

Classic style Z3 door handles in stainless steel

Overview

The standard Z3 central locking controlled door and boot entry system is both robust and effective. As kit car builders we need to integrate with this system to gain access to the car whilst simultaneously presenting a classic look on the exterior.

Until fairly recently the options for accessing the car were limited by the functionality of off-the-shelf handles which were designed for other cars and the means and mechanisms of interfacing with the Z3 central locking system.

When it came to interfacing with the Z3 door locking system there were two approaches:

1. One approach was to keep the Z3 external handle in place and to operate the handle by fixing a plate to the handle which could then be actioned by a push button which directly moved the plate by way of an extendable bolt in the push button mechanism.
2. The other approach was to remove the Z3 handle and to create a mechanism of levers, cables and pulleys which would directly act upon the door latch release lever.

Both approaches work but both had limitations and implications.

If you trawl the kit car fora you will find incidents of people being deadlocked out of their cars, others being locked out because the battery has flattened over the winter and others that have experienced general equipment failure associated with normal wear and tear. There are also reports of push buttons getting locked after having pressed the door handle button.

If you look into the causes of these issues there is a very well defined set of problems which, once understood can be addressed. In the case of option 1 above the issues are deadlocking, being locked out due to flat batteries and the prospect of the push button bolt sliding along the plate and then the head of the bolt hooking over the end of the plate. This happens when the bolt strikes the plate at an oblique angle, strokes the plate rather than pushes it and extends beyond the edge of the plate.

Deadlocking is a nightmare. It seems to happen if tension is applied to the door release lever when the door is closed. If the system deadlocks because of this issue then there might be a get-out-of-jail-card by connecting a wire from one of the control modules to a 12V supply: more details of this later.

Why might there be tension applied to the door release lever? Well, the Z3 lever has to move by a certain amount (around 17mm to be safe) to operate the release latch. If you attach a plate to the original Z3 door handle and attempt to move it with a push button lever which only has around 13mm of travel then you want to be sure that the bolt is tight up to the plate. Get this wrong or get a bit of wobble when the door is slammed closed and you wander in to deadlock territory.

Another reason that you might be locked out of the car is because the Z3 door release solenoid has failed, in which case, sadly, the get-out-of-jail-card wouldn't be of much use. Instead you'd need a mechanical system that could manipulate the relevant components.

Staying with option 1, when you fix your door handle (Mustang, Maserati / Ferrari, Mini) then the angle that it presents to the original Z3 handle is also fixed. If you managed to get the angle wrong on

the curved door skin, let's say suboptimally positioned, then there is the prospect of hitting the plate at an angle and not only diluting the throw of the plate by the bolt but also the prospect of the bolt slipping over the end of the plate and having the head of the bolt catch over the edge of the plate.

Then there's the issue of springs. The Z3 release latch has a built in spring which is intended to return the latch to a safe position (to avoid deadlock). The Z3 handle has a spring (quite a strong one) to return the handle to the closed position after you've opened the door. Then there's the spring in the external handle which pushes the plate on the Z3 handle. That's a lot of springs...

Enough of option 1, let's look at option 2.

By removing the Z3 handle the avoidable excess spring issue goes away, happy thumbs. This means that the push button in the handle can now directly operate the Z3 latch lever.

A means of translating the push button's linear movement into something which replicates the angular motion of the Z3 handle comes in to play. This is often accomplished by placing a pulley just below and to the outside of the latch release lever. At the handle end a pivot translates the linear motion of the push button into a moment which pulls a cable which in turn operates the Z3 lever. This is quite an effective solution because pushing the button on the handle directly moves the Z3 release lever (rather than moving the Z3 handle which then moves the lever), however there are issues.

The desire / need to move the lever by a required minimum distance can result in applying too much tension on the cable and therefore the Z3 lever which can result in deadlocking. There is also the very real (personal experience here) possibility that, if the wire isn't taut, then it could jump off the pulley, especially if, for example, the door is slammed. The push buttons typically have around 12-13mm of travel which is seldom enough to securely move the latch release lever by the necessary amount. Creating a longer lever can achieve this but there is a trade off between the size of the lever and the amount of force required to move the lever.

There's one more thing. If central locking isn't working and if the car is locked and if there is a failure of the solenoid then you would need an alternative mechanical means of unlocking the door. Neither getting access to the battery through the boot nor, using the get-out-of-jail-card (details later) would help because both rely on the door release solenoid working.

This is not intended as a scare story, it's a realistic review of known issues which have been taken into consideration by us with the aim of developing an alternative system which is elegant, effective and which takes into account the normal operation of the original Z3 system (including known failure modes).

