

Beige Mirabello

FULVIA

2nd SERIES

COUPE
SPORT

**OWNERS NOTES:
2. RESTORATION (Part 1)**

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1.1 Introduction

Congratulations! You may be considering buying a Fulvia Coupe or have recently acquired one and want to know what the future may hold. If so, this User Guide is intended to provide information that will help you plan for the worst, while hoping for the best and still enjoying Fulvia ownership. The information contained is based on the maintenance and restoration of two Series 2 Fulvias by the authors—one a 1971, 1600HF Lusso and the other a 1973, 1300 Coupe. Both cars had several previous owners and, in both cases, earlier repair work had been done. This Guide is based on our personal experiences of participating in major restorations on our cars and is intended to be a useful, and not definitive, description of restoring and maintaining a Fulvia.

It is important to remember that the Fulvia model is over 50 years old and dates from a time when Lancia was under severe financial pressure. Despite this, the company maintained its high standards of innovation and engineering, although commercial factors must have limited the scope of further development during its production. Even so, the lifetime of the Fulvia Coupe was marked by changes in the engine, gearbox, suspension geometry and levels of comfort in order to cater for different market sectors. In common with most manufacturers of the time, little attention was paid to longevity, although the basic body design, construction and most of the flaws that will eventually necessitate a restoration are also present in the earliest Berlinas, as well as the final Coupes.

If you are new to Fulvias and have access to a roadworthy car, our first suggestion would be to drive and enjoy it before embarking on structural work. After a year or two, you will be much better placed to decide how much time and resource you are prepared to spend keeping it on the road and what you want to achieve from restoration. For a car of this age, it is inevitable that some previous repair work will have been carried out on the typical weak points (including sills, wheel arches, lower subframe mounting points and rear spring mountings). Unless you have a documented history of the previous restorations, any earlier work in these areas should be inspected carefully and further repairs included in your plans. In our experience, Fulvias that have been used regularly throughout the year in Northern Europe can expect to require significant work every 10-15 years.

The restorations featured in this Guide took place in two different decades and used two different approaches. Purchased in 1986, the 1971 1600HF Coupe was restored between 1994 and 1999 by its owner (GW) in the workshop of the Welwyn Garden City Motor Club (WGCMC). At that time, little information and only a few repair panels were commercially available; however the WGCMC had a range of tools and equipment, as well as members with experience of restoring a wide variety of vehicles or building 'street-rods'. Previous poor repairs and crash-damage were soon uncovered, and a decision was taken to also address some of the long-term Fulvia weaknesses during its restoration. Finding practical solutions to problems and delaying future restorations were prioritised over originality.

The second car, a 1973 S2 1300 Coupe, was restored between 2017 and 2021, using a professional garage for bodywork and with other items restored & refurbished by the owner (NT). By this time,

information and advice was more readily available on the internet and spare parts and replacement panels could be purchased online, partly driven by the increase in value of Fulvias. This presented a different set of problems, namely how to select the best advice and choices from the available options, as well as how to coordinate the overall project. Again, a pragmatic approach was taken – to restore the car and retain or recreate its original features & colour, while making some limited modifications to encourage daily use.

Disclaimer

This Guide is not intended to be comprehensive, being limited to topics where we have some direct, and usually hands-on, experience. Our hope is to encourage owners to get to know their cars and decide which jobs they can tackle safely, without requiring professional assistance. In addition we have tried to restore our cars with their long-term use in mind, rather than simply repairing each fault as necessary. While some of the work described here was prompted by an obvious problem, many hours have been spent removing and restoring other items as they became accessible. This differs from the approaches taken in most commercial restorations which are designed to minimise the time spent fixing a single fault. While the methods described here gave good results on our cars, other cars with different histories may have additional challenges. If so, we would recommend consulting other users and online forums for additional advice before proceeding.

When in doubt, 'Do No Harm'.

1.2 Warning Signs

Any issues with the engine, gearbox, suspension or brakes should be identified before purchase during a test drive. A warmed-up, well-looked after Fulvia should idle (fairly) smoothly at 800-1200rpm, cruise at 3000rpm with an engine note best described as 'sporty', accelerate progressively and pull up in a straight line. The steering will be heavy and the brakes will require some effort compared to more modern cars, but the quality of Fulvia engineering and the road holding are well ahead of its contemporaries. Identifying and fixing faults in any of these areas may require advice from other owners or specialist help.

More significantly, the prospective buyer (or new owner) should critically examine the body work. Do the doors, bonnet and boot fit properly? Panel gaps may have varied from 2mm to 5mm on new cars, but overlap of the doors with the body suggests some distortion of the body (or a lot of filler) is present. It is also possible that doors from a different Fulvia Series have been fitted (S1 alloy doors are always popular with S2 owners) or that the body has been allowed to distort during the fitting of replacement sills. Finally, it is also possible that the ends of the original sills have corroded. These areas are hidden under the wings and provide support to the A- and B-posts. To investigate further, the car should be lifted, allowing inspection of the floor pan, lower subframe mounting points and

the adjacent areas at the rear of the front wheel arches (see below). However, a full investigation is not possible unless the subframe is also lowered.

1.3 Identifying Your Fulvia Coupe

There were two distinct series of Fulvia Coupe (S1 and S2) followed by cosmetic, but not mechanical, revisions during series 2 that led to cars described as Fulvia 3. The transitions occurred in periods when Lancia was experiencing economic difficulties and later undergoing acquisition by FIAT. While some changes were aimed at improving performance and driver comfort, others were intended to reduce the costs of production and servicing. Within Series 1, small (non-obvious) modifications were made to the engine dimensions (capacity, stroke, V-angle), camshafts (e.g. 'Variante 1016') and trim levels ('Lusso') during production, while in Series 2 additional 'Special Editions' were marketed with changes to the bodywork and trim ('Montecarlo', 'Safari').

Early cars, with less powerful engines and made in better economic times, employed more alloy panels - typically some combination of doors, bonnet/hood and boot/trunk – with an eye to homologation of alloy parts for rallying. In production cars, these were only used for the high-performance (1.2 HF/HFS and Rallye 1.3) models and eventually phased out completely on the grounds of cost and increased robustness. To add to the complexity, during the changeover periods between Series 1 and Series 2, the Lancia Factory at Chivasso adopted a 'parts-bin' approach and continued to use some remaining steering and suspension parts from the older model, while producing the new model. After 50 years on the road, a typical Fulvia Coupe may already have had some items replaced using parts from other cars so, before ordering replacements, it is important to establish which combination of models and variants you have purchased.

There are 5 serial numbers to be found on the Fulvia Coupe:

(1) Chassis Number e.g. 818-741*003647. The chassis number is stamped on the blue Vehicle Identification Plate which is located in the engine bay and also in the bodywork rain channel at the rear of the bonnet. It identifies this car as Model 818 (= Fulvia), Variant 741 (= Series 2, 1600HF, RHD) and Production Number 3647. The first six numbers (818-741) define the Lancia Type (*'Tipo'*).

(2) Engine Number e.g. 818.540*007495. This number is stamped into the top of the gearbox bell housing, behind the oil filter. It denotes the complete assembly of gearbox, block and cylinder head that was installed at the factory and identifies the engine as being factory item 7495, first produced for a Fulvia (818), Series 1 Rallye 1.6HF LHD (540).

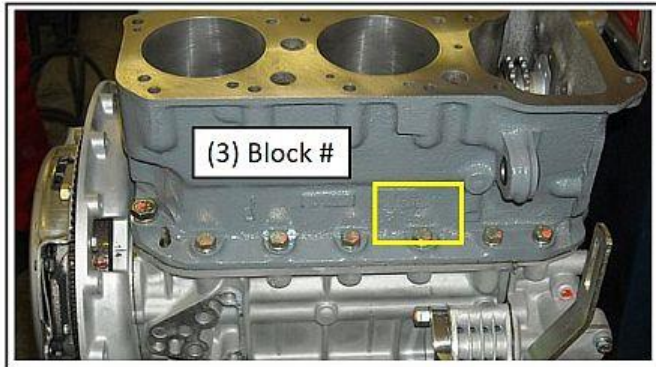
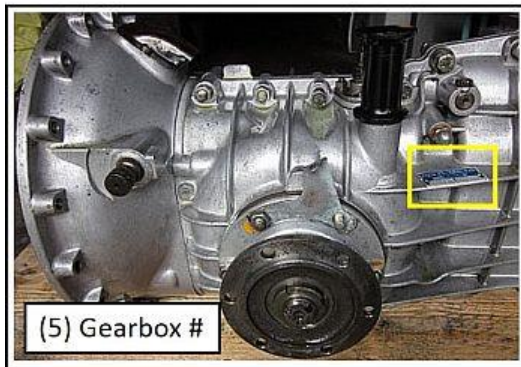
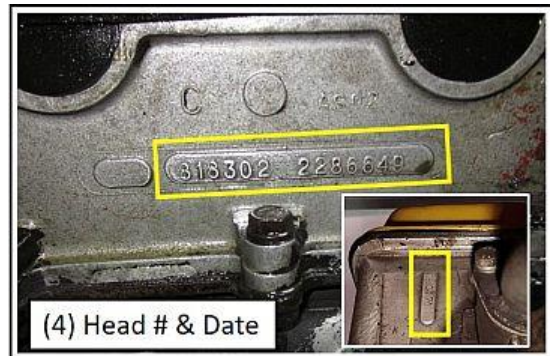
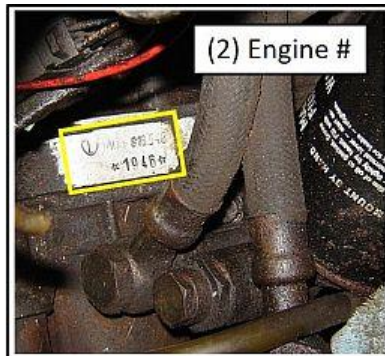
(3) Block Casting Number e.g. 818.540*2274787. This number is cast into the block on its right-hand side, beneath the inlet manifold and behind the alternator. The number is common to all blocks of the same type, in this case made for a Series 1 Rallye 1.6HF LHD (540).

(4) Head Casting Number e.g. 818.540*2264676. This number is cast into the cylinder head on its front face, above the water pump. As with the block casting number, it is common to all cylinder heads of the same type (540 = Series 1 Rallye 1.6HF LHD). The head also has a casting date (in this case 19/04/71) on its left hand side, near to the number 1 exhaust port.

(5) Gearbox Number e.g. 818-740 003983. This number is stamped on a small blue plate, attached to a flange on the gearbox, near its oil filler hole and dipstick. It should be common to all factory gearboxes for Variant 740 (Series 2 1600HF LHD) which have the standard gear ratios.

For Series 2 some parts, e.g. cylinder block and head, remained in common with the Series 1 Rallye 1.6HF and therefore have a 540 variant number, while the gearbox was updated to 5-speeds and has a 740 number. Chassis numbers 540/541 and 740/741 denote LHD/RHD cars but that distinction is not relevant to engine and gearbox parts. For more detailed information on the interpretation of numbers and dates for your car, it will probably be necessary to consult an authoritative source e.g. the UK Lancia Motor Club Fulvia advisor, or seek a consensus view from other owners via the online Fulvia Forums.

Dates	Tipo (LHD/RHD)	Model	Special Editions
1965-1967	818.130/131	S1 1.2 Coupe	
1966-1967	818.140	S1 1.2 Coupe HF	
1967-1968	818.330/331	S1 1.3 Rallye	
1967-1969	818.340/341	S1 Rallye 1.3 HF	
1969-1970	818.540/541	S1 1.6 Coupe HF (' <i>Fanalone</i> ')	Variante 1016
1970-1973	818.630/631	S2 1.3S Coupe	Montecarlo
1970-1973	818.740/741	S2 1600 HF	Lusso
1974-1976	818.630/631	Fulvia 3	Montecarlo, Safari



While serial numbers can tell you much about your car, there may still be surprises to uncover. When ordering replacement rear springs for the S2 1600HF described in this Guide, it became apparent that the rear spring hangers and leaf springs that had been fitted by the factory were S1 items – an example of the ‘parts-bin’ approach that was used during the change-over period between models.

