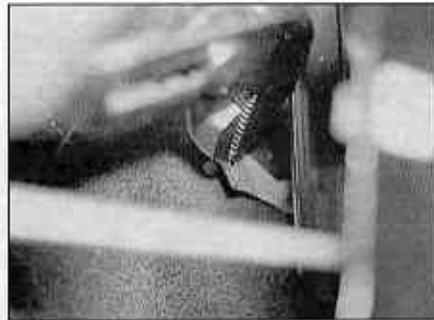
16.4 Detach the link rod (arrowed) from the door lock mechanism



16.5a Slacken and remove the handle retaining screws . . .



16.5b . . . and lift the handle assembly from the door



16.7a Release the retaining clip from the rear of the cylinder using a pair of pliers



16.7b Extract the lock cylinder from the door

manual). Refer to Section 14 and remove the door inner trim panel and sealing sheet.

Door handle

Removal

2 Where applicable on 3-door models, refer to Section 18 and remove the bolts that secure the window glass guide rail to the door, then remove the guide rail.

3 Working inside the door space, unbolt and remove the anti-theft bracket from the rear of the door handle (see illustration).

4 Detach the link rod from the door lock mechanism (see illustration).

5 Slacken and remove the handle retaining screws and lift the handle assembly from the door (see illustrations).

Refitting

6 Refit the door handle by following the removal procedure in reverse. Ensure that the

link rod engages correctly with the lock mechanism operating lever.

Lock cylinder

7 Working inside the door space, release the metal retaining clip from the rear of the cylinder using a pair of pliers (see illustrations). Extract the lock cylinder from the door.

Refitting

8 Refitting is a reversal of removal. Ensure that the lugs on the rear of the cylinder engage correctly with the lock mechanism.

Lock mechanism

Removal

9 Working inside the door space, unplug the wiring for the central locking motor and switches, at the multiway connector (see illustration).

10 At the trailing edge of the door, remove the three screws that secure the lock mechanism to the door (see illustration).

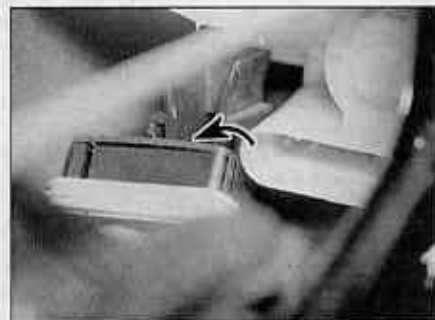
11 Disconnect the locking knob link rod from the lever on the top of the lock mechanism. **Note:** On models fitted with a plastic anti-theft lock shield, the locking knob link rod remains connected to the lock mechanism and is then removed with the mechanism as a complete assembly.

12 With reference to the relevant subsection, detach the exterior door handle link rod from the lock mechanism operating lever.

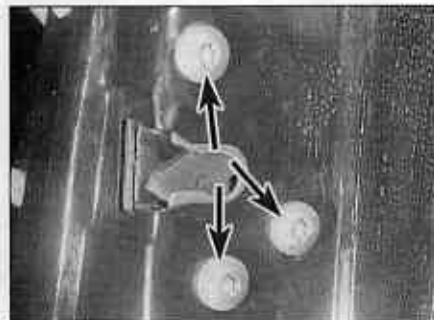
13 Uncouple the link rod for the interior door handle from its guide, then manoeuvre the lock mechanism out of the door (see illustration).

Refitting

14 Refitting is a reversal of removal. On completion, tighten the lock mechanism retaining screws securely.



16.9 Unplug the wiring at the multiway connector



16.10 Remove the three screws that secure the lock mechanism to the door



16.13 Manoeuvre the lock mechanism out of the door



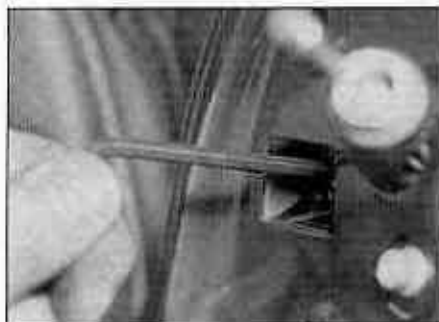
17.3a Prise the rubber cover off the adjustment lever ...



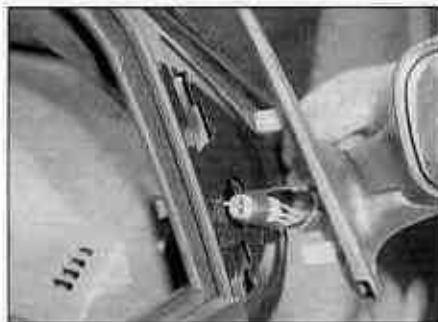
17.3b ... then unscrew and remove the locking collar



17.4 Remove the plastic trim panel, to expose the mirror securing screws



17.5a Remove the securing screws ...



17.5b ... and withdraw the mirror assembly from the door

the rear of the mirror glass, then push the glass into position to engage the securing clips.

HAYNES **HiNT** To aid refitting, lightly grease the securing clips on the rear of the mirror glass.

18 Electric window components
- removal and refitting

17 Exterior mirror components
- removal and refitting

Mirror assembly

Removal - models with electrically-adjustable mirrors

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Refer to Section 14 and remove the door inner trim panel. Reach inside the door space and unplug the electrical supply to the mirror at the multiway connector. Unclip the mirror wiring from the door, noting its routing.

Removal - models with manually-adjustable mirrors

- 3 Prise the rubber cover off the adjustment lever, then unscrew and remove the locking collar (see illustrations).

All models

- 4 Remove the plastic trim panel, to expose the mirror securing screws (see illustration).
- 5 Remove the securing screws, and withdraw the mirror assembly from the door (see illustrations).

Refitting

- 6 Refitting is a reversal of removal. Tighten the mirror securing screws securely. On models with electric mirrors, ensure that the electrical wiring is correctly routed so that it cannot foul the electric window mechanism.

Mirror glass

Removal

- 7 On models with electric mirrors, disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 8 Insert a suitable thin plastic or wooden tool between the mirror glass and the mirror body, and carefully lever the glass forward to release the securing clips.



Warning: Protect your hands and eyes from glass splinters.

- 9 Where applicable, disconnect the heater element wiring from the rear of the glass, and withdraw the glass from the mirror assembly.

Refitting

- 10 Where applicable, reconnect the wires to



18.4a Unclip the plastic fastener that secures the window glass to the regulator mechanism

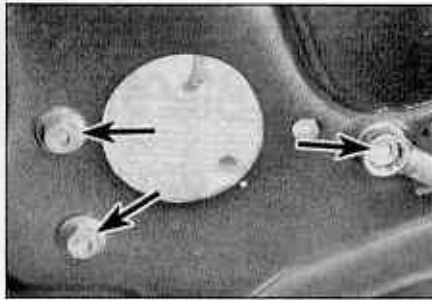


18.4b Disengage the regulator mechanism from the hole (arrowed) at the base of the window glass

Door window glass

Removal

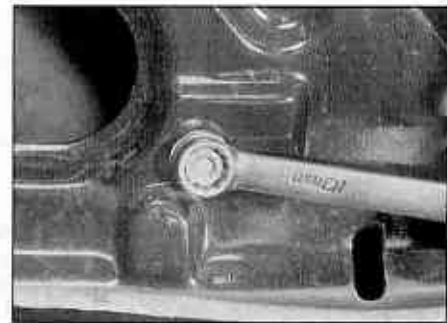
- 1 Operate the window regulator mechanism, such that the glass is positioned halfway down the aperture. On models with electric windows, disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Remove the door inner trim panel and the plastic sealing sheet, as described in Section 14.
- 3 On three door models, remove the screws at the trailing edge of the door and lift out the window glass rear guide channel. Similarly, remove the screws at the front edge of the door and remove the window glass front guide channel.
- 4 Support the glass, then unclip the plastic fastener that secures the window glass to the regulator mechanism. Disengage the regulator mechanism from the hole at the base of the window glass (see illustrations).



