LIFT TECHNOLOGY

AUTOMATION AND DRIVE SOLUTIONS

EN

HIGHLIGHTS

- Power range: 0.75 kW ... 450 kW – 400 / 480 V and 0.75 kW ... 45 kW – 200 V
- Compact design
- Flexible motor operation: for asynchronous/synchronous motors, with or without gearbox
- Encoderless control for asynchronous/synchronous motors
- Overload capacity – over 200 % for demanding loads
- High switching frequency – up to 16 kHz for quiet, low-vibration operation

SYSTEM SOLUTIONS

INTELLIGENT DRIVE TECHNOLOGY FOR MODERN LIFT SYSTEMS

The requirements for modern lift systems are high: energy efficiency, ride comfort and seamless system integration are the focus. Powerful and intelligent drive solutions play a central role here – they determine the dynamics and precision of the movement, influence energy consumption and create the connection to building automation.

KEB Automation offers a comprehensive portfolio for this purpose: frequency inverters, regenerative systems, EMC filters and components for power quality assurance. Among other things, these technologies enable the precise control of synchronous and asynchronous motors. As a specialist in drive and automation technology, KEB develops and manufactures high-performance systems – from control systems to motor shafts. Flexible integration, long-lasting quality and compliance with standards make these solutions the first choice for demanding lift applications.

IIoT

IIoT & Edge-Platform

Analytics

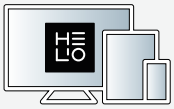
Monitoring

Management

Service

SOFTWARE

Visualisation

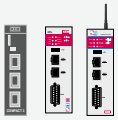


HMI

Engineering

Control Software

Remote Control

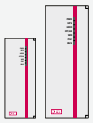


Router

CONTROL

Web HMI

Embedded Control



IPC

I/O

Safety PLC

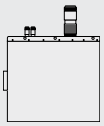
DRIVES

Inverter

Servo Drive

Drive Controller

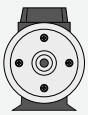
Pitch Drive



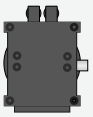
eMobility Drive

MOTORS

PM Motor



AC Motor



PM Gear Motor

AC Gear Motor

BRAKES & CLUTTCHES

Permanent Magnet Brake

Spring Applied Brake

Electromagnetic Brake

Electromagnetic Clutch

FREQUENCY INVERTERS IN LIFTS – THE HEART OF MODERN DRIVE ELECTRONICS

Frequency inverters are the central element in the electronic drive control of modern lift systems. They enable the speed and torque of the motor to be precisely regulated – regardless of load or lifting height – thus ensuring smooth, gentle and energy-efficient operation.

KEB offers the COMBIVERT F6 and S6 drive controllers for lift construction – enhanced with a special lift feature. A software package designed for lift operation ensures maximum safety and allows you to benefit from additional functionalities. F6 and S6 combine maximum control quality, robust design and maximum flexibility – all in a compact space.

Thanks to their compact design, the drives can be easily integrated even in limited space. The device series together cover a wide power range from 0.75 kW to 450 kW and are suitable for both gearless and geared motors – regardless of whether they are synchronous or asynchronous machines. Encoderless operation is also possible, which gives the user additional freedom in system design.

For particularly demanding driving situations, the F6 and S6 Lift drives offer high overload capacities up to 250 %. At the same time, it allows a switching frequency of up to 16 kHz, enabling extremely low-noise and low-vibration operation – ideal for applications with increased comfort requirements. Intelligent power adjustment ensures that the drive functions reliably at all times.

Functional safety
STO (Safe Torque Off)
SBC (Safe Brake Control)