1.4 Routine Maintenance

1.4.1 Servicing and Lubrication

	SERVICE	7000km/ 4350 miles or 1 Year	14000km/8700 miles or 2 years
Fluids	Engine Oil	Replace	Replace
	Gearbox Oil	-	Replace
	Steering Box Oil	-	Check level/Top up
	Brake Fluid	Check level	Replace
Filters	Air Cleaner	Clean	Clean or Replace
	Fuel Filter(s)	Clean	Clean or Replace
	Oil Filter	-	Replace
	Sump & oil strainer	-	Clean (28000km)
Mechanical	Steering Idler Arm	Lubricate	Lubricate
	Front Suspension	Lubricate	Lubricate
	Clutch	Adjust free travel	Adjust free travel

	CHECK	7000km/ 4350 miles or 1 Year	14000km/8700 miles or 2 years
Engine	Valve Clearance	Set clearance	Set clearance
	Spark Plugs	Clean & adjust gap	Clean & adjust gap
	Distributor	Inspect & adjust gap	Replace rotor arm
	Alternator Belt	Check & adjust tension	Check or replace
	Alternator	-	Renew brushes (49000km)
	Coolant (glycol/water)	Replace	Replace
	Battery	Check condition	Check & Clean terminals
Mechanical	Brakes	Adjust handbrake	Check pads
	Shock Absorbers	-	Check operation

Recommended service intervals are given in the Fulvia Coupe/Sport Instruction Book and summarised in the table above. These were designed for cars being driven “normally” and with an annual mileage of around 7000km. Routine servicing involves replacing the oil every 7000km (4350 miles) and the oil filter every 14000km (8700 miles). It is recommended to stick to these intervals, even with the improved performance of modern semi-synthetic oils, since oil changes also provide

an opportunity for the early detection of wider engine problems. A more extensive check should be carried out every 28,000km (17,400 miles) by lowering the sump, removing any non-magnetic debris and sludge and cleaning the strainer. For cars doing low mileages, the 7000km and 14000km intervals should be replaced by 1-Year and 2-Year time points. Visual inspections during services will also allow developing issues (fluid leaks, damage to hoses, wiring, lights etc.) to be identified and corrected before they cause a problem on the road.

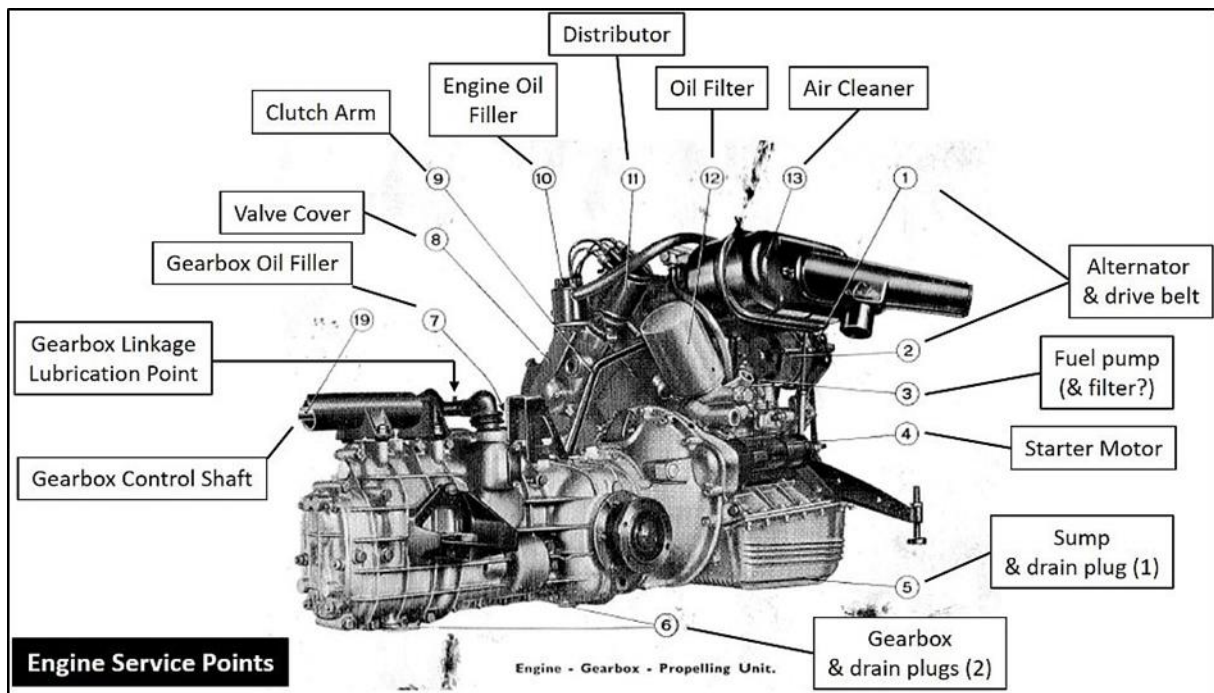
Engine lubrication is provided by a semi-pressure system in which oil is drawn from the sump, passing through a strainer in the sump and the replaceable oil filter before being pumped through narrow galleries to the crankshaft, cylinder walls and timing chain in the engine block and also to the cylinder head where it is distributed by the moving parts and lubricates the valves and camshafts. Oil then drains back down into the sump, through larger oilways. The sump drain plug incorporates a magnet that should catch any ferrous metal debris that is circulating in the oil. The presence of small amounts of fine bright metal filings is a feature of normal wear; however large amounts of coarse or rusty metal fragments may be an indication that a metallic mesh, contained in a compartment within the oil filler can and intended to allow oil vapour to condense and return to the engine, is breaking down. This is a particular issue for cars that have been stored for long periods of time. Advice should be sought but, at present, the best solution is to prise (or cut) the top off the can to gain access to the mesh, and then press (or weld) the top back on after filling the compartment with a suitable stainless steel mesh.

There are a number of oil filters available to fit the Fulvia from trusted manufacturers such as Fram, Mann and Bosch. Some filter types contain a non-return valve which traps oil in the filter after the engine is turned off and are preferred by many users. However, the Fulvia's vertical filter mounting tube ensures that even those without a valve retain most of their oil. Consequently, when removing the filter, it is recommended that a drip tray is placed under the car while a small container is used to catch the retained oil.

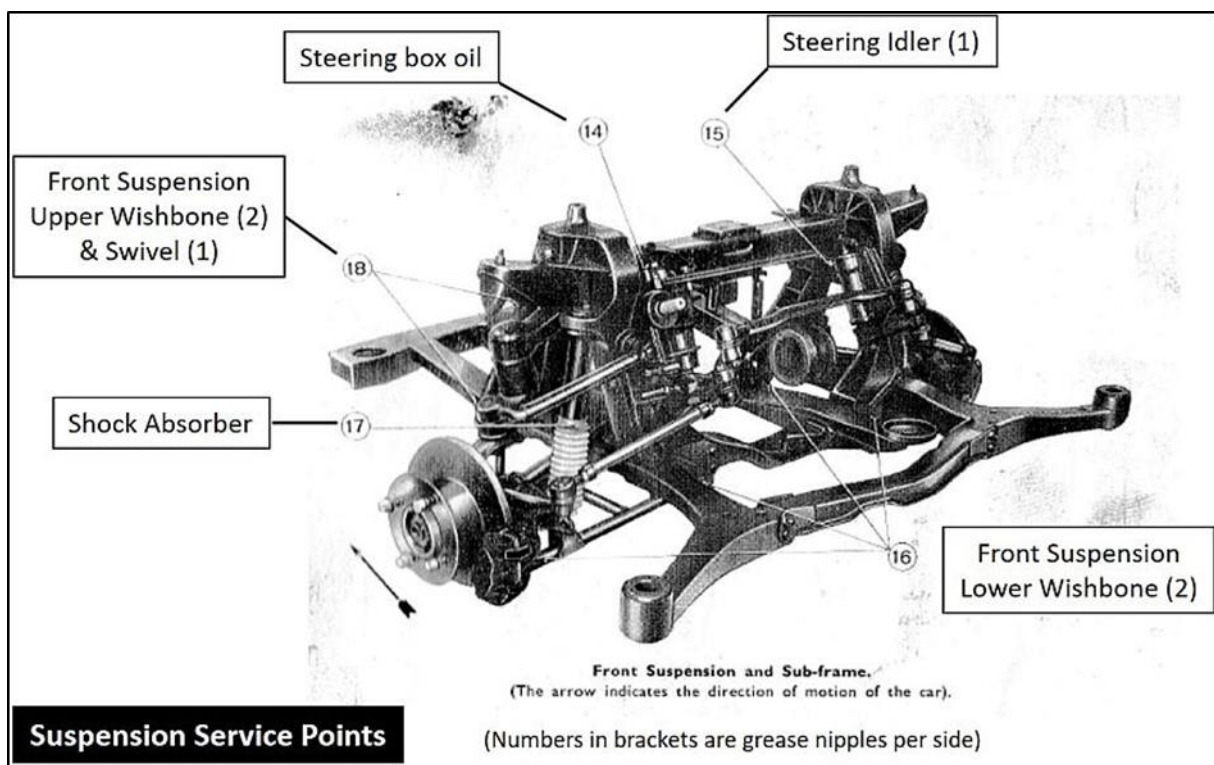
The gearbox oil is filled through the hole occupied by the short, plastic dipstick on the right-hand side of the gearbox. The gearbox oil level should be checked every 7000km and replaced every 14000km. The oil is drained via plugs at either end of the gearbox, ideally done when the oil is hot and the car is level. These drain plugs also incorporate magnets and attention should be paid to the amount and size of any metallic debris that is found.

Originally, in addition to the mesh fuel filter built into the fuel tank, Lancia initially installed a glass-globe filter, located near the fuel pump. This was removed on Series 2 cars, but most should now have had this restoted by addition of a glass-bowled Malpassi Filter King (or an equivalent unit), which is commonly mounted on the inner wing. These units also regulate fuel pressure and can prevent excessive fuel from the mechanical fuel pump flooding the carburettors when engine revs are high. Cars that are fitted with secondary electric fuel pumps (used to prime the carburettors prior to starting) may also have a second filter installed immediately after the fuel tank to protect the electric pump.

The locations of engine and gearbox service points are shown in the diagram below.



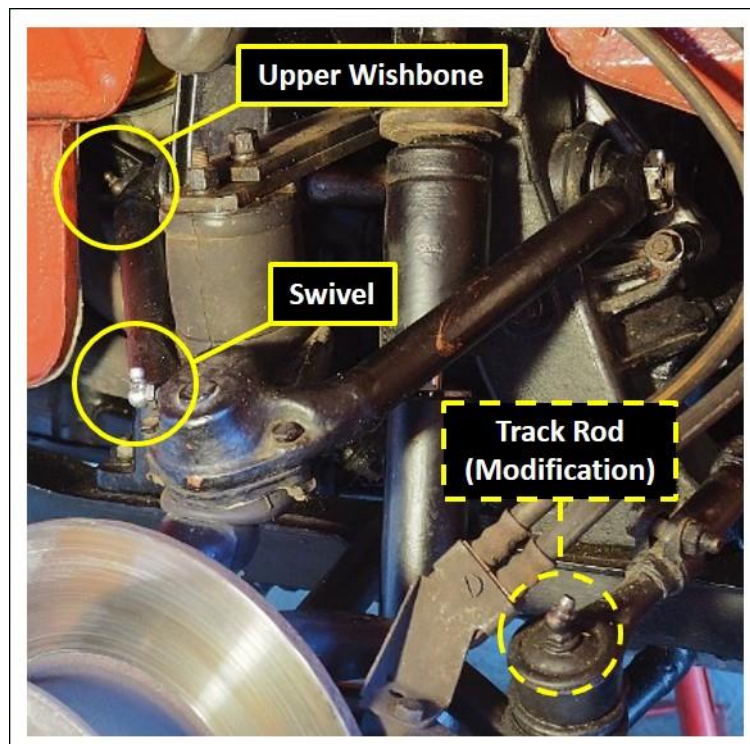
The first Series of Fulvia Coupes included a number of lubrication points (grease nipples) on the front suspension, steering idler and gearbox control shaft, with a recommendation that these should be re-greased every year or after 7000km. These lubrication points were retained for the start of Series 2 production in 1970 and are illustrated in the first edition of the S2 Instruction Book, shown below. Single lubrication points were present on the steering idler and the gearbox control shaft housing, while another ten points were distributed between the upper and lower steering swivels (4), the front and rear bushes of the lower wishbones (4) and the front bush of the upper wishbone (2).



After placing the car on axle stands and removing the front wheels, most of these points can be reached using a grease gun with a flexible hose. Access to the grease nipple on the top of the steering idler is obtained through slots in the battery tray, after removing the battery. However, accessing the nipple on the gearbox control shaft, requires the rear of the gearbox/subframe assembly to be lowered while the body is supported. In practice, this can be safely left until other work on the gearbox or gear linkage is required.

As Series 2 production progressed, Lancia changed the design of the wishbone bushes and steering swivels in favour of 'sealed-for-life' items and the steering idler bush material was switched from bronze to plastic. Accordingly, the requirement to grease the front suspension was removed from the servicing schedule during 1971. However S2 cars continued to be fitted with some suspension lubrication points while the old parts were used up. For example, the mid-1971 1600HF Lusso that is described in this Guide retained four lubrication points, on the upper swivels and the upper wishbones. Later editions of the S2 Instruction Book contained no reference to maintenance of the suspension, although lubrication points on the steering idler and gearbox control shaft were retained. Over time, the Lancia plastic steering idler bushes often wear badly; however it is straightforward to replace these using available phosphor-bronze or modern, self-lubricating polymer items.

While later S2 cars have no factory-fitted lubrication points, it is still possible to add them to some existing ball joints. The illustration below shows factory-fitted lubrication points on the mid-1971 1600HF, as well as a modification made to all four track-rod ends around 1995.



1.4.2 Steering Adjustment

The Fulvia steering is provided by a 'worm-and-roller' steering box that is connected to the front wheels via track rods. On the passenger side, the steering box acts, through a connecting rod and additional ball joints, on an Idler box that is connected to the track rod on that side.

