PARAVAN GmbH

Revolutionary mobility solutions for people with disabilities
Live the dream together!
Who we are | PARAVAN GmbH

Our mission:
To develop, produce and sell quality of life, independance and freedom of movement for the benefit of mobility impaired people!

Our philosophy:
Humanity wins!
The PARAVAN GmbH

- Founded in 1998 by Roland Arnold. Expanded into a limited company in 2005
- Leading global technology provider for innovative and comprehensive mobility solutions for people with disabilities
- Product Portfolio “All from one source - all under one roof“
- 160 employees are developing and producing innovative automotive conversions, electric wheelchairs, control and steering systems, special seats and much more.
- Nationwide license partner network and four own branches in Germany
- Annual sales increases up to 20 percent
- Export share of 43 percent. Sales in more than 30 countries worldwide
- Numerous high-ranking national and international awards
On the way to a global brand...
Body shop, paint shop and assembly
Development & high tech
Engineering | Technology made in Germany
Modern machinery
Custom integrated mobility solutions:

- Vehicle conversions
- Driving & Steering Aids
- Perfect Seat Collection
- Development
- Technical Services
- Rental Service

- Power-Wheelchairs
- Dockingstation
- Head- & Back rest
- Lift & ramp systems
- Machinery
- Driving-School
- Experts
The Paravan wheelchair series
PARAVAN wheelchair PR-series

- First power wheelchair with EU approval as a car-driver’s seat
- Crash-tested and successfully passed in combination with Paravan docking station, special seat and integrated belt system
- Up to 50 ° seat and backrest tilt backwards (tilt function) for improved bedsore prevention
- Perfect companion for business, leisure time, while car driving and in the home environment
- Very low seating position for optimal driving under tables or workplaces
- Lift function with great lifting height enables communication at eye level.
- Many electrical functions as an option
PARAVAN wheelchair series
PARAVAN wheelchair series custom design

Possible custom design:
- Special controls
- Communication systems
- Seat systems
- Chassis
Paravan biometric standing wheelchair “biolution”
PARAVAN standing wheelchair bioluation

• Unique biometric joints for a natural stand up process
• Three different sizes available
• Pre-programmable motions
• Optimum relief for the vestibular system
• Use as a multifunctional therapeutic device
• Complete redevelopment of PARAVAN
• Patented system!
• Perfect solution for early mobilization in the rehabilitation process (for example, stroke patients)
PARAVAN's movanimo® exercise trainer

• Different training arrangements possible (active / passive / symmetry, etc.)
• Individual programs for each disease
• High-resolution touch screen for comfortable operation
• Anti-spasticity protection
• Combination of arm and leg trainer optional possible
• 2 years manufacturer warranty
• Compact, functional and appealing design
• High safety and rollover stability
• Extreme flexibility and adjustability for all customer needs
• Extensive accessories
PARAVAN docking station

- Mechanical electronic docking station for receiving the PARAVAN Electric Wheelchair
- Crash-tested and successfully passed in combination with Paravan wheelchair (incl. Harness) and special seat
- Charging the wheelchair batteries while driving possible
- Complete Paravan development with patent for self-drivers and passengers
- Optimally matched to the Paravan vehicle conversions
- Integrated emergency release
- 100% security and stability (stable in all three axes)
PARAVAN docking station (in a car)

Installation example on the driver's side as a self-drive solution
Built in Paravan docking station with lowered floor assembly and Paravan electric wheelchair
PARAVAN vehicle conversions

• Level flooring from A to C pillars
• Level floor throughout the vehicle
• Flexible use of the vehicle interior space.
• Fast, easy and secure installation and removal of the driver and front passenger seats thanks to Paravan’s unique seating system.
• Optimally for the use of proprietary Paravan transfer console and the Paravan cassette lift
The unique Paravan perfect seat collection

Rotating Seat  Swivel seat  Transfer console
PARAVAN rotating seat

- Unique in the world
- Crash-tested and successfully passed
- Swivel seat portion (up to 120 °) with a fixed backrest
- Convenient use, especially on driver side, despite space restrictions from steering wheel
- Patented rotating system
- Optional electrically adjustable stand-up aid
- All comfort features possible as an option
- Integrated emergency release
PARAVAN swivel seat

