L-force

Decentralised drive technology

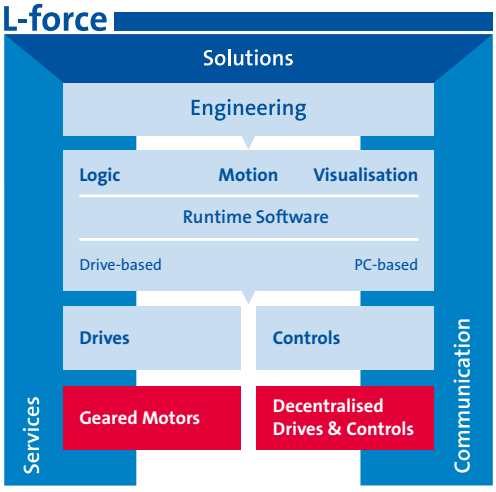
Efficiently and consistently decentralised

Lenze

L-force | Decentralised drive technology

Cost efficiency, saving time and improving quality are the challenges of the future. Lenze is meeting these challenges with L-force – the drive and automation family with wide-ranging solutions and compatible interfaces and components. L-force means faster project planning and commissioning, enhanced performance and flexibility in production.

The latest additions are the 8400 motec and protec decentralised inverters from the Inverter Drives 8400 range. They offer a number of advantages along with cost-cutting potential, particularly in the case of distributed systems. Special functions are implemented exactly where they are needed. The new decentralised Inverter Drives 8400 require fewer motor cables, lower cooling requirements, reduce control cabinet space to a minimum or eliminate the need for a control cabinet completely and implement complex system structures clearly.



Inverter Drives 8400 motec
This compact motor inverter is an attractive alternative, particularly for simple applications, and guarantees a high degree of efficiency in every respect. The 8400 motec version, which can be mounted both on the geared motor and on the wall, is available immediately in the power range of 0.37 to 1.5 kW. Power extensions will gradually be made available.

8400 motec Drive Package
Together with our L-force motors and L-force geared motors, the 8400 motec represents a comprehensive and efficient “Drive Package”.

Inverter Drives 8400 protec
The inverter for higher-performance and more complex functions. Its particular strength lies in positioning tasks and integrated safety. The device is available in the power range 0.75 to 4 kW.

Users will consistently benefit from the advantages offered by the new decentralised Inverter Drives 8400, which include user-friendliness and efficiency.

Efficient 8400 platform | common strengths

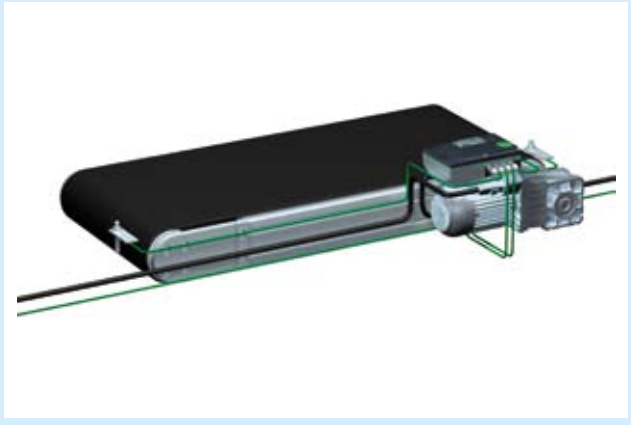
Just like our central 8400 control cabinet drives, the new decentralised drive solutions also save valuable time in all phases of the value-added chain, from installation right up to servicing. The new Inverter Drives 8400 motec and protec are particularly innovative in this regard. A variety of options and accessories allows for simple system integration, resulting in cost-efficient drive solutions.

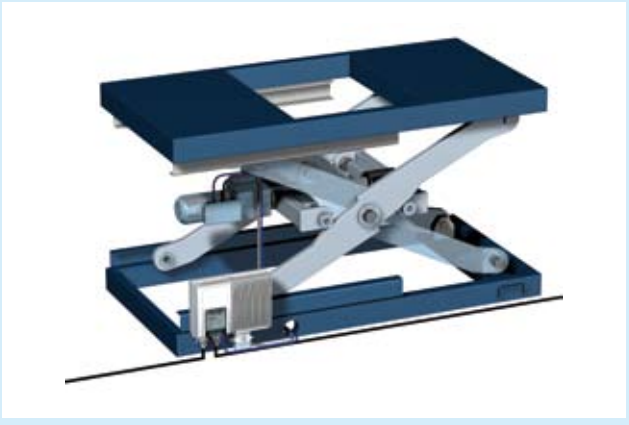
Consistently Rightsized
From our scaled product range, you can chose products that are perfectly tailored to your individual application, be it simple or complex.

