SmartBrake

Driving without limitations

BEVER MOBILITY PRODUCTS

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Bever Mobility Products, Inc.

Bever Mobility Products is the US and Canada distributor for Bever Car Products. Bever Car Products has been a manufacturer and European distributor of high-tech mobility equipment for over 20 years. Bever Mobility Products and Bever Car Products are part of a group of companies from the Netherlands active in the field of mobility and mobility equipment since 1973.

Bever Car Products has its own product development department. All parts of the development process like mechanical engineering, electronics, software development and testing are performed in house. Being the leading company in the Netherlands, Bever has a large home market with many clients using equipment of Bever for many years.

SmartBrake is Bever's second generation electronic Brake system. All the gained experience and feed-back from the European dealer network and clients has been used to develop an even better system. Improvements were made on every aspect like ease to use, ease to install, minimize maintenance, improve reliability and higher level of safety.

The system is an addition to the existing brake system of the vehicle. The original brake system remains unaltered and operable by non-handicapped drivers. SmartBrake enables operation of the brakes in various alternative ways using very little force. By means of electronic signals from a client specific control, the driver can control the brake pedal of the vehicle. The system can be used in almost all minivans and light trucks.

Brake actuator mounted on brake pedal

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Functionality

SmartBrake becomes active as soon as the ignition is switched on. SmartBrake will first perform a start-check (self-test) to check whether all parts of the system function properly. SmartBrake consists of two almost identical branches, which work continuously in parallel. By means of a client specific gas/brake hand control, signals are sent to the ECUs. Subsequently, the ECUs operate the brake actuator. The brake actuator is mounted directly on the OEM brake pedal and is equipped with two motors. The operation of SmartBrake is adjustable to the requirements and capabilities of the driver.

OEM controls

When a non-disabled driver wants to drive using the OEM controls, SmartBrake can be easily switched off at the start of a new journey. By putting SmartBrake in sleep mode, the brake actuator no longer responds to the hand controls. It is only possible to enter the sleep mode immediately after start-up.

Brake actuator

SmartGas

SmartBrake is normally used in combination with SmartGas. SmartGas is a fully electronic system that plugs into the vehicles electronics. SmartGas will respond to the gas/brake hand control SmartGas will respond to the gas/brake hand control or when SmartBrake is in sleep mode, to the OEM gas pedal, when SmartBrake is in sleep mode. (see page 5 in this brochure.)

ECUs

Installation

SmartBrake is installed in the interior of the vehicle. Most common places for installation are under the front seats and under the dashboard. Installation kits are available for a number of vehicles to enable a fast and safe installation. Only the client specific gas/brake hand control and warning lights will be visible in the vehicle.

Battery / power supply unit

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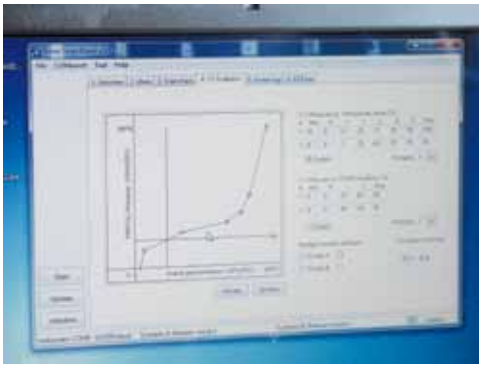
Safety

SmartBrake is a fully redundant system. The system consists of two almost identical branches which continuously work in parallel and check themselves and each other. A malfunction in one of the two branches can never result in a complete malfunction of SmartBrake. The other branch ensures normal operability of the brake by the driver. The fault is detected and relayed to the driver by an audio signal and warning lights.

Communication module

User interface

The SmartBrake user interface provides information about the status of the system to the driver. It also enables the non-disabled driver to switch off the system at the start of a new journey.



Error logging

Detected faults are stored in a log. Stored faults of a serious nature are relayed to the driver by the user interface. A certified mobility equipment dealer can read the logs with a laptop. The log shows which faults occurred.

Self-test

When the ignition is switched on, SmartBrake will first execute a start-check (self test). During this test, the capacity of the back-up battery and proper functioning of the brake actuator are verified.

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SmartGas

SmartBrake only operates the brake pedal. To operate the throttle pedal, SmartGas is the needed. It acts as an interface between the hand control and the engine. SmartBrake and SmartGas work together seamlessly to act as a single solution for gas and brake. When SmartBrake is active, the throttle can be controlled through the hand control, such as the gas/brake slider, stick or lever. When SmartBrake is in sleep mode, the OEM gas pedal controls the throttle. SmartGas has no moving parts which makes it silent, responsive, reliable and maintenance free.

