4-WHEEL DISC BRAKES – CHEAP AND EASY

BY: CHARLES GOIN

The Following Tech Tip was brought into being after a laborious and intensive study on my part. It all started with the realization that the Isuzu Impulse (RWD) was a direct descendant of the Isuzu I-mark, which, of course, was a direct descendant of the Opel Kadet "C". Now most of this story I had already known. But, when I found out that the tooling for the Isuzu rear-end was also passed down and had been used in all of the small RWD Opels from the GT and Manta it grabbed my attention. Then I heard Roger Wilson at Roger's Opel Engineering had converted the entire rear end into a GT and had used the GTs center support and torque tube in the process. Though this had required a great deal of work on Roger's part, it at least had confirmed some of my suspicions about the compatibility of parts between them. After hearing about the work involved in doing the entire rear end, I thought except for a slightly higher ratio (3.91:1) the only good thing about the Impulses' rear was the disc brake set-up. So why not at least check and see how hard it would be to swap the rear discs onto a stock Opel rear end? After some under-the-car inspections at my local U-Pull-It I decided it seemed easy enough to do. This is where the story gets good. After going back and forth from the yard to get tools (which are a slide hammer, 8mm Allen wrench, 10mm & 14mm sockets, 8mm, 10mm & 14mm Crescent Wrenches, 10mm line wrench, socket wrench, screwdrivers and a good hammer) I finally removed the Impulse's brakes (it is easier and not much more expensive to buy from a regular junkyard). Then I went to work measuring, cutting, welding and dry fitting the set-up onto a junk axle in my garage. After I was satisfied it would work I pulled off my Mantas brakes and tried it out. I drove on them for over two years and they performed flawlessly. I know my braking power has improved at least 30%-40% since the operation was done I will admit some of the improvement is probably directly the result of my old drum brakes not being adjusted quite right, but whose really are? Also there are some other things you have to take note of before deciding whether to do this or not. First, Opel 13" rims will not fit (not even '75 rims) over this brake set-up, so 14" rims are a must. Second, early GTs (69'-early 71') will need to have their rear ends replaced with a late model GT rear (late 71'-73'). This is because of the way the bearings allow the axle shafts to float and that will cause a lot of problems with disc brakes. So if you have always wanted disc brakes on your Opel but couldn't afford them, read the article and see if you would like to attempt it. If you use all used parts except for new pads it should cost you less than $250 and your time.

TOOLS & SUPPLIES THAT ARE REQUIRED: (FEEL FREE TO ADD TO THIS LIST)

POWER TOOLS:	**OTHER TOOLS:**
Motorized wire wheel Welder Drill press Hand held grinder	Engineering Ruler in decimal inches (do not use a fractional ruler) Vise Slide Hammer Needle nose pliers 10mm line wrench 13mm Crescent Wrench 19mm Crescent Wrench Socket Wrench 3" Socket Wrench Extension 14mm & 15mm Sockets Screwdrivers
SUPPLIES:	
(1) - 13/32" Drill bit - get high quality bit (1) - Tube of Permatex Make-a-Gasket #1 - (do not use RTV!) (1) - Bottle of White-Out or white nail polish (3) - Welding rods (1) - Grinder wheel (8) - Approx. 3/32" Thick Washers (To fit over lug bolts) (8) - Coarse Thread Bolts and Nuts. To Match Axle bolts and nuts (In diameter and length, get a coarser thread than the original)	