18.10 Unscrew the bolts (arrowed) securing the motor assembly/winder mechanism to the door



18.11a Unscrew the upper ...



18.11b ... and the lower regulator mechanism securing bolts ...

5 Lift the glass out through the window aperture in the top of the door, manipulating the glass past the weatherstrips as it is withdrawn. On 3-door models, it will be necessary to partially remove the weatherstrip from the upper edge of the window aperture, to allow the glass to be withdrawn.

Refitting

6 Refitting is a reversal of removal, bearing in mind the following points:

- a) Ensure that all weather strips are securely seated on the edges of the window aperture.
- b) Check the operation of the window regulator mechanism before refitting the door inner trim panel.
- c) Refit the door inner trim panel with reference to Section 14.

Door window regulator

Removal

7 Separate the window glass from the regulator mechanism, as described earlier.

8 Fully raise the window glass, and secure the glass in position using suitable tape, or by wedging the glass in position using rags between the glass and the edge of the door - ensure that the glass cannot drop into the door. Alternatively, lift the glass panel out through the window aperture.

9 Where applicable, separate the two halves of the regulator motor wiring connector.

10 Unscrew the bolts securing the motor assembly/winder mechanism to the door (see illustration).

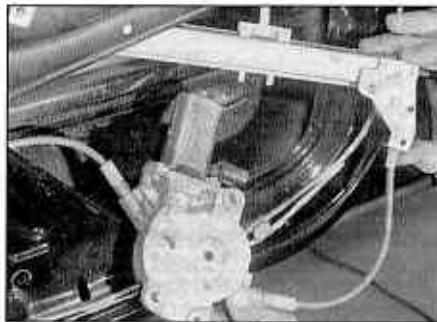
11 Unscrew the two upper and the two lower regulator mechanism securing bolts, then manipulate the complete regulator assembly out through the aperture in the door (see illustrations).

12 The winder/motor assembly, together with its associated control cables remains connected to the regulator mechanism (see illustration). **Note:** Carefully mark the relationship between the guide rails and the door to ensure correct adjustment on refitting.

Refitting

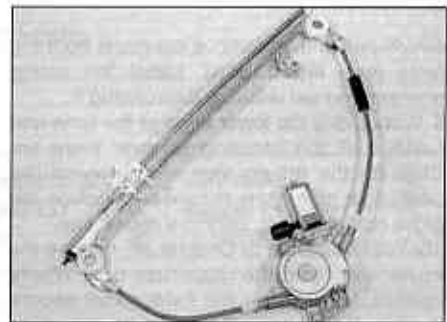
13 Refitting is a reversal of removal, bearing in mind the following points:

- a) Ensure that all weather strips are securely seated on the edges of the window aperture



18.11c ... then manipulate the complete regulator assembly out through the aperture in the door

- b) Check the operation of the window mechanism before refitting the door inner trim panel.
- c) Refit the door inner trim panel with reference to Section 14.



18.12 The electric window regulator assembly

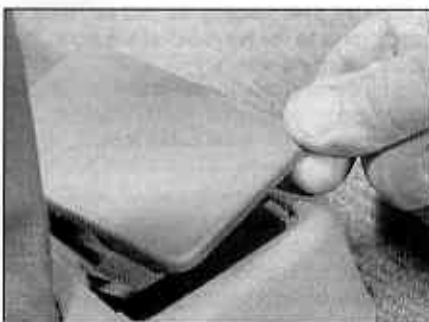
19 Facia - removal and refitting

Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Refer to Chapter 12 and carry out the following:

- a) Remove the instrument panel from the facia.



19.5a Prise open the plastic covers ...



19.5b ... remove the fixings ...

- b) Remove the radio/cassette unit from the facia

3 Unscrew the fixings for the storage bin above the radio aperture, then remove the bin from the facia.

4 Remove the steering wheel (see Chapter 10) and the steering column shroud.

5 Prise open the plastic covers, remove the fixings and lift off the handbrake lever console (see illustrations).

6 Work around the outside of the centre console and unscrew the fixings. Unclip the gear lever gaiter, lift the centre console over the gear lever, then label and unplug the wiring connector beneath and remove the console from the vehicle.

7 Remove the heater control panel from the facia, with reference to Chapter 3.

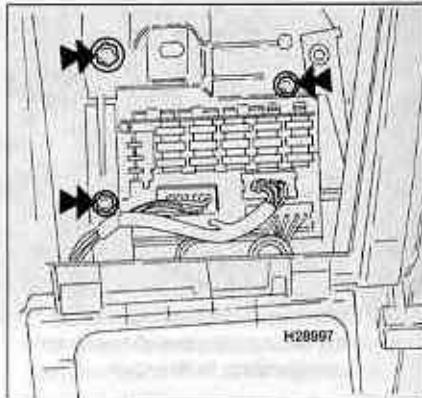
8 Unscrew the fixings from the upper and lower edges of the combined ventilation/



19.5c . . . and lift off the handbrake lever console



19.8 Remove the combined ventilation/switch panel from the facia



19.10 Remove the facia mounting bolts (arrowed) located adjacent to the control unit mounting bracket

switch panel, then remove the panel from the facia (see illustration). Label the wiring connector to aid refitting, then unplug it.

9 Work along the lower edge of the facia and remove all the securing screws; there are three on the drivers side and three on the passenger side - one is concealed inside the glove compartment, behind a plastic cap.

10 With reference to Chapter 12, remove the cover and open the main fuse box. Where applicable, unscrew the fixings that secure the electronic control unit to its mounting bracket. Remove the facia mounting bolts located adjacent to the mounting bracket (see illustration).

11 Refer to Chapter 10 and unbolt the steering column from its support bracket, allowing the column to rest in the footwell. There is no need to slacken the clamp bolt at the base of the steering column to separate it from the steering gear.

12 With reference to Chapter 12, remove front right and left speaker grilles. Remove the two facia upper mounting screws that are now exposed. Similarly, prise open the plastic cover from centre of upper edge of the facia and remove the mounting screw behind.

13 Carefully pull whole facia moulding forward away from the bulkhead slightly. Label all wiring connectors to aid correct refitting later, then unplug them. Check that nothing remains connected between the facia and bulkhead then draw the facia moulding away and remove it from the vehicle.

Refitting

14 Refit the facia by following the removal procedure in reverse, noting the following points:

- Reinstate all electrical connections according to the labels made during removal and ensure that cables are secured in their clips, using the original routing.
- Ensure that all ventilation ducting locates correctly over the rear of the grilles before tightening the facia retaining screws.
- On completion, reconnect the battery negative cable and check the operation of all controls, gauges and instruments disturbed during the removal process, including the ventilation/heating system.

20 Seats - removal and refitting

Front seats

Removal

Warning: On models with seat belt pre-tensioners, entrust the work of seat removal to a Fiat dealer. DO NOT attempt to remove the seat on vehicles so equipped.

- The front seats frames are secured to the floorpan by four bolts. Where applicable, prise out the caps from the plastic trim panel to expose the bolt heads.
- Slide the seat towards the rear of the car to gain access to the two bolts at the front, then slacken and withdraw them.
- Slide the seat fully forwards and remove the two rearmost bolts.
- Lift the seat out of the cabin area.



20.8 Remove the bolt (arrowed) and detach the backrest from the mounting bracket

Refitting

5 Refit the seat by reversing the removal procedure.

Rear seat back rests

Removal

6 Using the hand straps, raise the seat cushion and tilt it fully forward.

7 The rear seat back rests are mounted on hinged brackets which are bolted to the floorpan. To remove both back rests together, first remove the screws and detach the load space carpet panel.

