

■ ■ ■ **ADVANCED FEATURES**

ETEL has always focused on developing advanced control features to make its position controllers unique in the market. From the first prototype commissioning to the serial production of machines, ETEL advanced features provide a simple access to major time savings, throughput enhancement and increased precision.

ETEL advanced features start to bring advantages at a very early stage of a machine design. For instance, **Identification Tools**, are available to allow a one-click evaluation of machine mechanical design, identify resonances and adapt controller settings. While commissioning the machine, other tools like **Friction Compensation** and **Stage Protection** can be used to cancel out repeatable errors and to secure system behavior in case of unexpected events.

In addition, the core of ETEL unique features is designed to bring higher throughput together with the most stringent position accuracy levels. **Trajectory Filters** have the ability to adapt trajectory shapes to minimize settling times. In combination with **Dual Encoder Feedback** capabilities and/or **Gantry Control** functions, outstanding performance can be reached with minimal tuning effort.

ETEL develops functions that are continuously setting the next milestones in motion control. In fact, with the **Fast Trigger** feature, ACCURET controllers can react to a real position crossing event in 1D or 2D within a few nanoseconds. This opens new possibilities at the machine control level.

Last but not least, ETEL **Force Control** algorithm is the flagship of advanced software features. With zero stop time and millinewton accuracy levels, accurate placement with force control can be performed at the highest ever throughput and with a precision never achieved till now.



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Motion Control

■ ■ ■ **ETEL MOTION CONTROL**

The full ETEL solution allows machine builders to simplify mechanical integration in their machine thanks to a very consistent design and a modular architecture that is easy to wire and mount. Customers can focus on their core competence and technology while ETEL takes care of their motion systems development.

ETEL's range of motion controllers (ULTIMET) and position controllers (ACCURET) allows machine builders to drive any available servo motors on the market (brushless, DC motors, steppers) with the highest performance regulation in a minimal footprint.

Its decentralized architecture ensures the same level of performance and speed regardless of the number of axes driven in the machine. Distributed architecture also makes cabling easier to manage and to maintain in the field. The software environment simplifies embedded programming, machine commissioning and maintenance.

ETEL motion control solutions are specifically designed for high-end equipment thanks to:

- A high frequency state-space regulator for high control bandwidth;
- An embedded programming and advanced control features at firmware level;
- A high speed communication through ETEL real-time bus (TRANSNET);
- A nanosecond level synchronization of axes for demanding multi-axis applications;
- A compact form factor and simple cabling for an easy machine building;
- Powerful and user-friendly software tools for setup, monitoring, simulation and automated testing.

■ For more information, refer to our **Motion Control** catalog and leaflets.

SOFTWARE ENVIRONMENT

COMET is a user friendly interface for commissioning, tuning and maintenance with ETEL controlled equipment. WINGLET is the software tool for automated test and simulation. Thanks to them, the user can optimize the machine design during the development phase as well as the controller parameter set. As a result, machine stability, robustness and performance are improved at runtime.



The ETEL Device Interface (EDI) is a library which enables the communication between the ETEL's motion control system and the customer's application.

The Interpolated Motion Planning (IMP) is a trajectory optimization library for optimisation of complex trajectories which require geometry fitting, automatic transition and trigger placement. Using IMP can lead to unprecedented increased throughput without compromise on accuracy.

MOTION CONTROL	HUMAN MACHINE INTERFACE Customer application software.	COMET is the software environment for commissioning and maintenance.
	IMP is the software designed for time/accuracy optimization of complex trajectories.	WINGLET is the software tool for automated test and simulation.
	EDI is the library provided to interface machine software with ETEL controllers.	ULTIMET can run 3 multi-axis structured code motion sequences at the same time. Available both in interpolated and synchronized.
	ACCURET can run 2 multi-axis structured code motion sequences on each axis.	