The steering box sits underneath the brake servo and has a lock-nut and screw on its top face that can be adjusted to remove excessive play in the steering. There is also a small filler cap that gives access to an oil reservoir in the box. Small leaks in the oil seals around the steering shaft are common and, in the event of a leak, the oil level should be inspected regularly and topped up as necessary using SAE90 Gear Oil. When doing this, it will be helpful to improve access by first disconnecting the vacuum hose from the brake servo and moving it aside.

To adjust the amount of free play at the steering wheel, lift the front of the car so that the wheels are off the ground. Note the position of the slot in the screw-head on the steering box and loosen the locknut. Make a small (90°, clockwise) adjustment to the screw and turn the steering from lock-to-lock. Return to the centre position and check the free play. If it is still excessive make another small adjustment. Continue, making turns from lock-to-lock, until the free-play is correct or any resistance to movement is detected at the steering wheel during the turns. If the latter, then loosen the steering again using a small, anticlockwise adjustment of the screw. Once satisfied, tighten the locknut, without moving the adjustment screw, and re-check the free play and resistance.

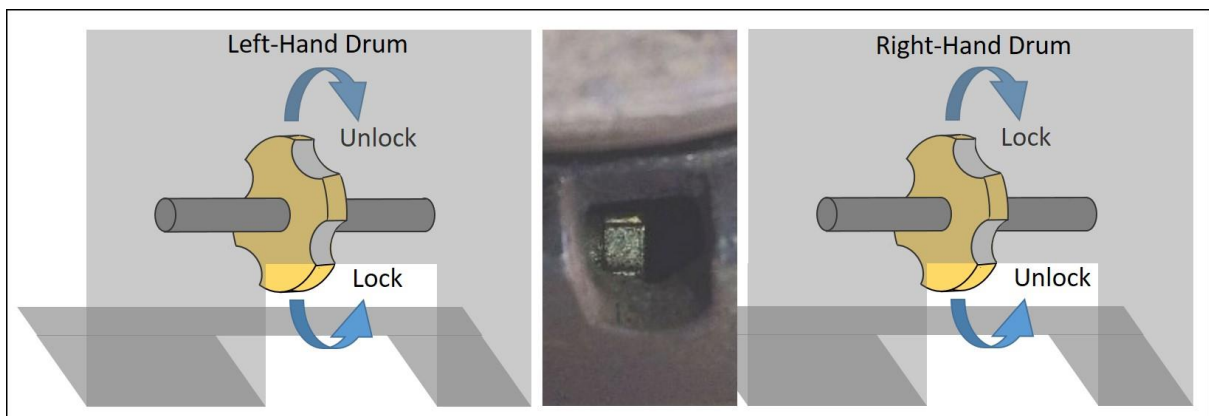
The steering idler box is located behind and below the battery tray and can be accessed through slots in the tray once the battery has been removed. Some idler boxes have a screw and locknut on the top that allows adjustment in the same way as the steering box; others have a grease nipple for lubrication and contain shims inside the idler box for adjustment. The idler shaft itself runs in two bushes. These were originally made from plastic (which wears) and should be replaced with phosphor-bronze bushes if the play in the shaft cannot be removed by adjustment.

1.4.3 Handbrake Adjustment

The handbrake operates on a pair of brake shoes that are incorporated into the rear disc/drum assembly (see section 4.1.3). Since the handbrake is only used when stationary, the drums never warm up and corrosion can lead to the movement of the shoes being restricted. For this reason, lack of handbrake efficiency is a common MOT failure, but can usually be cured by simple adjustments.

With the rear wheels removed and the handbrake off, the disc/drums should be rotated until the inspection holes in the drums are close to their lowest point. Using a torch, an adjuster with a knurled brass ring should be visible through both inspection holes.

On the right-hand side drum, use a flat-bladed screwdriver to push the closest edge of the knurled ring downwards, rotating it until the brake shoes prevent the disc from rotating. Repeat the procedure on the left-hand drum although, on this side, the edge of the knurled ring must be pushed upwards to lock the drum. With both drums locked, gently pull the handbrake on and then off a few times to centre the shoes and handbrake cable. With the handbrake off, check that both drums are still locked and, if not, readjust them. At this point the adjusters should be backed off by about 1 turn (4-6 'clicks') or until the rear discs rotate freely.



With the handbrake shoes correctly positioned, the handbrake cable can then be tensioned by adjusting the position of the yoke that connects the cable to the threaded handbrake rod underneath the car. The cable should be set so that the handbrake is locked on after three or four clicks of the handbrake lever ratchet.

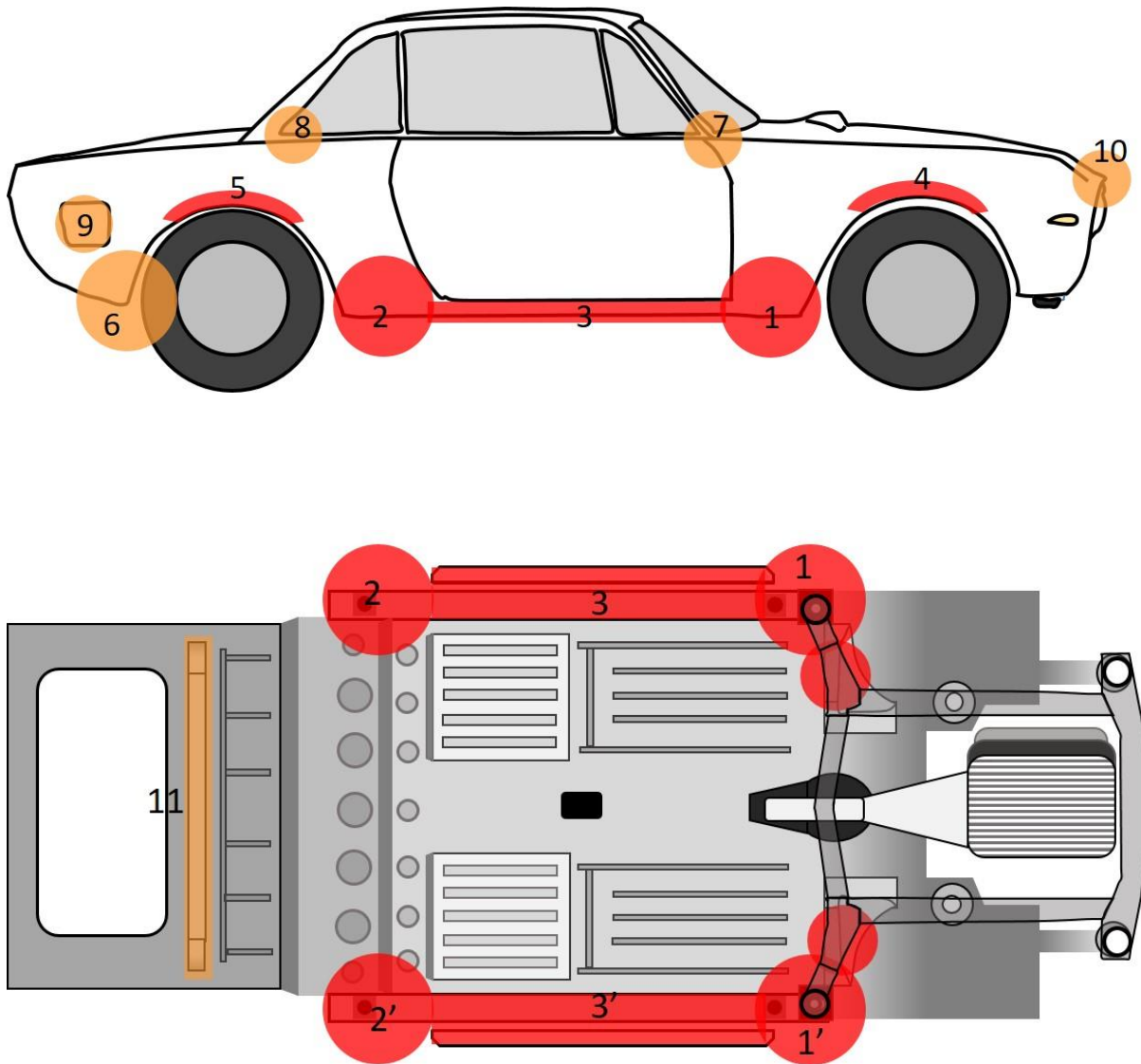
2.1 Bodywork Inspection

The Fulvia Coupe bodywork areas that are prone to corrosion and therefore likely to need attention are shown on the diagrams below. They have been divided into two groups:

Critical Areas (red) – these are responsible for the safety and integrity of the structure. Full inspection will require removal of some sound areas of external bodywork. Visible failure in one area [subframe mounting point, the floor beneath the sill, or the transverse box-section at the junction of the foot-well with the front wheel arch] may warrant inspection of other areas [the rear of the sill, rear wheel arch and lower B-post], since their causes of corrosion may be connected [ingress of water into the sill which is distributed along the length of the inner and outer sills]. Removal and repair should be carried out with the car properly supported and braced to avoid distortion. Improvements to the original design can be made by adding a central plate between the inner and outer sills, as well as drilling 10-13mm drain holes/cavity-wax injection points in the sill and other box-sections

Non-critical areas (orange) – these are localised in extent and are not critical for structural integrity (although they may lead to MOT failure). They are often areas where mud and water can be trapped, causing corrosion. Repair can often be effected without extensive work and improvements can be made by adding drain holes, applying paint and cavity wax and carrying out regular cleaning.

The start of a restoration is often prompted by visible issues in the critical areas. In the case of the 1600HF Coupe, restoration was started in 1994 after an MOT failure due to corrosion in the floor, under the sill and near the jacking points. The RHS door was also a poor fit, with a small (5mm) overlap between the bottom corner of the door and the bodywork, which could not be corrected by adjustment. After the restoration started, it was apparent that there was severe internal corrosion of the sills and that an earlier repair to the subframe mounting box had been merely cosmetic, at best.



1 – Sill, subframe leg & mounting point, footwell box-section and internal support for A-post

2 – Sill and Internal support for B-Post

3 – Floor pan below sill

4 – Front wheel arch (double-skinned area between inner and outer arch)

5 – Rear wheel arch (double-skinned area between inner and outer arch)

6 – Junction of rear valance with inner wing (water trap)

7 – Windscreen, lower corner

8 – Rear screen, lower corner

9 – Petrol Filler box, front face (double-skinned area between outer wing and box)

10 – Front wing, near bonnet (water trap)

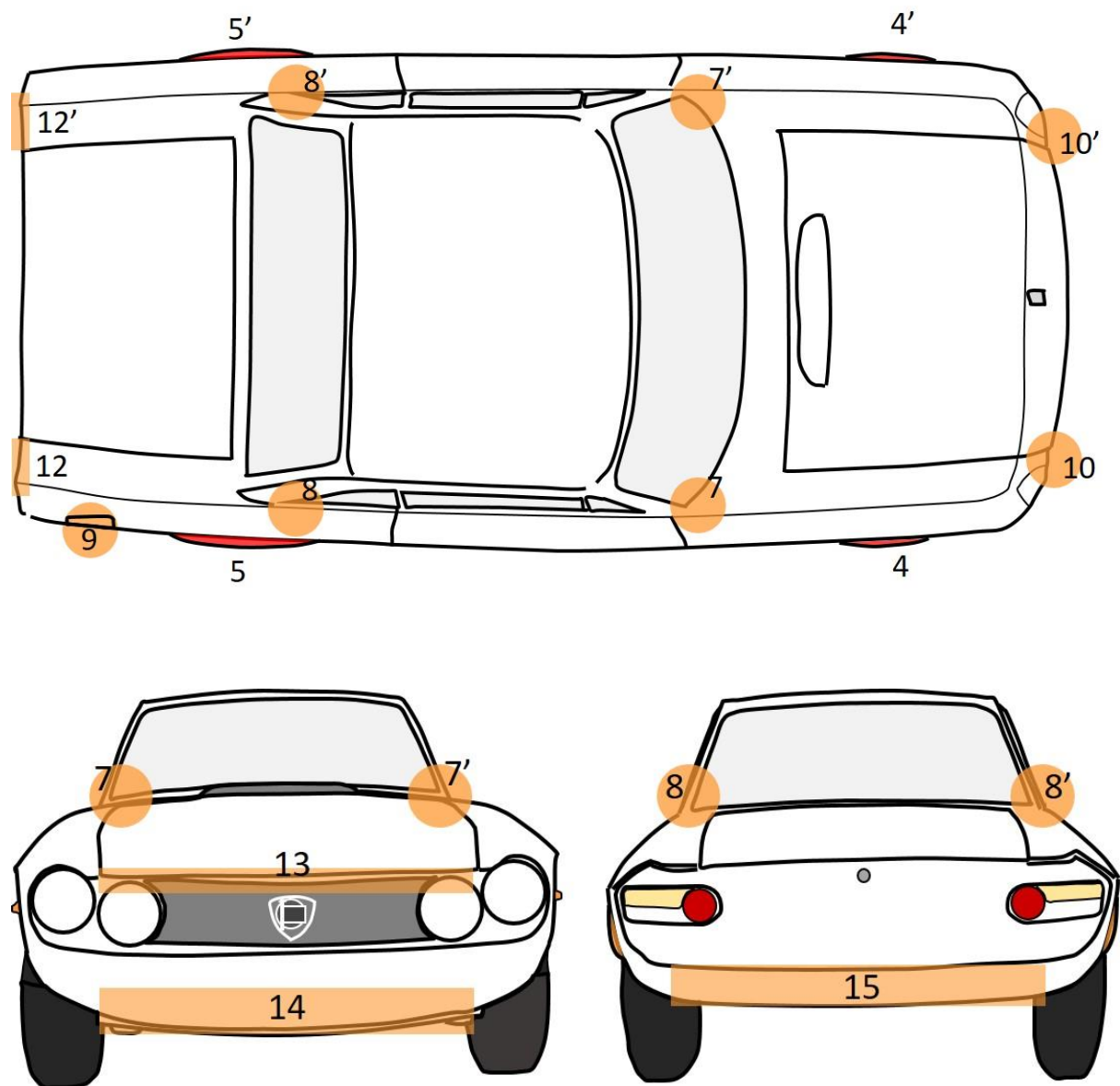
11 – Transverse box for locating the Panhard rod and the boot floor above

