

Pumps with Lenze VFDs

Optimize equipment design
and reduce costs



Lenze is your **competent partner for variable frequency drives (VFDs)** for pumps, pump skids or machines where pump control is essential.

Different installation requirements?

The frequency drive series offers a wide range of solutions from **0.25 to 132 kW (0.33 to 180 HP)**. They are available in **IP20** or decentralized **wall or motor** mounted in **IP55/66**.

Facing high costs for automation & drives?

Robust decentral i550 protec with **adaptable extension box** cut costs for electrical cabinet designs. Maximum integration of functionality offers the i650 motec with **built-in PLC** and **IO-Link Master**.

Limited power range for motor mounted VFDs?

The i550 motec in **IP66** is very compact from **0.37 to 45 kW (0.5 to 60 HP)**, e.g. i550 motec with 45 kW weighs only 14 kg.

Lack of skilled personnel?

Reduce the installation **time** by at least **30 minutes** per VFD. Features like the **memory module** for parameters and cable connectors make the commissioning easy and efficient.

Highest quality standards worldwide

Lenze drives are developed in Switzerland and produced in large quantities in **Germany, USA** and **China** – for the respective region with **local support**.



i550 cabinet

i550 motec

i550 protec



Centrifugal pumps

Indispensable in numerous commercial and industrial applications, ideal for **non-critical liquids** such as water.

Operating modes

They most efficiently **handle small to high volume flow** of liquids. They have a quadratic load profile, i.e. the required torque (M) is the square of the volume (n) with $M \sim n^2$.

Typical applications

- Circulation pumps (cooling/heating)
- Process technology
- Filtration pump systems for water or food & beverage
- High pressure multi-stage pumps
- Irrigation technology
- Swimming pool pumps
- Water and wastewater technology



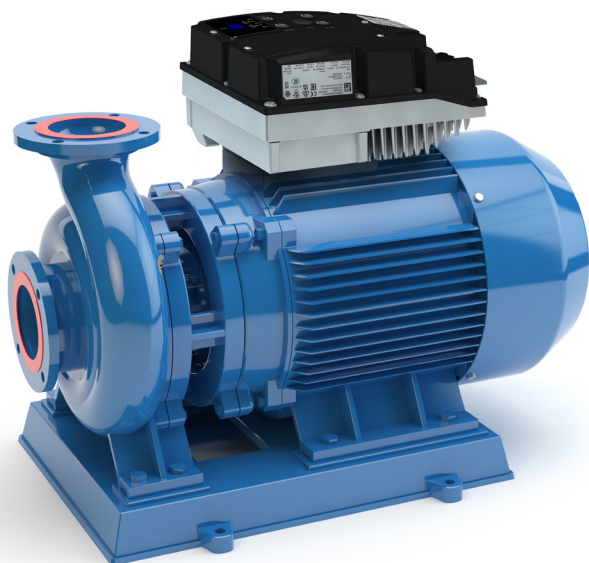
Frequency drives i500 for maximized efficiency

Reducing the speed or flow rate by 20% can lead to 50% energy savings with VFDs which is especially useful for applications with **varying demand**. Even **fixed-speed applications**, which are often oversized, can benefit from using a VFD with a **demand-based PID controller**.

Energy cost saving with an 11 kW pump sums up to **3,000 EUR** (~ 3,300 USD) per year (@ 0.15 Ce/kWh).

Features:

- **Energy-saving motor control:** Energy-efficient V/f eco control, vector control for AM or PM motors
- **Easy maintenance:** the decentral i550 protec drive features an optional integrated service switch
- **Specific pump functions:**
 - Cascade control (up to 3 pumps)
 - Pump rinse/sleep mode in PID mode
 - Purge (cleaning) function
 - Minimum flow rate
 - Pump run-out detection
 - Pipe burst detection
 - Pipe filling/water hammer minimization
 - Dry run/cavitation prevention
 - Keypad user units (e.g. m3/h)



The performance of centrifugal pumps increases exponentially with the speed (flow rate) ($P \sim n^3$).