The same product features – the same operation
Uniform product features simplify handling: after initial training designers, operators or service personnel will be familiar with all products in the range. This saves valuable time – during project planning and commissioning as well as during operation. Commissioning couldn't be simpler thanks to DIP switch setting. Alternatively, you can use the “L-force Engineer” tool for more demanding tasks.

Plug and Drive – pluggable connection system
Unpack, connect, and you're done. All connections for the decentralised 8400 inverter – from the shielded motor cable and the mains supply right up to the fieldbus link and sensor connection – are equipped with standardised screwed connections or connectors, resulting in extremely fast installation times.

Diagnostics at a glance
Diagnostics options via status LEDs and clearly visible displays also play a significant role in increasing system availability. In the case of the 8400 motec, for example, a large two-coloured LED indicates the status of the inverter.





Applications | decentralised with Inverter Drives 8400

A modern, decentralised system architecture helps to avoid system downtimes and thereby the risk of financial losses. This has proven to be the case where high system availability is critical, e.g. in intralogistics and the automotive industry.

The decentralised 8400 inverters support modular system structures and thereby contribute towards extremely fast installation and commissioning times.

Power supply
With the existing connection system, which uses screwed connections or plug connections, the inverters can be directly integrated into an existing power bus. This facilitates, for example, the loop-through arrangement of the mains connection across several drives.

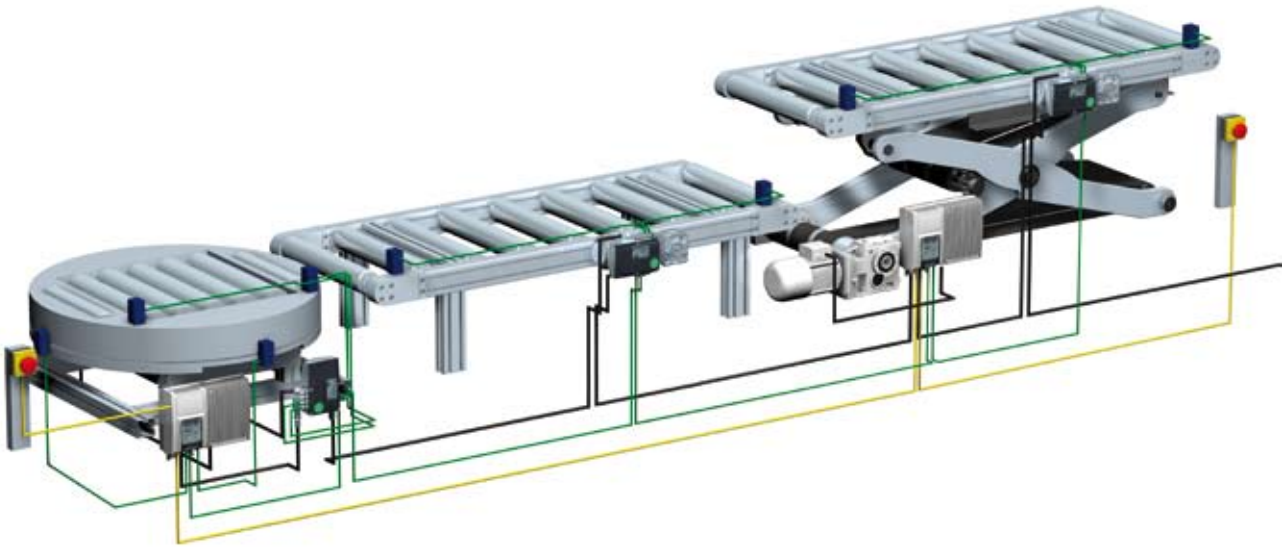
Memory module
The memory module serves as the central memory unit for all inverter parameters. This is parameterised prior to commissioning and subsequently inserted. In the event of service it is only necessary to replace the drive.

Communication
The decentralised 8400 inverters allow for communication via CANopen or PROFIBUS in order to securely facilitate integration into the overall concept of the machine. The bus is connected via pluggable M-12 couplings.