Installation

SmartGas is installed between the OEM gas pedal and the engine. It reads the signals from the OEM pedal and from the hand control. Depending on which input is active, it generates signals to the engine. The product is sold vehicle specific. That means that it comes with vehicle specific wiring. The wiring harness plugs into the connectors of the OEM gas pedal. The hardware and the settings in the ECU are programmed for that specific car make and model.

Beside the gas pedal wiring, only wires for power supply, ignition signal and brake light signal have to be connected to the vehicle. The wiring for the user interface and the connection to SmartBrake is prepared and just a matter of plugging in the connectors.

Similar to SmartBrake, a curve can be configured to adjust the responsiveness of the hand control to the driver's preference.

Safety

When braking, outbound throttle signals return to idle. To be able to apply gas again, both the throttle and brake inputs have to return to the idle position first.

This provides an extra safety for unintended acceleration.

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Alternative gas/brake controls

To operate SmartBrake and SmartGas the following gas/brake controls are available:

- **Gas/brake slider with tri-pin**
- **Gas/brake slider with switch module and tri-pin**
- **Gas/brake stick**
- **Gas/brake lever with T-bar or L-grip**
- **Rocker pedal**
- **Instructor brake**

Gas/brake slider with tri-pin

This gas/brake hand control enables the driver to comfortably and easily brake and accelerate by hand with an adjustable effort. The gas/brake slider is supplied with a high-quality tri-pin that can be adapted to the shape and dimensions of the hand. The driver can control gas and brake by moving the tri-pin forwards or backwards in a horizontal movement. Maximum stroke for the brake is 3½" and for the gas 2". The slider is equipped with a high-quality rail. Effort level can be adjusted to the requirements of the driver by replacing the spring. The direction of operation of gas and brake can be reversed by the installer. The gas/brake slider is often used by quadriplegics in combination with a low or zero effort steering.

Gas/brake slider with L-grip

Gas/brake slider with T-grip

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Gas/brake slider with switch module and tri-pin

The gas/brake slider can be accommodated with a switch module. Through this switch module four switches can be actuated by turning or tilting the tri-pin. Most common functions operated this way are turn signals, windshield wipers and washers and horn or lights. The driver can now perform gas and brake and the most important secondary controls required for driving with one hand. The effort level of the switch module can be adjusted by mounting different ball spring plungers. Two types of ball spring plungers are supplied to make three different combinations (light, medium and heavy) depending on the drivers requirements. In order to be able to use the switch module, the product SmartControl is available as an interface to the vehicle electronics.

Turn right

Turn left

Tilt right

Tilt left

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Gas/brake stick

This gas/brake hand control gives the driver the possibility to control the brakes and accelerator with a very low effort level. The gas/brake stick differs from the gas/brake slider by using a refined finger motion to accelerate and brake instead of a sliding one. The gas/brake stick is commonly used by drivers with muscular diseases or people with a very small reach.

Gas/brake stick combined with SmartSteer (steering device with secondary controls)

Gas-brake lever

This gas/brake hand control is a combination of the gas/brake slider and gas/brake stick. It's more compact than the slider, but has a bigger stroke then the stick. The gas/brake lever is equipped with a damper that dampens fast movements to optimize the controllability. It is suitable for both left-handed and right-handed drivers. The operation force is adjustable by changing the spring load.
The direction of gas and brake can be reversed by the installer.

Gas/brake lever with T-grip combined with Bever 3-pin device

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gas/brake lever
with L-grip

gas/brake lever
with T-grip

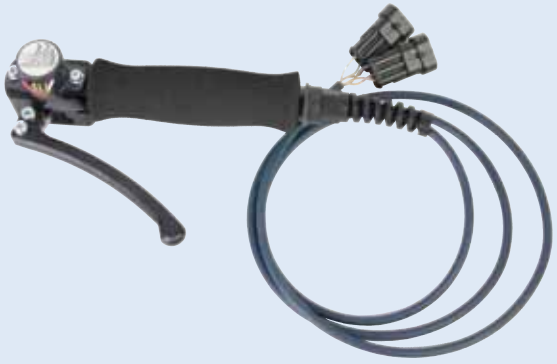
Rocker pedals

This product enables the driver to operate the brake and gas by feet. When the driver can't make the movement with his foot from the accelerator pedal to the brake pedal and visa versa rocker pedals can be a good solution. This enables the driver to use one foot for braking and the other for gas. Pushing both pedals at the same time will shut off the gas until the brake and gas are released. The pedals can be adjusted to the driver to prevent unintentional operation and fatigue.