Positive displacement pumps

These dedicated pumps are primarily used for **high-viscosity or acidic fluids**, very **high-pressure generation** or precise volume control. Typically, these pumps are more complex, costly and require more maintenance.

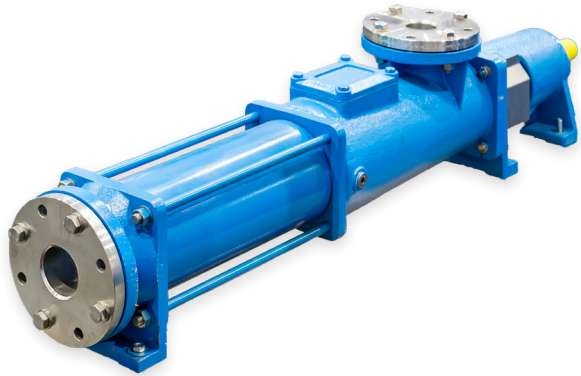
Using VFDs helps **improve process control**, extend **service-friendly operation**, and enhance efficiency.

Typical applications

- Measuring and dosing pump equipment
- Filtration pump skids
- Industrial or wastewater sludge conveying
- Hydraulic pump aggregates
- Progressing cavity pumps
- Cooling and lubrication equipment for machine tools

Operating modes

There is a great variety of reciprocating or rotary pumps like progressive cavity, screw, gear, diaphragm, hose, lobe, piston and further pump design.



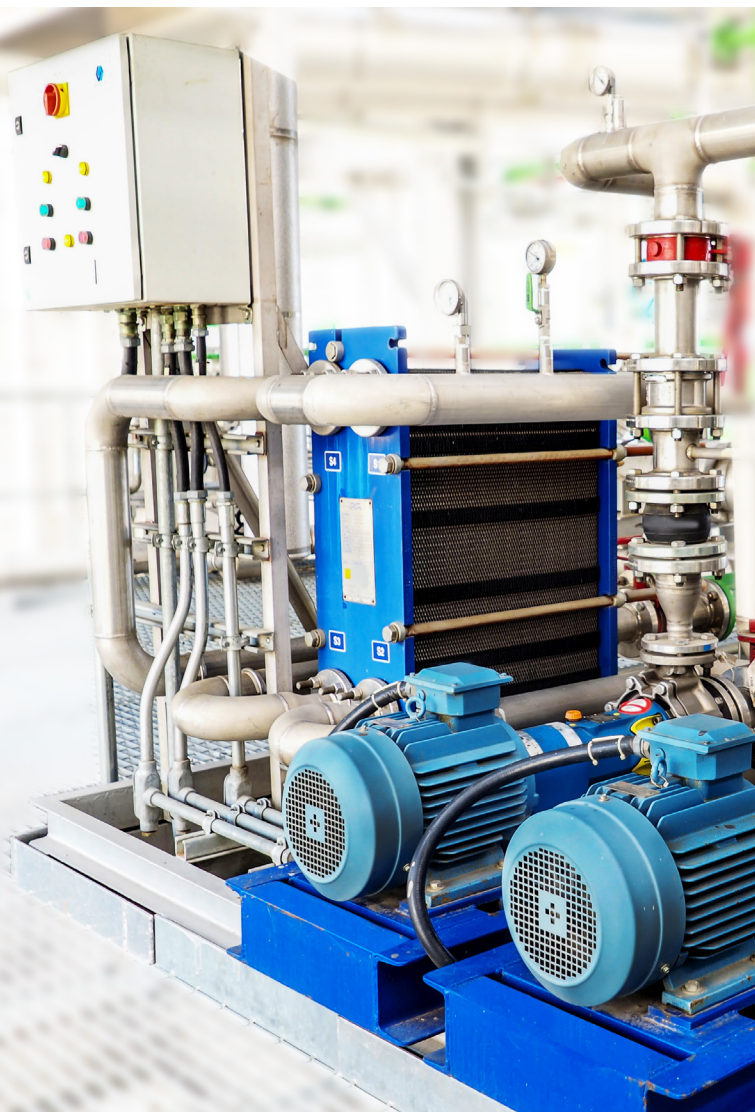
Displacement pumps produce a constant pressure (torque) at different flow rates.

