Before You Begin

This driver manual provides instructions and information for the KLAM Retarder System (a frictionless brake) for commercial vehicles.

Before you begin to use the KLAM Retarder System!

1) Read and understand all instructions in the driver manual.

2) Be aware of all Warning, Caution and Safety alerts. They will avoid damage to the system components or serious personal injury, or both.

3) This KLAM Retarder has been installed according general installation rules of the automotive industry. Regular maintenance or service to the vehicle needs to be preformed according the manufacturer.

Additional Information

Call (800) 852 5445 or get online www.klamamerica.com

"Setting the pace with Retarder Technology"
Valued Customer,

We thank you and congratulate you on the purchase of a KLAM electro magnetic retarder made by “Industrias Zelu, S.L.”.

This “frictionless brake” has been developed and manufactured with the latest technological methods and more than 40 years of knowledge and experience, in order to obtain the highest quality for your absolute satisfaction.

We have prepared this driver manual for you to know every detail of the KLAM electro magnetic retarder system and how to use it in the best and safest way.

In here you will find information, advice and important warnings for adapting your driver style, it will help you to take the maximum advantage of the technical - and economical qualities of the KLAM electro magnetic retarder.

Have a Save Journey
KLAM Retarder System Overview

1 – KLAM Retarder
2 – EPM Modul
3 – EPM wiring to Retarder
4 – EPM wiring from Battery
5 – Data Cable EPM to ECM
6 – Pressure Transducer
7 – ECM Modul
8 – Handcontrol with Brake Cruise Button
9 – Retarder Function Control-light
10 – Brake Cruise Light
11 – Winter Switch

"Setting the pace with Retarder Technology"
BENEFITS AND SAVINGS.

By its essential definition, a KLAM electro magnetic retarder, is an alternative and independent braking system, which can be used to reduce, gradually and constantly, the inertia force of a moving vehicle, without causing any friction or wear. Therefore, several factors which influence the retardation force, such as, the total vehicle weight, the actual driving speed (at any moment), or geographic factors along the route, like heavy duty roads and mountains are reasons to use the benefits of the KLAM electro magnetic retarder.

The KLAM electro magnetic retarder, by itself, has the potential to substitute the vehicle’s conventional/standard braking system (foundation brakes), as it is designed to retard the vehicle for a longer time period independent of shifting, engine brake performance or driver mistakes. It is obvious that the fatigue, tear and wear on the vehicle’s service brake system and / or engine, not only cause a dangerous situation for controlling the vehicle but also additional cost of parts, repairs and labor. Considering the downtime, these events are significant. On the contrary, the frequent use of the KLAM electro magnetic retarder, will avoid all above mentioned inconveniences.
“HOW TO USE”

BASIC INSTRUCTIONS:

Before using the vehicle, it should be checked if the handcontrol (A) is in position “0” (off). By turning the ignition key the KLAM Retarder System is active and can be used immediately.

The handcontrol (A) has 4 stages of braking power and 5 positions (off + 4). It allows you to designate the retarder braking power accordingly to your needs.

If the KLAM Retarder System is used, the green function control-light (B) will indicate that the retarder is “on”. This light can be integrated in the dashboard by the vehicle manufacturer or is additionally installed.

The KLAM electro magnetic retarder does not change nor improve your driving style and can be used in every situation if slowing down (retarding) is required. In short, whenever your vehicle needs to decelerate its driving speed, no matter the reason, it is very important to be aware that, your vehicle is equipped with a KLAM electro magnetic retarder, which if you give it priority in using, will always improve your safety and gives you savings by avoiding wear on your vehicle braking system.
In normal traffic the handcontrol (A) can be used also for your comfort, but keep mind that you are in full control at any time. Also consider that the KLAM electro magnetic retarder will benefit from you using the 4 stages in a professional way. Why use position 2 if we can manage in 1, or why to go to position 3 if it is enough with position 2, and so on. After you obtain the required deceleration, return the handcontrol to position “0” (off).

If the vehicle is not moving (standing still) or you approach a stoplight with your handcontrol switched on the KLAM Retarder will automatically disengage. Your KLAM system has a internal speed recognition and the retarder control-light (B) will switch off.

Should you forget to return the handcontrol (A) back to it’s off position the KLAM Retarder will not function if you engage driving. Only when you apply the handcontrol to a different stage the KLAM Retarder will resume working. This is a protection against abuse and prevention of unnecessary overheating. Stage 4 is the exception because this is the retarder 100% (full) on and could be required or demanded by the driver.