Foot plate in different sizes

Instruction brake

After SmartBrake is installed in the client's vehicle, an instructor brake can easily be plugged in during test-driving or instruction. This enables the instructor/evaluator to intervene and operate the brake. The user can be instructed safely, without the need to mount a mechanical trainer brake.



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Bever high-tech products in your evaluator vehicle

SmartBrake, SmartGas and SmartSteer gives new possibilities to CDRS's/Evaluators or other driving specialists to create a Mid-Tech Evaluator Vehicle. This means you can provide services to most of your clients just with one vehicle (Mini-Van). Because of the compactness, flexibility and ease to install, you can easily combine Bever products with other driving aids, such as low or zero effort steering, a left-foot accelerator and mechanical hand controls. You can have one vehicle with a lot of different driving aids for an affordable price. Please ask us for the possibilities. We will help you to create a vehicle with the most possible options so you are able to give the best service and advise to your clients.

Quick exchange brackets

You can simply move the electronic gas/brake controls from left to right or visa versa, adjust the position and change between the different type of controls. The quick release plugs make it possible to quickly connect the gas/brake control that you need without having to do any software adjustments.

Position stick easy to change

Quick exchange connector to change easily between different gas/brake controls

Quick exchange bracket right

Quick exchange bracket left

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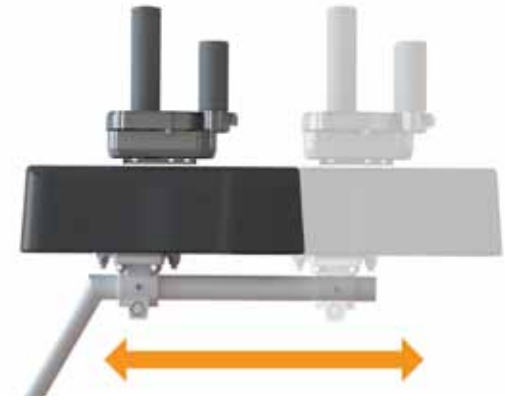
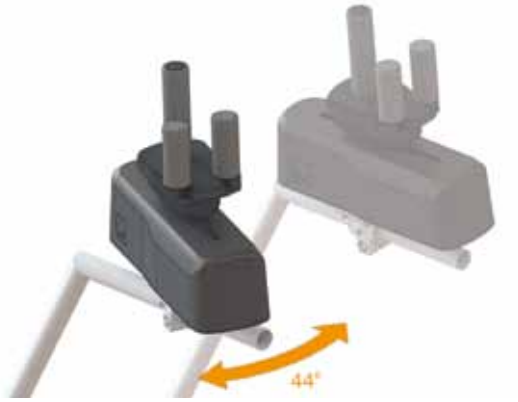
The gas/brake hand control can be rotated to the left or the right and adjusted in height

The gas/brake hand control can be moved forwards or backwards





The gas/brake hand control can be swiveled to the left or the right

The gas/brake hand control can tilted to the left or the right

With all these possibilities you can always find the optimum position for the different gas/brake hand controls and train your client in the best way. This will raise the confidence and joy of driving for the driver.

Bever's high-tech products in your evaluation vehicle do not limit you in the use of all types of mechanical hand controls, foot controls, etc. This makes your vehicle better equipped for a larger group of clients. Using the high tech controls is very easy and does not demand a lot of training. The vehicle can be arranged in such way that different products can be used in the same vehicle, without conflicting each other. It gives you the flexibility to serve most of your clients with one vehicle.

Left-side hand control

Right-side hand control mounted on SmartBrake floor bracket

Please contact us to discuss the possibilities and be ready for the future to train your clients with the latest equipment.

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Characteristics SmartBrake and SmartGas

- Fully redundant brake system
- Adjustable brake and gas characteristics
- Switch off easily and safely
- Original gas and brake system remains intact and operable in a normal way
- Suitable for electric and hybrid vehicles
- Vehicle specific installation kits available
- Almost maintenance free
- Can be combined with various alternative gas/brake controls
- PC interface for calibration, settings and diagnostics
- Tested and approved according to:
  - braking directive ECE R13,
  - EMC (EMU) directive ECE 10,
  - SAE J2603 and SAE J2604 (guidelines for powered gas/brake systems)
  - NMEDA QAP guidelines

SmartBrake & SmartGas consists of

- Brake actuator
- ECUs (2 for brake and 1 for gas)
- Wire harnesses
- Charging module
- Battery module
- Communication module
- Park position detection switch
- Alarm module with system on/off switch (and brake hold)
- Vehicle specific or universal installation kit
- Client specific gas/brake control
- Software

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