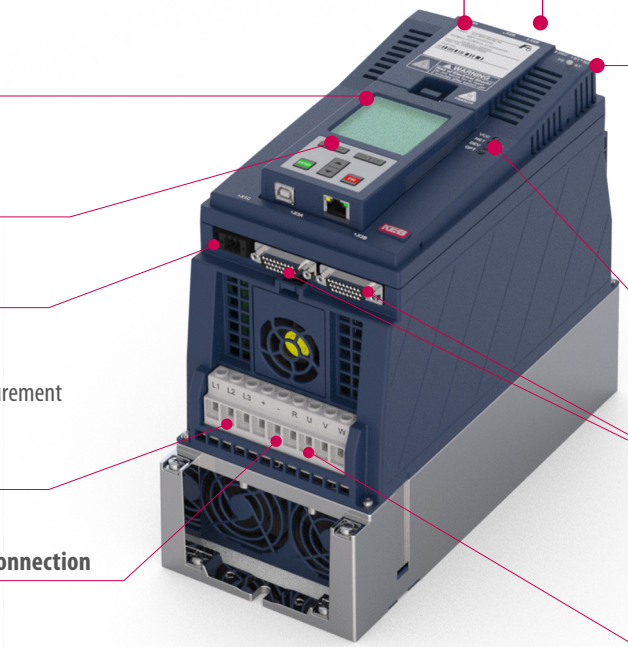
LCD display
Display, USB, Ethernet

Diagnostic interface

Drive monitoring
Brake control 24 V / 2A
Brake monitoring
Motor temperature measurement

Mains connection

Braking resistor + DC connection



Interfaces
CANopen, Ethernet,
serial RS-232/485

I/O
8 digital inputs
2 digital outputs
1 relay
2 analog inputs
1 analog output
24 V DC power supply

Status LEDs

Multi-encoder interfaces
SinCos, EnDAT, BiSS, SSI,
HIPERFACE, Resolver,
Incremental HTL/TTL
Incremental output

Motor connection

Control:
Bus: CANopen Lift (CiA 417),
DCP 3 +4, KEB Lift Protocol, DIN 66019, Ethernet TCP/IP
Terminals: digitally input-coded, binary-coded, analog 0-10 V

Certified according to:
UL, CE, UKCA, FS EN81-20/50, ASME A17.1/CSA B44

HIGHLIGHTS

- Automatic inertia determination for the entire system
- Point arch travel for shortened travel distances
- Travel counter and direction change counter
- Emergency travel programs in the event of earthquakes, evacuations, etc.
- Lift operator
- Universal control via CANopen Lift, DCP, serial, Ethernet, digital parallel, analog and more
- Event and error logs with time stamp
- Automatic calibration of motor data
- Synthetic pre-torque
- Brake chopper monitoring with safe shutdown
- Encoderless emergency operation of synchronous motors
- Adaptive speed profile with limited mains power

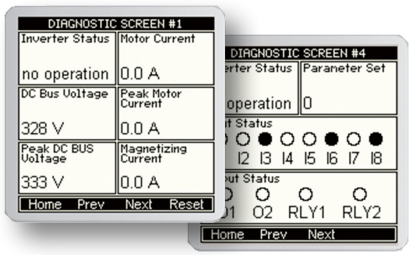
HIGHLIGHTS

- STO for operation without motor starters
- Motor and encoder identification with brake closed
- Connection for brake monitoring microswitch
- Motor protection switch, configurable in the software
- Motor test before each run for short circuit, earth fault, wire break, etc.
- UPS operation
- Overspeed monitoring
- Speed deviation monitoring
- Motor blockage monitoring
- Unintentional movement, standstill monitoring, emergency functions such as UPS evacuation, earthquake, evacuation, ...
- Trip counter, counter for change of direction (belt change)
- Earth fault monitoring
- Storage space for OEM-specific parameterisation
- Easy commissioning thanks to guided parameterisation

CONTROL WITH LIFT-OPERATOR

- Intuitive operation
- Lift terminology, 7 languages
- Choice of metric or imperial units
- USB and Ethernet interfaces
- Detailed diagnostics and data logging
- 5-level parameter password protection
- Custom parameter library available
- Memory space and real-time clock
- Detailed diagnostics
- Also suitable as a remote display

Optional LCD display especially for the lift application



Graphic displays for quick diagnosis

COMBIVIS DRIVE SOFTWARE

Our integrated software products support you in various areas of the process chain, from planning to commissioning, diagnostics and trouble-shooting. They simplify operation and offer great flexibility in adapting your drives to reduce time and costs.

Scope function: Multi-channel digital oscilloscope for recording and displaying measured variables. Ideal for fine-tuning the lift.

For easy parameterisation and management of your parameter lists.