- Crash-tested and successfully passed
- Squab and backrest pivot up to max. 120° outwards
- Convenient use especially on the passenger side
- Specially developed and patented kinematics movements
- Standing-up aid feasible (seat) as an option
- All comfort features possible as an option
- Integrated emergency release
PARAVAN transfer console

• Crash-tested and successfully passed
• Up to three-directional movements
• Unique emergency release system for rotating and forwards/backwards (as an option)
• High stability and high quality materials
• Very compact installation dimensions
PARAVAN cassette lift

• Developed entirely by Paravan
• Processor assumes digital control with self developed software
• Middle position (entry position) can be approached from above or below
• Excellent lifting height
• No mechanical limit switches; electronic control instead
• Extensive options for manual operation in case of emergency
• Load-bearing capacity (up to 320 kg)
The PARAVAN Space-Drive-II-System:
PARAVAN Space-Drive:

The Space Drive drive-by-wire system is marketed in the following countries:

<table>
<thead>
<tr>
<th>Region</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DACH (Germany, Switzerland, Austria)</td>
<td>4100</td>
</tr>
<tr>
<td>Scandinavia</td>
<td>550</td>
</tr>
<tr>
<td>Benelux</td>
<td>200</td>
</tr>
<tr>
<td>Great Britan, Ireland, France, Spain, Portugal, Italy</td>
<td>1320</td>
</tr>
<tr>
<td>North America &amp; Oversea</td>
<td>190</td>
</tr>
<tr>
<td>Israel</td>
<td>520</td>
</tr>
</tbody>
</table>
PARAVAN Space Drive II

- Electronic digital driving and steering system (gas, brake, steering)
- Proprietary patented drive-by-wire system
- Individual parameter setting even for progressive diseases
- Active Redundancy: triple safety and full motor performance even of a control circuit fails
- System can be completely deactivated - vehicle can be moved with original steering wheel and pedals.
- Connection for driving school panel
- Several input devices possible
- **Service-Hotline 24 hours**
Certified Safety

- The guidance system SPACE DRIVE - fully meets the European directives and is certified according to ISO 26262 ASIL D
- **ECE-R 10** (Test Report P130468 in granting a type approval for an electrical/ electronic (sub)system with respect to Electromagnetic Compatibility in accordance with Regulation EEC-R10 Rev. 04)
  **ECE-R 13** (Technical Report EODJ0001, special requirements of the safety aspects of complex electronic control systems in motor vehicles)
- **Technical report E13** * 10R00 * 10R04 * 13448 * 00, NATIONAL CERTIFICATION AND APPROVAL CORPORATION - Ministry of Sustainable Development and Infrastructures LUXEMBOURG
- **ECE-R 79** (Technical Report EODJ0002, ECE Regulation Nr. 79 Annex 6)
- Manufactured according to the highest quality level **IPC A 600 class 3**
PARAVAN Space-Drive:

Your advantage:

Safety
Triple redundant control unit for safety-based drive-by-wire/steer-by-wire applications. More than 5000 systems are in use worldwide (ECE-R-13 / ECE-R-79 / ECE-R-10)

Environmental conditions
Robust performance, environmental test according to ISO16750 – Part 5, especially for the application area of mobility

Communication
Flexible interfaces for analog or digital signals, 2x CAN, 2x LIN, 2x FlexRay (3 Amp. per pin)

Extendable
Up to 256 control units are scalable
PARAVAN Space-Drive:

Your advantage:

**Connection with own hardware**
Customer-specific extensions are possible – software and hardware

**High driving power**
Controlling and regulating up to 100 A at an ambient temperature of +85°C

**Modular system design**
CPU and software, input devices, high performance servo motor, secure cable looms, removal systems
SPACE DRIVE COMPONENTS

Check Control

- 4-button touchpad
- 4-line, 20-character VFD display
- Multicolored background illumination
- Adjustable brightness for day and night
SPACE DRIVE COMPONENTS

Servo motors for gas, brake, steering

- Highly dynamic disk servo motors
- PNG fittings with isolated tube
- Triple sensor technology, with over 50 million cycles’ performance
- 35% more performance with the same motor size
- Improved handling
- Optimized parameterability
- Authentic driving emotion
SPACE DRIVE COMPONENTS