If your vehicle is equipped with dual controls (proportional foot control) the retarder control light (B) will also illuminate when using the foot brake pedal. You can switch off this function by using the “winterswitch” (D) which might be required with snow - or icy road surface.

However the winterswitch should be avoided as the KLAM Retarder has proportional control (from 0 to 100%) when using the footbrake pedal and will cause smooth retardation without engaging an ABS event.
The brake cruise light or V set (C) has several functions and it is combined with the green push button on the handcontrol (A).

The brake cruise function allows the driver to select a certain speed in which he likes to maintain the vehicle cruising downhill (and not become faster). He can select that speed during driving by pushing the "green button" on the handcontrol (A).

It is possible that your KLAM Retarder controls have a normal 4 stage handcontrol and the push button is the Vset light itself.

During a downhill descent and a selected speed of, for instance, 40 mph the KLAM Retarder System will maintain the speed by adding more brake force to the driveline (automatically). This brake cruise function will allow the driver to concentrate on the road without applying the retarder manually.

If the brake cruise function is "on", the brake cruise light will illuminate. The brake cruise function can be reset or switched "off" by pushing the green button on the handcontrol again. As written before some vehicle applications might have a seperate push button (yellow) on the dash instead of a handcontrol with pushbutton.

CAUTION: The KLAM Retarder System has it's limitations. If this is reached during the brake cruise function, it is possible that the speed of the vehicle will increase due to the inertia of the vehicle or the degree of the decline. The driver is in control!
The second function of the brake cruise light (V set) is the diagnostic tool. If something is wrong or not properly working with the KLAM Retarder System, this light will illuminate by blinking a code if the retarder is applied. It will show the driver that something is wrong and he needs to advise the workshop.

Driving under normal circumstances, the KLAM electro magnetic retarder is to be used frequently and should be applied by you if:

- STOP AND GO TRAFFIC.
- ON DOWNHILL DESCENT.
- TO ASSIST WITH AN EMERGENCY STOP.

Using the KLAM Retarder System with “STOP AND GO”.

The most frequent reasons for stop and go are heavy traffic (congested), driving in city limits or secondary roads. Particular vehicles for this type of traffic are refuse trucks and buses. In all these situations, the KLAM Retarder System shall be used (with priority), using position 1 to 3 or even 4. Try to use them in stages to have the maximum benefit of the braking torque given by each position.

Once the vehicle has been decelerated to “stop” condition, the service brake can be applied for total standstill. In this moment, the handcontrol should be returned to off “0”. Take care that, retarder braking force is much softer if you compare that with the service brakes and therefore, bear in mind the time and distance during each stopping of the vehicle. Just in case your judgement is wrong, (best judgement is achieved through practice), the KLAM Retarder System and service brakes can always be applied at the same time.
It is possible that your KLAM Retarder System has besides handcontrol also footcontrol (dual controls), which means the retarder braking power can be applied by using the brake pedal. More comfort, safety and savings are guaranteed.

How to use “ON DOWNHILL DESCENT”.

When driving along routes with heavy inclinations, there are two often cases:

1. **Short descend, slow speed and frequent stops.**
   Road circumstances, continuous changes of surface and dangerous bends, are good examples of this driving situation. If your experience with using the KLAM Retarder System has improved, it is normally enough to use positions 1, 2 rarely 3 only in very extreme situations position 4. Main elements that influence the retarder power are the road characteristics and the actual vehicle driving speed.

2. **Long and heavy inclined roads.**
   Select the most appropriate gear at the transmission according to the descent. The KLAM Retarder System, will allow you to shift one higher selection than you are normally used to. The handcontrol position will be selected in relation with the gear previously selected and changed if vehicle inertial energy will cause to become faster or slower. Once the vehicle speed is slower, the handcontrol position can be reduced, taking maximum benefit of vehicle natural inertia.

   It is important to notice, as long as maximum retarder torque is utilized (position 4 of handcontrol), without taking advantage of vehicle inertia, the KLAM Retarder System is only “overheating” and not adding any savings.

**Styles 1 or 2 can be avoided by using “Brake Cruise”**
“TO ASSIST WITH EMERGENCY STOPS“

When an emergency stop is required, such as, finding an unexpected obstacle on the way, or to meet unforeseen pedestrians crossing the road, etc., it is advisable to react as follows:

- There is no problem, to activate the handcontrol from off “0” to “4” in one single action. The retarder system is designed to handle that.

- The service brakes and retarder system, can operate simultaneously, causing no incompatibility. Moreover, when using both systems at the same time, the stopping distance will be drastically reduced.

