

# LIFT CONTROL SOLUTION



# GEFRAN

BEYOND TECHNOLOGY

Over fifty years of experience, an organisation highly focused on the customer's needs and constant technological innovation make Gefran a benchmark in the design and production of sensors and components for industrial process automation and control.

Expertise, flexibility and process quality are the factors that distinguish Gefran in the production of integrated tools and systems for specific applications in various industrial fields, with consolidated know-how in the plastics, mobile hydraulics, heating and lift sectors.

Technology, innovation and versatility represent the catalogue's added value in addition to the ability to create specific application solutions in association with the world's leading machine manufacturers.



# APPLICATIONS



HOME LIFT



LOW RISE



MEDIUM RISE



HIGH RISE

## LIFT CONTROL SOLUTION

With forty years of know-how and experience on the civil lift market, Gefran offers a range of dedicated products with technology that ensures **reliability, safety and comfort** plus regenerative solutions that provide maximum energy efficiency.

The modernisation of existing systems, new systems with and without a machine room, and applications with synchronous and asynchronous motors with and without a reducer, can all be handled in a determined and simple way with Gefran's drives. Flexible and complete, thanks to a vast range of dedicated options and accessories, the SIEIDrive - LIFT inverters represent the most rapid and immediate solution to every sector application requirement.

The thousands of functioning systems throughout the world are the best testimony to Gefran's expertise and the high quality of the product.

In addition to foreseeing the market's application needs, Gefran forms partnerships with its customers to find **the best way to optimise and boost the performance of various applications.**

Gefran products communicate with one another to provide integrated solutions, and can dialogue with devices by other companies thanks to compatibility with the most common communication protocols.



CANopen

DCP<sup>3</sup>

DCP<sup>4</sup>

Modbus

# ADL300 • DESCRIPTION AND DIMENSIONS



The ADL300, designed for new installations and upgrades, is the ideal system for a wide range of applications, including very low rise (home lifts) or very high rise (skyscrapers).

Its software, developed for geared (including open loop) and gearless (closed loop) lifts with absolute or incremental encoder, guarantees maximum safety and control.

Precise landing at the floor, with both direct landing and creeping, and load compensation at start give passengers an extremely comfortable ride.

The ADL300's compact size and operation in contactor or contactorless mode make it perfect for Machine Room-Less (MRL) applications.

## SAFETY CERTIFICATION



Safety™ inputs for use with a single output contactor or in contactorless mode

### Single output contactor

The ADL300 is certified for the use of a single output contactor, in accordance with EN81-20, EN81-50.

### Safety Certification for a CONTACTORLESS operations

ADL300 is CERTIFIED as EN81-20, EN81-50; SIL3 according to EN61800-5-2:2007.

## WEIGHTS AND DIMENSIONS

| Sizes ADL300 | Dimensions: Width x Height x Depth |                       | Weight |       |
|--------------|------------------------------------|-----------------------|--------|-------|
|              | mm                                 | inches                | kg     | lbs   |
| ADL300-1...  | 162 x 343 x 159                    | 6,38 x 13,50 x 6,26   | 5,8    | 12,8  |
| ADL300-2...  | 162 x 396 x 159                    | 6,38 x 15,59 x 6,26   | 7,8    | 17,2  |
| ADL300-3...  | 235 x 401 x 179,4                  | 9,25 x 15,79 x 7,06   | 10,5   | 23,5  |
| ADL300-4...  | 267.6 x 616 x 276                  | 10,53 x 24,25 x 10,87 | 32     | 70,6  |
| ADL300-5...  | 311 x 767 x 331.4                  | 12 x 30,2 x 13,05     | 60     | 132,3 |

