



Product Overview

ETEL

ABOUT ETEL

Since its founding in 1974, ETEL has grown steadily to become a leading supplier of high performance motion control components and complete motion platforms. ETEL is the preferred supplier worldwide that is 100% dedicated to direct drive solutions. ETEL will maintain its leadership position with:

- Continuous technological innovation
- Leading-edge products and services
- Uncompromising quality standards
- Synergies within the HEIDENHAIN group already proven to be a winning combination
- A stable working environment where employees can develop their expertise and contribute to success

Our presence in a broad range of industries and experience with many demanding OEM manufacturers make us the perfect partner for companies looking for high precision, repeatability and long-life quality solutions.

High level competences and services

In order to serve its customers, ETEL has developed a variety of competences allowing ETEL to propose the appropriate abilities depending on machine builders' support requirements:

- Application oriented engineering
- Turnkey solutions
- Complete vertical integration
- Mechatronic experts
- Customized services
- On-site support
- Hotline and technical support
- Advanced trainings



For more information about ETEL, refer to our **Company Profile** catalog.



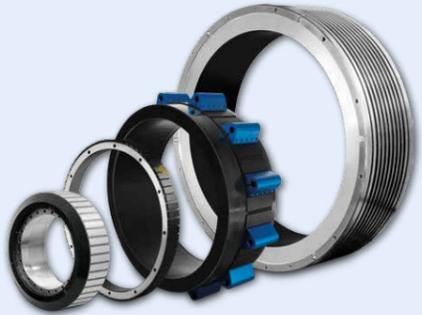
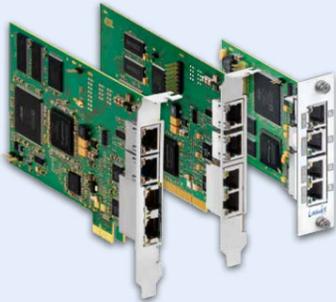
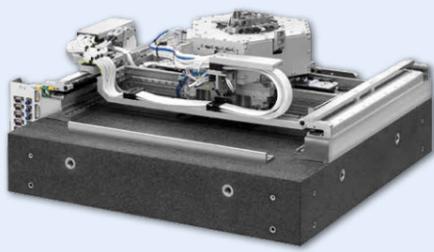
INDUSTRY SECTORS

ETEL is a leading supplier of components and motion systems to the following industries.



THREE CORE BUSINESSES

ETEL focuses on three core businesses, we develop, manufacture and support in the fields of:

MOTORS	 <p>LINEAR MOTORS</p>	 <p>TORQUE MOTORS</p>
MOTION CONTROL	 <p>MULTI-AXIS MOTION CONTROLLERS</p>	 <p>POSITION CONTROLLERS</p>
MOTION SYSTEMS	 <p>STANDARD MODULES</p>	 <p>ADVANCED MOTION PLATFORMS</p>

TORQUE MOTORS

ETEL offers the most comprehensive standard torque motor range in the industry. With more than 100 models to choose from, almost any requirement can be successfully fulfilled. ETEL also excels in developing custom motors to meet a specific application need.

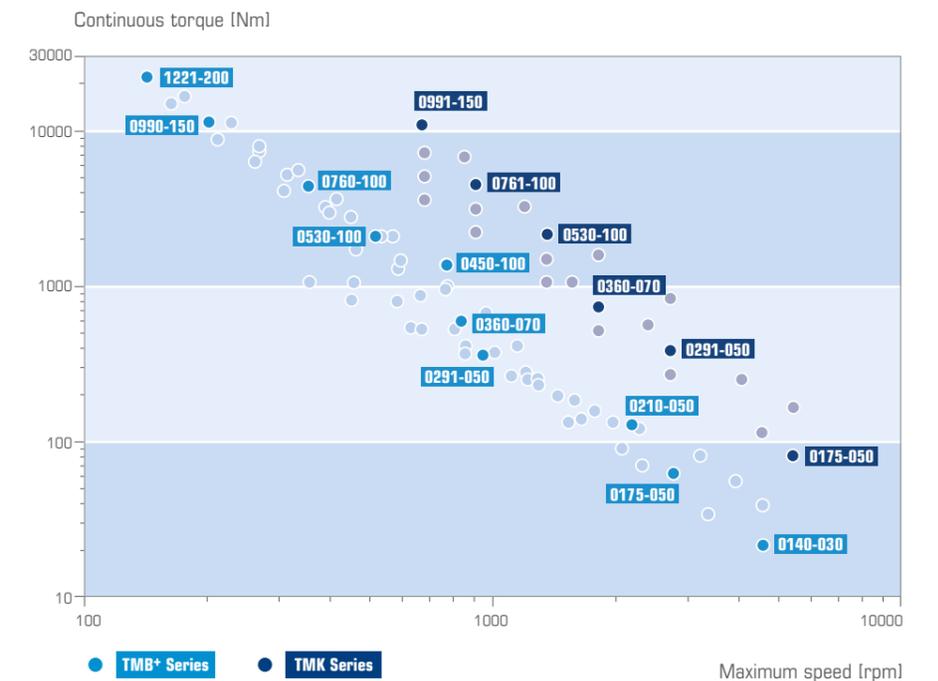
ETEL's TM series are the industry's most popular ironcore frameless torque motors. Powerful magnets are used to maximize torque and acceleration while minimizing the size of the motor. The performance of ETEL's torque motors have been further increased by the use of "buried magnet" technology on the latest TMK family.