12 – External flanges (junction of the rear wings and rear panel)

13 – Slam panel for Bonnet

14 – Front Valance (bottom edges and junction with the headlamp panel)

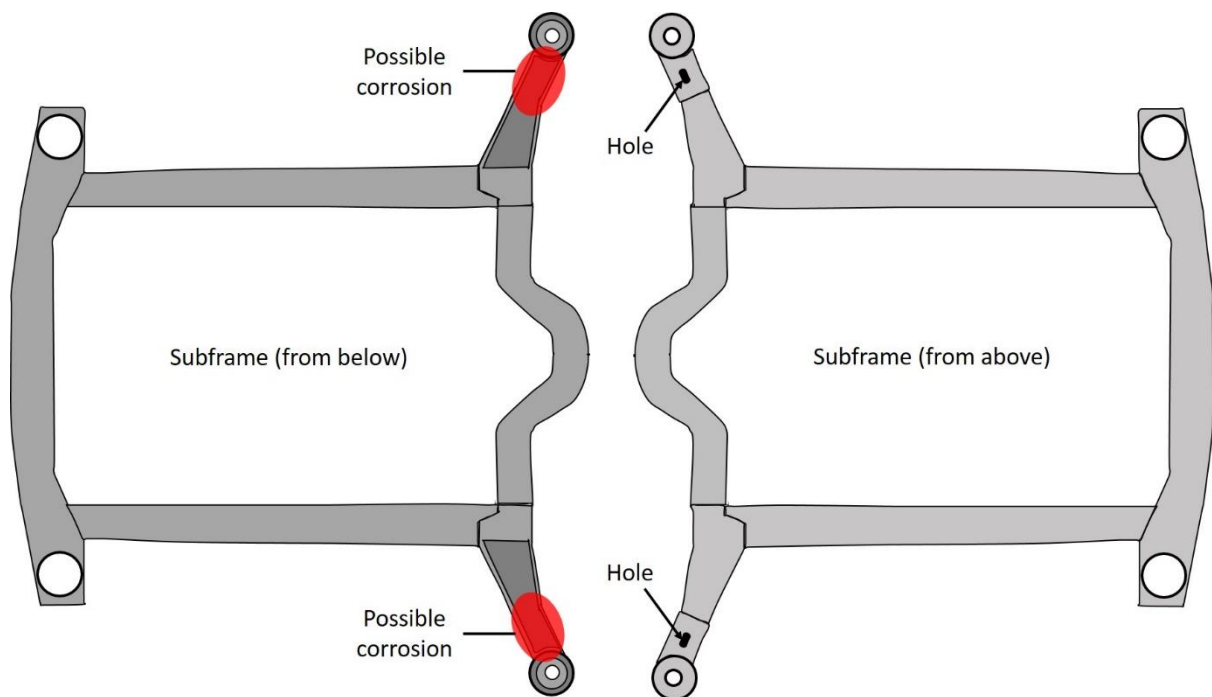
15 – Rear Valance (bottom edges and junction with the rear panel)



2.2 Subframe

The Fulvia subframe provides a solid platform for the engine, gearbox and front suspension. The monocoque body is attached at four points on the lower subframe with another two upper mounting points provided by aluminium towers which are bolted to the lower subframe (not shown). Since the engine, subframe and front suspension form a separate unit, it is usually preferable to remove them as such, once the bodywork has been stabilised during a full restoration.

After disconnecting all connections from the body to the engine & gearbox (fuel lines, clutch cable earth straps and electrical connections to alternator, horns, fan and sensors etc.), the body can be lifted and the engine, gearbox and subframe rolled out as a unit. This should be done with the doors in place and closed, in order to minimise any distortion of the body after removal of the subframe. Prior to any further work, the body should be supported on stands or preferably trestles placed at or near the four lower subframe mounting points and in front of the rear wheel arches.



The subframe is well-constructed from thick steel (approx. 14SWG/2mm) – however, it comes with an Achilles heel. Lancia designed the rear subframe out-riggers with a hole in the top surface which, in normal use, allows water and dirt to enter the box-section. No blanking grommet was provided for this hole and no drain hole is present in the lower surface to allow water to escape. This leads to internal corrosion of the box, which is only detected on the outside when the outrigger is close to failure. At this point, perforations may be visible in the lower surface of the box and the inner surface of the mounting point (area highlighted in red, above).

This hole serves no known function although it may have been introduced as a tooling hole for use during construction or assembly of the subframe. Remanufactured rear subframe outriggers are now available; however some of these have been reproduced with holes in the same place. During restoration, any such hole should be sealed or, preferably, deleted.

2.3 Critical Areas

It is generally advisable to start on one of the critical areas, to assess the scale of the problem, decide on how to manage the restoration and estimate the costs involved. However, if planning to do some or all of the work yourself, you might choose to work on a single, non-critical area in order to get a realistic view of the skills and tools that will be required. Whichever approach you choose, it is certain that you will require help, advice and probably access to specialist skills at some point in the restoration. Our first advice would be:

- Work on one side at a time.
- Work on the worst side first: at least ‘things can only get better’ and you will not repeat your mistakes on the second side.
- Leave screens, doors, boot, bonnet and subframe in place until you need to remove them. Doors provide some structural rigidity and all gaps are useful indicators of distortion in the body during restoration.

Our own restorations relied on input, information and workshop manuals provided by the UK Lancia Motor Club (LMC) and its Forum (<https://www.lancia.myzen.co.uk/forum/>) and the Lancisti Community Forum (<https://lancisti.net/wbb/>). There are also a number of commercial sites that can provide parts and reproduction panels, including Omicron (<https://omicron.uk.com/>) and Lancia Classic (David Ashworth, <https://www.lanciaclassic.com/>), who have both supported UK owners for many years and Viva-Lancia (Huib Guerink, <https://viva-lancia.com/>) whose information-rich site also supplies electronic ignitions and uprated oil pumps. PiècesFulvia, a relatively recent French entrant in the field, have quickly built up an impressive collection and on-line catalogue of reproduction parts (<https://www.pieces-fulvia.com/mag/en/home.php>) with a seamless order, payment and delivery service.

2.4 Straightening the Body

If, at the start of restoration, one or both doors are a poor fit to their openings then some distortion of the body may be present. First, all the paint and filler should be removed from the sills and door on the worst affected side. If the reason for the poor fit is not due to accident damage and poor repair, then further investigation is necessary.

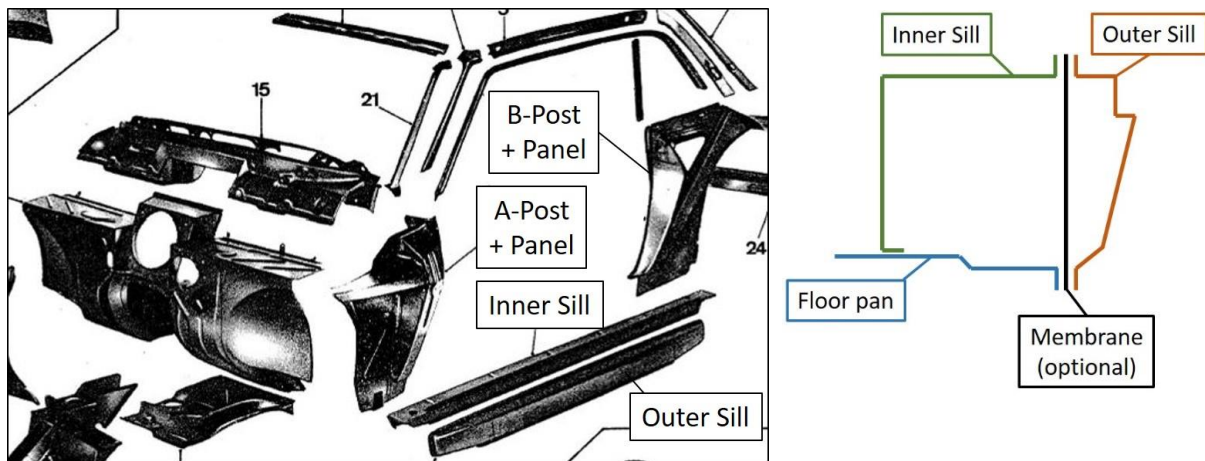
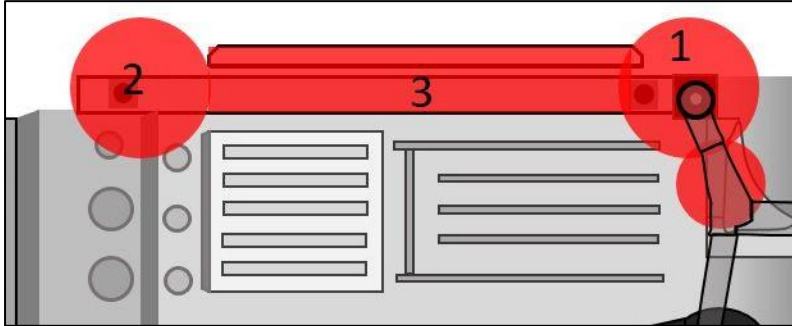
Removing the outer sill and a portion of the front wing will expose the area around the rear subframe mounting box. If this is badly corroded, it is likely that some distortion of the body has occurred. This was the case in the restoration of the 1971 1600HF Coupe, where the right-hand door overlapped the body by 5mm in the lower rear corner.

With the outer sill, door and windscreen removed, and the subframe/engine dropped, a hydraulic ram was placed across the door opening and used to carefully exert pressure from the lower rear corner to the door post and hinges. To avoid local distortion of the panels, wooden blocks were placed at each end of the ram in order to spread the load. Measurements were taken as the pressure was increased and, when the correct shape had been achieved, the door gap was braced by tack-welding square sectioned tubing across its inner faces. At this point the ram was removed and the fitting of the door was checked, repeating the process where necessary.

The bracing was left in place until repairs to the subframe mounting point had been completed, at which point the subframe was reinstalled. With the body supported across the middle as well as at either end, the bracing was removed and the door refitted. Having established that the fit was good, the whole side was stabilised by completing the inner sill and adding a central membrane along the length of the car (see photo below and section 2.5).



2.5 Sills, Subframe Mounting Points and A- and B-Post supports



Fulvia Parts Manual 1970: Body Components (TAV69)

The Fulvia sills are box-sections, formed between a deep Inner Sill and a shallower Outer Sill which extend the full length of the body between the two wheel arches on each side of the car. Together they are responsible for providing a rigid link between the front subframe and the rear axle. Both ends of the Outer Sill are extended to form tapered boxes which support the A-post at the front and the B-post at the rear. Near the A- and B-posts, the Inner and Outer Sills are separated by the lower portion of their panels. However, over the portion of the sill that lies under the door, the floor, Inner Sill and Outer Sill form a single box section.

The front of the inner sill encloses the subframe mounting box, which is welded to the inner surface of the A-Post panel. Unless properly sealed, this area will collect water directly from the road, through gaps between the rear subframe mounting box and the floor pan. Once the sill has been compromised, water can travel internally over its length and will collect in areas around the sill's junctions with the floor and the front and rear panels.

These areas corrode internally and considerable damage may have been done to the internal structures before any rust holes are apparent from the outside. The internal structures include the rear subframe mounting box and both extensions to the outer sill which support the A- and B-posts.