6

DRIVE SOLUTIONS WITH **INTEGRATED FUNCTIONAL SAFETY**

Safety is non-negotiable in lift construction. Drive systems must not only function reliably, but also actively contribute to the safety of people and machines. The functional safety of frequency inverters – in particular the integration of safe shutdown and monitoring functions – is an essential component of this.

NORMATIVE REQUIREMENTS

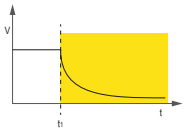
Lifts are subject to clearly defined safety standards, including:

- • EN 81-20 / EN 81-50 (safety requirements for passenger lifts)
- • EN ISO 13849 and IEC 61508 / IEC 61800-5-2

These standards require a risk-based approach and often compliance with specific safety functions at a specified performance level (PL) or safety integrity level (SIL).

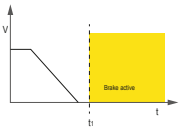
INTEGRATED SAFETY FUNCTIONS DIRECTLY IN THE DRIVE

Modern frequency inverters from KEB offer safety-related functions directly in the device – without separate safety relays or external hardware:



STO (SAFE TORQUE OFF)

For operation without motor starters. The two-channel STO signal ensures safe shutdown of the motor torque. PL e / SIL3 certified. Direct connection of the motor offers many advantages. In addition to cost reduction through less material and wiring, there is also less EMC radiation. Sources of error are also reduced.



UCM (UNINTENDED CAR MOVEMENT)

The internal SBC function (Safe Brake Control) monitors the motor brakes. Designated inputs are available for connecting the brake monitoring contacts. This ensures that the requirements for unauthorised movement (UCM) of the drive are met.

ADDITIONAL FUNCTIONS FOR MONITORING THE DRIVE:

MOTOR PHASE CHECK

The cable and motor windings are measured before each journey. An error is displayed in the event of irregularities such as a short circuit, earth fault, wire break, etc.

EVACUATION WITH UPS

Various modes are available. For example, if the UPS is undersized, the lift can be operated in the light mode. Here, the converter checks where the cabin is moving and then travels in a controlled manner to the desired floor. There are separate speeds, ramps and torque limits for UPS operation.

EVACUATION WITH SYNCHRONOUS MOTORS WITHOUT ENCODERS

If the encoder fails, the inverter can simply be set to open loop. This allows the cabin to be moved electrically in order to evacuate people or to move the cabin for repairs.

ADDITIONAL FUNCTIONS THAT MAKE THE LIFT SAFER:

- Blockage monitoring
- Overspeed
- Speed deviation
- Torque limitation
- Trip counter
- Internal monitoring of the brake chopper
- Software motor protection switch
- Motor and inverter temperature monitoring
- Temperature-dependent switching frequency reduction
- Delay monitoring for shortened shafts
- Modes for evacuation and earthquakes

ADVANTAGES FOR LIFT MANUFACTURERS

- Reduced complexity and fewer external components
- Simplified safety verification
- Less downtime in the event of faults
- Future-proofing for modifications and upgrades

EFFICIENT ENERGY USE IN LIFT OPERATION – COMBIVERT R6

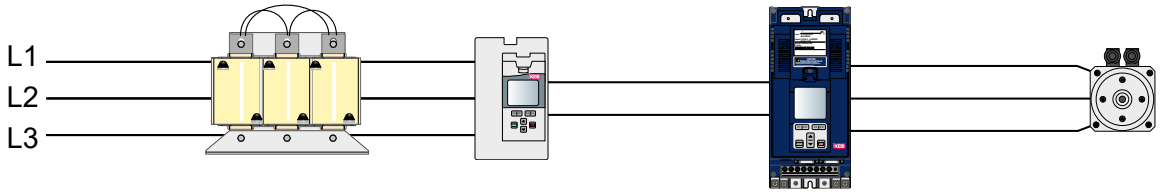
Nowadays, the energy consumption of a lift is not only a question of cost, but also a decisive factor in the efficiency rating of buildings. Regenerative drive systems offer a clear advantage here: instead of converting the energy generated during braking into heat via resistors, it is efficiently fed back into the building grid and utilised.

RECOVER ENERGY INSTEAD OF WASTING IT

The motor acts as a generator, particularly in driving situations such as travelling downwards with a loaded cabin or upwards with an empty cabin. The electrical energy generated in this process can be fed back into the grid using a suitable energy recovery module – cleanly, efficiently and economically.