In addition to this, the motec also features an AS interface and the protec offers communication via PROFINET.

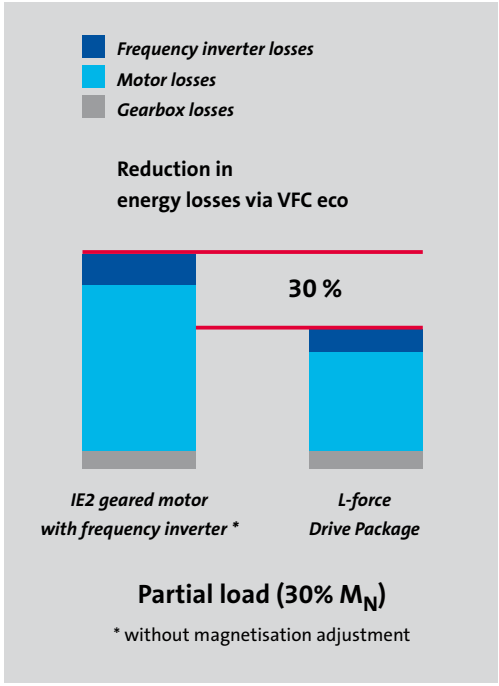
Safety engineering
Safety functions are available as an option in the inverter. This allows frequently used functions such as STO (Safe Torque Off) to be implemented directly via the inverter.

The illustration below shows the simple wiring.



Drive Package | 8400 motec

In the Drive Package, gearboxes, motors and motor inverters are perfectly coordinated. The package is characterised by an optimum cost per kW ratio.



The motor inverter with VFC eco
Using the Voltage Frequency Control economic (VFC eco) standard function, the 8400 motec can automatically adapt the magnetising current of the motor to operating conditions. This increases efficiency at partial load and reduces the energy required by up to 30 percent. VFC eco is already used in low-dynamic applications.

Three-phase AC motors with a new concept
For the first time, the MF motor series, which is exclusively tailored to this Drive Package, is available in addition to the L-force MD and MH (IE2) three-phase AC motors.

The L-force MF three-phase AC motors optimise the potential of the inverter operation and thereby safeguard the budget:

- **Compact**: Up to 2 sizes smaller than conventional three-phase AC motors
- **Energy-efficient**: Motors exceed the minimum degree of efficiency for efficiency class IE2
- **Dynamic**: The same moments of inertia as servo motors
- **Variable**: Wide speed setting range (1:24)

L-force gearbox with the highest degree of efficiency
Thanks to their high efficiency levels, the right-angle and axial gearboxes in the L-force series ensure that energy is transferred to the application with practically no losses. The modular concept and high power density allow for particularly compact drive packages.

8400 motec | at a glance

The new motor inverter from Lenze is mounted on the motor with just four screws. The 8400 motec's modular and sophisticated structure, consisting of the "Drive Unit", "Communication Unit" and "Wiring Unit" modules, is indicative of its flexibility.

The Drive Unit – simple handling

- Simple commissioning via DIP switch, potentiometer or diagnosis terminal
- An easy to replace memory module
- A large LED as status display – clearly visible, even under the most challenging installation conditions

The Communication Unit – functionality on site

- CANopen, PROFIBUS and AS interface
- Includes integrated safety dependent on the selected functional scope, e.g. STO
- I/Os on board
- Pluggable M-12 connection system for communication, safety engineering and sensor technology or via screwed connections

The Wiring Unit – easily accessible and easy to connect

- Flexible connection options such as cable glands and various plug connections
- Connection for brake resistor
- Spring-applied brake control

8400 motec | Highlights

The 8400 motec motor inverter is characterised by maximum levels of user-friendliness during operation and installation, also minimum space requirements.

Particularly in the case of so-called “basic applications”, the 8400 motec demonstrates its high level of efficiency in terms of cost, time, space and energy.