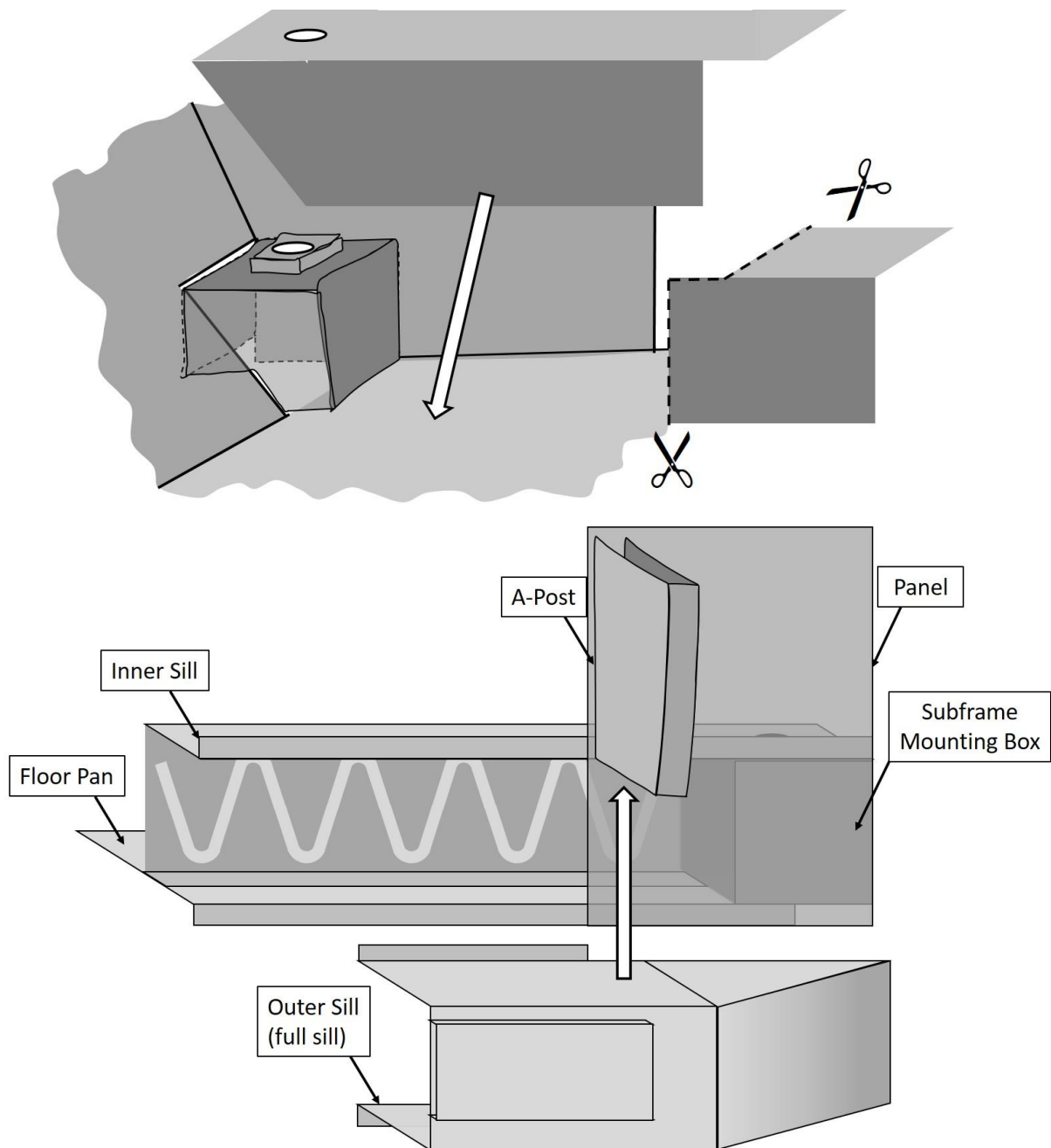
In severe cases, the loss of structural integrity can lead to distortions of the body leading to misalignment of the doors and vertical cracks appearing in the wing above the wheel arch.

The first step in the restoration of this area is to remove a section of the lower wing, between the door edge and the wheel arch. This will expose the lower portion of the A-post panel and the outer sill extension that supports the A-post (below left, after replacement of sill).



In the case of the 1600HF (above right), the outer sill extension and the area of the panel around the subframe mounting box, as well as the box itself, were badly corroded or missing. A previous repair in this area had consisted of connecting the floor to one of the remaining faces of the box using a strip of bent metal, leaving little support for the A-post.

The drawings below show the proper arrangement of the Inner Sill, floor pan and the rear Subframe Mounting Box, viewed from the right-hand foot-well and, separately, from the outside of the car. When removing the front section of the inner sill, the horizontal and vertical cuts can be offset as shown, to provide greater strength when a new section is welded in.



It is currently possible to purchase full-length Outer Sills, Subframe Mounting Boxes and repair sections for the Inner Sills. These are well-made and contain all the pressings that are required for an authentic finish. An inner sill repair section from Lancia Classic (<https://www.lanciaclassic.com/>), is shown below.



While professionally-made repair panels are usually accurately made and easy to fit, their use for all corroded sections will substantially add to the cost of a current restoration. As an alternative, a self-fabricated section of the inner sill and floor can be made using the cutting plan and dimensions shown in Appendix 1.

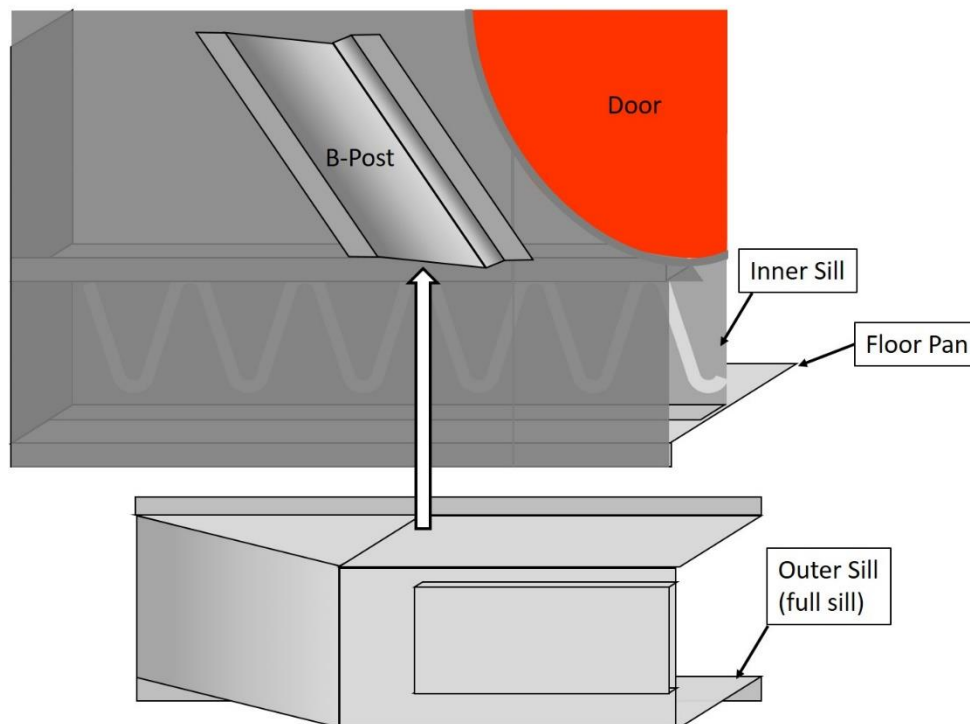
In 1994 many items were not available, and so sections of the Inner and Outer Sill, as well as the Subframe Mounting Box, were made by hand. This proved relatively straightforward and permitted the use of thicker steel ($\phi = 1.5\text{mm}$, 16-17 SWG) to make a fully sealed, tapered box to support the A-Post. This restoration option is shown in Appendix 2, along with cutting plans for the A-post support box. A cutting plan for the Subframe Mounting Box is given in Appendix 3.

After removal of a section of the 1600HF rear wing, at the front of the rear wheel arch, severe corrosion was also found in this area of the sill. This wheel arch showed signs of earlier repairs and the extension at the end of the outer sill that forms the B-post support was no longer connected to the rest of the outer sill. The lower section of the B-post panel was also corroded, with no connection to the floor.



While disappointing, this was a lesson that a car with serious structural issues can drive deceptively well. Visible corrosion in the critical areas shown in section 2.1 should be investigated and addressed, particularly when combined with small bodywork distortions or cracks. The decision was taken to remove any corroded metal and reconstruct the sill and its components, while also trying to prevent future corrosion and extend the time between repairs.

The proper arrangement of the sill and B-post panel is shown below.



As with the front of the sill, the unavailability of full length sills in 1994 led to the decision to make a sealed box that could support the B-post using 1.5mm (16-17SWG) steel. This was then joined to the available sill repair section, which did not have an extension at its end. Although requiring extra fabrication, this separation provides an additional barrier to the movement of water inside the sill and has proved to be resistant to corrosion for over 25 years. Details of the arrangement and fabrication plans are given in Appendix 4.

In both the 1994 (1600HF) and 2018 (1300 S2) restorations, the bottom of the B-post panel was trimmed back to the B-post and the top of the sill, and replaced by a plate which was then extended along the full length of the sill, forming a central membrane that separated the inner and outer sills. This was done in period by the Lancia Rally team to strengthen the cars; our motivation was to provide a barrier to water moving between the inner and outer sills, improving resistance to corrosion. Ideally this would protect the inner sill and the subframe mounting points, so that any future problems could be resolved simply by replacement of the outer sill. The 1994 restoration (GW) used a plain 1.5mm plate as the membrane. However, in order to save weight and add strength, holes with pressed edges were cut into the membrane during the 2018 restoration (NT). This, as well as a full-length outer sill, are shown below.



Ideally, all bare metal inside the sill should be primed and painted before reassembly and welding. In addition, in 1994, 10mm holes were made at three points in the floor, below the inner sill (both ends and middle). These holes were later used to introduce cavity wax and can also be used as drain holes if necessary. In normal use they are sealed with grommets.

2.6 Floor Pan and Wheel Arch (Triangular Box)

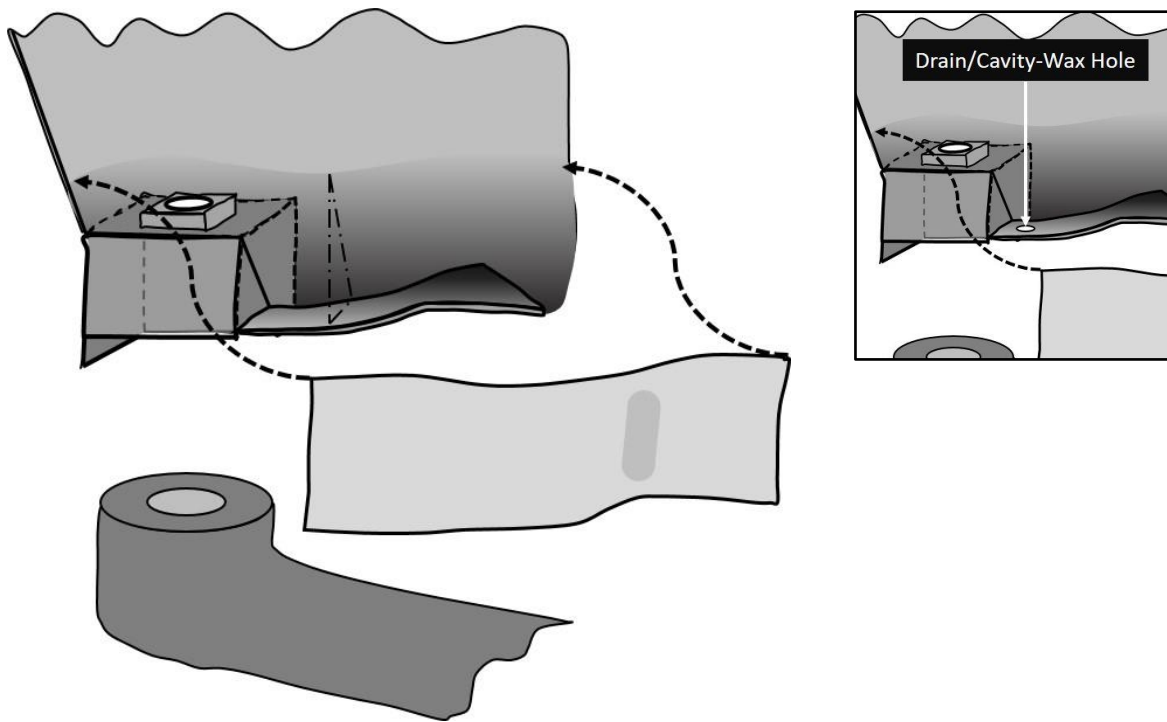
If the front section of the inner sill needs to be replaced (see Section 2.5), it is likely that the floor will also be corroded. Although small areas can be plated over, a better long-term option is to remove the corroded metal and replace it. While small sections of floor may be fabricated, it proved difficult to replicate the pressings which give the floor its strength and produce a satisfactory join between the old floor and any new section without distortion and introducing flexing.

A better option is to replace a large section of the floor (approximately wheel arch-to-seat runner and sill-to-gearbox tunnel) using one of the commercially available repair sections.



If the repair panel and the existing floor are overlapped and spot welded, the repair panel should be laid below the floor, so that the external joint faces towards the rear of the car. This allows water running under the front of the car to flow over, rather than into, the joint (see above). All joints should be protected with seam-sealer before painting.

At the junctions between the foot wells and the inner wheel arches lie triangular-sectioned boxes which provide torsional strength to the body. The front portions of the subframe mounting boxes lie within these triangular boxes; the right-hand triangular box is shown schematically below.



