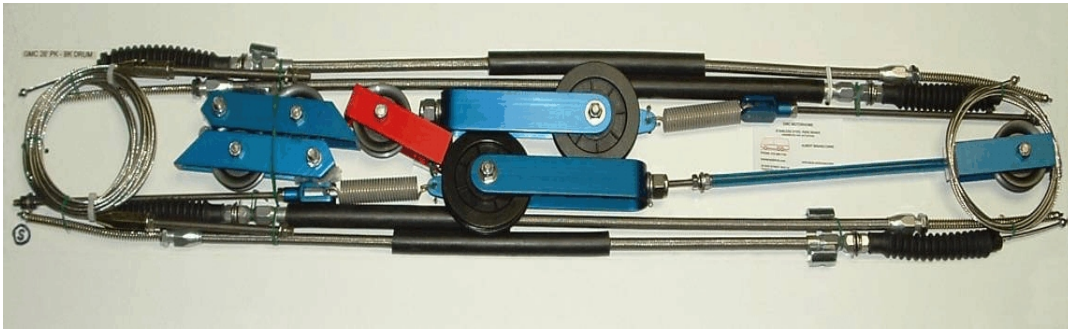


**GMC Motorhome Premium Grade Stainless Steel
PARKING BRAKE CABLE ASSEMBLIES**



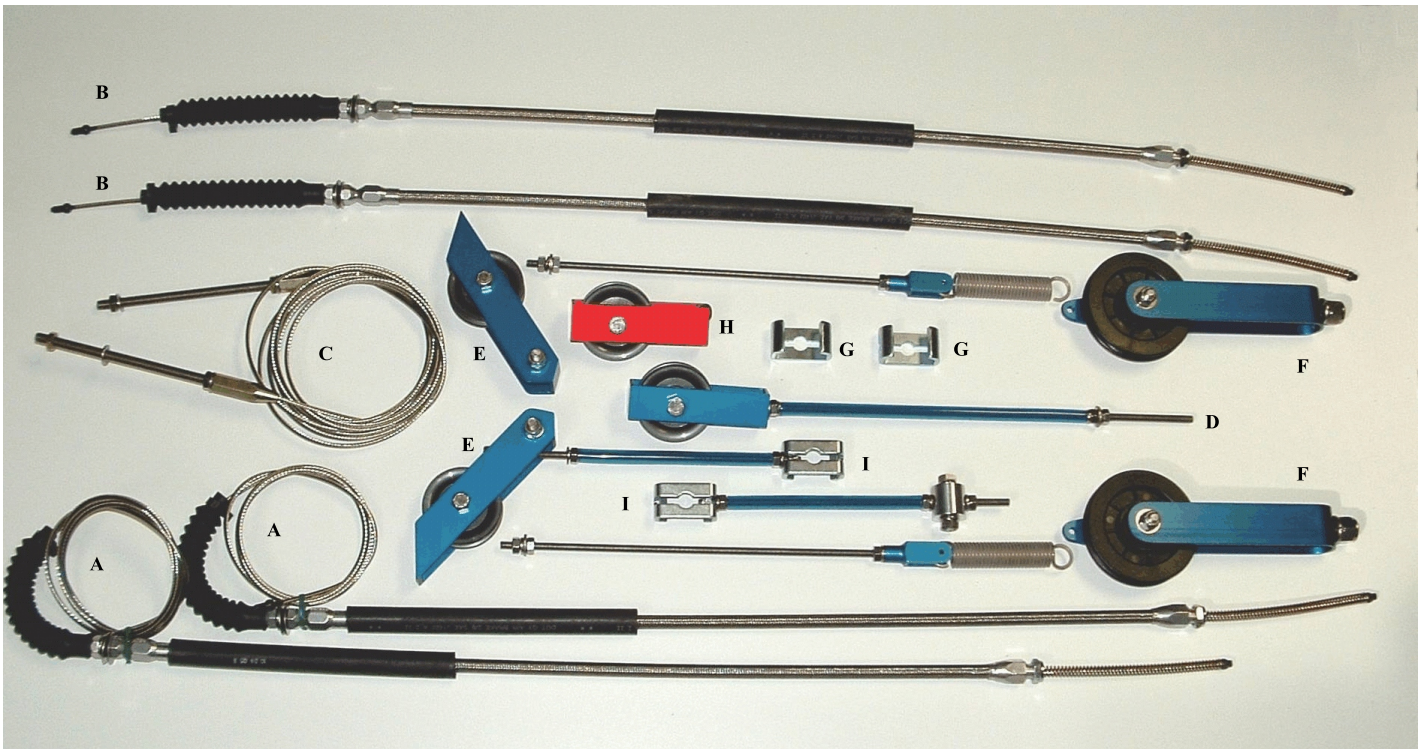
- ✓ **Manufactured and sized to be an exact fit for 23 and 26 foot GMC Motorhomes
Custom assemblies available for disc brakes or “ stretch “ applications**
- ✓ **Cable kits designed to be compatible with new force / distance assist actuator**
- ✓ **Virtually zero friction cable / conduit assemblies using polished stainless steel
core cables and teflon lined conduits**
- ✓ **Anodized aluminum bracket and pulley assemblies for enhanced corrosion and
scuff resistance and reducing pull friction to negligible levels**
- ✓ **Heavy duty anodized aluminum equalizer / adjuster pulley assembly affords lots
of adjustment and large stainless steel adjuster nut can often be adjusted without
wrenches once unlocked**
- ✓ **Intermediate cable retract springs (stainless steel) avoid having to rely on
individual conduit springs to help pull back the intermediate and brake handle
cable, ensuring positive release of brake shoe tension**
- ✓ **Due to low friction components and structural design of brackets, much more
force can be applied to the brake shoes with the same force on the P-Brake handle**
- ✓ **Frame mount conduits with rubber bellows boots are designed to “ Pop - Apart”
when in significant tension to avoid destroying the stainless steel conduit due to
accidental over extension of bogie arms (ie. Broken shock , blown tire, etc.)**
- ✓ **Where most manufactures / suppliers offer 90 days to 6 months limited warranties,
We are warranting these assemblies to be free of manufacturing or material
defects for a period of (10 YEARS)**
- ✓ **Attractive price when compared to GMC-OEM park brake assemblies. Call for potential
dealer enquiries.**