The Grassbank Z3 door handle system has the following features which are designed to mitigate all of the known issues as listed above.

- Externally the handle is a drop in replacement, visually and mechanically for the original style of handle found on Italian cars of the '50s and '60s
- The handle is made from marine grade 316L stainless steel which is mirror polished. Chrome handles bubble and flake, stainless steel ones don't.
- The Grassbank solution does not require the original Z3 handle to be used. This eliminates the issues of excessive spring tension, bolt overshoot and deadlock tension on the handle's plate.
- The Grassbank handle has been designed with a built in pivot which amplifies the throw of the push button into something that has sufficient excess movement to satisfy that needed to operate the lever without being excessive such that it becomes difficult to operate.

- The pulley is eliminated and replaced with a cable guide. There is no pulley for the cable to jump off and no worry about over tensioning the cable to eliminate pulley jump. But in any case you NEVER want to over tension the latch release lever.
- An accurate template and detailed fitting instructions for the Grassbank handle are available.
- The handles are a universal fit. They will suit left or right hand drive vehicles.
- You can choose as much or as little functionality as you need.
 - No key locks
 - Driver's side key lock
 - Both side key lock
 - Any combination of the above key locks with a matched lock for the boot...

As with all things there is a down side. Our handles require the removal of the original Z3 handle and the installation of the cable guide. We provide a jig for accurate placement of the cable guide.

Getting the cable tension right is important. Our cables are fixed with stainless steel crimps both at the push button end and the Z3 lever end. Getting sufficient slack on the cable before crimping them in place is important, it also requires a bit of dexterity and patience and some good pliers.

We provide plenty of leverage in the system to allow the cable to have some slack (to minimise the risk of deadlocking) whilst ensuring that there is sufficient tautness to ensure that the lever will move enough to perform its intended task. Our system is designed to open the lock when the push button is around half way through its travel.

If the system does deadlock our solution is unlikely to be any better, and certainly no worse, than alternative solutions. This is where the get-out-of-jail-card comes in handy.

Finally, our solution is priced competitively alongside the remanufactured chrome handles which only offer an extendable bolt and so which require the installer to devise their own solutions and to avoid the known pitfalls without the design intent which is built in to our solution.

If you are happy with the extendable bolt as a way forward then our handles can be purchased at a similar price and have the built in benefit of being made from stainless steel which has been mirror polished.

A word about cables

Some people may consider that using a cable between the push button and the lever is higher risk than say using levers, plates and rods. I would point out that cables are used millions of times each day in life critical circumstances. If you ever saw a mountain biker or road racer hurtling along at speed or even a casual cyclist approaching a busy road junction then you would know that they rely on their cables to bring them to a safe speed. What we ask our cables to do is nothing compared to the cycling world and other areas where control is essential.

Get-out-of-jail-card

I was reading a post on the Zroadster forum and came across a potential solution to the deadlock. There is a signal which will mimic the pressing of the internal remote unlock button that is a feature of some BMW cars. If the car is deadlocked then touching this wire to the positive terminal of the battery will release the deadlock. If you run the cable to the boot and if you have access to the boot (see our boot handle solution...) then this could just get you out of jail.

Having said that, it's much better to avoid the problem than to have to solve it. As the saying goes... an ounce of prevention is worth a pound of cure...

Take a look at post 14 in the link below.

<https://zroadster.org/threads/roof-switch-brake-delete.48301/>

The image on the left shows a right hand side driver's door latch with our cable guide alignment jig fixed in place. We use the latch mounting bolts to ensure that the jig can precisely position the cable guide.

The image on the right is an enlarged view of our cable guide. There are two guides built into this item. The J shaped guide connects to the lever on the push button which is somewhere above and slightly to the right of all of this. The cable will enter at the top of the J guide, and exit at the base where it points directly at the Z3 lever. When the push button is pressed it pulls the lever in precisely the right direction.

The other smaller guide is used when the handle is fitted with a key. Turning the key will raise the lever. The cable connects to the lever at the top, passes through the guide and connects to the latch release lever which you can see with a white plastic clip on it. This plastic clip is what the Z3 door top push button operates.



Once the cable guide has been positioned it is possible to set the cable tension before removing the jig from the door. With the jig still in place the guide can either be fixed to the body of the end door panel or to a cosmetic bright polished cover plate which in turn can be fitted to the door end panel. In either case, the jig ensures correct alignment of the cable guide and, if necessary, the correct positioning of the cover plate.