Input devices for disabled mobility

- Mini wheel
- 2- and 4-way joystick
- Gas / brake lever
- Rotary steering
- Foot steering
SPACE DRIVE COMPONENTS

Gear Control

- Comfortable and easy gear selection
- Applicable for every automatic transmission
- Easily operated softtouch buttons
SPACE DRIVE COMPONENTS

Battery Pack

- Light and compact
- Integrated charge function
- Integrated fuses (50 Amp.)
- Self-sufficient solution
- Easy and flexible installation
New: PARAVAN Touch & Touch Display

Paravan’s innovative operating concept for secondary functions. Can be used as a permanently installed 7-inch touch display in vehicles. Also available as a mobile app for all iOS and Android terminals (iPad, iPhone etc.).
Satisfied customers from around the world
Visionaries automotive engineering
Paravan drive-by-wire technology
PARAVAN Drive-by-Wire-Technology

Used by vehicle manufacturers worldwide as the basic technology for autonomous / automated driving
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Used by vehicle manufacturers worldwide as the basic technology for autonomous / automated driving
A few of our over 50 Awards

- National Champion European Business Award
- Harvard University: German Business Award 2012
- Innovation Award of the German Economy 2011
- German Skilled Crafts Prize 2005
- German Industry Award 2012
- Winner N-TV "Hidden Champion" 2012
- Grand Prix of the SME sector 2011
- Federal Champion "Encouragement for the nation" 2010
- Bavarian State Prize 2008 and 2012
Thanks

for your attention
New: PARAVAN Touch & Touch Display

Paravan’s innovative operating concept for secondary functions. Can be used as a permanently installed 7-inch touch display in vehicles. Also available as a mobile app for all iOS and Android terminals (iPad, iPhone etc.).

Doors open, ramp out, ignition on, indicate left … Until now, you have had to integrate numerous “little helpers” into your vehicle, or you needed to go to the trouble of finding the right button on your remote control. What was the one for the ramp again? Now everything is more convenient with a sure and easy touch. Just open the Paravan Touch App on your smartphone, tap the desired command on the console and your vehicle will open as if by magic. Up to 100 different functions are available. The best thing about it? Whether on your mobile device, permanently installed or combined with our Paravan Voice Control - Paravan Touch knows the command and synchronises it to all installed devices. So you’ve always got full control. Other information is available online at www.paravan.de
PARAVAN Touch App & Software

- Innovation and technology made by PARAVAN
- All secondary functions can be operated (e.g. indicators, gear selection, electric windows, wiper operation, high beam, horn, door opening, cassette lift, engine control and much more)
- Up to 100 customisable commands possible
- Fast execution of the entered command
- Compatible with iOS and Android terminals. Also suitable for smart watches.
- Parallel use on touch display and mobile terminals possible.
- Compatible with Paravan Voice Control

PARAVAN Touch Display

- Supply voltage 9 - 32V
- Storage temperature -40°C to +85°C
- Operating temperature -30°C to +60°C
- Capacitive touch display 7”, anti-reflective glass
- Size: 187 x 130 x 45mm
- Connection via 4-pole M8 socket
- Resolution 800x480 px
- Communication to Gateway via CAN bus
- Fast system start-up (less than 10 seconds)
- Modern design
- **Note:** Only in connection with Paravan Gate Way. Only use Paravan Touch App in conjunction with Paravan Touch Display

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**Application on iPad**

**Application on iPhone**

**Application on Apple Watch**

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**Winner of the major SME initiative ARBEITER DER NATION**

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**Note:** Mobile terminals not included in shipment.
Paravan Advantages

Safety

1. Triple safety redundancy on all CPU’s
2. Galvanic alloy separate power supply
3. Permanent and continuous monitoring of all CPU processors
4. Certified according to ECE R-13, ECE R79, ECE R10
5. Functional safety certification according to ISO 26262 ASIL D
6. Certified vehicle class types: M1, M2, M3, N1, N2, N3
7. US Patented system

Construction

1. Modular components available directly from PARAVAN
2. Automotive standard safety wiring harness
3. Compact construction for driving comfort
4. Simple driver change from system to OEM controls
5. Easier installation
6. Available driving instructor panel
7. Multiple input devices available, also with ForceFeedback