- In extreme stop situations and both brake systems are applied, the driver is still in control of the vehicle by means of steering and can avoid a crash or collision. If the vehicle is equipped with an ABS system, the KLAM Retarder System is interfaced and will instantaneously release, until the ABS event is switched off.

- If the KLAM Retarder System has dual controls, by using the foot brake pedal the KLAM Retarder will be applied according to the pressure you apply with your foot. The more foot pressure on the brake the more retarder power. These settings are programmable in the ECM Modul and can be adjusted to your needs.

Should you require assistance or adjustment in your ECM setting!
Please contact your local dealer or (800) 852 5445.
CORRECT USE OF THE KLAM RETARDER SYSTEM

A.) Whenever the ignition is “on” and, therefore, the engine is running but the vehicle is stopped, the handcontrol (A) should be in position “0”, the retarder control-light (B) is off and winterswitch on (D).

B.) Do not use the KLAM Retarder System when engine is stopped. For service and maintenance reasons it is allowed to do that shortly.

C.) The KLAM Retarder System only works when the vehicle is moving, so, it can never be used as “parking brake”.

D.) Prevent from shifting gears, if the retarder system is activated.

E.) If the KLAM Retarder System has been used continuously for a longer period, it is advisable to cool the retarder before stopping the vehicle at once. It is highly recommended to run about 2miles, or equivalent in time (10 min.). In that case, only use the service brakes. The KLAM Retarder System is equipped with an internal temperature control system that will override the driver if critical temperature is reached. It will show the driver a yellow blinking code if he applies the retarder function.

F.) In order to keep the KLAM Retarder System in very good condition, it is recommended to drive without abruptness, not move gears, as matter of fact, to drive with care. Remember that the KLAM Retarder System is part of the driveline of your vehicle. The relation between selected gear and engine r.p.m., has to be in compliance, even if you’re not using the retarder system.
G.) Take special care whilst driving on off-road surface or roads with potholes. Also if the road circumstances do not allow fast driving. In these cases, we recommended to reduce the speed, in order to avoid collision, which could damage the KLAM Retarder System.

The KLAM Retarder System should be and must be used, only when needed. Do not make unfair demand of it. Remember the KLAM Retarder System will make you efficient downhill, safer and will reduce your cost and improve your comfort.

H.) The second function of the brake cruise light (V set) is the diagnostic tool. If something is wrong or not properly working with the KLAM Retarder System, this light will illuminate by blinking when the retarder is applied. It will allert the driver that something is wrong with the retarder system and he needs to take this into consideration during his journey. He also needs to advise the workshop of the event.

The diagnostic tool also allows to pinpoint the failure in more detail. This can be activated by turning the ignition "on" and applying the retarder. You can do that by putting the handlever in the first stage or, for instance in case of footcontrol, push the brake pedal.

If the light is blinking you may push the green button on the handcontrol for 1 second (or the seperate Vset button on the dash-board). The brake cruise light will start blinking a code (sequence). Count the number of blinks. In the list (figure 3) you will find the explanation of the different codes.

CAUTION ! We advise you to visit your KLAM dealer, or workshop, to have the problem looked at and solved.
KLAM Retarder Diagnostic Tool

The details in figure 3 can be solved by an authorized KLAM dealer or installer and allows you to diagnose the trouble beforehand.

<table>
<thead>
<tr>
<th>Number of flickers</th>
<th>Text displayed on the PC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DATA LINE OPEN</td>
<td>Cable between ECM and EPM interrupted</td>
</tr>
<tr>
<td>2</td>
<td>EPM LOW VOLTAGE</td>
<td>Supply voltage below established limits</td>
</tr>
<tr>
<td>3</td>
<td>EPM OVER TEMP</td>
<td>Temperature of EPM above 105°</td>
</tr>
<tr>
<td>4</td>
<td>EPM / COIL SHORTCUT</td>
<td>Defective EPM or coil in short circuit, could also be due to fluctuations in current</td>
</tr>
<tr>
<td>5</td>
<td>DATA LINE SHORTCUT</td>
<td>Cable between ECM and EPM in short circuit</td>
</tr>
<tr>
<td>6</td>
<td>EPM NO VOLTAGE</td>
<td>EPM without supply</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>SETUP DATA INVALID</td>
<td>Incorrect parameters in ECM</td>
</tr>
<tr>
<td>10</td>
<td>ECM HIGH VOLTAGE</td>
<td>Supply voltage to ECM above 32V</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>SPEEDSIG. TOO FAST</td>
<td>Speed signal frequency above 10 kHz. This may also be due to interference</td>
</tr>
</tbody>
</table>

The KLAM Retarder System is also standard equipped with a PC / laptop interface which will allow the KLAM dealer to check your retarder function, adjust your settings and service the KLAM system.