The TMB motor series is today's industry preferred torque motor solution. This renowned family is designed with a precision stator and has been optimized to achieve very high continuous torque while minimizing the dissipated heat when liquid cooling is used. For more demanding applications, the TMK family can achieve more torque and significantly faster speeds than TMB+ motors thanks to its unique rotor design. In addition, the TML family can be used to reach high performance at a lower price in less demanding applications. All families of torque motors benefit from ETEL's know-how in ironcore design that provides unmatched torque efficiency and low torque ripple.



Torque motors range

ETEL offers the most comprehensive standard torque motor range in the industry. With more than 100 models to choose from, almost any requirement can be successfully fulfilled.



		CHARACTERISTICS	TYPE	HIGHLIGHTS	APPLICATIONS
PERMANENT MAGNETS SYNCHRONOUS TORQUE MOTORS	CONVENTIONAL TORQUE MOTORS	 <p>With cage</p> <ul style="list-style-type: none"> External diameter up to 1290 mm Large hollow shaft up to 1070 mm Peak torque up to 42900 Nm Maximum rated speed up to 4590 rpm Liquid cooling channels 	TMB+	<ul style="list-style-type: none"> More than 60 standard sizes available 600 VDC bus voltage Very high continuous torque Very high peak torque Flux weakening compliant Low torque ripple Designed for the most demanding applications 	<ul style="list-style-type: none"> High speed milling / turning tables High precision machining centers Grinding / finishing machines Boring / drilling / tapping machines Milling heads Transfer lines EDM Laser / ultrasonic cutting machines Stamping machines Lathes Indexing tables Electronic chip testing equipment Pick-and-place machinery High-end printing / scanning machines Packaging equipment Handling equipment Composite materials manufacturing Telescopes
		 <p>Without cage</p> <ul style="list-style-type: none"> External diameter up to 581 mm Large hollow shaft up to 420 mm Peak torque up to 4990 Nm Maximum rated speed up to 2600 rpm No liquid cooling option 	TML TMM	<ul style="list-style-type: none"> Two fixing methods (TML & TMM) 600 VDC bus voltage Very high peak torque Low torque ripple Light weight 	
	HIGH SPEED TORQUE MOTORS	 <p>With cage</p> <ul style="list-style-type: none"> External diameter up to 1050 mm Large hollow shaft up to 800 mm Peak torque up to 20800 Nm Maximum rated speed up to 5450 rpm Liquid cooling channels 	TMK	<ul style="list-style-type: none"> Powerful high speed ironcore torque motor TMK stator (up to Ø530 mm) compatible with the mechanical interface of the TMB+ series 600 VDC bus voltage Continuous torque increased by up to 30% vs TMB Very high peak torque Up to 8 times speed increase vs TMB Flux weakening compliant Low torque ripple 	

TMB+ torque motors range

ETEL continuously strives to deliver the most top-of-the-line product on the market and the TMB+ is a further example of this. The TMB+ is fully pin-to-pin compatible with the worldwide known TMB series but offers an increased performance of up to 22% continuous torque, up to 4% on top of it is already high peak torque and power losses reduction can reach up to 30%.

With four different winding options per size and a new 200 mm active length for each diameter, the TMB+ increases its overall size selection from the TMB. These options help propel ETEL torque motors beyond the competition and pushes towards the goal of making direct drive technology as accessible as possible.

With 62 standard model sizes and four different windings each, the TMB+ allows the user to get the maximum performance depending on how much torque, current, and speed are required. TMB+ motors can achieve a peak torque of up to 42900 Nm and utilize flux weakening to increase its speed capabilities.

It also has the option of coming with ETEL's IMTHP thermal module which, when coupled with ETEL's torque motors, enables users to reduce their amount of safety margins while receiving precise and reliable temperature monitoring.