Handling

1. Precision driving dynamics with intuitive handling
2. Ergonomic and relaxed driving controls
3. Fast and complete activation and deactivation of the steering wheel and pedals
4. Speed sensitive – safe steering even at increased velocity
5. Adjustable parameters for personalized adaptability
6. Minimum operation and service costs
7. 24 hour replacement parts service

Diagnostics

1. Completely troubleshooting with PARAVAN’s own Diagnostic Tool and One-Click Support via E-Mail.
2. Quick and accurate diagnostics through local US dealers
3. Each processor saves its own data and data of accompanying CPU’s
4. Up to 7 different categories for error messages
5. Secure parameter settings
6. Transparent error code descriptions – No encoded scripts

Communication

1. Digital and analog interfacing (CAN, LIN, and FlexRay)
2. Connectivity to current system
3. Direct connection to steering, gas and brake functions
4. Downloadable data from digital vehicle signals
Hardware

1. Customer specific expansion available, in both hardware and software
2. Customer desired settings available
3. Separately developed secondary system
4. Connectivity through diverse, individually fitted input devices

Expandable

1. Up to 40 operating devices can be scaled and programmed
2. Accessibility and useful for scientific test purposes
3. Connectable to available monitoring system

Performance

1. Operable at 100 A at 85 degrees Celsius ambient temperature
2. Separate, individually layered motor outputs
3. Highly dynamic disc motor windings, precise and high performance servo motors with triple redundant position recall

Installation

1. Robust and non-sensitive system components, especially designed for mobility use
2. Highly durable, compact and lightweight construction with passive cooling, automotive standard connectors and plugs.
3. Environmentally tested according to ISO 16750

Manufacturer

1. PARAVAN, GmbH
2. 150 employees
3. Worldwide dealer network
4. Sole development and manufacturing at one location
5. Complete mobility solutions using the latest technology (software, hardware, and vehicle conversion – all from one source
6. 51% ownership acquired from Adolf Würth GmbH & Co
**SPACE DRIVE II Technical Details**

- Active redundancy: triple safety and full motor performance even if a control circuit fails
- Variable interfaces (analog/digital) for connection of various input devices (CAN, LIN, FlexRay)
- Blackbox in all systems of the controller (error memory)
- Enough pedal distance and force in all vehicles, even if the vehicle control circuit fails
- Permanent scanning of the component status
- Speed-dependent steering facilitates the same driving performance as with power-assisted steering at high speeds
- Better lookup at low speeds thanks to automatic adaptation to the pedal distance and force
- Clearly described error codes
- Optimal and best design to fit all vehicles
- Connection for driving school panel
- Different throttle curves are available
- Integrated interfaces
- Password-protected workshop menu
- Innovative-modular system of control elements to match your individuality
- Unprecedented ergonomics, operability, flexibility and durability new perceived value
- Individually adaptable software package
- Made in Germany: fast spare parts delivery / high quality

**SPACE DRIVE II Operating specifications**

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>-40°C to +95°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental conditions</td>
<td>Operating voltage 12V DC: +10.5V DC to +15V DC</td>
</tr>
<tr>
<td></td>
<td>Operating voltage 24V DC: +22V DC to +32V DC</td>
</tr>
<tr>
<td></td>
<td>10 Layer HW-metal block 100 Amp</td>
</tr>
<tr>
<td></td>
<td>12V / 24V</td>
</tr>
<tr>
<td></td>
<td>100 Amp</td>
</tr>
</tbody>
</table>

**SPACE DRIVE II Drive Module**

1. | Plug sockets
   1| encoded plug systems IP 65
   2| vehicle patented plug system
   3| protects against unintended loosening, pull and vibration
   4| Grounded ambient temperature range (+40° C to +70° C)
   5| High-performance processors
   6| 3x CAN BUS
   7| 2x LIN BUS
   8| 1x FlexRay
   9| 3x analog input
   10| 3x analog evaluation
   11| Redundant electric power supply
   12| Galvanically isolated
   13| 2x VCC Bat1
   14| 2x VCC Bat2
   15| 4x GND
   16| Motor outputs
   17| per 8 x 35 Amp Contacts
   18| 100 Amp, permanent load
   19| 60 Amp, peak load
   20| 10 Layer HW-metal block