8 Unbolt the back rest panel from the mounting brackets (see illustration).

Refitting

9 Refit the back rests by reversing the removal procedure.

Rear seat cushion

Removal

10 Using the hand straps, raise the seat cushion and tilt it fully forward.

11 Remove the screws that secure the hinged brackets to the floorpan, then lift-out the cushion (see illustration).

Refitting

12 Refit the seat cushion by reversing the removal procedure.



20.11 Remove the screws (arrowed) that secure the hinged brackets to the floorpan






Chapter 12

Body electrical systems

Contents

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Bulbs (interior lights) - renewal	5	Radio/cassette player - removal and refitting	12
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Exterior light units - removal and refitting	6	Switches - removal and refitting	14
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Degrees of difficulty


Easy , suitable for novice with little experience 	Fairly easy , suitable for beginner with some experience 	Fairly difficult , suitable for competent DIY mechanic 	Difficult , suitable for experienced DIY mechanic 	Very difficult , suitable for expert DIY or professional 
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Specifications

Bulb ratings

	Watts
Headlights	60/55
Front long range driving light	55
Front foglight	55
Front direction indicator light	21
Front sidelight	5
Front direction indicator repeater light	5
Stop light	21
Tail light	5
Rear direction indicator light	21
Reversing light	21
Rear foglight	21
Rear number plate light	5
Courtesy light	10
Map reading light	5

1 General information and precautions

 **Warning:** Before carrying out any work on the electrical system, read through the precautions given in *Safety first!* at the beginning of this manual, and in Chapter 5.

The electrical system is of 12-volt negative earth type. Power for the lights and all electrical accessories is supplied by a lead/acid type battery, which is charged by the alternator.

This Chapter covers repair and service procedures for the various electrical components not associated with the engine. Information on the battery, alternator and starter motor can be found in Chapter 5.

It should be noted that, prior to working on any component in the electrical system, the

battery negative terminal should first be disconnected, to prevent the possibility of electrical short-circuits and/or fires.

Caution: Before proceeding, refer to *Disconnecting the battery in the Reference Section of this manual for further information.*

2 Electrical fault finding - general information

Note: Refer to the precautions given in *Safety first!* and in Section 1 of this Chapter before starting work. The following tests relate to testing of the main electrical circuits, and should not be used to test delicate electronic circuits (such as anti-lock braking systems), particularly where an electronic control module is used.

General

1 A typical electrical circuit consists of an electrical component, any switches, relays, motors, fuses, fusible links or circuit breakers related to that component, and the wiring and connectors which link the component to both the battery and the chassis. To help to pinpoint a problem in an electrical circuit, wiring diagrams are included at the end of this manual.

2 Before attempting to diagnose an electrical fault, first study the appropriate wiring diagram, to obtain a more complete understanding of the components included in the particular circuit concerned. The possible sources of a fault can be narrowed down by noting whether other components related to the circuit are operating properly. If several components or circuits fail at one time, the problem is likely to be related to a shared fuse or earth connection.

3 Electrical problems usually stem from simple causes, such as loose or corroded connections, a faulty earth connection, a blown fuse, a melted fusible link, or a faulty relay (refer to Section 3 for details of testing relays). Visually inspect the condition of all fuses, wires and connections in a problem circuit before testing the components. Use the wiring diagrams to determine which terminal connections will need to be checked, in order to pinpoint the trouble-spot.

4 The basic tools required for electrical fault-finding include a circuit tester or voltmeter (a 12-volt bulb with a set of test leads can also be used for certain tests); a self-powered test light (sometimes known as a continuity tester); an ohmmeter (to measure resistance); a battery and set of test leads; and a jumper wire, preferably with a circuit breaker or fuse incorporated, which can be used to bypass suspect wires or electrical components. Before attempting to locate a problem with test instruments, use the wiring diagram to determine where to make the connections.

5 To find the source of an intermittent wiring fault (usually due to a poor or dirty connection, or damaged wiring insulation), a wiggle test can be performed on the wiring. This involves wiggling the wiring by hand, to see if the fault occurs as the wiring is moved. It should be possible to narrow down the source of the fault to a particular section of wiring. This method of testing can be used in conjunction with any of the tests described in the following sub-Sections.

6 Apart from problems due to poor connections, two basic types of fault can occur in an electrical circuit - open-circuit, or short-circuit.

7 Open-circuit faults are caused by a break somewhere in the circuit, which prevents current from flowing. An open-circuit fault will prevent a component from working, but will not cause the relevant circuit fuse to blow.

8 Short-circuit faults are caused by a short somewhere in the circuit, which allows the current flowing in the circuit to escape along an alternative route, usually to earth. Short-circuit faults are normally caused by a breakdown in wiring insulation, which allows a feed wire to touch either another wire, or an earthed component such as the bodyshell. A short-circuit fault will normally cause the relevant circuit fuse to blow.

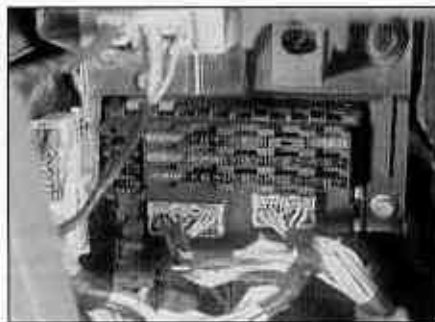
Finding an open-circuit

9 To check for an open-circuit, connect one lead of a circuit tester or voltmeter to either the negative battery terminal or a known good earth.

10 Connect the other lead to a connector in the circuit being tested, preferably nearest to the battery or fuse.

11 Switch on the circuit, bearing in mind that some circuits are live only when the ignition switch is moved to a particular position.

12 If voltage is present (indicated either by



3.2 Main fusebox, located on the driver's side of the facia

the tester bulb lighting or a voltmeter reading, as applicable), this means that the section of the circuit between the relevant connector and the battery is problem-free.

13 Continue to check the remainder of the circuit in the same fashion.

14 When a point is reached at which no voltage is present, the problem must lie between that point and the previous test point with voltage. Most problems can be traced to a broken, corroded or loose connection.

Finding a short-circuit

15 To check for a short-circuit, first disconnect the load(s) from the circuit (loads are the components which draw current from a circuit, such as bulbs, motors, heating elements, etc).

16 Remove the relevant fuse from the circuit, and connect a circuit tester or voltmeter to the fuse connections.

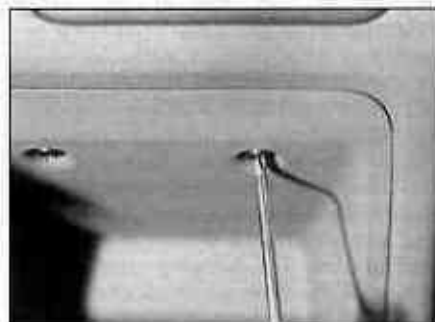
17 Switch on the circuit, bearing in mind that some circuits are live only when the ignition switch is moved to a particular position.

18 If voltage is present (indicated either by the tester bulb lighting or a voltmeter reading, as applicable), this means that there is a short-circuit.

19 If no voltage is present, but the fuse still blows with the load(s) connected, this indicates an internal fault in the load(s).

Finding an earth fault

20 The battery negative terminal is connected to 'earth' - the metal of the engine/transmission and the car body - and



3.3 To gain access to the fuses, remove the screw and pull the stowage bin away from the facia

most systems are wired so that they only receive a positive feed, the current returning via the metal of the car body. This means that the component mounting and the body form part of that circuit. Loose or corroded mountings can therefore cause a range of electrical faults, ranging from total failure of a circuit, to a puzzling partial fault. In particular, lights may shine dimly (especially when another circuit sharing the same earth point is in operation), motors (eg wiper motors or the radiator cooling fan motor) may run slowly, and the operation of one circuit may have an apparently-unrelated effect on another. Note that on many vehicles, earth straps are used between certain components, such as the engine/transmission and the body, usually where there is no metal-to-metal contact between components, due to flexible rubber mountings, etc.

21 To check whether a component is properly earthed, disconnect the battery, and connect one lead of an ohmmeter to a known good earth point. Connect the other lead to the wire or earth connection being tested. The resistance reading should be zero; if not, check the connection as follows.