POWER SUPPLY AND REGENERATIVE UNIT WITH SYSTEM ADVANTAGES

The COMBIVERT R6 from KEB is a compact and economical power supply and regenerative unit for the efficient use of braking energy. As a mains-powered power supply, the R6 enables a central DC supply for multiple drives – flexible and powerful, even under high continuous loads.
When combined with harmonic filters, the R6 unit improves power quality, reduces reactive power and meets current EMC requirements. It also replaces conventional braking resistors, which not only reduces heat generation in the machine room but also potential fire risks. The system can be scaled flexibly thanks to the option of operating multiple units in parallel.



Harmonic filter *Regenerative unit* *Drive Controller* *Motor*

ACCESSORIES: EMC FILTER SYSTEMS, MAINS CHOKES AND BRAKES

In an increasingly electrified and connected building environment, electromagnetic compatibility (EMC) is essential for the smooth operation of all systems. Frequency inverters, as power electronic components, can cause significant interference if they are not adequately suppressed – from data errors in control lines to failures in neighbouring systems. Lift systems are subject to standards such as EN 12015 (interference emission) and EN 12016 (interference immunity). These standards specify limit values to ensure that the lift itself operates without interference and does not cause interference in the electrical environment.

FOR INTERFERENCE-FREE AND STANDARD-COMPLIANT OPERATION

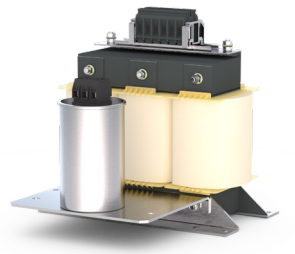
KEB offers matching EMC filter solutions and choke technology that are optimally harmonised with the company's own frequency inverters. Various components are used to ensure compliance with the relevant standards:

MAINS FILTER FOR LIMITING HIGH-FREQUENCY INTERFERENCE ON THE MAINS SIDE: EMC FILTER COMBILINE E6

- Very low leakage currents
- Perfectly suited for operation with modern RCDs
- Compact book-shaped design with small mounting surface, alternatively available as an sub-mounted filter
- High EMC attenuation, designed for shielded motor cable lengths of up to 100 m or 300 m

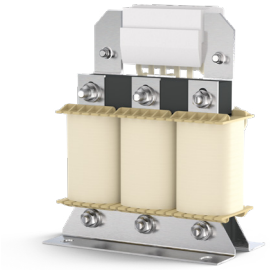
MAINS FILTER FOR SINUSOIDAL CURRENT CONSUMPTION:
HARMONIC FILTER COMBILINE Z1C

- Reduction of THDi to below 8 % and PWHD to below 15 % – for clean power quality
- High overload capacity up to 150 % and efficiency of over 99 %
- Compact, ready-to-connect design – no additional wiring required
- Suitable for multiple parallel loads and for use with dynamic load changes



MAINS CHOKES FOR SMOOTHING THE CURRENT FLOW AND REDUCING THE THDI VALUE (TOTAL HARMONIC DISTORTION):
COMBILINE Z1 MAINS CHOKE

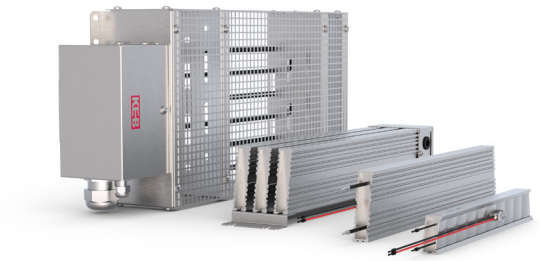
- Universally applicable mains chokes for single-phase and three-phase consumers
- Space-saving rear panel installation with EMC filter wires possible
- Relief for cables and transformers, mains harmonic optimisation
- Protection and longer service life for rectifiers and electrolytic capacitors



BRAKING RESISTORS

KEB offers a wide range of braking resistors suitable for use in hoists for your specific application.