LINEAR MOTORS

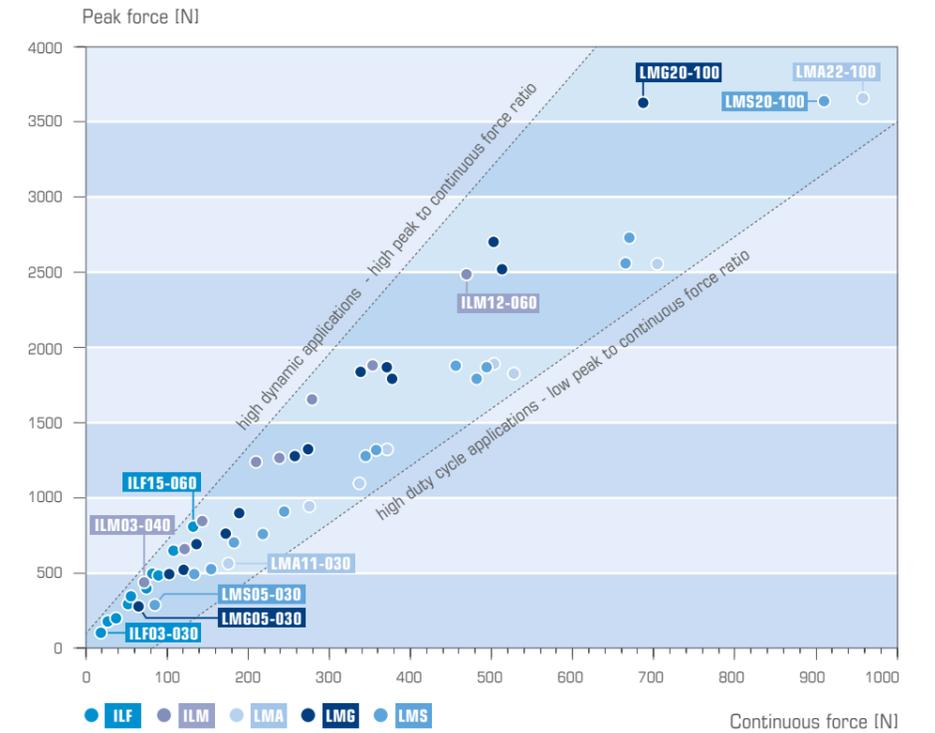
During the last two decades, many linear motor variations have emerged on the market. Nevertheless, only a few were found to be practical, perform well and economically viable. ETEL has always remained dedicated to the flat, synchronous, 3-phase linear motors with permanent magnet excitation. This family of motors represents more than 90 percent of industrial applications worldwide. They can be classified into ironcore and ironless motors.

The ironcore construction enables an exceptional peak force density, as well as unparalleled thermal efficiency, which is a significant advantage for thermal-drift-sensitive precision machines. The LMA is a mid-size motor optimized for application requiring high continuous force. The LMG is smaller, optimized for high dynamic applications and provides a high peak-to-continuous force ratio. In case an upgrade is requested by the application, the LMS is highly similar to LMG in terms of integration but provides about 30% more continuous force. This makes the LMS perfectly suited for high duty cycle axes. The ILF is a small size motor perfectly suited for very high dynamic and low moving mass applications. The ILM is a more powerful version of the ILF. These motor types also provide a highly linear behavior perfectly suited for the most demanding scanning applications where zero attraction force and outstanding speed stability are required.



Linear motors range

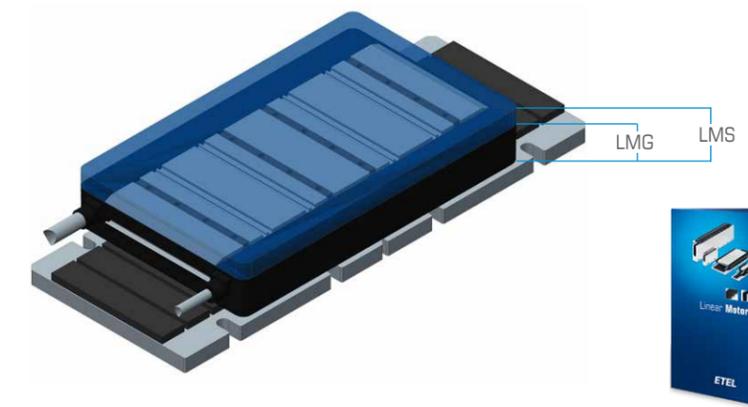
ETEL offers the most comprehensive standard linear motor range in the industry. With more than 50 models to choose from, almost any requirement can be satisfied.