**Albert Branscombe
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(519) 368-7129 branscoa@bmts.com**

www.bdub.net/branscombe

Page 1x

Pictorial of GMC Park Brake Kit Contents :



A - Rear bogie cable & conduit (L + R)

B - Front bogie cable & conduits (L + R)

C - Intermediate Cable

D - Intermediate cable guide pulley

E - Intermediate cable thru- frame
Routing pulleys (L + R)

F - Equalizer / Adjuster pulleys (L + R)

G - GMC - OEM cable connectors (L + R)

H -Park brake handle cable EQ pulley

I - Equalizer / Adjuster pulley yoke
adapters for disc or single drum
brake applications (L + R)

NOTE:

Items “B” and “G” are omitted in the kits meant for disc brake and / or rear drum park brake only (ie. Using the two rear most wheels for park brake application.) Item “I” is included in the kits designated as “Disc Kits” and will replace the equalizer / adjuster pulley in the adjuster yoke if desired by the coach owner.

CAUTION : NOTE: *When we first started making stainless parking brake cables in mid 2005 , about one coach in twenty required a park brake “ Handle” cable as well as the wheel & frame cables. Now in 2012 , that 1 in 20 number has decreased to approximately 1 in 5 . Basically a 4 fold failure increase in a period of 7 years strictly due to corrosion issues. IS YOUR PARK BRAKE HANDLE CABLE IN GOOD CONDITION ?*

GMC Motorhome Premium Grade Stainless Steel PARKING BRAKE CABLE ASSEMBLIES

The following is a list of “heads -up “ items to ensure your success in installing and operating your new park brake assembly. Parts makeup will vary slightly for 2 wheel disc kits , differences will be noted where applicable.

In a convenient place unwrap and lay out all the individual parts to familiarize yourself with their application and location on the coach. A complete kit will consist of the following items:

Please refer to picture on previous page:

- **A - 2** -Stainless steel braided cable conduits with the long stainless core wire, These will be for the two rear bogie assemblies.
- **B - 2** - Stainless steel braided cable conduits with the short stainless core wire, These will be for the two front bogie assemblies.(Omitted in disc kits)
- **C - 1** - Intermediate cable assembly with adjuster unions and 5 inch, NF threaded studs c/w jam nut and lock washer, for 260 series GMC motorhome, see later instructions for 230 series application.
- **D - 1** - Intermediate cable guide pulley assembly, this will attach to the right rear side of the transmission crossmember where the previous wire loop hook guide was attached thru a 9/32" dia. hole.
- **E - 2** - Thru-frame routing pulley assemblies, one **left** and one **right**, these will replace the S-Hook guide that routes the intermediate cable thru the frame rail slots on either side of the coach.
- **F - 2** - Anodized aluminum equalizer / adjuster pulley assemblies c/w intermediate cable retract springs and tension adjusters and (2) yoke adapters for disc kits.
- **G - 2** - GMC - OEM type cable connectors to join the front and rear bogie cables together at the top of the equalizer / adjuster pulley assembly on each side of the coach, 2 cable connectors attached to 10.5" SS -1/4" threaded rod to be used for cable anchor devices in the “Disc Kits”

NOTE:

The front of the frame slot on each side of the coach will have to be enlarged from its current 3/8" dia. to just over 9/16" dia . this is best and easiest done with a small pneumatic angle grinder with a 3/8" tapered burr, it can be done with a file but its painful .

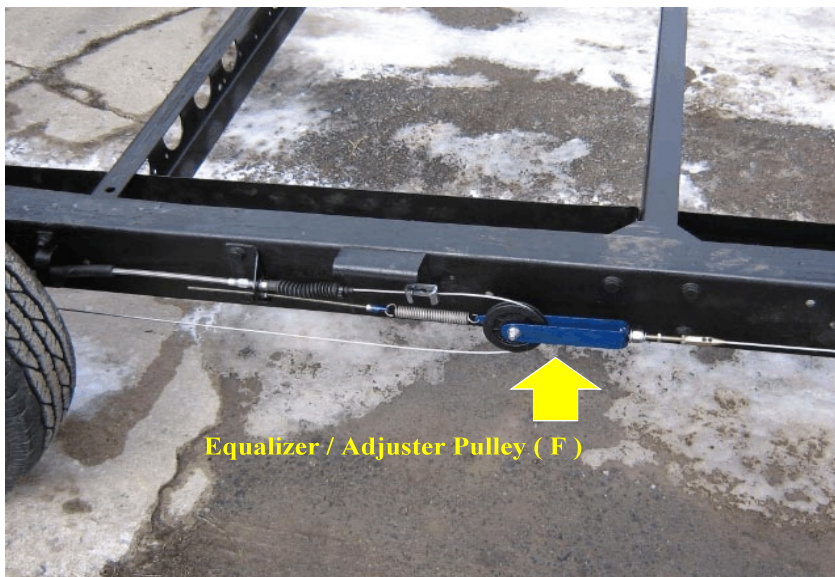
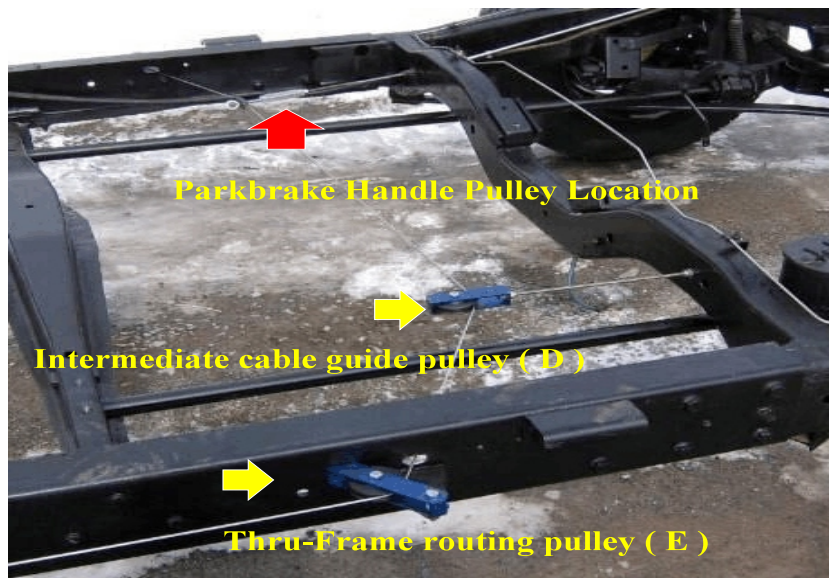
BEWARE: OF THE GAS LINES ON THE LEFT SIDE OF THE COACH WHEN ENLARGING THE LEFT SLOT.