- Braking resistors in aluminium housings for the lower power range
- Braking resistors in steel tube housings for the upper power range
- Intrinsically safe versions and versions with integrated temperature switches available
- Low noise emissions



PRECISE POSITIONING, SECURE HOLDING:
COMBINORM AND COMBISTOP BRAKES

- Ideal for use in the mechanisms of revolving doors or escalators
- Various sizes with short switching times available
- Designed for 100 % duty cycle
- Spring-applied brakes for HomeLift, small goods lifts and stair lifts in the portfolio
- Double brakes available

BENEFITS FOR THE USER

Targeted filtering and choking enable manufacturers and operators to benefit from:

- Safe, standard-compliant operation
- Minimised susceptibility to interference from other building systems
- Increased service life of all electronic components
- Simplified certification of the entire system

Greater efficiency, safety and flexibility for your lift system

– individually implemented in accordance with standards using modular drive technology from KEB.

GOODS LIFTS

For transporting heavy or bulky goods, such as in warehouses, industrial plants or department stores.

- COMBIVERT F6/R6: For high outputs up to 450 kW and flexible energy recovery solutions
- Connection to common industrial fieldbus systems such as EtherCAT, PROFINET or CANopen
- Robust industrial technology
- High input voltage

SERVICE LIFTS

Specially designed for smaller transport goods or service items, often used in hotels, restaurants or libraries.

- COMBIVERT S6: Compact, space-saving solution for smaller transport capacities
- Power supply for 24 V motor brake in the converter
- COMBIVERT G6: Compact open-loop converter with built-in filter and display

PASSENGER LIFTS

For the safe and comfortable transport of people in residential, office or public buildings.

- COMBIVERT F6/R6: For precise and energy-saving applications
- Low noise thanks to switching frequencies up to 16 kHz
- Synthetic Pre-Torque: Builds up a defined torque before releasing the brake – for smooth starts and maximum ride comfort
- Quiet braking resistors
- Evacuation functions

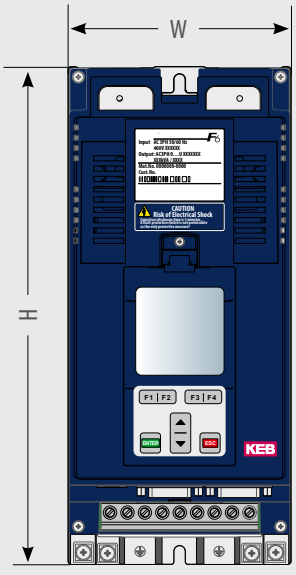
MACHINE ROOM-LESS LIFTS

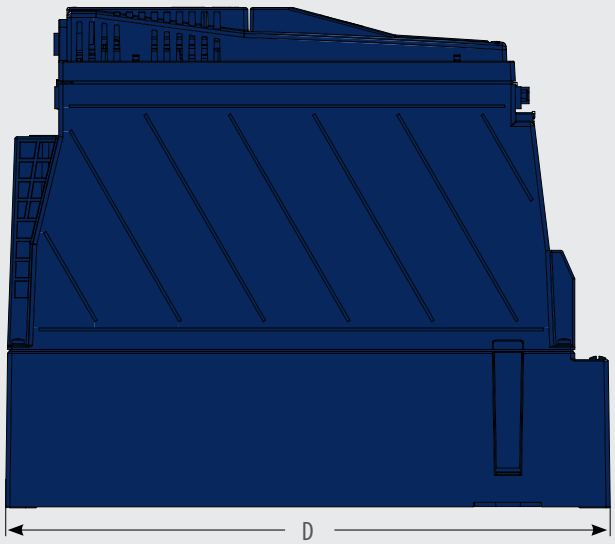
- Compact design for installation in the shaft or door frame
- Models with integrated EMC filter and pluggable terminals with touch protection
- Connection for remote display
- Various cooling solutions available
- 3C3 protective coating for circuit boards
- Quiet operation thanks to high switching frequency

