

L-force

Decentralised drive technology



Efficiently and consistently decentralised

NEW

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

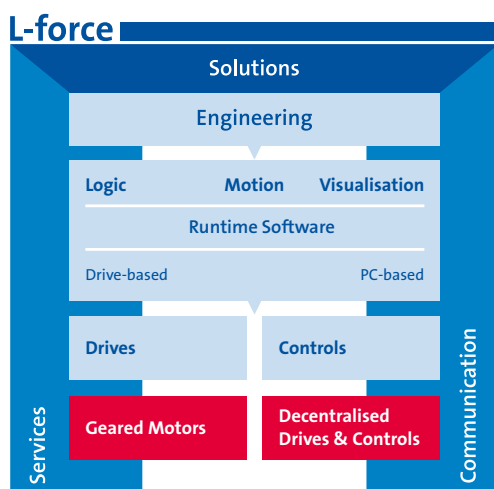
This compact motor inverter is an attractive alternative, particularly for simple applications, and guarantees a high degree of efficiency in every respect. The 8400 motec version, which can be mounted both on the geared motor and on the wall, is available immediately in the power range of 0.37 to 1.5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

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 choose products that are perfectly tailored to your individual application, be it simple or complex.

The same product features – the same operation

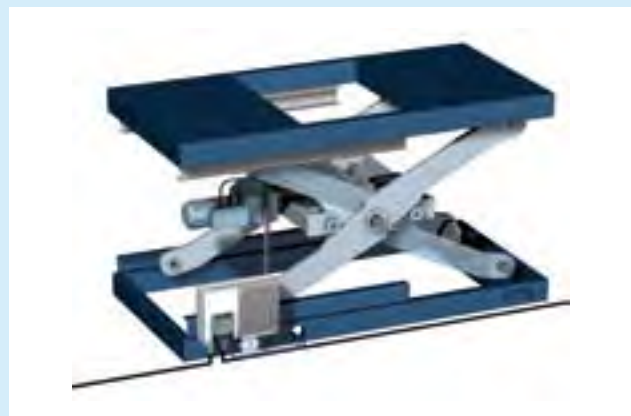
Uniform product features simplify handling: after initial training designers, operators or service personnel will be familiar with all products in the range. This saves valuable time – during project planning and commissioning as well as during operation. Commissioning couldn't be simpler thanks to DIP 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.



8400 motec | Drive Packages



Gearboxes, motors and motor inverters from Lenze are perfectly coordinated and thereby open up a wide range of solutions for decentralised drive tasks.

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.

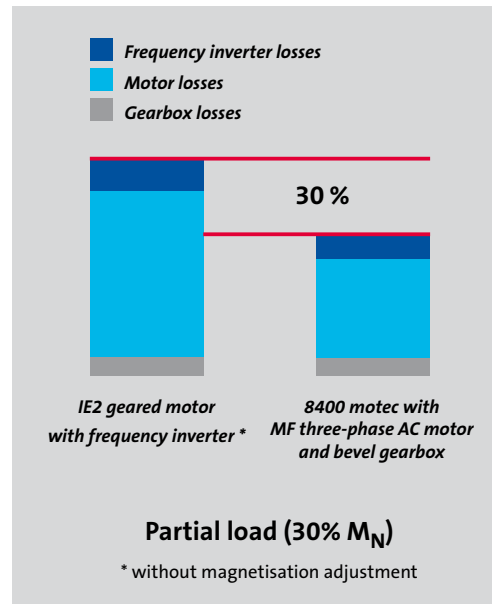
The L-force MF three-phase AC motors optimise the potential of the inverter operation and thereby safeguard the budget:

- ▶ **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 solutions.

Energy savings of up to 30 percent are possible



Example of the cost-cutting potential through combining the 8400 motec with L-force geared motors



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
- ▶ Maintenance opportunities adapted to the application – without being a software specialist

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 | 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

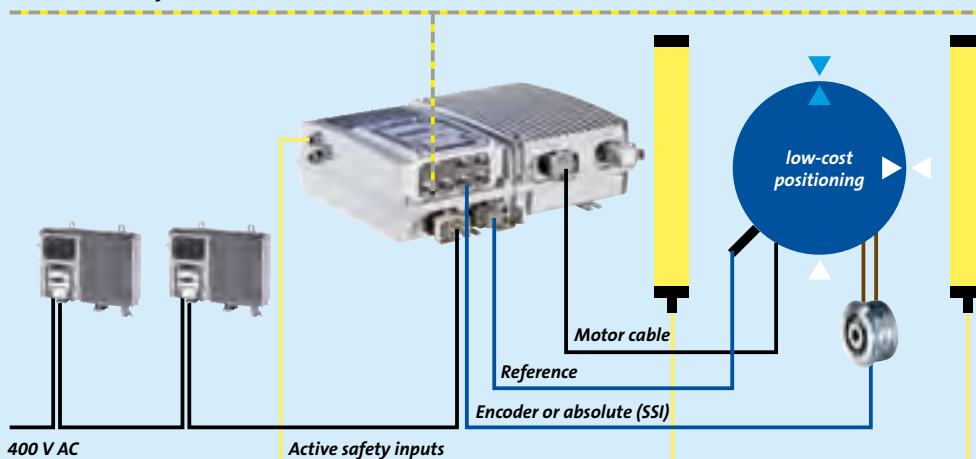
Along with the ability to connect local safety elements and the secure communication via PROFIsafe, the certified safety engineering also offers a range of safety functions

- ▶ 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

PROFINET/PROFIsafe



Technical data | at a glance

8400 motec Drive Packages

		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 %				
		Enclosure		IP 55 (brake motor: IP54)				
		Approval		UL in preparation				
		Ambient temperature	T °C	-20 to 40 °C; up to 60 °C derating				
MD motor	Size			071	071	080	080	090
MH motor	Size			---	---	080	090	090
MF motor	Size			---	063	063	071	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
Rated output current	I _N [A]	1.3	1.8	2.4	3.2	3.9
Overload		150 % (60 sec); 200 % (3 sec)				
Dimensions Height x Width x Depth	H x W x D	109 x 156 x 241				
Climatic condition Operation (EN 60721-3-3)		3K3 (temperature: -30 °C ... +60 °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
Rated output current	I _N [A]	2.4	3.9	7.3	9.5
Overload		150 % (60 sec); 200 % (3 sec)			
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

		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 ² t-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, EN 61508/EN 62061 (SIL 3)	cat. 3, PL e	cat. 4, PL e
	Approvals: CE, UL, RoHS	●	●

* in preparation