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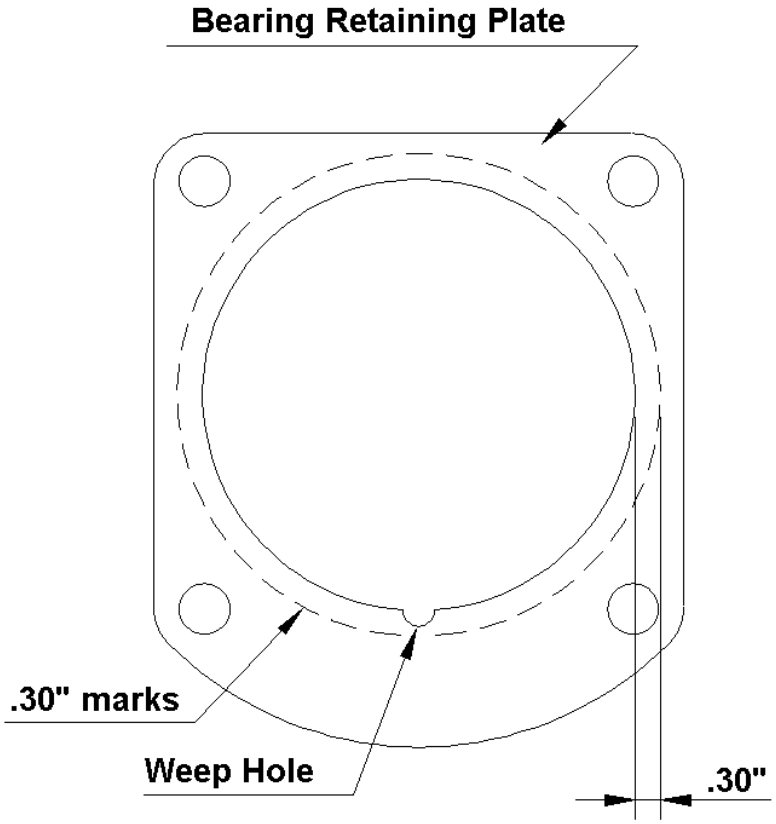
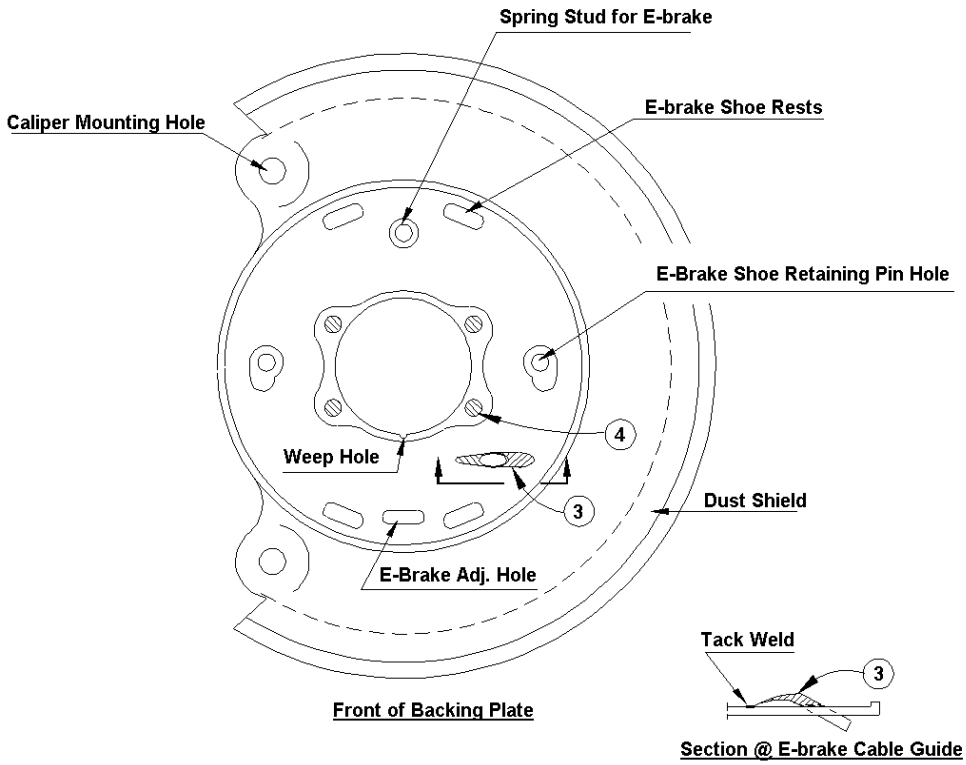
NOTE: 14" RIMS ARE A MUST. MAKE SURE THAT THE OFFSET OF THE RIMS ARE COMPATIBLE WITH THE BRAKES OR RUBBING ON THE INSIDE OF THE RIM WILL RESULT. A GOOD WAY TO CHECK THIS IS TO BRING ONE OF YOUR RIMS TO THE JUNKYARD AND FIT IT ON AN IMPLUSE OR BUY EITHER USED RIMS FROM AN IMPLUSE OR NEW RIMS THAT FIT AN IMPLUSE. One Concession to this is that the BMW 320i (Early 80s') Cast Aluminum rims do fit over this. BUT you will have to take the grinder to the caliper and grind off any areas that rub. Its not easy and is very time consuming but can be done without affecting the safety of the Caliper.