**SPACE DRIVE II Connection Kit**

- Easy installation individually in several cars
- Fast installation - reduced workshop hours
- Perfect communication between car and system via CAN
- Flexible, multiple-shielded, very high-quality cables
- Protected contacts and highest automotive standard
- Coded, no risk of confusion

**Drive-by-wire in a new dimension**

**SPACE DRIVE II Technology - a brand of PARAVAN Technology**
The new PARAVAN Space Drive II - System

More safety, more power, more control - a totally new dimension of drive-by-wire. SPACE DRIVE II is a perfectly coordinated operation system including hardware and software with a revolutionary safety concept. The system can be adapted individually to different drive-by-wire applications in the handicapped sector. PARAVAN Space Drive II: more than 10 years of experience and expertise in drive-by-wire technologies. We have received 50 national and international innovation awards for our innovative-in-house developments!

The SPACE DRIVE II operation system is a three-step multiple redundant motor driver- and control system for all current electric motors (60 A / DC 12 / 24 V) in application areas with very high safety requirements. Dependent on the application area and the customer requests the system can be delivered in subcomponents and with especially coordinated software modules. All components are street-legal according to ECE-R-13 and ECE-R-79.

With a revolutionary new safety concept!

SPACE DRIVE II Diagnostic Tool

The new “Diagnostic Tester” from Paravan opens up countless possibilities. For example, in just two clicks, all system information is sent by email directly to the Paravan technology center, providing the technicians and engineers with all the data they need for providing professional assistance and for system diagnostics!

• System status (current values, vehicle data) in real-time
• Status display of the position sensors of the input devices and engines in real-time
• Transferring parameters during operation (without rebooting the system)
• Fault memory entries with description and abnormal information
• One click support, data set of all settings and values via Email
• Automatic download of the latest software modules for uploading to the SpaceDrive controller
• Graphical support for parameter settings
• Fast diagnostics directly to the dealer

SPACE DRIVE II Key facts

• Safety: 3-times redundant control unit for safety-based drive-by-wire steer-by-wire applications. The control tasks are executed in parallel by three identical processors which supervise each other continuously. Our system therefore exceeds the highest safety requirements. The System can be operated without a conventional steering column.
• Communication: CAN, LIN, FlexRay (3 Amp. per pin)
• Environmental conditions: Robust achievement, environmentally tested, according to ISO 16750 – Part 5, especially for the application area of mobility.
• Extendable: Up to 40 control units are scalable with each other
• Connection with own hardware: Customer-specific extensions are possible - as well for software as for hardware
• High driving power: Controlling and regulating up to 100 A at an ambient temperature of 85°C
• Modular system design: CPU and software, input devices, high performance servo motor, safety cable looms, removal systems

Individual Software Packages!

SPACE DRIVE II Single System

SPACE DRIVE II Dual System
Uncompromising mobility for people with disabilities

Greater safety, greater performance: Experience a new dimension in disability mobility with the new and improved Space Drive II system. Drive by Wire technology guarantees superior driving control thanks to highly comfortable and intuitive operation. It represents a revolutionary control system with a sophisticated safety concept, all made possible thanks to perfectly coordinated hardware and software. Thanks to its modular design, the Space Drive II can be tailored to your needs. Your one-stop shop for an individual mobility solution of the highest quality—as you would expect from PARAVAN.

Award-winning PARAVAN solutions

We are grateful for, and also a little proud of, the many top awards we have received over the last few years. These are great achievements that wouldn’t have been possible without our customers. These include:

- German Innovation Award for Service 2014
- German Entrepreneurs’ Award 2013
- German Industry Award 2012
- European Business Award 2013
- Grand SME Prize 2011
- Innovation Award of German Industry 2011
Experience freedom: Realize your dreams with PARAVAN technology. Our Space Drive system has started a small revolution in road traffic. With the new generation we have now developed a completely intuitive vehicle control system. What is so incredible about this technology? People with disabilities, low residual strength, a large girth, low mobility, and even those without limbs can drive a car from a wheelchair. Our customers said it has helped them start a new life.