SOFTWARE HARDWARE

ULTIMET MOTION CONTROLLERS

The ULTIMET motion controller is the master on the TRANSNET communication bus and can manage up to 63 axes. This motion controller is available in two formats:

The **ULTIMET LIGHT** offers different ways to manage multi-axis movements, depending on the needs: synchronized or interpolated movements, or advanced control feature requiring slave to slave communication between the different position controllers.



ULTIMET LIGHT is available in three versions: PCI and PCI Express version integrated into a PC for high speed applications requiring real-time deterministic communication. And the TCP/IP version directly mounted inside an ACCURET position controller and suitable for stand-alone machines, in which the need for time deterministic data transfer between motion system and machine PC is lower.

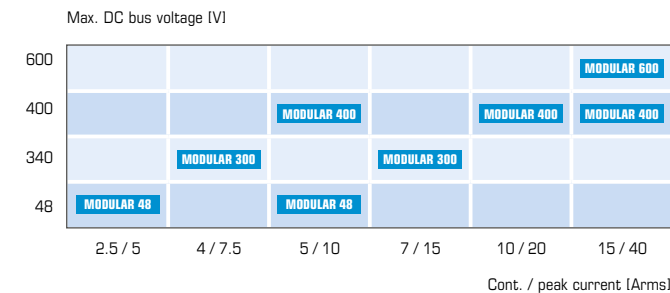
The **ULTIMET ADVANCED** is a powerful and versatile high-end multi-axis motion controller suitable for processes requiring more computation power, data processing, interfacing and free real-time operating system. This standalone box controller is fitted with a quad-processor from which one core is fully dedicated to the user and running with a real-time operating system. The computation power provided by this "user core" can be used for any type of motion control algorithm, enabling the ULTIMET to become a very open and flexible architecture possibly hosting part of the process IP.



ULTIMET ADVANCED also provides many more interfacing capabilities such as multiple TCP/IP connections, SPI channels, GPIOs, SD card, etc. to directly bring additional data into the real-time motion control execution.

ACCURET MODULAR

ACCURET dual axis controllers are key in ETEL's distributed motion control architecture. They perform setpoint generator, position and current loop real-time control algorithms. ACCURET also computes all encoder and local I/O related programming. In addition, they run up to 2 embedded programs per axis, so machine builders can manage any process specific tasks at the controller level.



Highlights

- Modular mounting concept and compact solution
- An optional board can be embedded
- Easy power and cabling
- 3D mapping available as standard
- Very well suited for electronics and semiconductor applications

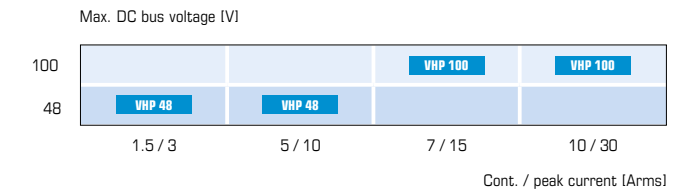
Advanced features

- Fast triggers (1D and 2D)
- Force control
- Identification tools
- Gantry control
- Stage protection
- Cogging and friction compensation
- Dual encoder feedback
- RTV (Real Time Values)
- Trajectory filters



ACCURET VHP

For the most demanding applications, ETEL developed a unique Very High Performance position controller range called ACCURET VHP. This range of product is equipped with both specific hardware and software that maximizes the performance. ACCURET VHP position controllers are compatible with all the other ACCURET controllers and can be dedicated to the most demanding axes of a multi-axis motion system.



Highlights

- Achieve outstanding signal to noise ratio of 100 dB @ 10 Arms
- Enable extremely low tracking errors and sub-nanometer position stability
- 3D mapping available as standard
- Control the most demanding axes in terms of speed accuracy
- Enable extremely high resolution position feedback in combination with high speed motion

Advanced features

- Fast triggers (1D and 2D)
- Force control
- Identification tools
- Gantry control
- Stage protection
- Cogging and friction compensation
- Dual encoder feedback
- RTV (Real Time Values)
- Trajectory filters
- Built-in analog Input/Output
- High Speed Encoder Interface (HSEI)