More details can be found in the KAC document ST 20176 and ST 20179. Please contact (800) 852 5445 or visit us online www.klamamerica.com
PERIODIC MAINTENANCE

This “maintenance” will depend on the type of KLAM Retarder System you have! For instance a “maintenance free” or “low maintenance” KLAM Retarder. (please check with your dealer). A “low maintenance” retarder system will require greasing every 40,000 miles or annually. Check the technical information or check with your dealer.

Also be aware to use the subscribed grease !!! It has to be heat resistant grease and should not contain graphite. Contact Us!

The only “maintenance” the KLAM Retarder System requires is limited to viewing periodically the state of the electrical system and its critical parts, described next.

- Verify the connection of all the cables from and to the retarder system. Check for isolation, humidity and/or corrosion. Clean and repair if required.

- Specially the ground cable from the battery to the EPM (or chassis). It needs to be free of damage and corrosion.

Also check if the EPM cooling ribs are free of dirt and damage. The EPM frontplate (see E) needs to be sealed after checking the wiring.

Check the wiring to the KLAM Retarder.
- Use the KLAM Retarder Software System to test the function of all main components, like the handcontrol, function control-lights and KLAM electro magnetic retarder. Follow the guidelines in KAC document ST 20179.

- In some cases (like power failure of the battery) the KLAM Retarder System needs to be reset at the ECM Modul. The sequence of reset (or calibration) is with ignition on and pushing with a thin object the white push button for 1 second. The brake cruise light (Vset) will illuminate for 3 seconds. The calibration is done.

CAUTION! Should the Vset light stay on or blink……you have to contact your dealer or installer.

- Keep the KLAM Retarder System clean, especially the rotors should not be covered with grease and dirt. This will only influence the performance of the system and long-term durability.

- The KLAM Retarder System on your vehicle is equipped with integrated “ABS switch off” and “low speed switch off”, but also monitors the battery voltage and EPM temperature. These functions can cause temporary failure and a blinking code. After the situation is restored the failure code will be erased automatically (but remains stored in the ECM). If you want to check these functions or amend the settings please contact your dealer or our technical department at KAC.

Do not manipulate any component of the retarder installation, it will void you of warranty.

Manipulation could effect the function of the KLAM Retarder System.
Visual Inspection

When you do the visual inspection of your vehicle, we recommend to verify the state of the main fixation (brackets) of the KLAM Retarder System.

The first check should be after 5,000 miles after installation, after this we recommend review every 20,000 miles.

1 - Check the bolts (4x) and nuts M18 (torque 240 lb.ft ±5%).
2 - Check the silentblock (rubber mounts).
3 - Check the bolts (8x) on the retarder brackets (torque 90 lb.ft ±5%).
4 - Check the bolts and nuts of frame brackets (torque 145 lb.ft ±5%).
5 - Check the screws of the propshaft (driveline). (torque depends on the type of flange).

Also lubricate the driveline joints regular (use heat resistant grease).

In case of a focal mounted retarder (KA series), the transmission output bearing needs to be inspected as well. (Same goes for axle mounted retarder systems).

This driver manual is provided upon the purchase of a KLAM Retarder System and may not be reproduced or used without written consent of KLAM America Corporation. Additional copies will be provided on request or visit www.klamamerica.com.
The KLAM Retarder is a product of Industrias Zelu, S.L., the electromagnetic retarder manufacturer out of Arre (Navarrra) Spain. With 40 year of experience in production and design, Industrias Zelu, S.L. has proven to be an excellent automotive supplier by offering new retarder products and braking solutions to the commercial vehicle industry.

A prove of that commitment can be demonstrated in a long list of satisfied OE’s, dealers, fleets and clients.

Industrias Zelu, S.L. is also investing in Quality and Employee Training in order to insure the growth of the satisfied customers list.

Should you have any questions regarding this driver manual or anything related to the KLAM Retarder System, please contact!

KLAM America Corporation

5502 Pearl Street
Denver (Colorado) 80216

Toll Free (800) 852 5445

Or (303) 297 3939 or Fax (303) 297 3815

You can also visit us online: www.klamamerica.com
Do you want to increase?

- the safety?
- the operational profit?
- the comfort?

The KLAM Retarder will do that!

- by using the KLAM Retarder you always have a “cool” set of functional brakes.
- The KLAM Retarder is a “frictionless brake” and will prevent the wear on your foundation brakes.
- the KLAM brake cruise function will increase safety and comfort for you and your passengers!

Come and See Us!

Call Us (800) 852 5445