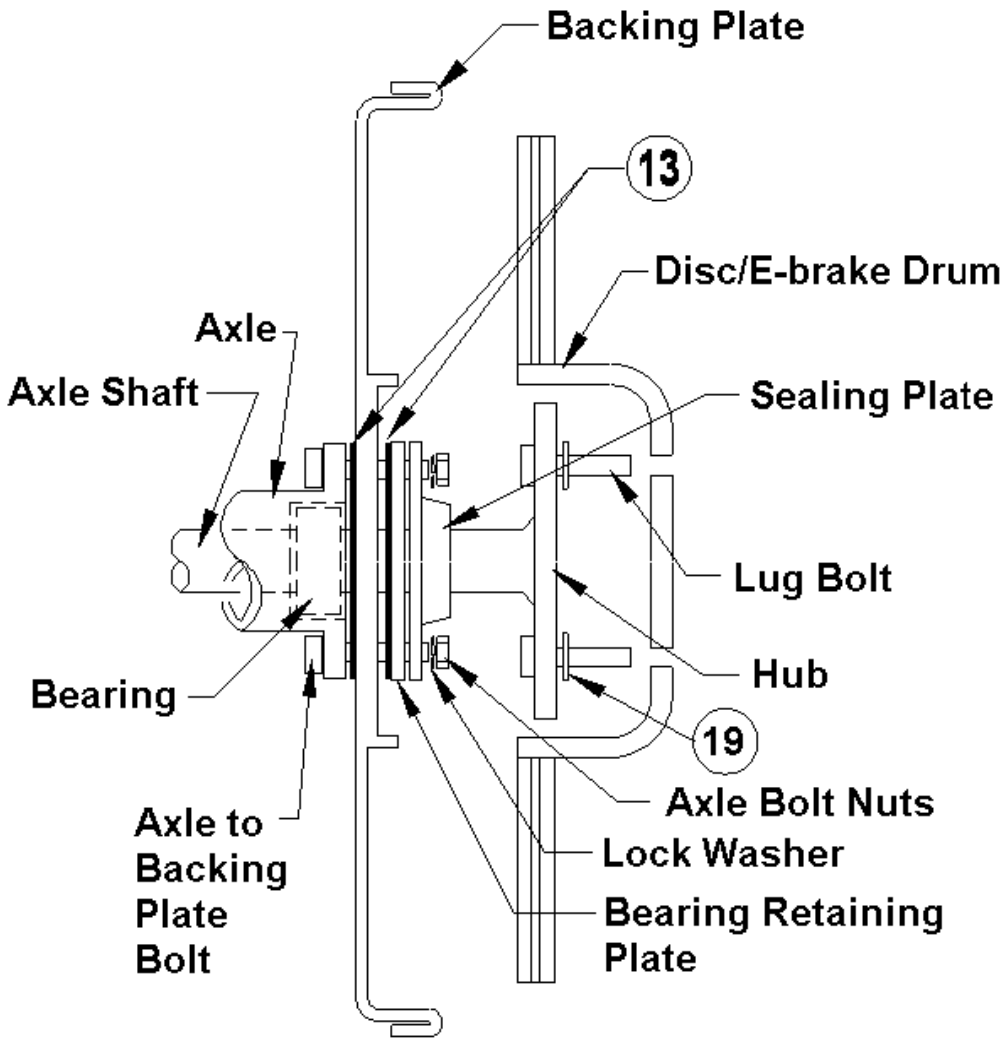
1 - Obtain retaining plate from either an Opel Dealer or press the bearing off of an old axle shaft to obtain one. Use a wire wheel to clean off old gasket material off of plate. After that is done, put a series of .30" inch marks around the inner circle of plate. When finished put plate to the side.