This is how it works

In Space Drive II, braking, accelerating, steering, and all other driving functions are operated by microprocessor-controlled driving aids (“Drive by Wire”). The various input devices digitally transfer the signals to a total of four servomotors in milliseconds. Powerful processors and newly developed motors ensure superb precision and ease of use. To be approved for use on roads, the system has to be absolutely fail-safe. This is guaranteed by multiple active redundancies. The driver’s control signals are processed in parallel by three identical processors, which monitor each other. Space Drive II has a modular design. It can be configured individually and specifically adapted to your physical disability. The system can also be retrofitted.
At a glance—

**Space Drive® II cockpit**

1. **Add-on wing mirror:**
   Provides a wider field of vision

2. **Start Control:**
   Operates the ignition and two other functions

3. **2-way joystick:**
   Input device for vehicle steering

4. **Gear Control:**
   For simple gear selection

5. **Steering wheel:**
   Can be activated if needed

6. **8-button touchpad:**
   Operates up to eight freely selectable secondary functions

7. **Joystick:**
   Simple operation of accelerator and brakes

8. **Beeper:**
   An extra small aid for freely selectable secondary functions
Two variants, endless possibilities—
the basic system

We install Space Drive II either as a "Single" or "Dual" system in your vehicle.

**PARAVAN Space Drive® II Single System**

Do you have difficulty steering your car, but can easily operate the accelerator and brake pedals? Then Space Drive II "Single" with Steer by Wire technology is the right option for you. Here you can use a freely selectable control element to issue steering commands, which are then implemented by a servomotor. Alternatively, we would be happy to install the Single System with an accelerating/braking function for customers without the use of their legs.

**PARAVAN Space Drive® II Dual System**

On the other hand, our Dual system is the ideal solution for customers with progressive illnesses or minimal mobility. Two servomotors are responsible for the accelerator, brakes, and steering of your car using Drive by Wire technology. A variety of different control elements is available for this purpose. Space Drive II can be adjusted to any changes that occur over the course of your illness and can be equipped accordingly.
Intelligent interaction—

Space Drive® II components

More than the sum of its parts: With its fully developed technology, Space Drive II offers precise function, the highest comfort, ease of use, and maximum safety.

The clever control panel: As the Check Control is installed within the driver’s field of vision, he/she can always see the system-relevant status information for Space Drive II. The different display colors are also highly attractive!

The Space Drive II brain: The head module ensures that all systems work perfectly together when driving with a disability. Three parallel digital computing units (CPUs) control and monitor the connection between the Space Drive II system technology and regular vehicle technology via the available interfaces. Input commands are converted into digital signals to control the servomotors for steering, accelerating, and braking in real time. A multi-redundant system that is completely safe!
The heart of the system: Servomotors perform all control commands when driving with Space Drive II. They translate braking and accelerating commands from the controls into active acceleration or braking; a steering servomotor converts the slightest steering movements on the control element (e.g. mini steering wheel, rotational steering device, or joystick) into active vehicle steering. The motors are fully redundant, patented, and deliver enough power for almost any vehicle type.

Superb handling: With the correct input device, you literally have everything to hand. We have developed an acceleration/braking lever, joystick, bicycle-type steering, mini steering wheel, and much more for the primary functions of braking, accelerating, and steering. Thanks to this wide range, we can tailor the system precisely to your individual needs.

Perfect connection: The flexible, multiple-screened high-quality cables ensure perfect communication between the Space Drive II system and vehicle via a CAN interface. Protected contacts and coding comply with the most stringent automotive standards and prevent confusion. Installation in the many different vehicle types is quick and easy, and the reduction in maintenance work is a further advantage.

Servomotors

Input devices

Cable harness
User-friendly—
Space Drive® II input devices

How does your car know what to do? With our sophisticated input devices, operation is very easy regardless of your disability.

The handy alternative to the standard steering wheel is only 15 cm large and is adapted to your individual residual strength. Perfectly tailored and completely reliable. A 3.5-turn or 6-turn steering wheel can be chosen.

Fittings for the mini steering wheel
- Three pins
- Fork
- Knobs (available in four sizes)

Even the best input device only reaches its full potential if it is very easy to operate. As a result, we have developed many different fittings. Of course, we will also adapt your vehicle according to your wishes. Don’t hesitate to contact us!