22 If an earth connection is thought to be faulty, dismantle the connection, and clean back to bare metal both the bodyshell and the wire terminal or the component earth connection mating surface. Be careful to remove all traces of dirt and corrosion, then use a knife to trim away any paint, so that a clean metal-to-metal joint is made. On reassembly, tighten the joint fasteners securely; if a wire terminal is being refitted, use serrated washers between the terminal and the bodyshell, to ensure a clean and secure connection. When the connection is remade, prevent the onset of corrosion in the future by applying a coat of petroleum jelly or silicone-based grease, or by spraying on (at regular intervals) a proprietary ignition sealer, or a water-dispersant lubricant.

3 Fuses and relays - general information

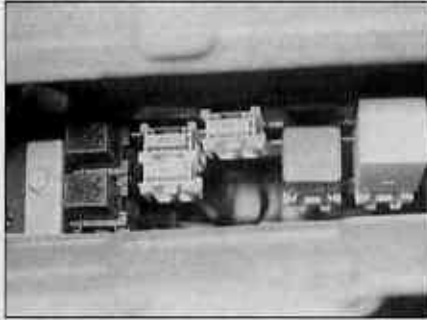
Fuses

1 Fuses are designed to break a circuit when a predetermined current is reached, in order to protect the components and wiring which could be damaged by excessive current flow. Any excessive current flow will be due to a fault in the circuit, usually a short-circuit (see Section 2).

2 The main fuses are located in the fusebox on the driver's side of the facia (see illustration).

3 To gain access to the fuses, remove the screw and pull the stowage bin moulding away from the facia (see illustration).

4 Additional fuses and circuit-breakers are located in the engine compartment, and in an



3.4 The auxiliary fusebox, located inside the glovebox behind a drop-down panel

auxiliary fusebox, which is located inside the glovebox behind a drop-down panel (see illustration).

5 A blown fuse can be recognised from its melted or broken wire (see illustration).

6 To remove a fuse, first ensure that the relevant circuit is switched off.

7 Using the plastic tool clipped to the main fusebox lid, pull the fuse from its location.

8 Spare fuses are provided in the main fusebox.

9 Before renewing a blown fuse, trace and rectify the cause, and always use a fuse of the correct rating (fuse ratings are specified on the inside of the fusebox cover flap). Never substitute a fuse of a higher rating, or make temporary repairs using wire or metal foil; more serious damage, or even fire, could result.

10 Note that the fuses are colour-coded as follows. Refer to the wiring diagrams for details of the fuse ratings used and the circuits protected.

Colour	Rating
Orange	5A
Red	10A
Blue	15A
Yellow	20A
Clear or White	25A
Green	30A

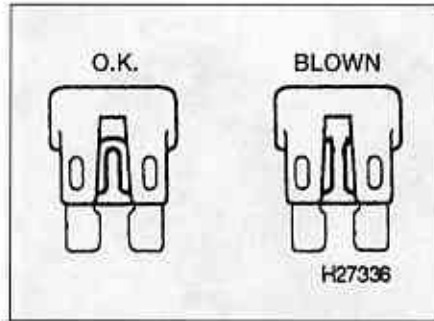
11 The radio/cassette player fuse is located in the rear of the unit, and can be accessed after removing the radio/cassette player - refer to Section 12 for greater detail.

Relays

12 A relay is an electrically-operated switch, which is used for the following reasons:

- A relay can switch a heavy current remotely from the circuit in which the current is flowing, therefore allowing the use of lighter-gauge wiring and switch contacts.
- A relay can receive more than one control input, unlike a mechanical switch.
- A relay can have a timer function - for example, the intermittent wiper relay.

13 The main and optional equipment relays are located in the main and auxiliary fuseboxes (see Fuses). A number of additional relays may be fitted, depending on model and specification. These are generally mounted



3.5 A blown fuse can be recognised from its melted or broken wire

adjacent to the component being controlled; e.g. the radiator cooling fan relay(s) are mounted on a bracket next the cooling fan itself.

14 The direction indicator/hazard warning flasher unit is mounted on the underside of the steering column stalk switch unit. It can be accessed by removing the steering column lower shroud panel (see illustration).

15 If a circuit or system controlled by a relay develops a fault, and the relay is suspect, operate the system. If the relay is functioning, it should be possible to hear it click as it is energised. If this is the case, the fault lies with the components or wiring of the system. If the relay is not being energised, then either the relay is not receiving a main supply or a switching voltage, or the relay itself is faulty. Testing is by the substitution of a known good unit, but be careful - while some relays are identical in appearance and in operation, others look similar but perform different functions.

16 To remove a relay, first ensure that the relevant circuit is switched off. The relay can then simply be pulled out from the socket, and pushed back into position.

4 Bulbs (exterior lights) - renewal

General

1 Whenever a bulb is renewed, note the following points:



4.3 Pull the wiring plug from the rear of the bulb



3.14 Removing the direction indicator/hazard warning flasher unit

- Ensure that the relevant electrical circuit is isolated before removing a bulb. If in doubt, disconnect the battery negative lead before starting work.
- Remember that, if the circuit has just been in use, the bulb may be extremely hot.
- Always check the bulb contacts and holder, ensuring that there is clean metal-to-metal contact between the bulb and its live contact(s) and earth. Clean off any corrosion or dirt before fitting a new bulb.
- Wherever bayonet-type bulbs are fitted, ensure that the live contact(s) bear firmly against the bulb contact.
- Always ensure that the new bulb is of the correct rating (see Specifications), and that it is completely clean before fitting it; this applies particularly to headlight/foglight bulbs (see following paragraphs).
- Pay attention to the orientation when fitting multi-filament bulbs (e.g. combined tail/brake light bulbs) - incorrect fitting will cause the filaments to illuminate in the wrong sequence.

Headlight

2 Open the bonnet. Ensure that the headlights are turned off at the stalk switch.

Models with single reflector

3 Pull the wiring plug from the rear of the bulb (see illustration).

4 Pull the rubber boot from the rear of the headlight unit (see illustration).



4.4 Pull the rubber boot from the rear of the headlight unit



4.5 Squeeze the retaining spring-clip lugs, and release the clip from the rear of the bulb



4.6 Withdraw the bulb



4.14 Twist the bulbholder to release it from the rear of the light unit

5 Squeeze the retaining spring-clip lugs, and release the clip from the rear of the bulb (see illustration)

6 Withdraw the bulb (see illustration).

Models with twin reflectors

7 Unclip the cover from the rear of the headlight unit. Note that the light unit houses three bulbholders; one for the combined main/dipped beam bulb, one for the long range main beam bulb and one for the sidelight bulb.

8 Pull the wiring plug from the rear of the bulb.

9 Squeeze the retaining spring-clip lugs, and release the clip from the rear of the bulb.

10 Withdraw the bulb.

All models

11 When handling the new bulb, use a tissue

or clean cloth, to avoid touching the glass with the fingers; moisture and grease from the skin can cause blackening and rapid failure of this type of bulb. If the glass is accidentally touched, wipe it clean using methylated spirit. Avoid knocking or shaking the bulb as this may weaken the filament.

12 Install the new bulb, using a reversal of the removal procedure, ensuring that its locating tabs are correctly located in the light unit cut-outs. Secure the bulb in position with the retaining clip.

Sidelight

Models with single reflector

13 Open the bonnet. Ensure that the sidelights are turned off at the stalk switch.

14 Twist the bulbholder to release it from the rear of the light unit (see illustration)

15 The bulb is a push fit in the bulbholder.

16 Fit the new bulb using a reversal of the removal procedure.

Models with twin reflectors

17 Unclip the cover from the rear of the headlight unit. Note that the light unit houses three bulbholders; one for the combined main/dipped beam bulb, one for the long range main beam bulb and one for the sidelight bulb.

18 Twist the bulbholder to release it from the rear of the light unit.

19 The bulb is a push fit in the bulbholder.

20 Fit the new bulb using a reversal of the removal procedure.

Front direction indicator

21 Open the bonnet. Unhook the light unit spring clip from the recess in the inner wing, directly behind the indicator light unit (see illustration).

22 Pull the light unit forwards from its housing.

23 Twist the bulbholder anti-clockwise and withdraw it from the light unit (see illustration).

24 The bulb is a bayonet fit in the bulbholder.

25 Fit the new bulb, then refit the light assembly using a reversal of the removal procedure. Ensure that the pegs on the side of the light unit engage with the lugs in the side of the headlight unit and the body panel (see illustration). Hook the retaining spring clip securely into the recess in the inner wing.

