



## Electronic Control Systems for Multi-Purpose Vehicles

## The LADOG Hydraulic Power Transmission with Direct Drive



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success story online

[www.ttcontrol.com/municipal](http://www.ttcontrol.com/municipal)



“ We didn't want to buy a finished product, but rather meet the increased requirements in cooperation with a competent partner. Together with TTControl/HYDAC we have been working on a solution that goes beyond the existing limits of purely mechanical and hydraulic systems to offer our customers greater comfort while saving fuel. ”

*Björn Guggenbühler*  
Managing Director at LADOG



TTControl, expert in providing safe electronic control systems for mobile machines, and HYDAC Electronic developed a new generation of hydrostatic drive deployed to LADOG's multi-purpose vehicles. LADOG is one of the leading manufacturers in the area of narrow-gauge and compact vehicles.

The electronically controlled direct drive can reduce the overall fuel consumption by up to 20 %, depending on the drive/working mode ratio. Furthermore, it has a positive impact on noise and exhaust emissions. The HY-TTC 90 control unit is best suited for direct drive applications. This multi-purpose programmable ECU is especially suited for the electronic control of safety-critical functions. It is designed to fulfill safety-integrity level (SIL) 2 according to the IEC 61508 standard, or performance level (PL) d as defined in ISO 13849.

The complete software package for the application was developed and tested with CODESYS®. This user-friendly development environment simplifies field maintenance since it allows end users to reconfigure parts of the system without any special tools. MATLAB®/Simulink® was used for the initial development of the rather complex core control algorithm - afterwards converted into CODESYS code. Rapid prototyping with MATLAB/Simulink significantly shortened the time needed for adjustments and tests on the vehicle. Due to the efficient code generated by CODESYS, a single electronic ECU can handle both the hydrostatic drive software as well as other application-specific functions.



# Constructing Efficient Working Environments with High-Performance Control Solutions

## About TTControl

TTControl, a joint-venture company of TTTech and HYDAC International with locations in Vienna and Brixen, offers electronic control systems for mobile machinery and off-highway vehicles, such as fork lifts, cranes, municipal vehicles and snow groomers, construction and agricultural equipment. Being leaders in functional safety, TTControl's software and hardware platforms enable equipment manufacturers to develop highly reliable electronic control systems quickly and economically.

Further information on TTControl available at [www.ttcontrol.com](http://www.ttcontrol.com)



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## About LADOG

LADOG-Fahrzeugbau und Vertriebs-GmbH a family-owned enterprise located in Zell am Harmersbach, builds its own products, from initial product design to construction and assembly of the components. By controlling the entire design and construction process, the company is able to achieve its objective of providing vehicles and equipment for the municipal, industrial and agricultural markets.

Due to permanent new developments in line with the market requirements LADOG became one of the leading manufacturers in the area of narrow-gauge and compact vehicles.

According to the family tradition "Advance through Innovation" a large program for vehicles and equipment will be produced in limited-lot production as well as in order related individual production.

Further information on LADOG available at [www.ladog.de](http://www.ladog.de)

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