Since the box has been formed between the outside of the car and the bulkhead, water can enter the box either through gaps in the welds along the edges of the external cover plate or via the inner sill and its junction with the bulkhead. Corrosion of the inner sill, subframe mounting box and triangular box are therefore linked and all should be checked in the event of failure of one of them.

It is advisable to add a drain hole/cavity-waxing point at the lowest part of this box, near the subframe mounting box (see inset). This can be used to protect the inside of the box and then sealed with a grommet in normal use. Templates for making replacement sections of this box are given in Appendix 5. If replacing this box, the use of thicker steel than standard is recommended for use as the outer plate (1.2-1.4mm, 17-18 SWG).

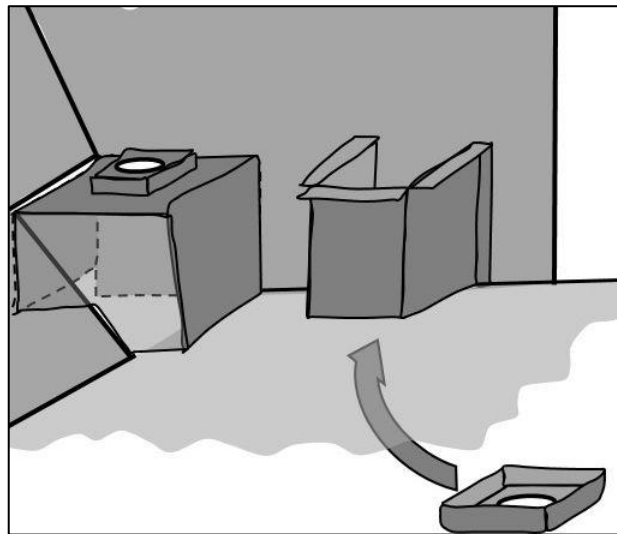


2.7 Jacking Points

While in the workshop, it is preferable to raise a Fulvia by using a trolley jack under the subframe at the front, or the beam axle at the rear. These provide solid locations in the centre and also towards the sides of the car.

However, in the event of a puncture on the road, it may be necessary to use a scissor jack to raise one corner of the car in order to change a wheel. For this reason, Lancia provided a number of Jacking points under the sills. Unfortunately, particularly on early cars, these points are prone to rust and are in locations where corrosion may have already weakened the floor and sill. If restoring a car, there is an opportunity to upgrade or modify the jacking points to ensure they are, and will remain, fit for purpose.

One set of jacking points consist of 45mm reinforced square plates which are welded to the underside of the floor using two tabs. Two are placed behind the subframe mounting boxes (see below, left) and the other two sit in front of the rear wheel arch. Unfortunately, in use, water and dirt collect in the gap between the plate and the floor, leading to the corrosion of both.



Replacement items can be purchased online. However, with the inner sill removed to replace the subframe mounting box, it is relatively straightforward to replace the jacking plate with a reinforcing box that distributes weight over the vertical A-post panel, rather than concentrates it on a small section of floor.

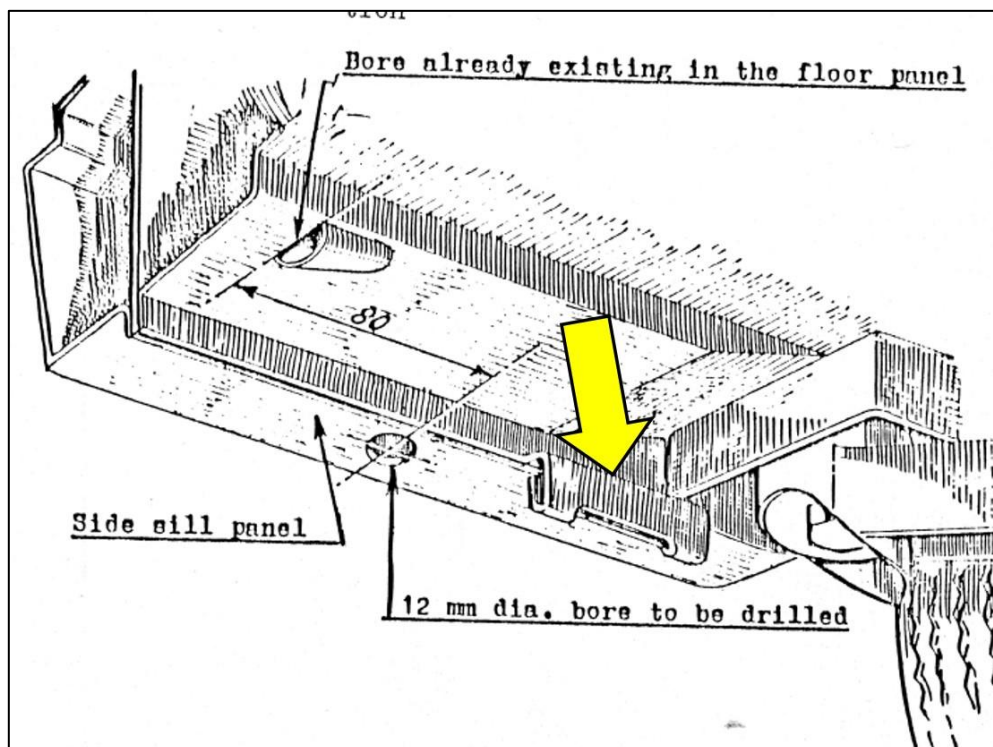
The proposed modification is shown above in the figure on the right. Fitting requires removal of a 45mm square section of floor. The floor edges should be welded to the side of the box and waterproofed with seam sealer. All dimensions and cutting plans are given in Appendix 6. The same cutting plan can also be used to make a standard replacement plate, if preferred. The modified

arrangement has been used on the 1971 1600HF for over 25 years, with no signs of corrosion to the jacking point or to the surrounding floor.

A second set of four jacking points are formed by vertical plates that insert into the weld gap between the inner and outer sills (see arrow, right), near the under-sill jacking plates. While the plates themselves are sufficiently thick to resist corrosion, the sills in these areas are particularly susceptible. Additional measures (cavity wax protection, reinforced sill membrane etc.) should be taken when replacing them.

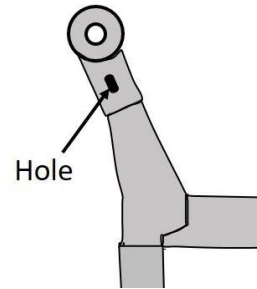


Fulvia Berlinas and some Coupes omitted the vertical plates and instead used metal frames, folded over and welded to the flange that is formed between the inner and outer sills. These are shown in the sketch below, taken from a Lancia Service Note from 1972 that also recommended the addition of a 12mm drain hole to the outer sill in this area.



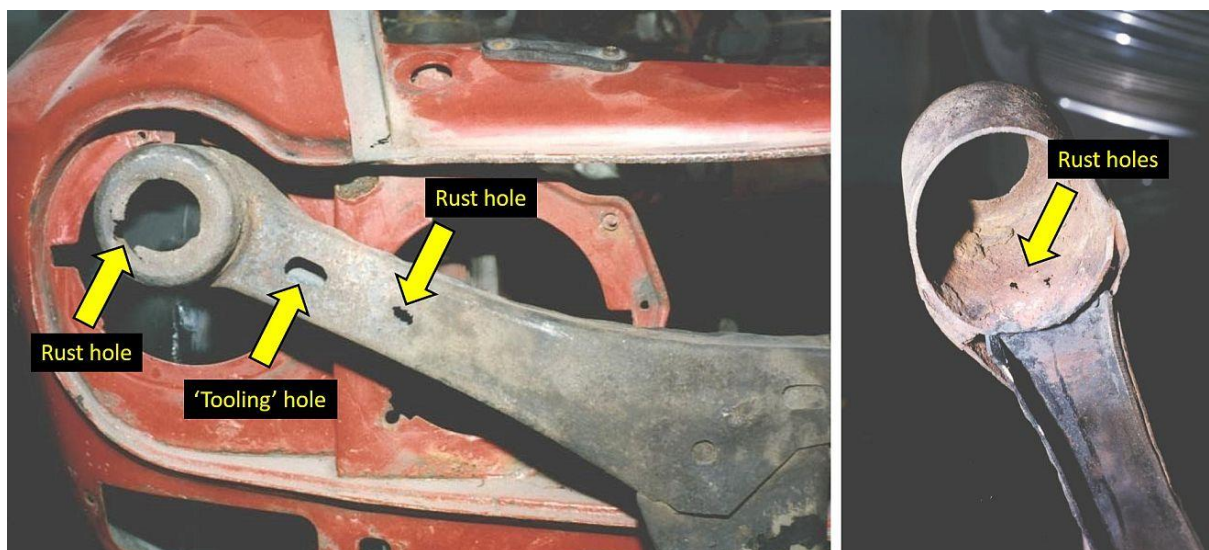
2.8 Subframe Repair

The most susceptible parts of the subframe, and hopefully the only areas that may require repair, are the rear outriggers which were manufactured with a hole on their upper surfaces (see section 2.2). This allows water and dirt to enter the outrigger where it then causes corrosion. Fortunately, the outrigger box-section is separate from other compartments in the subframe, which may also be protected by oil leaks and vapour from the engine.



Since the subframe corrodes from inside, it is difficult to reliably assess its condition. However, the presence of loose rust inside the frame is an indication of problems and pinholes in the sides or lower surfaces will indicate that larger areas are likely to be thin and will require replacement. While short-term repairs to the underside of the subframe can be carried out *in-situ*, full inspection and renovation will require removal of the engine and subframe unit. This should only be done after the sills and rear mounting points have been examined and either reinforced or replaced. For reference, the front subframe dimensions, which are common to all Fulvia types except the very first Berlinas (818.000), are given in Appendix 7.

Before starting repair work on the subframe, it is advisable to make a jig with bolts that locate through the four lower mounting points on the subframe and also line up with the mounting points on the car body. The jig can be used to ensure that the correct subframe geometry is maintained during subframe repair. Once the engine and subframe have been removed and separated, the subframe should be stripped, cleaned and checked. The pictures below show a right-hand outrigger before and during its restoration in 1994.



Ideally, the whole outrigger would be replaced as a unit and remanufactured items are currently available (although some reproductions have included the unwanted hole). None were available in 1994 and both outriggers were carefully reconstructed, by removing and replacing one face at a time, tacking each new piece into position and checking the overall alignment of the outrigger using the jig before final seam welding. An advantage of this method is that the internal structure of the outrigger can be rustproofed, sealed and painted during its construction. In addition, the tooling hole in the top face of the outrigger was deleted and a drain/cavity-waxing hole was added to the lower face of the outrigger.



2.9 Non-Critical Areas

2.9.1 Inner Body Panels

Panel work that may require replacement in non-critical areas include several with double curvature. These are difficult to reproduce without specialist equipment but, at the time of writing, complete front and rear valances, valance/rear wing sections, outer wheel arch repair sections and inner arch panels are all available for many Fulvia Coupe models.

When replacing sections of a panel, a decision must be taken whether to repair the panel in-situ or to remove the panel by drilling out its spot-welds and repair it on the bench. In many cases, particularly where corrosion is present at the panel junctions, removing the panel can be the best option and will also give better access to areas that are otherwise hard to assess or repair e.g. behind the valences.

Panels without significant curvature are easier to reproduce and will be within the capabilities of many owners. While some of these panels also have pressings and folded edges, these can be added using a set of body hammers, dollies and, in some cases, using wooden moulds and home-made pressing tools. Often these panels are in less-visible areas of the car and so any imperfections can be considered charming, rather than obtrusive.

Panels that needed to be fabricated by hand during the restoration of the S2 1600HF included the face-plate of the fuel filler box, both front wheel arch lower splash panels and the right-hand inner arch upper front panel.





2.9.2 External Panel Flanges

The Fulvia front panels (front valance and headlight panels) and the rear panels (rear valance and boot/trunk panel) are joined to each other and to the front and rear wings along external flanges which are spot welded together. The flange is then covered by a stainless steel trim which is secured by metal clips.

These external flanges on the front and rear of the Fulvia are common corrosion points. Water is held behind the stainless trim that runs around the flanges, and moisture can penetrate the rear of the flanges from the boot/trunk area and engine bay. The problem is exacerbated by Lancia's use of metal clips to hold the external trim in place. When these are pushed into place, they bite into the paint surface and can expose the bare metal underneath.

In areas where this flange joins together two sharply curved sections of bodywork, above the headlights and in the boot/trunk corners (see Section 2.1, non-critical areas 10 and 12), water which penetrates the flange can collect and cause corrosion to the surrounding panels.