These enlargements are necessary to route the unions on the intermediate cable through on each side of the coach frame.

Also a 9/32" dia. hole has to be drilled thru the front bogie conduit frame mount bracket on each side of the coach. These are to accept the 1/4" stainless threaded adjuster rods from the intermediate cable retract springs.

See fig. 1 and 2 on page 7w.

GMC Motorhome Park Brake Cable Routing Photos



Top photo : Showing ‘Thru frame ‘ pulley and intermediate cable routing pulley and location of ‘red’ parkbrake handle pulley

Bottom photo : Showing Equalizer / Adjuster pulley and retractor spring assembly and right side front conduit

Both photos courtesy of Richard Davis , Remsen , NY

GMC Motorhome Premium Grade Stainless Steel PARKING BRAKE CABLE ASSEMBLIES

NOTE:

The red pulley assembly to connect the intermediate cable to the parkbrake(PB) handle cable must be installed on the PB handle cable stud (5/16"NC) before the intermediate cable is routed thru the intermediate cable guide pulley (D) over top of the right hand muffler and the red PB handle cable on the left hand side of the coach.

The stud hole is of sufficient size that the stud can be pushed out of the pulley frame so one can easily attach the washer and nut and then reinstall the pulley wheel as shown below.



GMC Motorhome Park Brake Single Pair Disc or Drum Assemblies

The kits are configured such that the customer has a choice of whether a direct pull on the intermediate cable represents a comparable pull in force and distance on the drum / caliper cable , ie. 1 : 1 ratio **or** the equalizer/ pulley adjuster yoke can be configured to provide a 2 : 1 ratio whereby the pull distance is doubled but the pull force is reduced to one half.

Configured to provide a 1 : 1 ratio of pull and distance (regular pulley wheel removed and replaced with yoke adapter & anchor connector)

Close up of anchor connector shown at right.



Configured for 2:1 ratio; double the pull distance & half the pull force.

This would be a good time to remove the nylon ties on the intermediate and rear bogie cables and let them unwind, ie. the two "A" cables and the "C" cable, The rubber bellows boots have a threaded nylon insert in the large end to attach it to the aluminum conduit fittings, remove these two/four boots at this time and set them aside in a safe place, they will be installed later. Don't lose the Snapper clamps on the small end of each bellows.

NOTE: Since all the fasteners are stainless steel or aluminum , thread seizure can become a potential problem, this type of seizure **will not** be covered by warranty. Therefore ensure use of a suitable anti-seize compound (sparingly) on every threaded connection during assembly.

NOTE: It is extremely important that the conduit fitting nuts at the backing plates and the frame mount brackets are not tightened excessively. Tighten these nuts until they are just snug. **DO NOT TORQUE!**

NOTE: Even though the aluminum anodizing coat is relatively tough and corrosion resistant, it can be gouged with tools or the sharp ends of the stainless steel retract springs.

NOTE: When stainless steel is exposed to heavy and prolonged road salt , it will undergo mild pitting and discolouration , this will not affect the integrity of the components but will eventually contribute to a shabby appearance . When road salt is encountered and for the sake of the park brake system, and more important ; **your coach in general** , get the underside of the coach washed off thoroughly. Periodically wash mud, grime, debris etc. off the park brake components to ensure smooth operation of the six pulleys.



Figure 1

Profile of keyhole slot for intermediate cable at thru - frame pulley bracket



Figure 2

Forward frame bracket showing 9/32" dia. Hole for retractor spring stud

INSTALLING “ THRU FRAME “ ROUTING PULLEYS (ITEM E)

With the frame slots enlarged and the two holes drilled for the intermediate cable retract spring adjusters, we are now ready to start installing the park brake components. There is a left and right “Thru- Frame routing pulley assemblies” **ITEM E**. These will sit on top of the bracket where the old “S-hooks” were attached. This OEM frame bracket may have been bent or distorted over the years causing the new pulley assembly not to fit correctly. It can usually bent back with a large adjustable wrench so the pulley assembly shoe sits flat against the frame rail and the posi-loc nut does not hit the bracket.