## GUIDE TO CHOICE OF MODEL

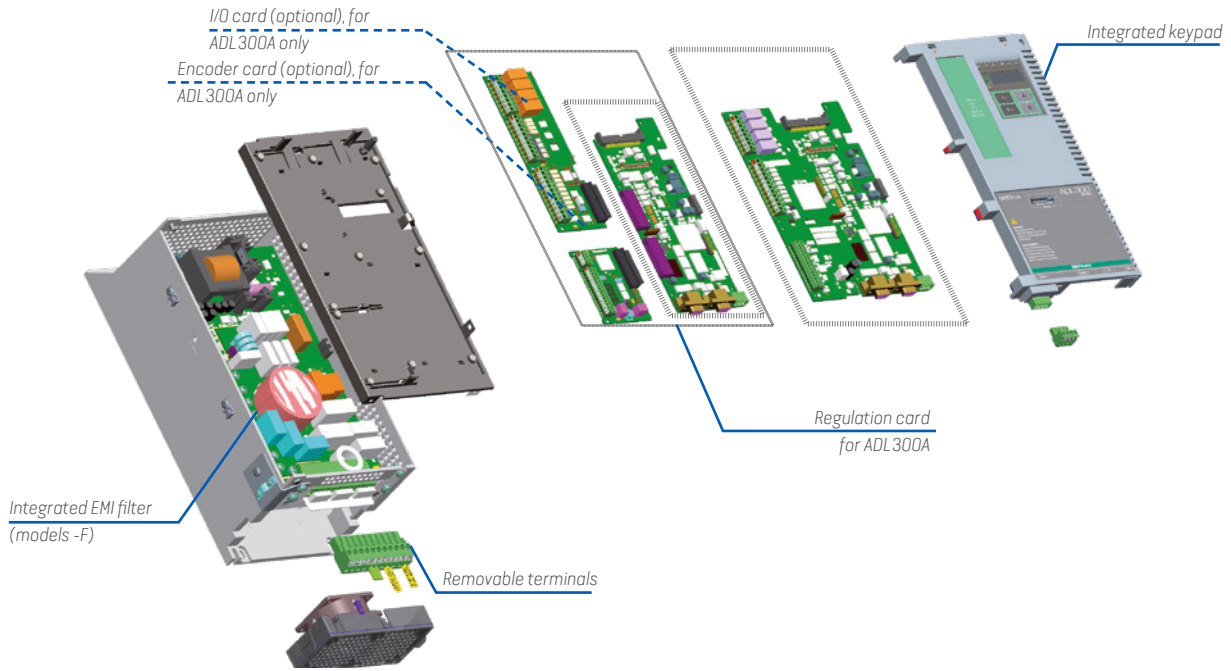
The ADL300 is available in two configurations:

### ADL300A (Advanced)

It is supplied as standard with no I/O or feedback cards, leaving the customer free to perform the appropriate configuration, choosing from an extensive range of options.

### ADL300B (Basic)

The standard configuration is showed in the table.



| Models             | ADL300A (Advanced)  | ADL300B (Basic)   |
|--------------------|---|---|
| I/O                | <p><b>Optional Expansion cards</b></p> <ul style="list-style-type: none"> <li>&gt; EXP-IO-D4-ADL : 2 2 digital inputs - 2 digital outputs + enable input;</li> <li>&gt; EXP-IO-D5R3-F-ADL : 5 digital inputs - 3 relays (NB: The terminals of this card are not extractable);</li> <li>&gt; EXP-IO-D6A4R2-F-ADL: 6 Digital inputs + 2 analog outputs + 2 analog inputs + 2 relay outputs;</li> <li>&gt; EXP-IO-D8R4-ADL : 8 digital inputs - 4 relays + enable input;</li> <li>&gt; EXP-IO-D8A4R4-ADL : 8 digital inputs- 4 digital outputs - 2 analog inputs + 4 relays outputs + enable input;</li> <li>&gt; EXP-IO-D12A2R4-ADL : 8 digital inputs- 4 digital outputs - 2 analog inputs - 4 relays outputs + enable input;</li> <li>&gt; EXP-IO-D16R4-ADL : 12 digital inputs - 4 digital outputs - 4 relays outputs + enable input.</li> </ul> | <ul style="list-style-type: none"> <li>&gt; 8 Digital inputs (NPN/PNP) + 1 Digital inputs (Enable) + 4 Relay outputs;</li> <li>&gt; 8 Digital inputs (NPN/PNP) + 1 Digital inputs (Enable) + 2 analog inputs + 4 Relay outputs (ADL300B-...-AD1).</li> </ul>  |
| Encoder management | <p><b>Optional Expansion cards</b></p> <ul style="list-style-type: none"> <li>&gt; EXP-DE-11R1F2-ADL : Digital encoder 3 Channels card + Repeat + 2 Freeze;</li> <li>&gt; EXP-EN/SSI-11R1F2-ADL : Sinusoidal encoder card - Absolute EnDat + Repeat + 2 Freeze;</li> <li>&gt; EXP-HIP-11R1F2-ADL : Hiperface encoder 3 Channels card + Repeat + 2 Freeze;</li> <li>&gt; EXP-SE-11R1F2-ADL : Sinusoidal encoder 3 Channels card + Repeat + 2 Freeze;</li> <li>&gt; EXP-SESC-11R1F2-ADL: Sinusoidal SinCos encoder 3 Channels card + Repeat + 2 Freeze;</li> <li>&gt; EXP-SESC-11R1-V-ADL: Sinusoidal SinCos encoder 3 Channels card + Repeat (VGA connector).</li> </ul>   | <ul style="list-style-type: none"> <li>&gt; Inputs for 5 Vdc TTL incremental digital encoder and absolute SinCos or Endat / SSI encoder (ADL300B - ... -ED);</li> <li>&gt; Inputs for 5 Vdc TTL incremental digital encoder and absolute SinCos encoder, with VGA 15 pin connector, without freeze (ADL300B-...-AD1);</li> <li>&gt; +24V IN/OUT on request (ADL300B - ... -24).</li> <li>&gt; Encoder with repetition (ADL300B - ... -ER).</li> </ul> |

