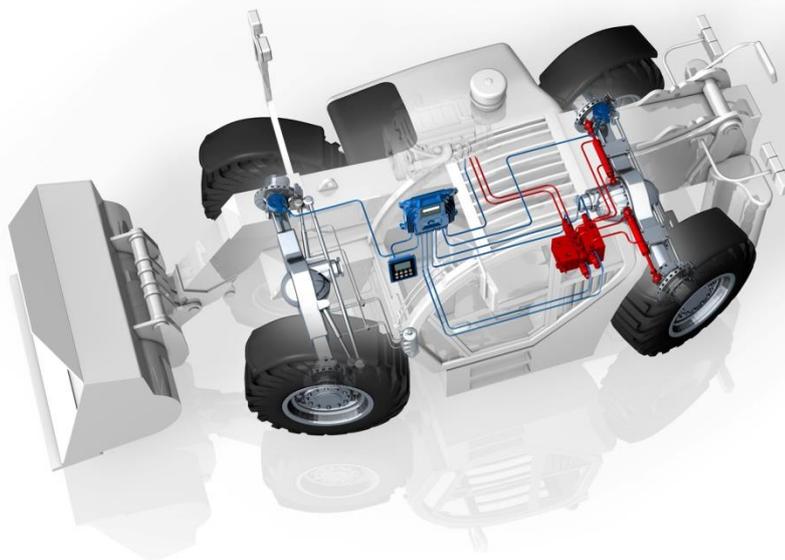


EHLA[®] PLUS also for Simple Construction Machines

Langenbrettach/Germany, Bauma 2019:



**Figure 1: © MOBIL ELEKTRONIK
2-axle loader with EHLA[®] auxiliary steering system**

Electrohydraulic steering systems for rear axles have been standard in commercial vehicles and complex construction machinery for many years.

In the case of commercial vehicles, the use of electrohydraulic auxiliary steering is primarily to ensure compliance with the legal requirements. – Without a steered rear axle the legally defined minimum turning circle, also known as “BOKraft-Kreis” in German, cannot be maintained.

In addition to compliance with legal requirements, complex construction machines such as mobile cranes, however, have to meet very high requirements for manoeuvrability, which can only be met by electrohydraulic auxiliary steering.

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Steering modes such as crab steering, manual steering intervention or automatic rear swing out suppression are standard here, as is the complete power decoupling of the rear axles from the front axle.

Figure 2 shows a 6-axle mobile crane where four axles are equipped with EHLA[®] auxiliary steering systems.



**Figure 2: © TADANO FAUN GmbH
Mobile crane with EHLA[®] auxiliary steering system**

Simple construction machines, such as 2-axle loaders, usually have hydrostatic front axle steering (e.g. Orbitrol) and often already rear axle steering. However, this is purely hydraulically and may only be switched on manually on the construction site.

It is obvious that application possibilities and flexibility, as well as operating comfort are very limited.

World market leader MOBIL ELEKTRONIK from Langenbrettach has committed itself to providing these vehicles with the same features that are already standard in mobile cranes. Operation will be easy and convenient. The steering mode can be changed at any wheel position. The synchronization of the axles with each other, as of Ackermann, is done automatically.

The EHLA[®] PLUS auxiliary steering system has been in use for a long time and is well known.

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Approval for Public Road Traffic and Safety

The EHLA[®] PLUS auxiliary steering system complies with the requirements of ECE R79 Annex 6, so that it can be approved for use on public roads. – This can also be interesting for smaller construction machines or even be an important prerequisite if these drive a lot on public roads.

The steering system constantly monitors itself. System faults are reliably detected and the driver is informed accordingly. The controllability of the vehicle is always ensured via a defined fallback level.

Assistance features of the EHLA[®] PLUS steering system also increase driving stability and thus driving safety.



**Figure 3: © Lindner Traktorenwerk GesmbH
LINTRAC with EHLA[®] PLUS auxiliary steering system**

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New Components

MOBIL ELEKTRONIK has revised some components of the EHLA[®] PLUS steering system to make this established steering system also attractive for smaller, 2-axle vehicles.

A newly developed generation of safety steering computers is used (Figure 4).



Figure 4: © MOBIL ELEKTRONIK
Safety Steering Computer for EHLA[®] auxiliary steering system

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Already the housing with IP Code IP6K9K offers advantages because it can also be mounted outside the cabin, where extreme conditions prevail due to dirt, water and salt.

Due to a completely new hardware and software architecture, a safety level up to PI e / ASIL D can be achieved.

The hydraulic components were also carefully examined.

The result was a compact proportional hydraulic unit in which all necessary valves are integrated, resulting in less tubing, fewer components and less assembly time.

Advantages of EHLA[®] PLUS on the Construction Site

The main advantages of EHLA[®] PLUS have its greatest effect where needed: On the construction site.

Many steering modes are available to manoeuvre the vehicle in different situations, such as all-wheel steering, crab steering or manual steering of the rear axle.

Another important steering mode is the automatic rear swing-out suppression, which is of great importance when driving around obstacles.