Front direction indicator side repeater

26 Slide the light unit towards the front of the vehicle slightly, then insert a plastic implement behind the rear edge of the unit and lever it out of the wing aperture (see illustration).

27 Withdraw the light unit, then twist the bulbholder anti-clockwise to release it from the light unit (see illustration).

28 The bulb is a push fit in the bulbholder.

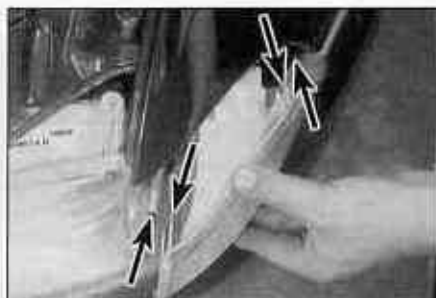
29 Fit the new bulb using a reversal of the removal procedure.



4.21 Unhook the light unit spring clip from the recess in the inner wing



4.23 Twist the bulbholder anti-clockwise and withdraw it from the light unit



4.25 Ensure that the pegs (arrowed) on the side of the light unit engage with the lugs in the side of the headlight unit and the body panel



4.26 Slide the light unit towards the front of the vehicle slightly, then insert a plastic implement behind the rear edge



4.27 Withdraw the light unit, then twist the bulbholder anti-clockwise to release it from the light unit



4.32 Disconnect the wiring from the rear of the foglight unit at the connector



4.33 Unscrew the rear cover from the foglight unit by turning it anticlockwise

Front foglight

30 Access to the rear of the foglight units can be gained by via removable hatches in plastic inner wheel arch liners.

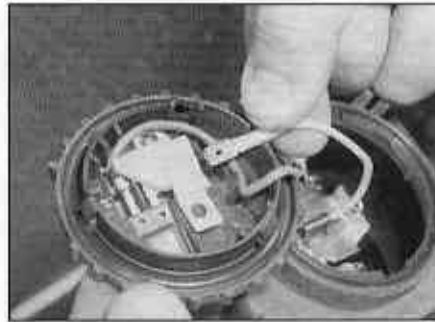
31 Turn the steering wheel to angle the roadwheel away from the rear of the relevant foglight.

32 Reach through the wheel arch liner and disconnect the wiring from the rear of the foglight unit at the connector (see illustration).

33 Unscrew the rear cover from the foglight unit by turning it anticlockwise (see illustration).

34 Unplug the flying lead from the push-fit connector inside of the rear cover. Release the spring clip, and withdraw the bulb from the rear of the light unit (see illustrations).

35 Fit the new bulb using a reversal of the removal procedure, ensuring that the recess in the bulb flange engages with the lug in the bulbholder.



4.34a Unplug the flying lead from the push-fit connector inside of the rear cover



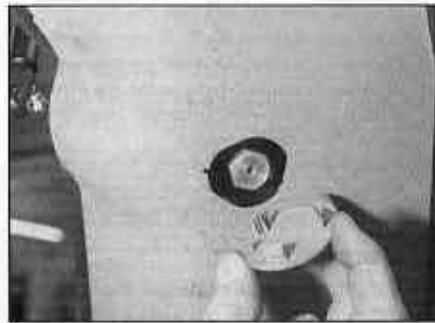
4.34b Release the spring clip, and withdraw the bulb from the rear of the light unit

Rear light cluster bulbs

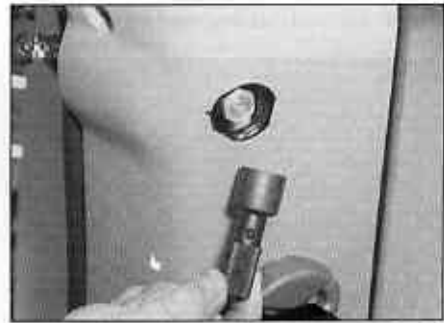
36 Open the tailgate. Working from within the loadspace, prise the plastic caps from the rear pillar trim panel (see illustration).

37 Using the special socket provided with the vehicle's toolkit, unscrew the rear light cluster securing bolts (see illustrations).

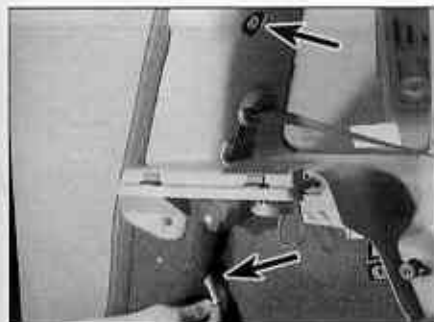
38 Pull the light cluster away from the bodywork. Unplug the electrical wiring at the connector (see illustrations).



4.36 Prise the plastic caps from the rear pillar trim panel



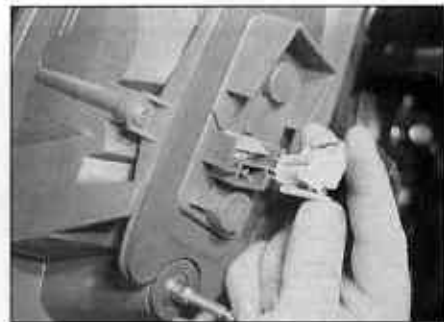
4.37a Using the special socket provided with the vehicles tool kit . . .



4.37b . . . unscrew the rear light cluster securing bolts (arrowed)



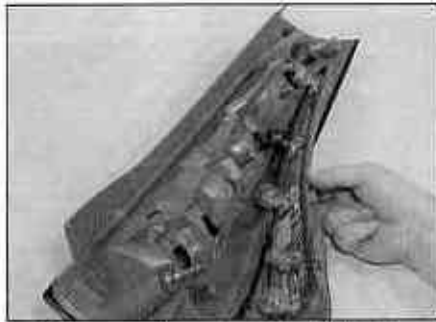
4.38a Pull the light cluster away from the bodywork . . .



4.38b . . . unplug the electrical wiring at the connector



4.39a Remove the screws ...



4.39b ... and separate the bulbholder from the lens unit



4.40 The bulbs are a bayonet fit in the bulbholder

39 Remove the screws and separate the bulbholder from the lens unit (see illustrations).
40 The bulbs are a bayonet fit in the bulbholder (see illustration).

41 Fit the new bulb using a reversal of the removal procedure. Note that the stop/tail light bulb has offset locking pins, to ensure correct orientation.

Rear number plate light

42 Remove the securing screws, and lower the light unit lens from the tailgate handle (see illustration).

43 The bulb is a push fit in the light unit.

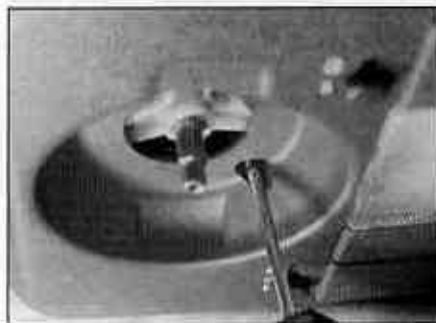
44 Fit the new bulb using a reversal of the removal procedure.



5.3a On models with a manually operated sunroof, remove the sunroof crank handle



5.3b Carefully prise out the plastic caps ...



5.3c ... and remove the screws that secure the overhead console to the roof



5.4 Unplug the wiring from the console at the connector

5 Bulbs (interior lights) - renewal

General

1 Whenever a bulb is renewed, note the following points:

- Ensure that the relevant electrical circuit is isolated before removing a bulb. If in doubt, disconnect the battery negative terminal (refer to Disconnecting the battery in the Reference Section of this manual) before starting work.
- Remember that, if the light has just been in use, the bulb may be extremely hot.
- Always check the bulb contacts and holder, ensuring that there is clean metal-to-metal contact between the bulb and its live contact(s) and earth. Clean off any corrosion or dirt before fitting a new bulb.
- Wherever bayonet-type bulbs are fitted, ensure that the live contact(s) bear firmly against the bulb contact.
- Always ensure that the new bulb is of the correct rating (see Specifications), and that it is completely clean before fitting it.