INSTALLING RIGHT SIDE INTERMEDIATE CABLE GUIDE (ITEM D)

Next will be the installation of the “right side” intermediate cable guide. This guide is the one that routes the cable over top of the right muffler. The OEM cable guide routed the cable approx. 10 ½" from the rear face of the transmission crossmember The inner nut of the new assembly is set to the same distance. On the front side of the transmission crossmember in the same location as the rear hole is a small bracket that retains a hydraulic brake line to the cross frame. Remove the self tapping screw that holds this brake clip in place and discard it. The 9/32" dia. hole in the front and rear of the crossmember line up, insert the 1/4" dia. stainless steel rod thru the crossmember with a flat washer on both sides, ensure the rod goes thru the brake line retaining clip on the inside, install washer and posi-loc nut and tighten securely . Gently bend the threaded rod near the crossmember 10-15 degrees horizontally toward the centre of the coach. This would be the approximate orientation of the OEM cable guide when under tension.

INSTALLING THE INTERMEDIATE CABLE (ITEM C)

Now the new intermediate cable can be installed across the coach and out thru the slots and down each side of the coach. It’s probably a good idea at this time to lay some plastic on the floor of the coach under and around the park brake handle and apply some light oil to all the moving parts of the mechanism , with the handle in the fully released position, ensure oil can get to all parts of the adjuster knob. **NOTE:** When we first started making stainless parking brake cables in mid 2005 , about one coach in twenty required a park brake “ Handle” cable as well as the wheel & frame cables. Now in 2012 , that 1 in 20 number has decreased to approximately 1 in 5 . Basically a 4 fold failure increase in a period of 7 years **strictly due to corrosion issues. Ensure your handle cable is in good condition.**

INSTALLING THE FOUR or TWO CABLE CONDUITS (ITEMS A and B or just A)

Preparing to install the two rear or all four of the cable conduits depending whether you are doing two discs or drums or all four drums. Replacing all four cable/conduits will first involve raising the four rear wheels off the ground and blocking up the coach accordingly.

ALWAYS use jack stands and / or wood blocks to block up the coach. DO NOT rely on jacks.

Remove the four rear wheels and brake drum / hub assemblies. Perform a thorough inspection of the backing plate components and bearing assemblies as per GMC Motorhome maintenance manual X-7525A, section 5-16, 17, & 18 and section 4-28 respectively. **CAUTION:** Remember to back off the spindle nut as described in the manual. - **THESE BEARINGS ARE NOT TO BE RUN UNDER PRELOAD CONDITIONS.**

INSTALLING THE FOUR or TWO CABLE CONDUITS (ITEMS A/B or A) cont'd

Carefully check that the notch in the parking brake actuator lever perfectly aligns with the appropriate tang on the brake shoe. Included is a picture and description from page 19 of Dec. '92 GMCMM by Ken Frey & Steve Galovic (Service Tip - Brakes), as well a note from Ken Frey in GMCMM , June '02 on problems with the " Parking Brake conduit guide loop". Both of these tips are important and should be addressed at this time. (**SEE FIG. 3 and 4**)

When installing the stainless steel conduits into the backing plate please note that there is a 9/16" shoulder on the aluminum conduit fitting. This shoulder fits **into** the backing plate hole, the backing plate hole may have rusted making this difficult. Use a round file to enlarge the hole as necessary to ensure proper seating of the conduit fitting. Using a small amount of anti-seize compound , attach the posi-loc nut to the conduit fitting inside the backing plate.

Just snug the nut up (**DO NOT TORQUE**) . The same applies to the frame mount conduit fittings. The neoprene O-Ring is to centre the 3/8" fitting in the 9/16" frame bracket hole. Apply a small amount of anti-seize compound to the threads and snug the nut up so the SS washer is compressed, again (**DO NOT TORQUE**).

NOTE: The fork tangs on the park brake actuator lever can become WORN / SPREAD thus allowing the cable ball to slip thru it ! Squeeze tangs together with channel locks as necessary.

Attach the cable ball into the park brake actuator lever and remove any rust where the brake return spring lies across the metal bump at the bottom of the backing plate. Apply some anti-seize to this area to prevent any spring binding. Double check all your work and install rear drum / hub assemblies as per previously mentioned **manual sections**.