Fittings for the acceleration/braking lever
- Three pins
- Fork
- L slider (optionally with Beeper)

This digital 'slider' for accelerating and braking provides a lightning-quick response and gives users the option to control the amount of force and travel.
The functional, dynamic, and flexible 2 or 4-way control system. Variation options are set mechanically. The sensitivity of your device can be parameterized via your computer and is therefore perfectly adapted to your needs. Upon request, we can integrate the Gear Control system for simpler gear selection.

**Fittings for the joystick**
- Stick (optionally with Beeper)
- Bevels

**Rotational steering device**
The ergonomic wrist control system. It is possible to set the reset force easily and mechanically without replacing the spring. It also comes with an adjustable angle of rotation and precision guide rail.

**Fitting for rotational steering device**
- Stick (optionally with Beeper)

**Bicycle handlebars**
The extensive steering unit with a 40 degree steering lock angle. The resistance can be individually set; seven operating buttons and a horn are also available for the driver.
Upgradeable—

Space Drive® II additional modules

Would you like anything else? Experience mobile freedom in even greater comfort with our additional modules.

**Back-up batteries**
The independent emergency power generator maintains the power supply even if the car experiences a voltage loss. Automatic testing and charging using dedicated charging intelligence.

**Gear Control**
This input device with keypad replaces the standard gear lever. Up to three further driving levels can be operated using the "D" button (depending on vehicle type). Gear Control can be installed separately or together with a steering, accelerating, or braking control element.

**Park Control**
The convenient alternative to the hand brake lever. Pull the handbrake using the switch without force. Can be installed in many vehicle types. The accurate control electronics mean there is no need for mechanical readjustment.

**Brake Control**
Simple braking for hand devices or original pedals, which requires no hydraulics. The electronic module is redundant and incredibly compact and can be upgraded with the correct steering element upon request. Using your hand or feet, simply press a flexibly attached pedal that is adapted to your residual strength. No conversion of the standard brakes is necessary; the system can be easily deactivated.
Braking, accelerating, and steering are under your control — but how do you activate the direction indicators, horn, and windscreen wipers? Our clever control elements cover all important secondary functions. Safe and convenient.

**Simply sophisticated—solutions for secondary functions**

10-button touchpad
The control panel for ten different functions. For example, ten pre-defined elements can be operated using a CAN bus interface via the PARAVAN gateway.

Beeper
A further solution for vehicles with or without CAN bus: Can be attached anywhere in the vehicle and covers up to ten secondary functions.

8-button touchpad
The compact control element for eight freely selectable secondary functions.

PICO button
Control element for any secondary function.

L-Button
A useful push button device for connecting to a single secondary function that offers a cushioned design and rests comfortably in your hand.

Remote Control
The remote, multi-functional control. With this device, you can operate 8 functions from a distance.
As unique as you are—

Space Drive® II installation examples

Created with our customers in mind—the new Space Drive II is as revolutionary as it is perfectly adapted to the user’s wishes. Numerous satisfied drivers are already delighted:
Getting started with mobile freedom—
Space Drive® II driving school unit

Being mobile feels strange to begin with, so users need to practice. Qualified driving instructors from our PARAVAN driving schools in Aichelau and Heidelberg accompany you on your journey to being mobile. Our driving school cars allow you to become familiar with Space Drive II technology, so you can feel at home in your own car. Enjoy a fascinating learning experience on the way to a new era of mobile freedom.

Fully networked—
the PARAVAN diagnostics tool

The new diagnostic tester is simply amazing. With just a few clicks, all information in your Space Drive II system is transferred by e-mail to engineers and technicians in the PARAVAN mobility park. With this data we can service, upgrade, and update your system at any time. Simple, fast, and reliable.
Free travel on any road—
the safety concept

Mobile but safe! We have developed our spectacular system according to this motto. It has turned out to be a real success story: Space Drive is the first Drive by Wire control system with road traffic certification.

The safety of Space Drive II is based on the globally unique triple active redundancy of all components. As soon as a part fails, another part takes over its function. The servomotors, in particular, are controlled and monitored by an ECU each, which contains several processors. Steering, braking, and accelerating signals are directly transferred into the PARAVAN ECU three times. Each data transfer is monitored and checked throughout.