Cost benefits
- Extremely simple commissioning via DIP switch and potentiometer settings
- Reduced energy requirements thanks to energy-saving functions in combination with Lenze geared motors

Space benefits
- Integrated safety and fieldbus communication tailored to individual requirements
- The modular structure minimises your spares inventory

Time benefits
- Reduction in mounting and installation times thanks to the pluggable connection system: “Unpack, connect and you're done!”
- Simple replacement of the memory module facilitates standard set-up and increases availability

Energy efficiency
- VFC eco mode performs the intelligent adjustment of the magnetising current
- Energy savings of up to 30 % possible

Further benefits
- 200 % overload current (3s)
- V/f control
- Sensorless vector control
- Short circuit and earth fault proof
- DC-injection braking
- S-shaped ramp for smooth accelerations
- Max. output frequency 500 Hz
- 3 Fixed frequencies
- CANopen, PROFIBUS and AS interface
- STO safety function

Wonderfully simple
The large LED, visible from some distance, shows the status during operation. Intermittent blinking indicates the cause of errors, making diagnostics clear and simple.

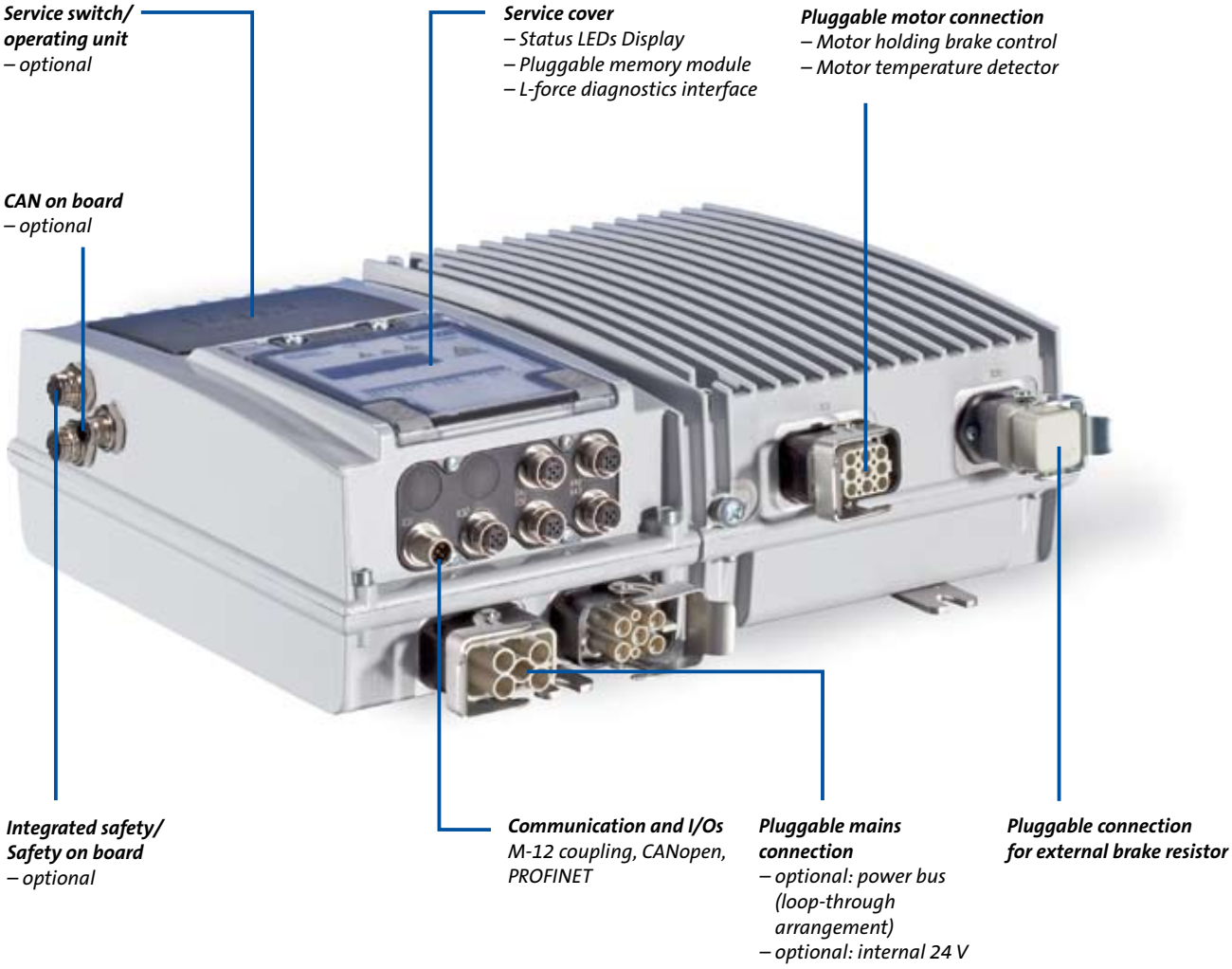
Mechanically and electrically robust
Best suited to the harshest environments thanks to enclosures IP55 and IP66.