# GENERAL CHARACTERISTICS

## UNIVERSAL MECHANICAL STRUCTURE

The extremely compact ADL300 reduces the size of conventional lift systems and it is suitable for installation in roomless systems.

**ADL300B**, integrates as standard:

- 8 programmable digital inputs NPN/PNP + an Enable input
- 4 single-contact programmable relay outputs

**ADL300A**, optional cards on request:

| Card                | Description  |
|---------------------|--|
| EXP-IO-D4-ADL       | 1DI (Enable) + 2 (Prog.DI) + 2 (RO)                    |
| EXP-IO-DSR3-F-ADL   | 1DI (Enable) + 5 (Prog.DI) + 3 (RO)                    |
| EXP-IO-DGA4R2-F-ADL | 1DI (Enable) + 6 (Prog.DI) + 2 (AI) + 2 (AO) + 2 (RO)  |
| EXP-IO-D8R4-ADL     | 1DI (Enable) + 8 (Prog. DI) + 4 (RO)                   |
| EXP-IO-D8A4R4-ADL   | 1DI (Enable) + 8 (Prog. DI) + 2 (AI) + 2 (AO) + 4 (RO) |
| EXP-IO-D12A2R4-ADL  | 1DI (Enable) + 8 (Prog. DI) + 4 (DO) + 2 (AI) + 4 (RO) |
| EXP-IO-D16R4-ADL    | 1DI (Enable) + 12 (Prog. DI) + 4 (DO) + 4 (RO)         |

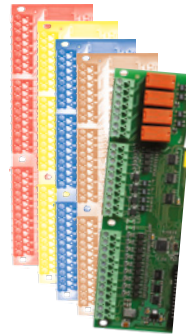
**ADL300B**, integrates as standard:

- Input for 5 Vdc TTL incremental digital encoder
- Input for absolute SinCos or Endat / SSI encoder (version -ED)

**ADL300A**, optional cards on request:

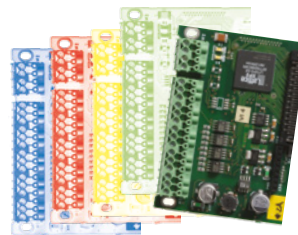
| Card                  | Description   |
|-----------------------|---|
| EXP-DE-I1R1F2-ADL     | Digital encoder 3 Channels card + Repeat + 2 Freeze               |
| EXP-EN/SSI-I1R1F2-ADL | Sinusoidal encoder card - Absolute EnDat + Repeat + 2 Freeze      |
| EXP-HIP-I1R1F2-ADL    | Hiperface encoder 3 Channels card + Repeat + 2 Freeze             |
| EXP-SE-I1R1F2-ADL     | Sinusoidal encoder 3 Channels card + Repeat + 2 Freeze            |
| EXP-SESC-I1R1F2-ADL   | Sinusoidal SinCos encoder 3 Channels card + Repeat + 2 Freeze     |
| EXP-SESC-I1R1-V-ADL   | Sinusoidal SinCos encoder 3 Channels card+ Repeat (VGAconnectors) |

