

Constructing Efficient
Working Environments
with High-Performance
Control Solutions for
Off-Highway Vehicles



www.ttcontrol.com

www.hydac.com

Key Customer Projects

Casagrande, IMER, Prinoth, LADOG

Casagrande



TTControl has been selected as a technology partner by the leading foundation equipment manufacturer Casagrande for the control and visualization system of their new XP generation of drilling machines. TTControl's electronic control units and operator interfaces compliant with IEC 61508 and EN ISO 13849 standards and fulfilling SIL 2 (Safety Integrity Level) as well as PL d (Performance Level) requirements were chosen as they met all necessary safety needs.

Morita Group



“To save as many lives as possible” – this has been a goal continuously inherited to the present within the Morita Group since its establishment in 1907. Always reflecting the latest technologies, Morita develops and produces products that help make society safe and secure for all. TTControl's HY-eVision² displays help Morita to fulfill its mission by guaranteeing functionality even under harshest environmental conditions and ensuring optimum usability and availability for operators of fire trucks.

Prinoth



TTControl has been selected by PRINOTH to develop a standardized control platform for the entire range of snow groomers. TTControl supplied controllers and I/O modules, ranging from simple models with 30 inputs and outputs to complex controllers with over 100 I/Os, programming the application software to ensure a high degree of standardization. TTControl further provided the operator interface HY-eVision² with a focus on user friendliness, easy maintenance and cost-effective development of graphical HMI's.

Wacker Neuson



The Wacker Neuson Group is a leading manufacturer of light and compact equipment with over 50 affiliates and 140 sales and service worldwide. The product brands Wacker Neuson, Kramer and Weidemann belong to the Wacker Neuson Group. TTControl supplies the electronic platform for all brands of the Wacker Neuson Group, including various controllers from its extensive range of products as well as expertise in functional safety.



Our Leading
Solutions in
Functional Safety
Enable Quick
and Economical
Deployment of
Highly Reliable
Electronic
Control Systems

Providing Robust Control Systems for Mobile Machinery

TTControl is a joint-venture company of TTTech and HYDAC International, offering control systems and operator interfaces for off-highway vehicles such as construction machinery, cranes, municipal vehicles and agricultural equipment as well as special machinery, like for example snow groomers.

As a leading provider for functional safety, TTControl unites two leading partners for the mobile machinery market. Its software and hardware platforms enable equipment manufacturers to develop highly reliable electronic control systems in a quick and economical manner. TTControl provides customers with significant benefits such as long-term safety experience, innovative technology and large operational flexibility through production outsourcing. Thus, our products and solutions meet today's most demanding needs regarding safety, reliability and usability for the off-highway and mobile machinery markets.

Electronic Control Units

ECUs for Demanding Work Environments

TTControl offers a wide range of off-the-shelf products, from powerful high-end controllers to cost-effective small ECUs. The portfolio also includes controllers for safety-critical applications which are certified according to DIRECTIVE 2006/42/EC. The products fulfill Safety Integrity / Performance Levels up to SIL 2 and PL d.

Our ECUs have been designed for the demanding work environment of off-highway vehicles. To ensure a maximum level of reliability, all devices have been tested under extremely harsh conditions. Only certified and tested components are used. The electronic circuits are well protected by a compact, automotive-style aluminum pressure die-cast housing. Several ECUs can be interconnected via CAN bus to form a network. The units are programmed either in C or in CODESYS®.

Key Characteristics

- Suitable for a wide range of applications
- Certified according to EN ISO 13849 (PL d) and IEC 61508 (SIL 2)
- Compliant with functional safety standards
- High-performance processors
- Software-configurable I/Os for many different sensor and actuator types
- Broad range of open programming environments including C and CODESYS (V2.3, V3, V3 Safety SIL 2)

“ TTControl’s distributed electronics support a very high level of flexibility in our vehicles. As a result, we were able to optimize mechanical functions by combining them with electronic control. ”

Riccardo Spadoni
Head of Engineering, PRINOTH AG



Find Out More Online www.ttcontrol.com/ECUs

Safety Certified Controllers



HY-TTC 30S Family

HY-TTC 30SH 14 Inputs, 16 Outputs
HY-TTC 32S 14 Inputs, 16 Outputs
EN ISO 13849



HY-TTC 94

28 Inputs, 20 Outputs
EN ISO 13849



HY-TTC 500 Family

HY-TTC 580 36 Inputs, 60 Outputs
HY-TTC 540 52 Inputs, 44 Outputs
HY-TTC 510 44 Inputs, 40 Outputs
IEC 61508 & EN ISO 13849



HY-TTC 70 Family

HY-TTC 71 25 Inputs, 18 Outputs
HY-TTC 77 39 Inputs, 26 Outputs



HY-TTC 30 Family

HY-TTC 30H 14 Inputs, 16 Outputs
HY-TTC 32 14 Inputs, 16 Outputs



HY-TTC 50 Family

HY-TTC 50 20 Inputs, 20 Outputs
HY-TTC 60 28 Inputs, 20 Outputs

General Purpose Controllers

I/O-Modules

CANopen-Based I/O Slave Modules

Our I/O slave modules are CANopen®-based, cost-effective, modular and user-friendly solutions for extending the number of I/Os in mobile applications. These controllers are best suited for different kinds of control tasks in a vehicle and act as slave units in a CAN-based network architecture.