8400 protec | at a glance

The wall-mounted device with large capacity for more complex decentralised systems. Characterised by its robust structure, high level of operational reliability and fast installation.

Lenze supplements these positive features with functions such as online diagnostics, positioning technology and integrated safety.

Diagnostics on site
A large display continuously informs users of the device's operating status. The 18 clearly arranged LEDs under the service cover provide additional diagnostics information. The fast diagnostics thus make a significant contribution towards increasing system availability.



8400 protec | Highlights

This inverter, which features a high level of functionality, can be used for servo-like applications. The 8400 protec is delivered ready to be connected with all modules and interfaces.

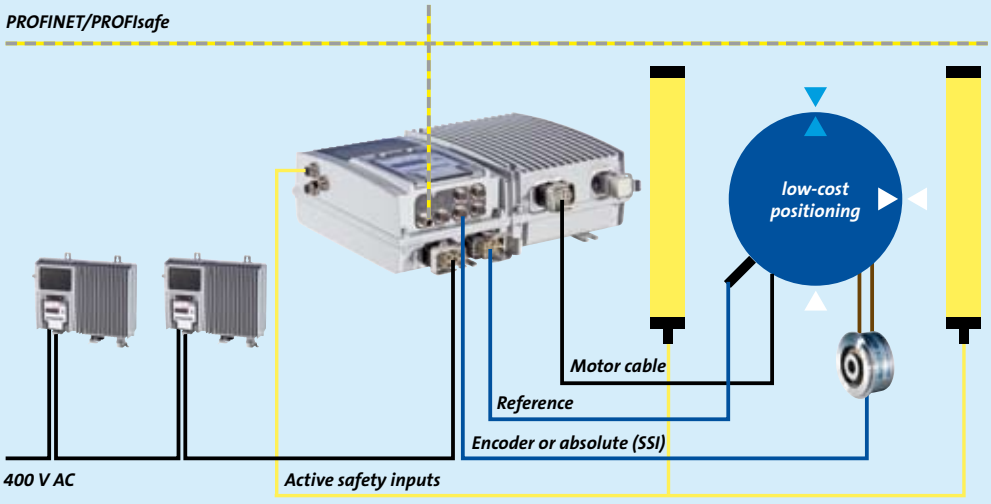
Decentralised, integrated positioning
Implement positioning applications with asynchronous motors cost-effectively and decentrally. Whether it's cyclic, table or absolute positioning, the 8400 protec provides integrated solutions for all of these applications. The ability to connect incremental and absolute value encoders rounds off this functional range. Parameterisation can be performed conveniently using the “L-force Engineer”. The series also features a freely editable function block interconnection for integrating logic, arithmetic and mathematical programs via graphical programming.

Safety engineering in accordance with EN ISO 13849-1
Along with the ability to connect local safety elements and the secure communication via PROFIsafe, the certified safety engineering also offers a range of safety functions

- Safe torque off (STO)
- Safe stop 1 (SS1)
- Safe stop emergency (SSE)
- Safe operation mode selector (OMS)
- Safe enable switch (ES)

Further benefits

- 200 % overload current (3s)
- V/f control with and without encoder
- Sensorless vector control
- Servo control
- Short circuit and earth fault proof
- DC-injection braking
- S-shaped ramp for smooth accelerations
- Max. output frequency 1000 Hz
- 15 fixed frequencies
- Standardised connectors
- CANopen, PROFIBUS, PROFINET
- Safety options: STO, SS1



Technical data | at a glance

Drive Package

		Rated power	**P [kW]**	**0.37**	**0.55**	**0.75**	**1.1**	**1.5**
		Supply voltage	U [V]	3~ 380 to 480 V +10 % / -20 %				
		Rated frequency	f [Hz]	50 Hz to 60 Hz / -10 %				
		Overload		150 % (60 sec); 200 % (3 sec)				
		Enclosure		IP 55 (brake motor: IP54)				
		Approval		UL optional				
		Ambient temperature	T °C	-20 to 40 °C; up to 60 °C derating				
MD motor **MH motor** **MF motor**	Size Size Size			071 --- ---	071 --- 063	080 080 063	080 090 071	090 090 071
Helical gearbox	1-stage 2-stage 3-stage	Efficiency	η	98 % 97 % 95 %				
Shaft-mounted helical gearbox	2-stage 3-stage	Efficiency	η	97 % 95 %				
Bevel gearbox	2-stage	Efficiency	η	96 %				
Helical-bevel gearbox	3-stage 4-stage	Efficiency	η	95 % 93 %				
Helical-worm gearbox	2-stage 3-stage	Efficiency	η	62 % - 92 % 64 % - 87 %				