Corrosion in these areas can be very hard to address if it is advanced. Removing the trim will make the extent of the problem clearer. The recommended approach to rectification is a multi-step one:

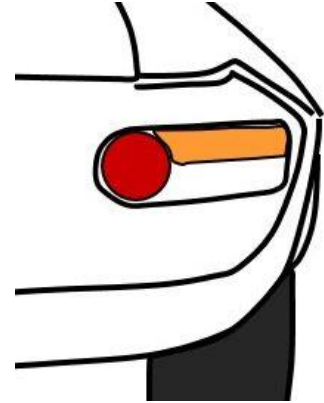
- wire brush as much of the visible rust from the front of the seam, getting the brush into any gaps between the two surfaces
- wire brush along the rear of the seam from inside the boot and engine bay, trying to brush as deeply as possible into the seam
- apply a rust converter, using a thin brush to get it into any open seams, and as far as possible into the rear of the seam
- when dry repeat the wire brushing stage, and apply a further coat of rust converter
- use a heat gun on a mild setting to dry the seam completely
- use a small knife to apply body filler or body putty to any gaps in the external seams to prevent further moisture ingress
- apply a coat of primer, then top coat

In extreme cases, sections of metal may need to be cut out and replaced. The likelihood of future corrosion can be reduced by securing the stainless steel trim with sealant rather than using metal clips. If the original trim is to be reattached with metal clips, it is recommended to lightly apply some clear silicone to the metal clip and to the area on the flange where the clip will sit, so that any scratches that are made during fitting will be protected.

2.9.3 Rear Light Clusters

The Fulvia rear light clusters are unique to the model and suffer from the typical issues of breakage, internal corrosion and fading/loss of silvering of the plastic parts.

While remanufactured replacements are becoming available, good second hand parts, particularly the beige plastic bases, are hard to find and may be no better than those they are bought to replace. In addition, the colour of the indicator lens seems to have varied from orange to yellow over the lifetime of the Fulvia, and so a satisfactory result may require replacing both lenses from the same source.



To reduce costs and preserve originality, renovation of the existing base units can be carried out, requiring only basic skills. Both the base unit and lens can be safely cleaned in warm water & detergent, before drying. The bulb contacts and spade terminals should be cleaned with emery paper and/or fine wire wool. Wires should be replaced if the insulation is cracked or the wires show signs of corrosion or damage, using the correct wire colours to avoid future confusion.

If the indicator lens colours are faded, bulbs can be replaced with orange LEDs. There is a good case for investing in LEDs for the reversing and brake warning lights also. These should be brighter and will draw less current than filament bulbs. Provided the lenses are clean, the rear indicator and warning lights should be as bright as those of a modern car, so reducing the chances of a rear end collision.

Overtightening of the four screws which join the lens to the base unit often leads to breakage of the screw cups in the lens unit and/or failure of the threaded bosses in the base unit. The screw cup in the lens can usually be repaired using a small washer inserted to reinforce or replace the base of the cup and secured using epoxy resin. Tape or superglue can be used to hold the washer in place while the epoxy resin is applied and excess resin can be removed using a blade and a small drill before the resin is fully set.



The corresponding threaded bosses in the base unit can be replaced using appropriately sized Rivnuts (threaded for M4 if using standard Fulvia screws). After drilling out any remaining plastic thread, the Rivnut is inserted into the hole and secured by filling the rest of the boss with a chemical metal putty. To avoid blocking the Rivnut at this stage and align it, filling and alignment can be carried out with a long screw inserted into the rear of the Rivnut.

While the putty is setting the lens should be carefully attached using a second screw to ensure correct alignment of the Rivnut (do not overtighten). If larger areas of plastic are missing, these can usually be built up in stages from chemical metal and finished by sanding and painting to produce an acceptable repair (see below, left).



Each base unit is mounted to the car using three embedded machine screws that pass through holes in the rear panel and are fastened from within the boot with washers and nuts. Often one or more of these screws will be missing. In these cases, a suitable machine screw of the correct length can be pushed through the hole in the base unit and fastened in place with epoxy resin. Care must be taken to keep the screw perpendicular to the base unit as it dries. An example, in this case a hex screw, can be seen at the bottom right of the right-hand photograph above.

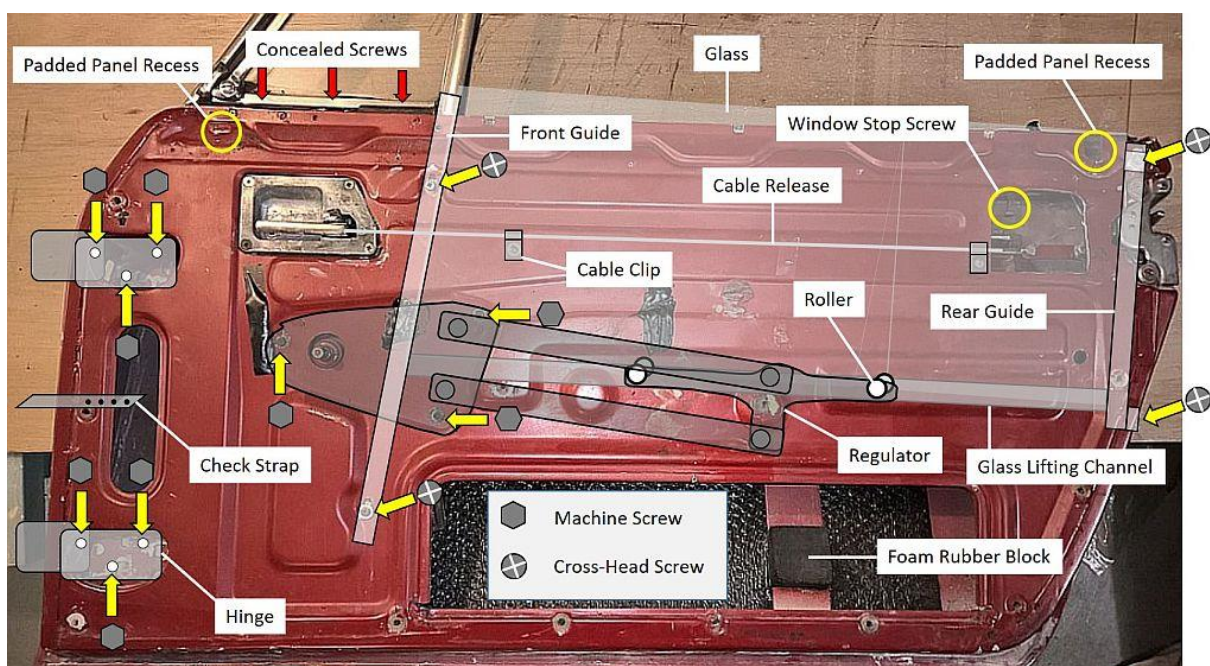
3.1 Doors

3.1.1 Construction

In common with almost all cars of this age, doors are particularly prone to corrosion along their bottom edges and faces. Being frameless, it is important that Fulvia window glass is mounted optimally within the door and maintains a firm seal against the rubber trims that are attached to the car body. While it is inevitable that water will seep past the window scrapers which cushion it from the door, corrosion can at least be delayed if the drain holes on the bottom of the door are kept clear.

Although the manufacture and fitting of repair sections is a specialist job, there is much that can be done to improve and maintain the doors. Since most door-related tasks are awkward and time-consuming but will reward attention to detail, they are ideally suited to an enthusiastic amateur with plenty of time and patience.

Problems with the fit of a door are usually addressed by the adjustment of its attachment to the hinge. This will require removal of the door card to gain access to the hinge, but the misalignment can be corrected without removal of the door itself. Similarly, problems with the engagement or release of the door lock pin with the lock barrel on the car body can usually be corrected by small adjustments of the position of the barrel, after loosening its screws. Typical signs of trouble with the internal door components are excessive wind-noise when driving, a stiff, a stiff window winder, glass that drops or moves in its guide independently of the winder and issues with the internal door release or lock button. The internal components and their attachment points are shown below.



3.1.2 Dismantling

[See Appendix 8 for copies of TAV76A and TAV77A from the Lancia Parts Manual, 1970]

All investigations start with the removal of the door trim card. This is secured by the grab handle (two long screws), the chrome surround to the door pull (2 short screws), the chrome cover plate for the lock mechanism (2 short screws) and the chrome surround to the window winder. The latter is removed by pushing a chromed cap, which sits on top of a spring under the winder, inward using a thin screwdriver. This exposes the shaft of the winder and a wire clip that prevents the handle being removed. The wire clip can be levered off with a second screwdriver, but be aware that the wire clip may be lost as the spring expands and propels the clip, cap and handle forward. We would recommend using a tool made out of a piece of stiff wire with a hooked end, which can restrain the clip as it is released. In any event, it is wise to perform this operation with the car doors closed and your eyes open (and wearing eye protection).

The door card is held in place by ten metal clips that fit through holes in the hardboard core and then push into matching plastic sockets in the door. To avoid damage to the card, use a plastic trim removal tool to pry the door card away from the door, starting at the front lower corner. Once all the clips have been separated from their sockets, the card can be removed by pulling downwards, freeing it from the channel in a stainless steel strip (item 23, in TAV76A) which locates its top edge.

When new, the inner face of the door card would have been protected from moisture inside the door by a sheet of polythene, which was attached to the top of the door and covered the openings which provide access to the hinges, lock and window mechanism, finishing just above the fastener sockets at the bottom of the door. If the sheet is missing, it should be replaced with heavy-duty polythene, using double-sided tape or a suitable adhesive. After making two cuts in the bottom of the plastic which meet the corners of the large lower opening, the outer corners can then be folded up, between the door and the sheet, while the bottom of the sheet is tucked into the lower door opening. This should direct any water that runs down between the door and the polythene sheet back inside the door, where it can exit via the drainage slots at either end.

After thorough cleaning of the bottom of the door and clearing the drain slots, the amount and type of work required can be assessed. If the problems only concern the door lock and the outer and inner handles, these can be investigated without removing the door. The lock is attached to the inner pull handle via a connecting cable which can be disconnected at the lock by removing a bolt. The cable should be secured by two clamps inside the door which are accessible when the window is up. Once these have been loosened, the pull handle can be withdrawn, and the cable removed, for cleaning and replacement. To remove the lock, the push button should first be unscrewed, followed by the four screws that attach the lock to the door. The lock itself requires careful manoeuvring to be withdrawn through the cut-out in the door. During this procedure, it may help to compress the plate behind the lock, which is acted on by the external door handle in normal use. While removed, check the functions of the lock levers for smoothness of operation and lubricate as necessary.

If the door requires welding then it is recommended to remove the door at this stage and continue the dismantling on the bench or on a pair of trestles, protected by a blanket if necessary. If only the window mechanism requires refurbishment, this can be done with the door in place although, in practice, it may be easier to remove it and work on the bench. Before the door is removed, the wiring for the door edge lights and the door check strap (which limits the door opening) must first be located and disconnected. The latter requires the removal of the split pin, washer and rubber pad which secure the end of the metal strap and can be accessed from a cut-out near the front edge of the door. Make sure that the door can be supported as it is removed – it is heavier than it looks, containing internal bracing and (usually) sound deadening panels as well as the window.

To dismantle the window mechanism, the following procedure can be followed (see Appendix 8):

- (1) Remove the padded panel that lies below the window (item 19, TAV76A) along with the lock push-button and the lock. The panel is held on by a number of small screws along the stainless steel strip that retained the door card. With the window wound down, the panel can be eased gently upward, freeing prongs at either end from recesses in the door skin.
- (2) Remove the rear glass guide from inside the door (item 16, TAV76A), which is secured by two screws, one at the top of the door, above the lock, and one on the shut face of the trailing edge of the door, below the door edge light. The rear glass channel can then be pulled upwards through the space vacated by the lock.
- (3) Remove the two screws that hold the front glass guide (item 17, TAV76A) to the inner face of the door. Note that this guide extends above the top of the door and forms the trailing edge of the quarter light assembly. Check that the section of the front guide within the door cavity is free to be pushed towards the outer skin of the door, since this is necessary to extract the regulator mechanism. If the lower section of the window front guide cannot be moved outwards, refer to step 10, below.
- (4) Carefully raise the window glass to its top (fully-closed) position. When raising or lowering the window glass, its rear edge should be supported as it is no longer located in the rear guide.
- (5) Remove the three machine screws that form a triangle around the window winder spindle. These release the regulator mechanism (item 1 in TAV77A) which comprises the winding mechanism and the arms which are responsible for the window lift. If the original regulator is still present, it may be additionally secured by two self-tapping screws, which were used to lock the final position of the regulator at the factory.



(6) Carefully lower the window to its fully open position, then remove the window winder handle and the bracket (item 45, TAV 77A) from the trailing edge of the Lifting Channel. This bracket limits the lift of the window when it meets an adjustable set-screw positioned below the lock push-button.