	CHARACTERISTICS	TYPE	HIGHLIGHTS	APPLICATIONS
STANDARD PRODUCTS	 <p>Ironcore motors</p> <ul style="list-style-type: none"> Speed up to 15 m/s Acceleration up to 20 g Peak force up to 3650 N Low force ripple All linear motors types work with same MWD magnetic way 	LMA	<ul style="list-style-type: none"> Highest continuous force Optimized for high duty cycle application 600 VDC compliant 	<ul style="list-style-type: none"> Wafer inspection systems Chip placement machines Flip-chip / die bonders Wire bonders PCB drilling PCB testing machines Flat panel display equipment Medical equipment General automation
		LMG	<ul style="list-style-type: none"> Compact design Economic High peak force 600 VDC compliant 	
		LMS	<ul style="list-style-type: none"> Compact design Economic High continuous force 600 VDC compliant 	
PERMANENT MAGNETS SYNCHRONOUS LINEAR MOTORS	 <p>Ironless motors</p> <ul style="list-style-type: none"> Speed up to 20 m/s Acceleration up to 30 g Peak force up to 2500 N Option: forced air cooling No attraction force No force ripple 	ILF	<ul style="list-style-type: none"> Medium force Very low mass glider Zero force ripple 	<ul style="list-style-type: none"> Wafer inspection systems Chip placement machines Flip-chip / die bonders Wire bonders Very high dynamic axes PCB testing machines Air bearing systems CMM measuring machines Optical equipment manufacturing Medical equipment
		ILM	<ul style="list-style-type: none"> High force Air cooling option available Low mass glider Zero force ripple 	
INTEGRATED MOTORS	<p>ETEL motor design competences serve also more complex requests such as fully integrated axes. In fact, motors can be designed to perfectly fit a very specific form factor to satisfy customer applications. This process ultimately provides highly integrated motion systems with unique performance. Our linear motors and our expertise in direct drive technology are included in the ETEL motion systems and the dedicated components.</p>			<ul style="list-style-type: none"> Chip placement machines Flip-chip / die bonders Wire bonders PCB testing machines Very high dynamic axes

Mechanical compatibility between LMG and LMS

In terms of dimensions, the LMS motors are thicker than the LMG motors (about +7 mm) and keep all other LMG critical dimensions unchanged. The mechanical interfaces are identical to the equivalent LMG motor; this means for example that the screw holes are positioned exactly the same way as on equivalent LMG motors to ease existing machine upgrades.



MOTION SYSTEMS

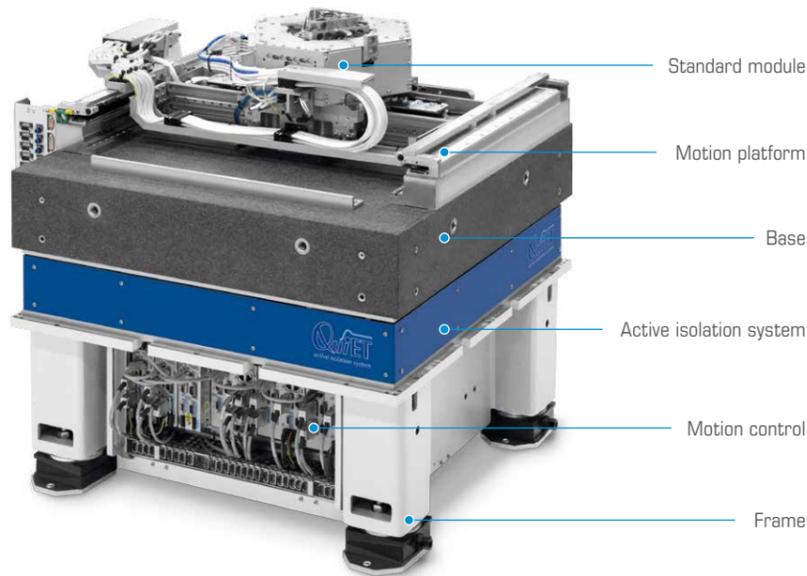
As the world leader in advanced motion systems and controls, ETEL offers a wide range of mechatronics solutions addressing the increasingly complex demands placed on precision motion components and systems in semiconductor and electronics markets.

Thanks to our dedication to the science of motion, 100% dedicated to direct drive technology, ETEL can provide its customers with the appropriate advanced motion control solution to address its specific application needs, from stand-alone actuators to high-end motion platforms. The latter includes not only the motion system, but also the base, active or passive damping system, and frame coupled to a state-of-the-art motion control architecture.

Companies looking for a motion system partner providing high quality, precision, repeatability and reliability need look no further.