The intelligent I/O slave modules are used in combination with, and controlled by a master electronic control unit, which can be located at a different place in the vehicle and communicates with the slave module via the standardized CANopen protocol. Such a distributed architecture reduces cabling and makes the design more economic.

If an OEM provides several vehicle variants, one or more HY-TTC 30X can be used in a modular way. This modular vehicle architecture makes the design and assembly of different vehicle variants possible and more cost- and time-effective than in the past.

Key Characteristics

- Easy integration and usage
- CANopen / CANopen Safety compliant
- Extensive I/O set with small form factor
- Safety-certified variants available (up to PL d)

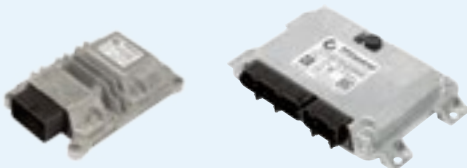
CANopen®

CANopen®
safety easy to use

I/O Modules

Find Out More Online www.ttcontrol.com/IO

Safe I/O Modules



HY-TTC 30XSH
14 Inputs, 16 Outputs
EN ISO 13849

HY-TTC 48XS
28 Inputs, 20 Outputs
EN ISO 13849

I/O Slave Modules



HY-TTC 30X Family
HY-TTC 30XH 14 Inputs, 16 Outputs
HY-TTC 30XO 16 Inputs, 14 Outputs
HY-TTC 30XI 26 Inputs, 4 Outputs

HY-TTC 36X
24 Inputs, 16 Outputs

HY-TTC 48X
28 Inputs, 20 Outputs



Visualization/HMIs

Highly Robust Operator Interfaces

The HY-eVision² product family sets new standards with respect to maximum resolution, programmability with CODESYS 3.x, and user friendliness. The modularly designed operator terminals are available in a large 10.4-inch variant with touchscreen (HY-eVision² 10.4) and a smaller 7-inch version (HY-eVision² 7.0) with or without touchscreen.

Both rugged displays have a powerful built-in display controller and are suited for harsh conditions in off-highway vehicles.

They are designed to become the central operator interface in mobile equipment and offer optimized visualization of the various in-vehicle parameters.

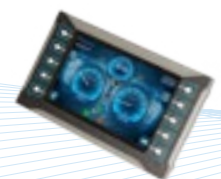
Object-oriented programming concepts allow fast and easy adaption of the HMI to different languages as well as specific additions like transparency effects, unicode fonts and a dashboard design elements library with more than 6000 already pre-designed elements like gauges, buttons or icons.

Key Characteristics

- Excellent sunlight readability
- Best-in-class CPU performance and boot-up time
- Capable of displaying two simultaneous video feeds – everything in sight
- Interface for Ethernet cameras
- Ability to display and generate PDF documents
- Dashboard Design Elements library with more than 6000 pre-designed elements like buttons, gauges or icons
- High-end graphics (picture-in-picture, overlay, 3D, transparency effects)
- Sleep mode - wake up within < 0,5 sec
- Software update of display and connected ECUs via USB
- Up to 4 CAN interfaces
- GPS, GSM as well as WLAN enabled (fleet management / remote maintenance)
- Robust and easy to clean



..... ➔ **HY-eVision² Family**



Functional Safety & Service and Support

TTControl Know-How & Customer Benefits

Functional Safety in Your Project

We support our customers in fulfilling the requirements of the machinery directive 2006/42/EC and train employees on the topic of functional safety for electronic controls.

In a 1-day seminar companies get an overview of the requirements of the valid norms and possible solutions for them. In cooperation a safety level for their machinery will be determined through the use of hazard & risk analysis. The results can be used for the design of the system architecture. Finally, with the help of our starter kits (control unit + programming software + cabling) clients can quickly and simply start programming application software.



Training, Support and Development

TTControl offers a broad range of services, from high-level system analysis, to architecture and safety consulting, to design and development of complete solutions. Working together with our experts is a very efficient and cost-effective way to transfer knowledge to your company.

Our well-trained support team consists of developers and application engineers offering software and hardware product support via telephone or e-mail, as well as on-site. We would like to invite you to discuss your application with us in order to find a solution together.



Find Out More About Functional Safety
www.ttcontrol.com/functional-safety

Contact us at support@ttcontrol.com

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