Courtesy light

2 On Punto S models (except those with a manually operated sunroof and/or theft alarm) access to the courtesy light bulb can be gained by unclipping the lens from the roof lining. The bulb can then be prised from its spring loaded contacts.



4.42 Remove the securing screws, and lower the light unit lens from the tailgate handle

3 On all other variants, carefully prise out the plastic caps and remove the screws that secure the overhead console to the roof. **Note:** On models fitted with a manually operated sunroof, it will be necessary to remove the screw and detach the sunroof crank handle from its shaft, before the overhead console can be removed (see illustrations).

4 Unplug the wiring from the console at the connector (see illustration).

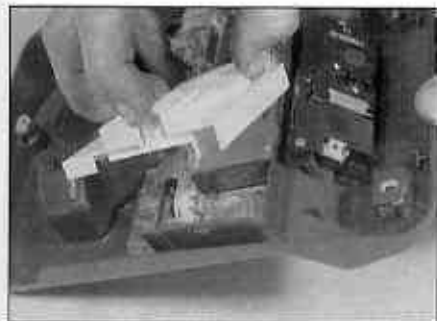
5 Unclip the plastic cover from the rear of the overhead console (see illustration).

6 Carefully prise the bulb from the spring contacts (see illustration).

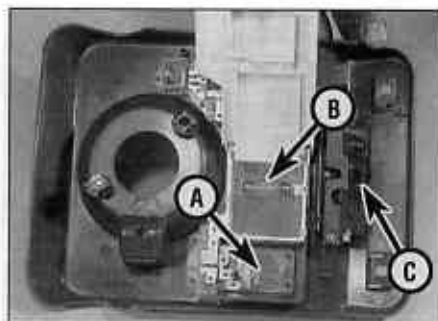
7 Fit the new bulb using a reversal of the removal procedure.

Luggage compartment light

8 The light unit is located under the left hand parcel shelf support panel.



5.5 Unclip the plastic cover from the rear of the overhead console



5.6 Overhead console bulb location

A Map reading bulb C Clock illumination bulb
B Courtesy bulb



5.9 Unclip the lens from the support panel

9 Unclip the lens from the support panel (see illustration).

10 The bulb can be prised from its spring-loaded contacts (see illustration).

11 Fit the new bulb using a reversal of the removal procedure.

Instrument panel gauge illumination

12 Remove the instrument panel as described in Section 7.

13 The bulbs are a bayonet fit in the rear of the instrument panel (see illustration). The colour of the bulb casing denotes its wattage - ensure that a replacement bulb of the correct rating is used.

Switch illumination

14 The bulbs that illuminate the facia-mounted switches are integral with the switch body and cannot be renewed separately.



5.10 The bulb can be prised from its spring-loaded contacts (arrowed)



5.13 The bulbs are a bayonet fit in the rear of the instrument panel

6 Exterior light units - removal and refitting

Caution: Ensure that the relevant electrical circuit is isolated before removing a light unit. If in doubt, disconnect the battery negative terminal (refer to Disconnecting the battery in the Reference Section of this manual).

Headlight

Removal

- 1 Remove the adjacent direction indicator light unit as described in Section 4.
- 2 Disconnect all wiring from the rear of the light unit at the connectors.

- 3 Unscrew the headlight side and upper securing bolts (see illustrations).
- 4 Withdraw the headlight unit from the vehicle (see illustration).

Refitting

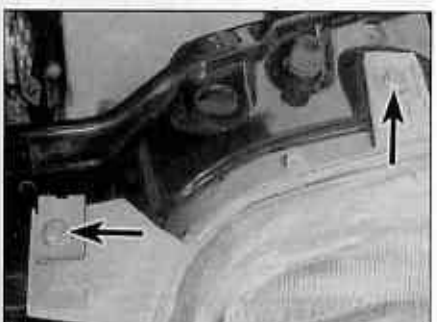
5 Refitting is a reversal of removal. On completion, it is advisable to have the headlight beam alignment checked with reference to Section 8.

Front direction indicator light

6 The procedure is described as part of the bulb renewal procedure in Section 4. Note that the wiring harness can be disconnected from the light unit without removing the bulb holder (see illustration).



6.3a Unscrew the headlight side securing bolt (arrowed) . . .



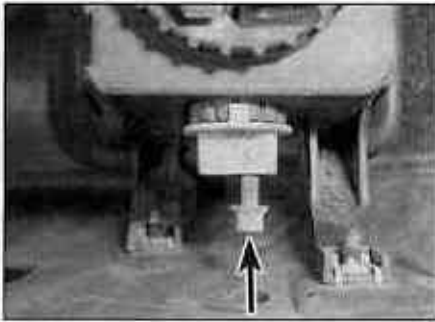
6.3b . . . and upper securing bolts (arrowed)



6.4 Withdraw the headlight unit from the vehicle



6.6 Disconnecting the direction indicator light unit wiring from the bulb holder



6.10 Front foglamp beam adjustment screw (arrowed)

Front direction indicator side repeater light

7 The procedure is described as part of the bulb renewal procedure in Section 4.

Front foglight

8 Remove the hatch from the wheel arch liner and unplug the wiring from the rear of the foglamp unit.

9 The front foglamps are secured to the valence by three screws - one directly above the light unit, accessed from the front and two accessed from below the valence. Once these are removed, the foglamp can be removed via the hatch in the wheel arch liner.

10 Refitting is a reversal of removal. On completion, it is advisable to check the foglight beam alignment. If necessary, the beam may be altered using the adjustment screw (see illustration).

Rear light cluster

11 The procedure is described as part of the bulb renewal procedure in Section 4.

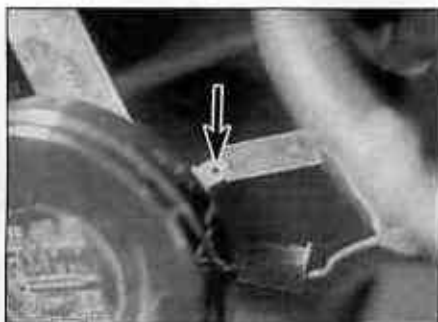
7 Instrument panel - removal and refitting



Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Remove the securing screws from the instrument panel surround.



9.2 Unplug the wiring from the horn at the connector (arrowed)



7.3a Carefully pull the panel away from the fascia

3 Carefully pull the panel away from the fascia. Label each bundle of electrical cables carefully to aid refitting later and then unplug them at the connectors (see illustrations). Where a mechanical speedometer drive is fitted, disconnect the drive cable from the rear of the instrument panel.

4 The individual gauges are illuminated by filament bulbs. These are a bayonet fit in the rear of the instrument panel and can be removed individually by rotating them through a quarter turn and withdrawing them - refer to Section 5 for details.

Refitting

5 Refit the instrument panel by following the removal procedure in reverse.

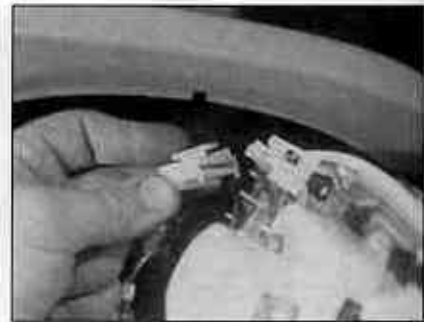
8 Headlight beam alignment - general information

Accurate adjustment of the headlight beam is only possible using optical beam-setting equipment, and this work should therefore be carried out by a Fiat dealer or suitably-equipped workshop. Incorrectly adjusted headlamps can dazzle other drivers and cause accidents.

Certain models are equipped with a headlight aim adjustment switch, located on the fascia, which allows the aim of the headlights to be adjusted to compensate for the varying loads carried in the vehicle. The switch should be positioned according to the



9.3 Unscrew the securing bolt (arrowed) and remove the horn sounder



7.3b Label and then unplug the wiring connectors

load being carried in the vehicle - refer to the vehicle's handbook for details.