For more information, refer to the corresponding flyers and leaflets.



Short stroke actuators

Solutions based on different motor, bearing and encoder technologies, featuring an optimized form factor, built-in gravity compensators, highly accurate force control, high dynamic, long lifetime and multiple degrees of freedom.



Linear and rotary axes

Wide range of linear and rotary axes, easily stackable, available in different sizes and travels, and with different options to provide you an optimized solution in an optimized form factor.



Combined modules

ETEL modules combine several degrees of freedom within one single unit. Typically vertical and rotary movements for wafer positioning or chip placement.



Stacked systems

Multi-axis configuration can be easily provided based on off-the-shelf axes and modules.



Gantry platforms

A wide range of gantry designs is available for high accuracy, high dynamics, high speed stability, high force in Z, typically for back-end semiconductor applications.



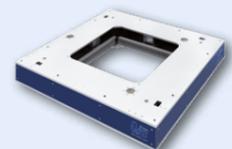
Planar platforms

Wide range of air bearing solutions, based on standard components on the market but also on in-house design to reach the ultimate performance required in terms of speed stability, bidirectional repeatability, dynamic flatness and straightness.



Active isolation system

QuiET is an active isolation system bringing the overall performance of high-end motion systems to the next level. It combines both vibration insulation from the surrounding environment and cancellation of the drive force generated by the stage movement.



Very large platforms

Through its sister company Soonhan, ETEL can provide very large motion platforms with travels up to 4 meters and longer. More information on www.soonhan.com



CORE COMPETENCES USED IN MOTION SYSTEMS

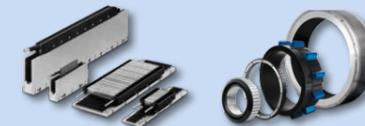
Motion control

Wide range of position controllers featuring high position loop sampling frequency, outstanding force control, vibration cancellation as well as real-time triggering, stage mapping capabilities, to name but a few. For more information, refer to our Motion Control brochure.



Motors

ETEL patented magnetic designs are used to provide state-of-the-art linear and torque motors including ironcore, ironless, and toothless technologies. For more information, refer to our Torque and Linear Motors brochures.



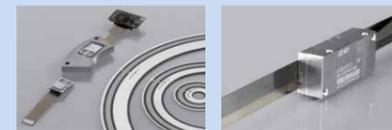
Bearings

ETEL developed a lot of expertise on the guiding elements for linear and rotary systems: mechanical bearings and air bearings are part of ETEL competences. Encoder kits combining high-quality bearings and high accuracy encoder disks allow ETEL to provide unique and unequalled high accuracy rotary solutions.



Encoders

ETEL has access to an extensive range of encoders which can be adapted to the application depending on the targeted performance, form factor, and cost requirements. Core components of those encoders can also be buried into the mechanics for an optimal embedded integration.



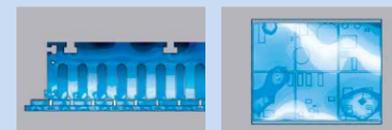
Cable management

With over 20 years of experience in producing highly reliable cable assemblies, ETEL's sister company provides solutions for highly dynamic, highly reliable, long lifetime applications, operating in clean environments. Flat or round high-flex cables, flexprints, and other pneumatic tubing assemblies can be specified to the application needs.



Mechatronics design

State of the art simulation tools are used on a daily basis to provide optimized mechatronics solutions: finite element analysis, thermal analysis, magnetic simulation, frequency analysis, dynamic simulations, etc.





HEADQUARTERS

ETEL S.A.
Zone Industrielle
CH - 2112 Môtiers
Switzerland

T +41 (0)32 862 01 00
F +41 (0)32 862 01 01
etel@etel.ch · www.etel.ch

GROUP SUBSIDIARIES AND SALES OFFICES

AMERICAS • sales@heidenhain.com
CHINA • china@etel.ch
CZECH REPUBLIC • heidenhain@heidenhain.cz
FRANCE • sales@heidenhain.fr
GERMANY • tbsw.etel@heidenhain.de
GREAT BRITAIN • sales@heidenhain.co.uk
HONG KONG • china@etel.ch
ITALY • etel@etelsa.it
KOREA • etelsales@heidenhain.co.kr
SINGAPORE • info@heidenhain.com.sg
SWITZERLAND • sales@etelsa.ch
TAIWAN • info@heidenhain.tw
THE NETHERLANDS • info@heidenhain.nl

OTHER COUNTRIES • internationalsales@etel.ch

REPRESENTATIVES

ISRAEL • comotech@medital.co.il
SPAIN • farresa@farresa.es

ETEL