This steering mode prevents the rear of the vehicle from swinging out when manoeuvring by means of the rear axle turning later than the front axle.

This cannot be achieved with a purely hydraulic steering system.

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Flexibility and Convenience

In contrast to purely hydraulic steering, the use of electronics in the form of the safety steering computer makes it possible, that the individual steering modes as well as the entire steering system can be adjusted to the respective vehicle type or to special customer requirements just by parameters. This means that regardless of wheelbases, tyre sizes and wheel loads, the components to be installed, such as steering cylinder and steering lever arm, are always the same. A clear advantage in purchasing, logistics and replacement parts management.

The steering modes can either be selected via a MOBIL ELEKTRONIK control panel (figures 5a, 5b), or alternatively via an existing terminal in the vehicle which is connected to the safety steering computer via CAN.

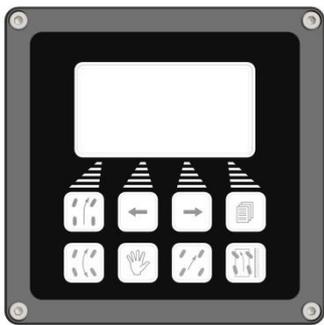


Figure 5a / front view
© MOBIL ELEKTRONIK
Control panel EHLA® auxiliary steering system



Figure 5b / side view
© MOBIL ELEKTRONIK
Control panel for EHLA® auxiliary steering system

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Further Savings of Expenses

The automatic hydraulic centering and locking of the rear axle in exact straight ahead position when driving on public roads ensures optimum directional stability with minimum tyre wear. This is an advantage that is particularly relevant for rental vehicles.

The hydraulic supply for the rear axle steered with EHLA[®] PLUS is provided from the vehicle's power unit. The rear axle steering is hydraulically and mechanically completely decoupled from the front axle steering. In addition to driving comfort and safety advantages, this also offers cost benefits. The hydrostatic steering (Orbitrol) of the front axle can be designed correspondingly smaller with regard to the steering power to be produced.

Competitive Advantages

The higher costs for the components of the steering system are more than compensated for by savings in mechanical components, shorter assembly times and, above all, by the many advantages.

With EHLA[®] PLUS, these vehicles can be upgraded considerably, which leads to competitive advantages for the vehicle manufacturer.

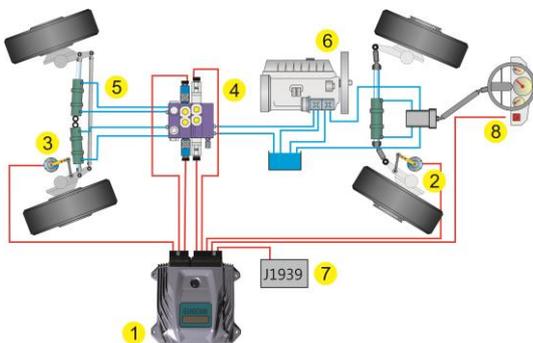


Figure 6a: © MOBIL ELEKTRONIK
System type of an EHLA[®] auxiliary steering system (with numbering of components)

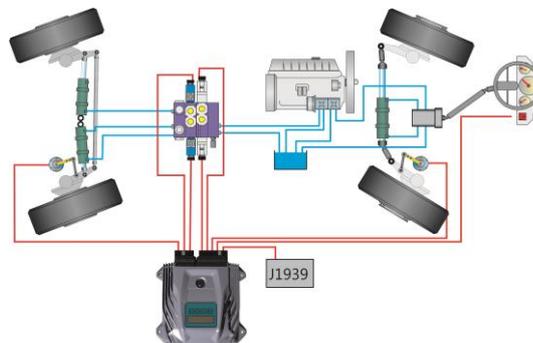


Figure 6b: © MOBIL ELEKTRONIK
System type of an EHLA[®] auxiliary steering system

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MOBIL ELEKTRONIK at the Bauma 2019 in Munich

In addition to this EHLA[®] PLUS concept for small construction machines MOBIL ELEKTRONIK will also be presenting further innovations and solutions at Bauma 2019.

Hall A3 / Booth 115

Description of components ref. figure 6a:

①	Safety steering computer	⑤	Steering cylinder with block valves or after tube installation
②	Safety angle transducer	⑥	Fixed displacement pump
③	Safety angle transducer rear axle (actual value)	⑦	Peripheral switching signals, speed signals, CAN connection J1939
④	Proportional hydraulic unit for fixed displacement pump	⑧	Connection of the steering system with CAN bus operational and display terminal

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About MOBIL ELEKTRONIK

MOBIL ELEKTRONIK develops and produces complex steering systems for well-known manufacturers of mobile machines, commercial and special-purpose vehicles worldwide for over 45 years now. The expanding family-owned high-tech company has meanwhile more than 130 highly qualified employees.

Through a passion for innovation, commitment and creativity the system provider from Germany sets standards. As regards diversity and know-how MOBIL ELEKTRONIK is pioneer and global market leader for electronic steering systems (Steer-by-Wire).

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