8400 motec

Typical motor power (asynchronous motor, 4-pole)	**P_N [kW]**	**0.37**	**0.55**	**0.75**	**1.1**	**1.5**
Mains voltage range	**U_{mains} [V]**	3/PE 320 V AC -0 % ... 550 V +0 %; 45 Hz -0 % ... 65 Hz +0 %				
Rated output current	**I_N [A]**	1.3	1.8	2.4	3.2	3.9
Dimensions Height x Width x Depth	**H x W x D**	108 x 156 x 241				
Climatic condition Operation (EN 60721-3-3)		3K3 (temperature: -30 °C ... +55 °C) Derating over 45 °C (2.5 % /K)				
Enclosure		IP55, IP66 available as an option				

8400 protec

Typical motor power (asynchronous motor, 4-pole)	**P_N [kW]**	**0.75**	**1.5**	**3.0**	**4.0**
Mains voltage range	**U_{mains} [V]**	3/PE 320 V AC -0 % ... 550 V +0 %; 45 Hz -0 % ... 65 Hz +0 %			
Rated output current	**I_N [A]**	2.4	3.9	7.3	9.5
Dimensions Height x Width x Depth	**H x W x D**	260 x 353 x 110		260 x 434 x 148	
Climatic condition Operation (EN 60721-3-3)		3K3 (temperature: -25 °C ... +55 °C) Derating over 45 °C (2.5 % /K)			
Enclosure		IP65			

This data is valid for operation at 400 V AC

Technology | at a glance

		8400 motec	8400 protec
Functions	Application-oriented commissioning (predefined application)	–	●
	Freely assignable “user” menu	–	●
	Motor identification	●	●
	V/f control without encoder (linear or square-law)	●	●
	V/f control with encoder	–	●
	Sensorless vector control	●	●
	Torque control	–	●
	VFC eco	●	–
	Motor brake frequency inverter	–	●
	Point-to-point positioning	–	●
	Flying restart circuit	●	●
	S-ramps for smooth acceleration and deceleration	●	●
	I^2t-motor monitoring	●	●
	DC injection brake	●	●
	Fixed frequencies	3	15
	Parameter switch-over	●	●
	PID controller	●	●
	Integrated, wear free Brake control	●	●
	Skip frequencies	●	●
	Frequency inverter Ixt monitoring	●	●
	Logic functions, comparator, Arithmetic function	–	●
	Function block interconnection for input and output signals	–	●
	Free function block interconnection	–	●
Properties	Protection against short circuits, earth faults, overvoltage, motor stalling	●	●
	Integrated interference suppression in accordance with EN 61800-3, category C2	●	●
	Protection against restart for cyclic mains switching	●	●
	Usability in an IT system	●	●
	Safe torque off (STO), Certified in accordance with EN ISO 13849-1 (cat. 4, PL e), EN 61508/EN 62061 (SIL 3)	●	●
	Approvals: CE, UL, RoHS	●	●

It's good to know | why we are there for you

"Our customers come first. Customer satisfaction is what motivates us. By thinking in terms of how we can add value for our customers we can increase productivity through reliability."

Lenze drive and automation solutions

"We will provide you with exactly what you need – perfectly co-ordinated products and solutions with the right functions for your machines and installations. That is what we mean by 'quality'."

"Take advantage of our wealth of expertise. For 60 years now we have been gathering experience in various fields and implementing it consistently and rigorously in our products, motion functions and preprepared solutions for industry."

"We identify with your targets and strive towards a long-term partnership which benefits both sides. Our competent support and consultation process means that we can provide you with tailor-made solutions. We are there for you and can offer assistance in all of the key processes."

You can rely on our service. Expert advice is available 24 hours a day, 365 days a year, in more than 30 countries via our international helpline: 008000 24 Hours (008000 2446877).

www.Lenze.com

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