2 - Take backing plate from Impulse and strip off E-brake assembly and E-brake cable.
3 - Put backing plate in vise and use grinder to grind off E-brake guide and the old tack-weld flush with backing plate.
4 - Now take backing plate and fill the 4 existing bolt-holes with weld. Do the welding on the backside of the backing plate. It may take a few applications to completely fill the holes. Wait for welded metal to cool between applications.
5 - Take grinder and grind weld on backside of backing plate flush with back of backing plate. Should look like a solid piece of steel when done.
6 - Now take template made in step #1 and place (with marked side face down) onto backside of backing plate. While holding template in place turn backing plate over and look through the large diameter hole in backing plate and align marks on template with the hole, while also lining up the weep holes on the bottom of the large hole and the weep hole on the template. Center to center of the template to the backing plate is the critical alignment, if you don't get the weep holes aligned 100% but the center-to-center is good that will be OK. Now take a small clamp and clamp the template to the backing plate. Check the alignment again. When satisfied with the alignment, take White-out and mark the 4 holes from the template to the back of the backing plate. Then dry check alignment and unclamp the template. Put template to side.



7 - Take 13/32" bit and place in drill press. Place and support the backing plate on the drill press (backside up). Align first mark with drill bit. Clamp down backing plate to drill press bench. Check alignment, lightly tap with hammer to re-align if it is out. Drill hole. Repeat process for all four holes.
8 - Using four bolts (use same size as hole in template) and template check the four newly drilled holes for alignment and trueness. Use a round file to reshape the holes as necessary.
9 - Repeat steps #2 - #8 to complete other backing plate.
10 - Remove old brakes, E-brake cable and axle shaft. Do one side at a time.
11 - Dry fit new backing plate onto Opel axle. Should go on easily. If it binds in any way determine where and reshape hole with file until it will slip cleanly and easily over the four bolts.
12 - After the check is complete, clean the backing plates and paint with a rust inhibiting paint. Set aside until dry. Paint while you are working on this side of the axle, so that you can save time instead of waiting again when you do the other side of the axle.



Cross section of Hub Assembly w/o E-brake

13 - Smear a medium coat of Permatex on back of backing plate where it contacts the axle. Take axle shaft and place a thick bead of Permatex on back side of retaining plate (side that mates to the backing plate) let set for 1/2 hr or until stiff enough to handle.
14 - Place backing plate onto axle.
15 - Insert axle shaft, align retaining plate and sealing plate with four bolts from axle. Gently and slowly tap the axle shaft with a hammer till bearing seats (while checking and making sure the plates don't bind and go through the bolts). Tighten the four axle bolt nuts down.

Caution :
Be careful not to strip the axle bolts. You do need to tighten the bolts as tight as you can. This is because the retaining plate needs to bend a little inwards to help hold down the bearing. If the bolts should strip replace them with a bolt that closely matches the bolt diameter and length. You then need to hold the bolt in the vise and shave off one side of the bolt head with the grinder. This is so it matches the original bolt head. Use grinder to shorten the new bolt so it also matches the original, if needed. {I recommend just using new bolts for this application. Since the old ones are prone to stripping as stated}

16 - Insert E-brake cable. Tap back of cable with a screwdriver and hammer till it seats into back of backing plate.
17 - Reassemble E-brake assembly. Take note to move E-brake shoe retaining clips out of the way of the hub.
18 - Route E-brake cable through car to other side (what?). Do not tighten yet, but do place cable yoke onto parking lever rod and finger tighten the nut to hold in place.
19 - Place washers on lugs (between rotor & hub) & Slip rotor on hub (just like drum)
20 - Put flex line on caliper.
21 - Install pads on caliper.
22 - Install caliper. (the caliper is installed correctly if the flex line points up when installed)
23 - Gently bend Opel steel brake line to mate with the flex line from the caliper. Careful not to kink the flex line or the steel line. Tighten lines together.
24 - Repeat steps #10-#17 & #19-#23 for other side.
25 - Bleed Brakes
26 - Adjust E-brakes. Re-install rubber adjustment hole plugs.
27 - Adjust E-brake cable.
28 - Reinstall rims.
29 - Check brake lines & connections for leakage.
30 - Check E-brake adjustment.
31 - Lower car and test drive
32 - If you detect rubbing of any kind you will need to remove the rims and locate the source of the rub. You may then need to grind either a portion of the caliper off or check to make sure that you have appropriate rims.

At this time you might want to consider whether you need a proportioning valve on your car. My Manta didn't seem to need one. But everyone's driving styles and cars are different. If you seem to lock up your rear easily and often, then that would be an indication that you need a valve. If you do need one, go to a nearby performance shop and they'll get you what you need. Directions for use and installation will come with the valve.