9 Horn - removal and refitting



Removal

1 The horn is mounted on the lower edge of the front left hand wing, behind the front bumper moulding. To gain access, remove the screws and detach the hatch from the wheel arch liner.

2 Reach through the aperture in the wheel arch liner and unplug the wiring from the horn at the connector (see illustration).

3 Unscrew the securing bolt (see illustration) and remove the horn sounder.

Refitting

4 Refit the horn by following the removal procedure in reverse.

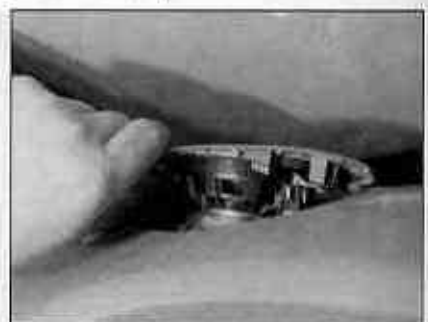
10 Loudspeakers - removal and refitting



1 Ensure that the radio/cassette unit is switched off.

Facia mounted front speakers

2 Remove the screw and lift off the fascia grille (see illustration).



10.2 Remove the screw and lift off the fascia grille

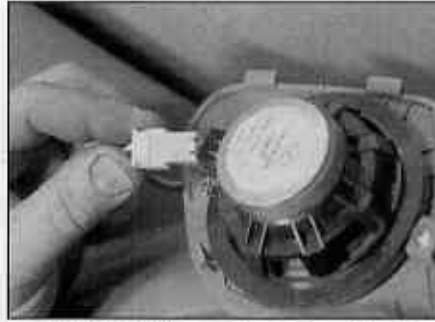
3 Undo the mounting screws and lift out the speaker (see illustration). Unplug the wiring at the connector.

4 Refitting is a reversal of removal.

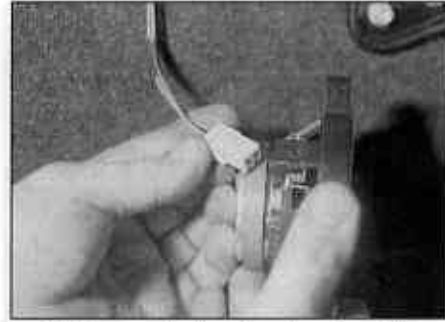
Rear parcel shelf speakers

5 Working underneath the relevant parcel shelf support bracket, remove the securing screws and lower the loudspeaker from the support bracket. Unplug the wiring at the connector (see illustration).

6 Refitting is a reversal of removal.



10.3 Lift out the speaker and unplug the wiring at the connector



10.5 Lower the loudspeaker from the support bracket and unplug the wiring at the connector

11 Radio aerial - removal and refitting



Removal

1 Carefully prise off the plastic cap, then remove the securing screws and withdraw the aerial from the roof.

2 Draw the aerial co-axial cable through the roof aperture and disconnect it. If there is insufficient slack in the aerial cable, remove the courtesy light unit/overhead panel from the inside of the vehicle (as described earlier in this Chapter) to gain access to the cable connector.

Refitting

3 Refitting is a reversal of removal, but ensure that seal between the aerial housing and the roof panel is in good condition.



12.2 Removing the radio/cassette unit using the special extraction tools

12 Radio/cassette player - removal and refitting



Removal

Note: Once the battery has been disconnected, the radio/cassette unit cannot be re-activated until the appropriate security code has been entered. Do not remove the unit unless the appropriate code is known.

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 Insert the special extraction tools supplied with the vehicle into the holes on either side of the radio/cassette unit. Press them home until the internal clips can be felt to release (see illustration).

3 Pull the unit forwards from the fascia, then disconnect the wiring plugs and the aerial lead from the rear of the unit. Note the bayonet fuse, which is a push fit in the rear of the unit. (see illustration).

Refitting

4 Refitting is a reversal of removal, ensuring that the wiring is routed freely behind the unit.

13 Speedometer drive cable - removal and refitting



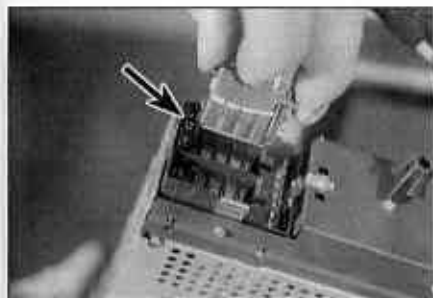
Note: Later vehicles are fitted with an electronic transducer in place of the mechanical speedometer drive. This is mounted on the transmission casing; refer to Chapter 7A, Section 3, for details.

Removal

1 Remove the instrument panel as described in Section 7.

2 Working in the engine compartment, unscrew the sleeve securing the cable end to gearbox, then pull the cable from gearbox.

3 Where applicable, release the cable from the brackets in the engine compartment bulkhead, then pull the cable through into the engine compartment. If necessary, pull the cable grommet from the bulkhead.



12.3 Disconnect the wiring plugs from the rear of the unit. Note the bayonet fuse (arrowed) which is a push fit in the rear of the unit

14 Switches - removal and refitting



Steering column stalk switches

Note: On vehicles equipped with steering wheel-mounted radio controls, the column stalk switch unit also incorporates the rotary contacts for the steering wheel switches.

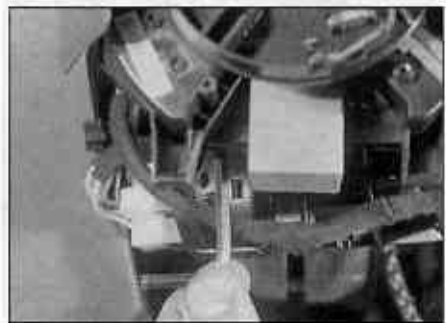
Removal

1 Disconnect the battery negative cable and position it away from the terminal. Turn the steering wheel so that the roadwheels are pointing in the straight-ahead position.

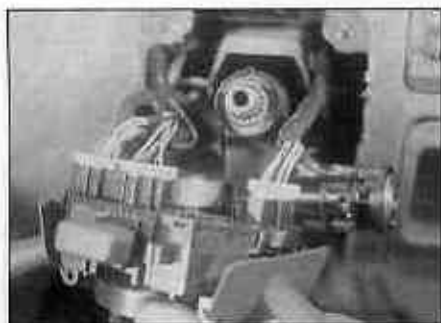
2 Refer to Chapter 10 and remove the steering wheel from the column.

3 Remove the screws and lift off the upper and lower steering column shrouds.

4 Using an Allen key, slacken the clamp ring at the rear of the switch unit (see illustration).



14.4 Using an Allen key, slacken the clamp ring at the rear of the switch unit



14.5 Remove the switch unit the steering column and unplug the wiring connectors



14.10 Unplug the wiring from the rear of the switch body at the connector

5 Pull the switch unit along the steering column slightly, then label and unplug the wiring connectors from the rear of the unit (see illustration).

6 Remove the switch unit from the steering column.

Refitting

7 Refitting is reversal of removal - ensure that the steering column/roadwheels are still in the straight-ahead position. On completion, ensure that the direction indicator cancelling mechanism functions correctly.

Headlamp beam adjustment switch

8 Disconnect the battery negative cable and position it away from the terminal.

9 Carefully lever the switch body out of the fascia, using a flat bladed instrument. Pad the



15.4a Working inside the tailgate, unplug the tailgate wiper motor wiring at the connector ...



14.9 Carefully lever the switch body out of the fascia, using a flat bladed instrument



14.14 Remove the screws and lift the switch bank from the rear of the fascia panel

facias with a small piece of card to prevent the instrument blade from damaging it (see illustration).

10 Unplug the wiring from the rear of the switch body at the connector (see illustration).

11 Refitting is a reversal of removal.

Stop-light switch

12 Refer to the information in Chapter 9

Centre console switches

13 With reference to Chapter 11, Section 19, remove the combined air ventilation/switch panel from the fascia.

14 Remove the screws and lift the switch bank from the rear of the panel (see illustration).



15.4b ... and disconnect the washer hose at the union

15 Refitting is a reversal of removal.

Courtesy light/door ajar warning switches

16 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

17 Open the door to expose the switch in the door B-pillar.

18 Remove the securing screw, then remove the rubber gaiter (where applicable) and withdraw the switch from the door pillar. Disconnect the wiring connector as it becomes accessible.