Pull 1/4" x 1" rubber adapters on core cables out about 5 or 6 inches from the frame mount conduit fittings, these adapters provide a seal for the small end of the rubber bellows boots. Install the four rubber bellows boots at this time by screwing them onto the threaded conduit protrusions. The larger end of the boot should make a seal on the tapered end of the conduit nut. **Do not close the Snapper clamp yet.**

Install cables around equalizer/adjuster pulley assembly (Item F) and install cable connector (Item G) to connect the cables together. Install the Intermediate Cable (Item C) to the equalizer/adjuster pulley assembly ensuring that the stainless steel lock washer is **between** the jam nut and the large yoke adjuster nut, repeat on the other side of the coach. Use anti-seize compound on the 5" adjuster rod prior to adjusting cables.

Ensure cables are all centred in their pulley grooves. Double check all 6 pulleys before proceeding to tighten up cable assembly.

If problems are encountered whereby the intermediate cable seems too short, the cable can be removed from the park brake handle equalizer under the left side of the coach and connected after the equalizer/adjuster pulley assemblies have been attached to the intermediate cable and the red park brake handle pulley has been installed. The intermediate cable is sized such that maximum adjustment is possible after all the components are connected together. Before starting adjustment , ensure the intermediate cable threaded rods just protrude thru the bronze adjuster nut assembly. If it had to be removed, then reattach the intermediate cable and equalizer pulley to the park brake handle cable under the left side of the coach.

Double check that the cables are all centred in their **6** respective pulley grooves and now adjustment of the system can begin. The success of the park brake system depends to a large extent on the service brakes being properly adjusted and the integrity of the drum components. Tighten the parking brake cables as per the appropriate manual section as mentioned previously. (See powerpoint presentation on our website for maint. tips)

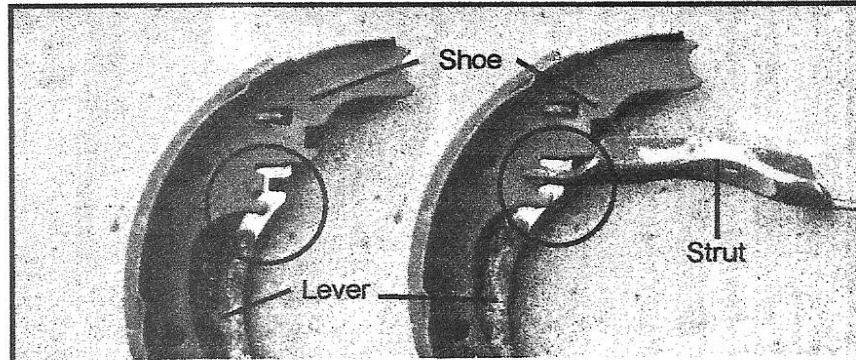
Service Tips

Brakes

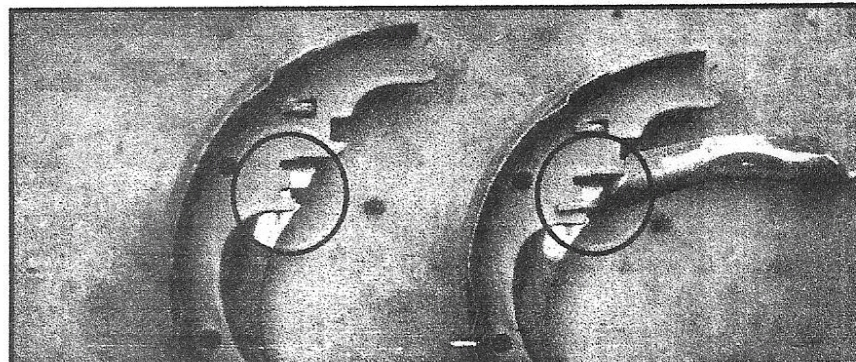
By:
Ken Frey and
Stephen Galovic

As a GMC servicing center Ken Frey, of Ken Frey Auto Service, has encountered several occasions of mismatch between the brake shoes and the emergency brake levers. The mismatch is created by mating early model parking brake levers with late model brake shoes, or visa versa. The problem seems to occur most often in 1976 Motorhomes, but could appear in any year coach. The easiest way to tell if you have the proper parts is by visual inspection. Ken has provided three sets of pictures one showing the correct association, and two incorrect possibilities. Operating with this mismatch causes very excessive brake wear and probable loss or partial loss of the parking brake. If the parts are properly matched and assembled there should be a very small amount of play (about 1/32 of an inch or so).