Certifications

The safety and quality of our technology has been officially checked from A to Z. At a glance:

- Certified according to ECE-R13, ECE-R79, ECE-R10
- Functional safety according to ISO 26262 (ASIL D)
- Hydro pulse test
- EMC test
- Temperature test
- Stability test
- TÜV certification DIN EN ISO 9001 : 2008
### Technical information

- Active redundancy
- Fault memory in several components (recording of respective event)
- Can be parametrized via computer
- One-click support via the innovative diagnostics tool
- Integrated interface
- Optimum and flexible design, suitable for all vehicles
- Multi-language function
- Modular system
- Made in Germany = fast delivery of spare parts
- Complies with all relevant standards and directives in Europe

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature:</td>
<td>-40° C to +85° C</td>
</tr>
<tr>
<td>Storage temperature:</td>
<td>-40° C to +125° C</td>
</tr>
<tr>
<td>12 V operating voltage:</td>
<td>+ 9 V DC to +16 V DC</td>
</tr>
<tr>
<td>24 V operating voltage:</td>
<td>+18 V DC to +32 V DC</td>
</tr>
<tr>
<td>Typical power consumption:</td>
<td>7 A per module</td>
</tr>
<tr>
<td>Continuous load:</td>
<td>330 A per motor / 60 A peak load</td>
</tr>
<tr>
<td>Current limiter:</td>
<td>100 amp.</td>
</tr>
<tr>
<td>Cycle time:</td>
<td>10 ms</td>
</tr>
<tr>
<td>Start time until ready for use:</td>
<td>1 sec. - 10 sec. depending on use</td>
</tr>
<tr>
<td>Bus systems:</td>
<td>2x CAN, 2x FlexRay, 2x LIN</td>
</tr>
<tr>
<td>Safety:</td>
<td>Triple redundancy</td>
</tr>
<tr>
<td>Diagnosis / car interface:</td>
<td>DTC connection/OBD-II</td>
</tr>
<tr>
<td>Languages:</td>
<td>DE, EN, FR, IT, ES, and more</td>
</tr>
<tr>
<td>Digital I/O:</td>
<td>8 (2 I/O with timer function)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>W: 225 / H: 60 / D: 144</td>
</tr>
<tr>
<td>Weight:</td>
<td>2,200 grams</td>
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<tr>
<td>Environmental test:</td>
<td>ISO 16750 - Part 5</td>
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<tr>
<td>EMC:</td>
<td>CISPR 25, ECE R10, ISO 11542-4</td>
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<tr>
<td>ESD protection:</td>
<td>ISO 10605</td>
</tr>
<tr>
<td>NEMP protection:</td>
<td>E=50 KV/m, H=133 A/m</td>
</tr>
<tr>
<td>Cooling:</td>
<td>Passive cooling with cooling fins</td>
</tr>
<tr>
<td>Plugs and connections:</td>
<td>Coded and compliant with automotive standards</td>
</tr>
<tr>
<td>Reverse polarity protection:</td>
<td>All power inputs</td>
</tr>
<tr>
<td>Power supply:</td>
<td>2 separate power sources</td>
</tr>
<tr>
<td>Microcontroller:</td>
<td>3 independent CPUs (1.28 MHz)</td>
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<tr>
<td>ISO 1939 CAN protocol:</td>
<td>High-speed CAN, 500 kHz, I I/29 Bit</td>
</tr>
<tr>
<td>Applicable standards:</td>
<td>AEC-Q100, Q101, Q200</td>
</tr>
<tr>
<td>Tests:</td>
<td>ECE-R13, ECE-R79</td>
</tr>
</tbody>
</table>
Unlimited mobility—advantages of the Space Drive II

- Patented, TÜV-approved
- Uncompromising in quality and safety
- System can be fully deactivated
  (Accompanying persons can operate the steering wheel and pedals as normal)
- Precise and simple operation
- All components are manufactured according to international automotive standards
- Suitable for all vehicles
- 20 million kilometers driven in continuous load test (hydro pulse) under extreme conditions
- Individual adaption even for advanced changes
- Multiple redundant safety thanks to three parallel safety circuits
- Exact configuration of parameters via computer
- Safe speed-controlled steering, even at high speed
- Ergonomically relaxed driving
- Superb value for money
- 24-hour service, including spare parts