Increase performance with i500 frequency drives

- **High-performance vector control** with the shortest step response times
- **Unique PM motor control:** 200% overload at "0" speed. Maximum overload and sensorless precise dosing with Lenze IE5 motors m5550p
- **Extended pump and process functionality** with i650 motec with integrated PLC for sequence control and direct integration of smart sensors via IO-Link interface
- **Flexible portfolio:** economical solutions with i550 frequency drives or i950 servo drives for high-performance solutions

Further information:

Lenze pump application guide



Technical data Lenze VFDs

3-phase mains connection 400/480 V – HD with 200 % (3 s), 150 % (60 s), STO SIL3, with integrated EMC filter

P _N (HD)		I _N (HD)		i550 cabinet IP20 NEMA 250 Open Type		i510 protec IP21 NEMA 1 (North America only)		i550 protec IP66 NEMA 4X IP55 NEMA 12		i550 motec/ i650 motec IP66 NEMA 4X								
[KW]	[HP]	400 V	480 V	m (kg)	H x W x D (mm)	m (kg)	H x W x D (mm)	m (kg)	H x W x D (mm)	m (kg)	H x W x D (mm)							
0.37	0.5	1.3	1.1	0.8	155 x 60 x 130	1.29	170 x 100 x 111	1.8	190 x 140 x 117	3.2	263 x 156 x 120							
0.75	1	2.4	2.1	1.0	180 x 60 x 130			2.7	205 x 140 x 140									
1.1	1.5	3.2	3	1.35	250 x 60 x 130													
1.5	2	3.9	3.5															
2.2	3	5.6	4.8															
3	4	7.3	6.3				1.33	200 x 100 x 111	4.9	250 x 180 x 168	3.8	263 x 156 x 120						
4	5	9.5	8.2	2.3	250 x 90 x 130				5.1	290 x 180 x 173	6.0	340 x 202 x 155						
5.5	7.5	13	11										2.3	250 x 90 x 130				
7.5	10	16.5	14		3.7	276 x 120 x 130	2.0	290 x 180 x 173										
11	15	23.5	21															
15	20	32	27	8.0	342 x 180 x 165	i550 protec in IP31/ NEMA 1		10.2	405 x 230 x 187	13.3	443 x 280 x 206							
18.5	25	40	34					46	778 x 298 x 286									
22	30	47	44.4															
30	40	61	52															
37	50	76	65	17.2	450 x 250 x 230	i550 protec in IP31/ NEMA 1		53	778 x 298 x 378	Not available								
45	60	89	77	24.0	536 x 250 x 265													
55	75	110	96															
75	100	150	124															
90	125	180	156	35.6	685 x 258 x 304	Not available		Not available		Not available								
110	150	212	162															

IO connections & mains voltages	Standard I/O: 5 x digital input, 1 x digital output, 1 x relay (NO/NC), 2 x analog input, 1 x analog output, Other mains voltages: 1 x 110 V; 1x 230 V; 3 x 230 V; 3 x 600 V, Light duty variants available up to 132 kW (180 HP) to safe costs.
Commissioning/ diagnostics	Keypad → Parameterization and diagnostics of the frequency drive EASY Starter PC Tool → Free of charge engineering & parameterization tool with power-free USB interface Lenze Keypad App → Userfriendly diagnostics and parameterization with optional wifi module
Functional safety	Option Safety Torque OFF: STO (SIL 3 / PL “e” Cat. 4)

CANopen

EtherCAT

EtherNet/IP

IO-Link

Modbus

PROFINET

PROFIBUS

ETHERNET POWERLINK

Lenze
engineered to win

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