Tape the wiring to the door pillar, or tie a length of string to the wiring, to retrieve it if it falls back into the door pillar.

19 Refitting is a reversal of removal, but ensure that the rubber gaiter is securely seated over the switch.

Electric window switches

20 Refer to the information given in Chapter 11, Section 14.

15 Tailgate wiper motor - removal and refitting

Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

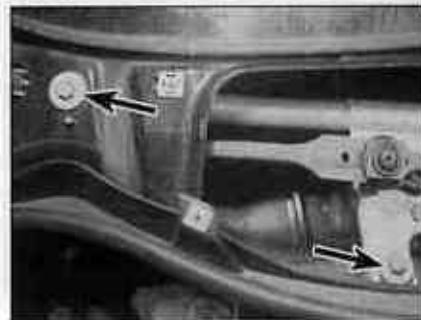
2 Remove the tailgate inner trim panel with reference to Chapter 11, Section 8.

3 Remove the wiper arm with reference to Section 18.

4 Working inside the tailgate, unplug the tailgate wiper motor wiring at the connector and disconnect the washer hose at the union (see illustrations).

5 Unscrew the bolts securing the motor mounting bracket to the tailgate (see illustration).

6 Withdraw the motor assembly through the aperture in the tailgate (see illustration).



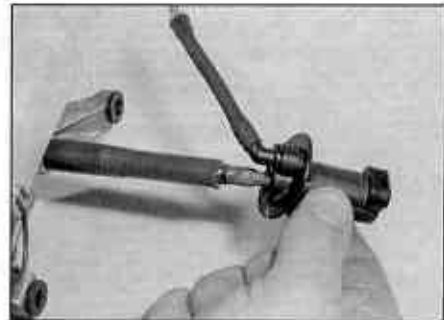
15.5 Unscrew the bolts securing the motor mounting bracket to the tailgate



15.6 Withdraw the motor assembly through the aperture in the tailgate



16.20a Remove the circlip ...



16.20b ... and then slide the nozzle housing from the end of the wiper shaft

Refitting

7 Refitting is a reversal of removal. Refit the wiper arm with reference to Section 18.

16 Windscreen/tailgate washer system components - removal and refitting

Washer fluid reservoir

Removal

- 1 Ensure that the vehicle is parked on a level surface. Apply the handbrake and chock the rear wheels. Slacken the left hand front roadwheel bolts.
- 2 Raise the front of the vehicle, rest it securely on axle stands (see *Jacking and vehicle support*) and remove the left hand front roadwheel.
- 3 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 4 Working from the engine bay, remove washer fluid reservoir upper securing screws.
- 5 Remove the securing screws and lift off the front and rear sections of the wheel arch liner.
- 6 Remove fluid reservoir lower securing screws.
- 7 Disconnect the wiring plugs from the washer pumps, and from the fluid level sensor, where applicable. Label each connector to aid correct refitting later.
- 8 Disconnect the fluid hoses from the washer pumps - if the reservoir still contains fluid, be prepared for spillage.

9 Where applicable, release the wiring harness from its clips, and move the harness to one side to allow sufficient clearance to remove the reservoir.

10 Lower the reservoir from under the wheel arch.

Refitting

11 Refitting is a reversal of removal.

Washer fluid reservoir and washer pump(s)

Removal

- 12 Remove the washer fluid reservoir, as described in the previous sub-Section.
- 13 Disconnect the wiring plug and the fluid hose from the relevant washer pump.
- 14 Release the spring clip, then pull the washer pump from the reservoir. Where applicable, recover the grommet.

Refitting

15 Refitting is a reversal of removal.

Windscreen washer nozzle

Removal

- 16 Open the bonnet.
- 17 Working under the bonnet, release the securing tabs using a suitable screwdriver, then push the nozzle from the bonnet. Disconnect the fluid hose, and withdraw the nozzle.

Refitting

18 Refitting is a reversal of removal.

Tailgate washer nozzle

Removal

19 The tailgate washer nozzle is integral with the wiper motor shaft; remove the wiper motor as described in Section 15.

20 Remove the circlip and then slide the nozzle housing from the end of the wiper shaft (see illustrations).

Refitting

21 Refitting is a reversal of removal, but ensure that the fluid hose is securely reconnected.

17 Windscreen wiper motor - removal and refitting

Removal

- 1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).
- 2 Refer to Section 18 and remove both wiper arms.
- 3 Remove the securing screws and plastic clips, and withdraw the cowl panel (see illustrations).
- 4 Disconnect the motor wiring plug.
- 5 Slacken and withdraw the motor and linkage securing bolts, then withdraw the assembly from the bulkhead (see illustrations).



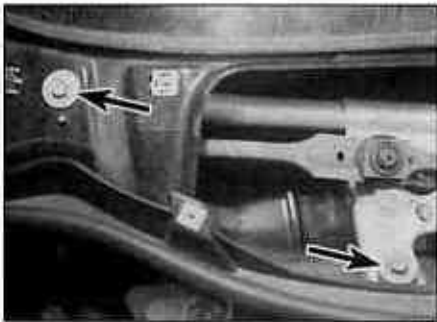
17.3a Remove the securing screws and plastic clips ...



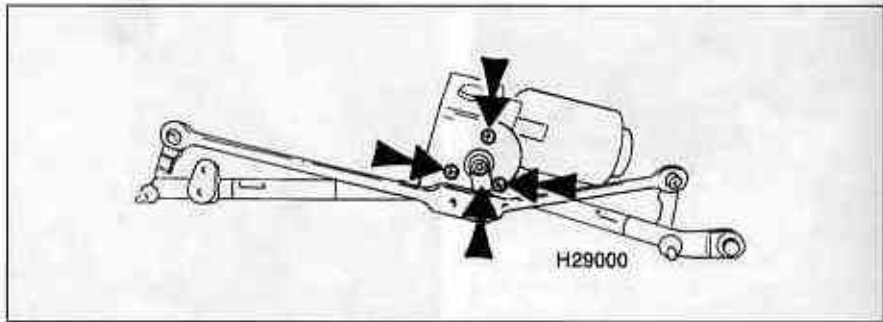
17.3b ... and withdraw the cowl panel



17.5a Wiper motor and linkage left-hand ...



17.5b ... and right-hand securing bolts (arrowed)



17.6 If desired, the motor may be detached from the linkage by removing the securing screws (arrowed)

6 If desired, the motor may be detached from the linkage by removing the securing screws (see illustration).

Refitting

7 Refitting is a reversal of removal, but ensure that the motor drive is in the 'parked' position before reconnecting the crank arm.

18 Wiper arm - removal and refitting

Removal

1 Operate the wiper motor, then switch it off

so that the wiper arm returns to the at-rest/parked position.

2 If a windscreen or tailgate wiper is being removed, stick a length of masking tape on the glass below the edge of the wiper blade, to use as an alignment aid on refitting.

3 Where applicable, lift up the wiper arm spindle nut cover, then slacken and remove the spindle nut (see illustrations).

4 Lift the blade off the glass, and pull the wiper arm off its spindle. If necessary, the arm can be carefully levered off the spindle using a suitable flat-bladed screwdriver. If both windscreen wiper arms are removed, note their locations, as different arms are fitted to the driver's and passenger's sides.

Refitting

5 Ensure that the wiper arm and spindle splines are clean and dry.

6 When refitting a windscreen or tailgate wiper arm, refit the arm to the spindle, aligning the wiper blade with the tape fitted before removal. If both windscreen wiper arms have been removed, ensure that the arms are refitted to their correct positions as noted before removal.

7 Refit the spindle nut, tighten it securely, and where applicable, clip the nut cover into position.



18.3a Lift up the wiper arm spindle nut cover ...



18.3b ... then slacken and remove the spindle nut