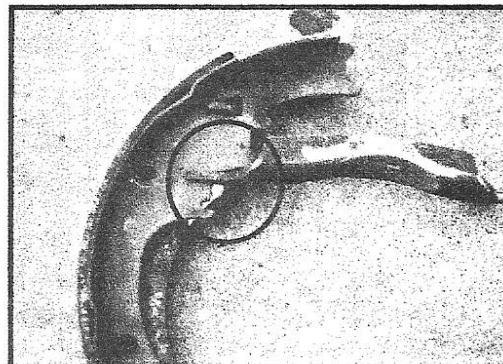
We would like to thank Ken for this servicing tip.



This is the correct relationship. Notice the position of notch in the lever designed to accept the strut, and the projection of the shoe circled on the left. Then the same view with the strut inserted on the right.



This is an incorrect relationship. Notice the position of notch in the lever designed to accept the strut, and the projection of the shoe circled on the left. The notch is too low. Then the same view with the strut inserted on the right showing an improper alignment.



This is another incorrect relationship. Notice the position of notch in the lever designed to accept the strut, and the projection of the shoe circled with the strut inserted showing an improper alignment. The notch and strut are too high.

Have any tips you would like to share? Send us your suggestions and we will consider them for publication with full acknowledgment of you as the author.

Parking Brake Guide

By Ken Frey

(Owner of Ken L. Frey Auto Repair)
Quakertown PA

In my work and travels, I have seen many parking brake cables damaged by the guide that holds them in place along the underside of the GMC Motorhome. This occurs because the guide (or hanger) does not allow enough space for the cable to “float” freely. Therefore, the brake cable tends to rub against the guide, which over time causes damage. Removing the original guide and either straightening, modifying or replacing it can achieve twice the travel and can easily remedy this problem.

In this case , we used a 3 /4" strap of scrap metal. Two 1/4" bolts, nuts and a couple of large washers fastened into two holes drilled into the frame for mounting the new guide completed the job - no more damage.

Quite often it's impossible to remove the frame fasteners securing this bracket, if the frame fasteners are corroded and cannot be removed then cut the inside of the strap near the fastener and simply bend it down as shown in the modified configuration or bend it up out of the way completely and don't use it at all. Due to the restrictive nature of the OEM configuration more severe conduit damage could occur than not having the bracket at all.



ORIGINAL CONFIG. OF GUIDE



MODIFIED CONFIG. OF GUIDE

FIG. 4

ADJUSTING THE PARKING BRAKES

When the parking brakes are adjusted as per the manual and the coach can be held stationary in “ Drive” with the engine at “ idle”, then the brakes are more or less adjusted, the drum park brakes can be overpowered by the engine above idle speed. There is a relatively fine line between having the parking and/or service brakes adequately adjusted and having them adjusted too tight. Too tight of an adjustment would lead to excessive brake shoe wear , overheated and / or distorted drums and possible fire or bearing damage. I personally would not adjust a set of brakes anymore without having an Infrared thermometer to check the drum temperature frequently the first few times out after the adjustment is made. These IR thermometers are now less than \$50 and are handy for checking brakes, tires, bearings, exhaust headers, etc. They are good insurance. Buy the wife one for checking her roast and perhaps she’ll let you borrow it for the coach !

Also, be aware that in a “side-pull “ park brake system such as our coaches have , it is impossible to balance the left and right pull forces unless the equalizer is free floating. It’s against the laws of physics . The left side force will always be 3 to 4 times higher than the right if the intermediate cable cannot move in the equalizer. The pulley attached to the threaded stud on the park brake handle cable will almost completely overcome this problem . Our third generation of kits included this red pulley. Otherwise a “centre pull” system would be the only way to overcome this problem. Higher forces are possible with the new system due to the fact the old “ S-hooks” have been replaced. These “ S-hooks” began to fail at about 150 pounds or slightly less on a straight pull. With the hook starting to straighten out at 150 pounds on the left side ; the force on the right side would be at best 50 pounds of “ pull force “ should the equalizer not be able to move. Aircraft cable tensiometers were used to map the various cable forces on the park brake system.

COMPLETING THE INSTALLATION, SEE ADDENDUM ON SEALING BELLOWS !