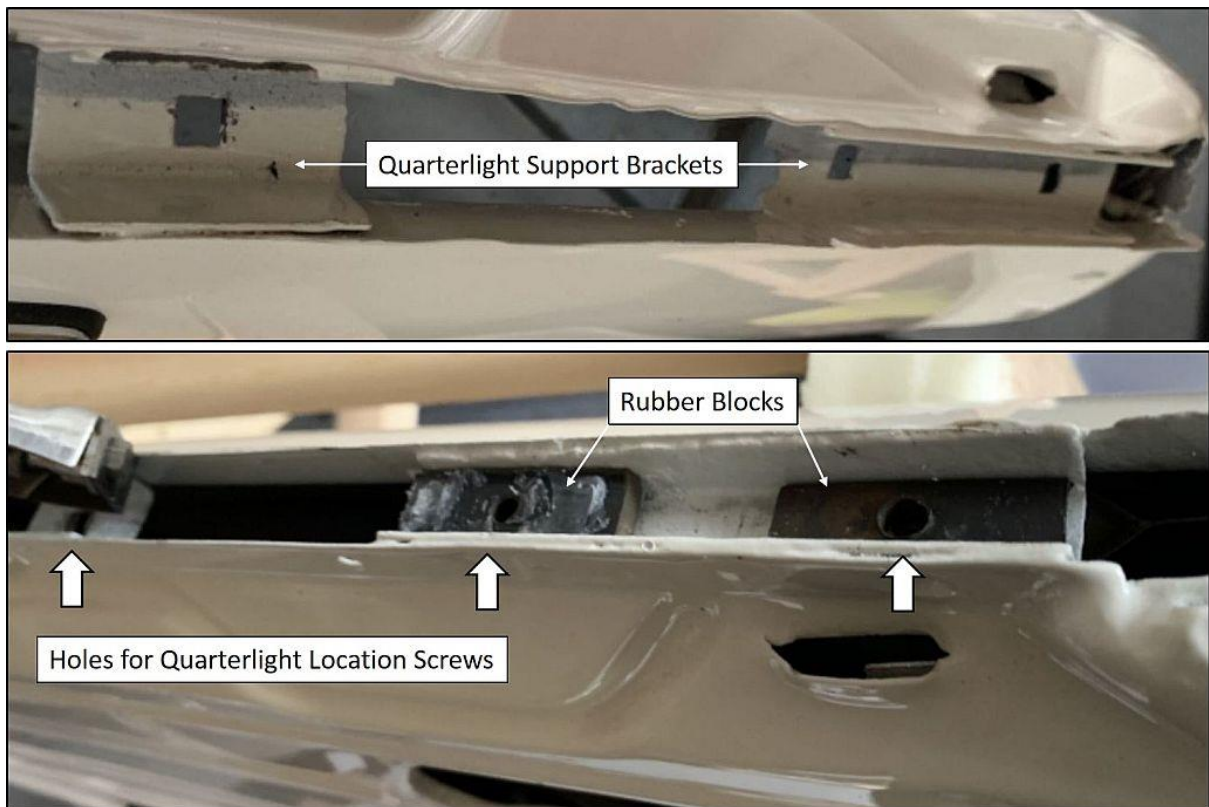
(7) Push the splined window winder spindle into the door cavity and tuck it under the edge of the hole, toward the leading edge of the door. This may require some pressure as it is a tight fit, and its movement inwards is restricted by the front glass guide (see step 3).

(8) Grasp the Regulator Mechanism (accessed through the large rectangular opening at the bottom of the door) and push it a couple of inches towards the (front) leading edge of the door. This will cause the two rollers of the lifting arms to detach from the Lifting Channel which is secured to the bottom edge of the glass. The lead roller will come out of the end of the Lifting Channel, and the other roller will drop through a gap at the bottom of the Lifting Channel.



(9) Once the window has been freed from the regulator, the glass can be lifted (with its Lifting Channel still attached) through the opening in the top of the door.

(10) Finally, the quarterlight assembly can be removed. In addition to the two screws that were removed in step 3, there are additional machine screws concealed under the quarterlight that attach its triangular frame to U-shaped brackets that span and brace the two door skins. The heads of the screws can be accessed through slots in the rubber seal when the quarterlight is fully open. There are three slots but, if you are fortunate, there may only be two screws present since one slot is close to the acute-angled corner of the frame and requires the use of a slim wrench when removing or replacing the screw, and is often missing. If original, these screws will be heavily corroded and may need to be removed by drilling/grinding their heads, or removing the caged nut which secures them below the brackets. Removing the heads will cause some damage to the window rubber, but this cannot be avoided. Rubber spacers should be found underneath the quarterlight when it is finally removed. These spacers came in various thicknesses and were used in the factory for fine adjustment of the height and angle of the quarterlight. They should be retained and their positions noted, for reinstallation later.



Some Fulvias were supplied with alloy doors, and in these cases, the support brackets may be riveted, rather than welded, to the door skins. When working on an alloy door, it can be easier to remove the rivets and then lift the brackets out with the quarterlight assembly. After removing these screws or freeing the brackets, the quarter light assembly can be pivoted back slightly towards the trailing edge of the door, swivelled inwards through 90 degrees to align the lower brackets with the door skins and then pulled upwards, withdrawing the quarterlight from the door. In all cases, when reassembling the doors, it is recommended to replace the quarterlight retaining screws with stainless or brass items, filing down the heads to fit the holes in the rubber seal if necessary, and protecting them with a heavy or copper-based grease to avoid future problems.

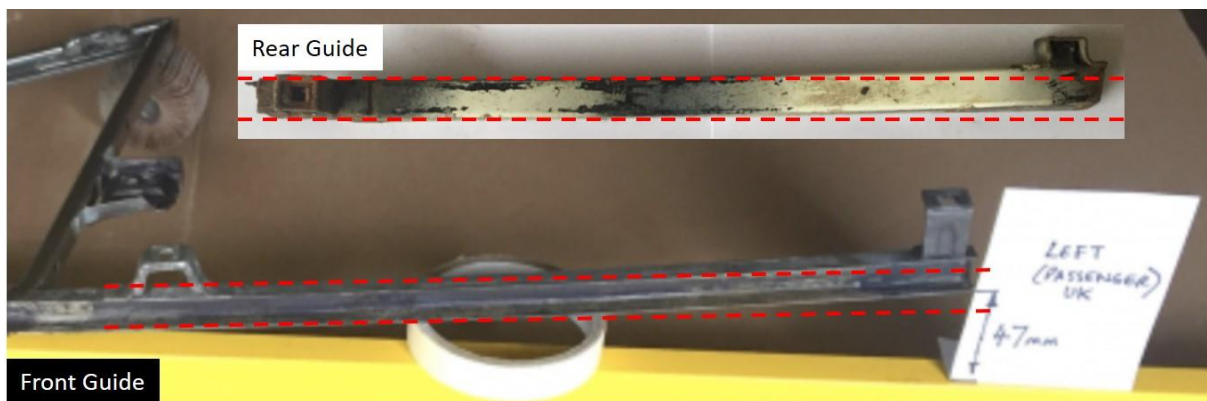
Once disassembly is complete, the door can be cleaned, inspected and new sections welded in as required. Owners with alloy doors should consider adding a shaped aluminium plate (approximately 6cm x 17cm) which can be glued to the door skin behind the external handle, providing additional strength and preventing distortion of the door skin when the door is opened and closed.

3.1.3 Repairs and Reassembly

Window Guides

The velvet-lined, metal-cored inner channels of the front and rear window guides are held in place with an adhesive and can be removed with a screwdriver. Surface corrosion of the metal guides can be removed with wire brushes mounted in a drill and then treated with a rust inhibitor before repainting. However, in the case of the 1973 Fulvia documented here, both rear window guides were severely corroded at their lower ends, around the fixing brackets, and required further repairs.

Before the repairs were carried out, it was noted that both front and rear guides have a pronounced curvature and that fabrication of a complete new guide would not be straightforward (see below). Fortunately a second-hand door guide was available whose centre section could be used to provide two shorter repair sections. These were welded in, along with the fixing brackets.



When replacing the inner window channels, the use of a flexible, metal-cored type, with a cross section of approximately 14mm x 14mm is recommended. This should be compressed before installation to fit the Fulvia glass ($3/16'' = 4.7\text{mm}$) and firmly glued into the frame using a black polyurethane adhesive/sealant.

Window Regulator

These should also be cleaned using a wire brush or wire wool, and any surface rust treated with a rust-killer. The teeth of the regulator should be inspected and any bent or damaged teeth reset and

reshaped before being greased. If the operation of the regulator is not smooth, the winding spindle can also be degreased and washed. After drying, avoid using excessive lubrication on the spindle since the action of the regulator must be stiff enough to oppose the weight of the window during use.

Window Weather-Seal

At the top of the door, the window passes through two strips of weather-seal. The outer strip is attached to the external stainless steel trim, using a number of small staples. The inner strip is screwed to the inner face of the padded panel which is attached to the top of the door. Small countersunk stainless steel trim screws were used for this and the heads are usually hidden in the weather-seal fabric. Both weather-seal strips are easily removed and should be retained intact for use as templates, to position the holes that may need to be drilled into their replacements.

For either weather-strip, hole-spacing from the old strip can be transferred to the new one by laying a length of decorators masking tape along the back of the strip, rubbing firmly while using a pin to locate the holes under the tape, and then pushing a small drill through to enlarge them. The tape can then be carefully removed and used to locate and drill matching holes in the new weather seal-strip.

Since the exterior weather seal used staples, the holes required are smaller and more numerous. If following this procedure, it is advised to replace the iron staples with copper wire which can be secured by twisting and soldering. However, it may prove easier to use a flexible polyurethane adhesive instead to attach the weather-seal to the stainless steel strip. In both cases a small bead of flexible adhesive can be applied to the weather-strip, providing a waterproof seal.



To avoid 'adhesive creep', three small trim screws were added to the ends and middle of each weather strip. The protruding ends of these screws were then cut-off, to avoid scratches to the glass.

Reassembly

When reassembling, the first step is to fit the regulator mechanism into the door, in its fully wound-down position. This must be done before the front window guide is re-installed, since the regulator mechanism sits between the guide and the inner door skin and there is insufficient space to insert it when the guide is in place. Attach the regulator loosely with a single machine screw at this stage. This will prevent the regulator falling back inside the door, but it should allow sufficient movement to align its rollers with the glass lifting channel later.

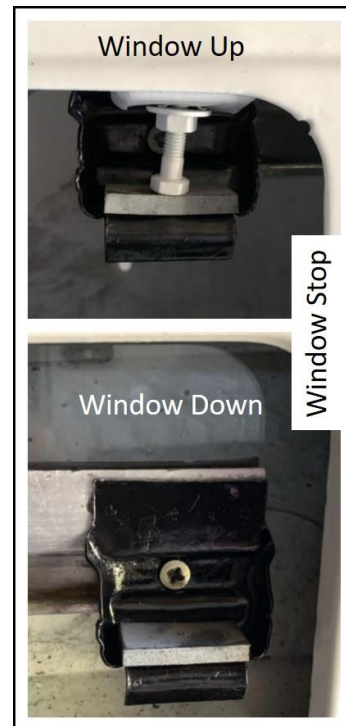
Next, the rubber spacers for the quarterlight assembly should be replaced before the complete assembly, with two or three mounting screws pre-installed, is inserted into the door. This must be done with the quarterlight rotated inward by 90 degrees to allow the fixing brackets on the runner to pass between the door skins, before being returned to its correct orientation and tilted backwards to allow the quarterlight swivel mechanism to fit into its gap in the door frame. Finally the quarterlight assembly can be rotated forward and lowered, ensuring that its mounting screws pass through the corresponding holes in the U-shaped bracket. These screws can be loosely fastened to locate the quarterlight while allowing free play as the glass is fitted.

At this point, the glass, with its lifting channel attached, can be located in the front runner and lowered through the top of the door until the channel approaches the rollers of the window regulator. Working through the large cut-out in the bottom of the door, the window can be slid backwards, towards the trailing edge of the door, and the regulator rotated (after removing its single locating screw, if necessary) until the rollers can be located in the lifting channel via the front end and the middle cut-out. The regulator screws are then inserted, as well as the two screws which locate the front window guide. Shake-proof or spring washers should be included when replacing door screws.

While holding the glass into the front guide, the window is now wound up to the top of the quarterlight, creating a gap at the rear of the glass through which the rear guide can be inserted. The rear guide is secured using two screws, one positioned at the top of the inner door skin and a second in a recess on the trailing edge of the door. The rear guide orientation is not adjustable, so this can be fixed tightly while adjustments are made to the quarterlight/front guide and regulator to ensure the window lift works smoothly and the window remains securely in the front channel throughout its range. If gaps are present at the front of the window when it is raised, the quarterlight assembly should be rotated backwards while tightening the three mounting screws and then locking the assembly in the correct position using the front-guide location screws.

Once these adjustments have been made, the bracket which limits the lift of the window can be reattached to the lifting channel (see instruction 6 in section 3.1.2). This bracket should include a rubber pad (item 46 in TAV77A) on its top face. This pad is often missing but can be replaced with 4-5mm thick rubber sheet. The height of the window lift is then adjusted using the window stop screw that is visible through the cut-out in front of the door lock.

At the bottom of its travel, the window is supported by one or two foam rubber blocks which are glued to the inner face of the outer door skin (not shown in the Lancia Parts Manual). Their function is to stop the window rattling when driving with the windows open, so were an important feature in Italy. If no blocks are present, they should be replaced at this point.



Also not shown in the Parts Manual, but present in some cars, are sound deadening panels inside the door. These are usually glued to the lower sections of the outer door skin and were originally made of fibrous matting. Since these can retain water and accelerate corrosion, they should be removed and replaced with a modern closed-cell foam or polymer damping mat.