COMBIVERT F6 LIFT

HOUSING		2			3	4		6		8	9
Device size		14	15	16	17	18	19	21	22	26	29
Typical rated motor power	[kW]	7.5	11	15	18.5	22	30	45	55	132	250
Rated output power	[kVA]	11.4	16.6	22.9	29	35	42	62	80	173	319
Rated output current 400 V	[A]	16.5	24	33	42	50	60	90	115	250	460
Rated output current 480 V (UL)	[A]	14	21	27	31,5	40	54	72	96	210	400
Rated output overload (60 s)	[%]	180	180	150	150	160	200	160	175	170	175
	[A]	29.7	43.2	49.5	63	80	120	144	201	425	805
Software current limit	[%]	200	200	190	180	200	250	200	225	227	216
	[A]	33	48	53.7	75.6	100	150	180	258	568	994
Cut-off current	[%]	240	240	230	216	240	270	240	270	275	260
	[A]	39.6	57.6	75.9	90.72	120	162	216	310	688	1196
Rated input current 400 V	[A]	21	31	43	55	59	66	99	126	263	485
Rated input current 480 V (UL)	[A]	18	27	35	41	48	59	79	106	217	414
Min. / max. switching frequency	[kHz]	2 / 16	2 / 16	2 / 8	2 / 16	2 / 16	2 / 16	2 / 16	2 / 16	2 / 8	2 / 8
Mains phases		3									
Input voltage range (AC)	[V]	280 . . . 550									
Mains frequency	[Hz]	50 / 60 ± 2 %									
Brake chopper		internal									
Max. current brake chopper	[A]	21.5	33.6	46.7	76	93	105	140	182	380	600
Dimensions H x W x D	[mm]	290 x 130 x 240			340 x 170 x 261	375 x 224 x 272		525 x 249 x 272		860 x 336 x 360	960 x 503 x 360

Other inverter sizes available on request.

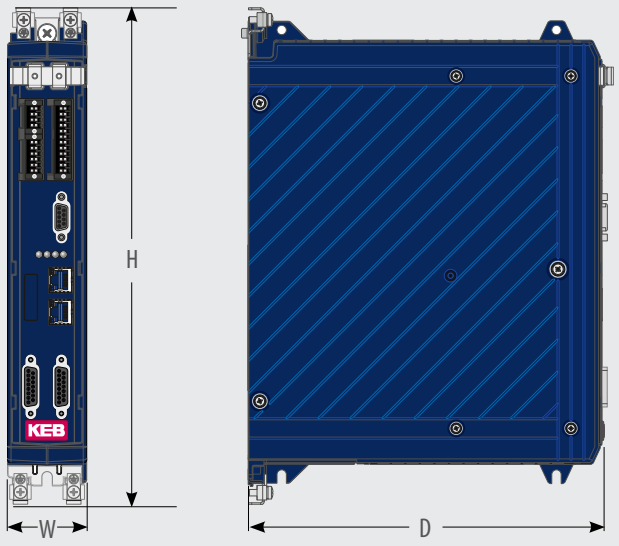




COMBIVERT S6 LIFT

HOUSING		2				4		
Device size		07	09	09	10	12	13	14
Typical rated motor power	[kW]	0.75	1.5	1.5	2,2	4	5.5	7.5
Rated output power*	[kVA]	1.8	2.8	2.8	4	6.6	8.3	11.4
Rated output current 400 V	[A]	4	7	4.1	5.8	9.5	12	16.5
Rated output overload (60 s)	[%]	150	150	200	200	200	200	150
	[A]	6	10.5	8.2	11.6	19	24	24.8
Overload (3 s)	[%]	200	200	250	250	250	250	180
	[A]	8	14	10.2	14.5	23.7	30	29.7
Cut-off current	[%]	240	240	300	300	300	300	216
	[A]	9.6	16.8	12.3	17.4	28.5	36	35.6
Rated input current	[A]	8	14	6	8	13	17	21
Min. / max. switching frequency	[kHz]	4 / 16	4 / 16	4 / 16	4 / 16	4 / 16	4 / 16	4 / 16
Mains phases		1		3				
Input voltage range (AC)	[V]	184 ... 265		184 ... 550				
Mains frequency	[Hz]	50 / 60 ± 2 %		50 / 60 ± 2 %				
Mains filter		internal		internal				external
Brake chopper		internal						
Max. current brake chopper	[A]	7.5	12.7	8	11	28	34	34
Dimensions H x W x D	[mm]	310 x 50 x 220		310 x 50 x 220		310 x 90 x 220		

**At nominal voltage 230 V / 400 V AC*



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