With the adjustments made and park brake “ON”; line up the 1/4" x1" rubber adapters on the stainless core cable so they are flush with the small end of the rubber bellows boots and carefully close up the Snapper clamps *FULLY*, sealing the small end of the bellows. Small channel lock pliers will work fine. Should you need to remove the Snapper clamp for any reason then pull one of the small ears toward you whilst pushing the other ear away. Repeat for other three boots. Release parking brake handle and we will now install and adjust the intermediate cable retract springs. Insert the 1/4" stainless adjuster rod thru the 9/32" hole you drilled thru the front conduit frame bracket with a nut and flat washer on each side of the bracket. Adjust the rod so the gap between the coils of the spring are approximately equal to the spring wire thickness, ie . About 1/16" to 1/8" gap between adjacent coils. This will give about 16 pounds retract pull on the intermediate and park brake handle cables, thus enabling the drum return springs to only pull their individual cable back.

CONTACTING US

If you have any questions, suggestions, criticisms ,or what have you, please feel free to contact me. It would be a pleasure to hear from you. Any assistance we can provide to make your and our project a success will be a benefit to all. Call (519) 368-7129 or email us at branscoa@bmts.com and ask for Albert Branscombe, 33 Rae Street, TIVERTON, ON, N0G 2T0
OUR WEB SITE: www.bdub.net/branscombe

Risks associated with insufficient “field” sealing of parking brake conduit bellows boots thus allowing moisture infiltration to conduit .

Identified Problem : Over the last short while (latter half of 2012) there has been 3 instances brought to my attention of partially or totally seized parking brake cables inside their protective conduits. Although this is less than a 1 % failure rate, **ANY failure rate is UNACCEPTABLE !**

There are presently about 450 SS conduit / cable assemblies in the field and due to the above statement ; ***They should be checked regularly for freedom of movement.*** At the frame end of the conduit / cable assembly is a threaded aluminum bushing that attaches the conduit to the GMC frame bracket. Approx. 1.25" of the inner bore of this bushing is in potential physical and electrical contact with the 1/8" dia. stainless cable strand that passes thru it. Add water ; Especially water with trace amounts of salt in it and galvanic action can and will eventually form a coating on the stainless strand and seize it in the bushing. Lab analysis has confirmed the white dense compound to be alumina (Al₂O₃) , this is essentially a ceramic compound and has the ability to completely seize the cable.

We consulted chemical engineers during the original design and were informed that galvanic corrosion could be prevented by keeping the bushings dry. This is why we selected a boot that would prevent water intrusion if properly installed. Good quality neoprene bellows boots were procured from Wescon Products in Kansas and a method was devised to seal the joint against water infiltration. It appears that the “ Nylon Snapper Clamp” at the cable end of the boot is not being completely done up in the field or in one case , being completely left off the boot.

The bellows boot of course will retain water inside it if not properly sealed due to its accordion structure and this will result in certain galvanic action occurring.

WHAT ARE WE DOING ABOUT THIS PROBLEM ?

First of all: Bring to your attention the fact that it’s imperative that the bellows boot is fully sealed against moisture infiltration by ensuring the “ Snapper Clamps” are fully engaged (ie. All 6 teeth engaged) , **Secondly :** That you should inspect the conduit bushing **regularly** for signs of moisture and the presence of any white powder at the end of the bushing. **Thirdly:** Check the cable strand for freedom of movement **regularly** . The entire conduit is teflon lined , the only parts of the conduit that wasn’t lined was the bushings at the forward frame bracket and the backing plate.

As of October 1st , 2012 all conduit assemblies will have their bushings fully dielectric sleeved to prevent any possibility of galvanic action in spite of boot sealing problems that may occur in the field **AND** this dissertation will accompany all kits being sold. This “ Heads Up” will also be posted on our website and anywhere else deemed helpful.

If after careful inspection ; you find or suspect a sealing problem that has impaired freedom of movement of your cables, remove the conduits (either 2 or 4 conduits depending upon your kit) and return them to us at “ ***your cost*** ” **and** ; I will rehab or replace the conduits with dielectric sleeved conduit bushings and ensure there are no defects in the assemblies **and** return them to you at “***our cost*** ” . In a “perfect world” the conduit manufacturer would not have used aluminum and stainless together , even though it’s often done in the aerospace industry. I suppose the conduit manufacturer imagined his products would be shown off on a hot rod or muscle car cruising down Woodward Avenue on a sunny Saturday afternoon, not on some GMC that has been parked on the beach on South San Padre Island for 3 months in a salt water atmosphere. **Keep in mind ; Dry boots - no galvanic action!** Alas : Sorry for any inconvenience. SincerelyAlbert Branscombebranscoa@bmts.com