## I/O MANAGEMENT



## ENCODER MANAGEMENT

The ADL300 interfaces with all the main feedback devices:

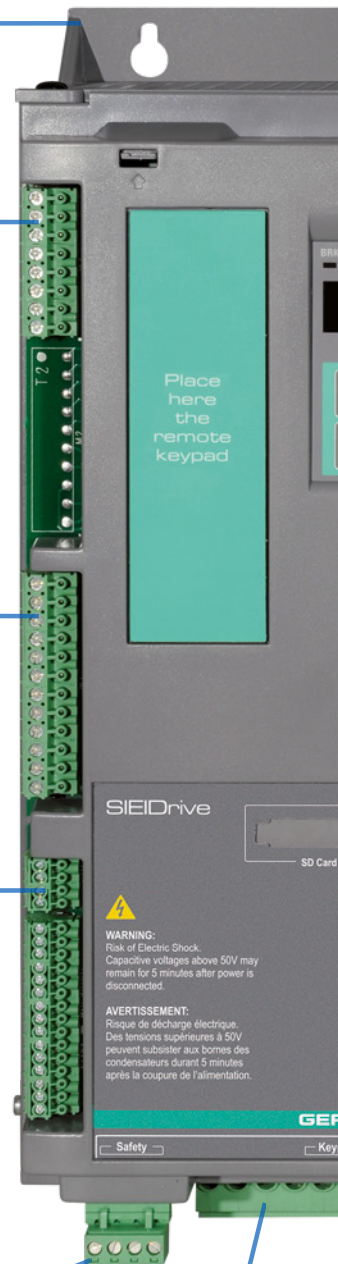


## "SAFETY" INPUTS

for use with a single output contactor or in contactorless mode.

## BACK-UP POWER SUPPLY

The ADL300 guarantees operation even in the event of a power failure. It features an automatic return-to-floor function managed by an external device such as UPS or buffer battery via a singlephase 230V AC power supply (with EMS module).



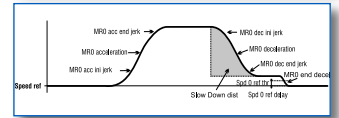
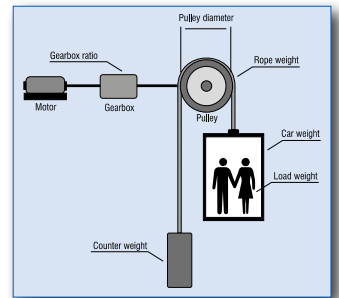
# ADL300 LIFT-FIELD-ORIENTED VECTOR INVERTER



## LIFT CONTROL SYSTEM

Basic and advanced lift functions are incorporated in a single product, to ensure maximum comfort for all systems at all times:

- Speed control: EFC (Elevator Floor Control) function: separate function for independent management of short floors, landing zone, re-starting with lift not at floor and automatic deceleration point calculation.
- Position control: EPC (Elevator Positioning Control) function: separate function for independent management of direct arrival at the floor with internal position regulator and saving of floor distances (system autotuning).
- Lift sequence: Typical sequence of input/output signals used in civil lift engineering applications such as I/O management, braking, output contactor and door control.
- Parameters in linear unit: Possibility of selecting different engineering units (also with values for the US) for the main movement parameters, rpm (fpm) or m/s for speed, m/s<sup>2</sup>, m/s<sup>3</sup> for cabin acceleration.
- Lift mechanical parameters: Mechanical system parameters such as pulley diameter and speed ratio for converting system units and weights, system for calculating inertia and speed regulation for the desired response.
- Ramp generation: Independent configuration of acceleration and deceleration ramp parameters and of the 4 jerk values for maximum travelling comfort in the lift cabin. Two independent S-shaped ramps, selectable via digital input with 4 independent jerk settings. Dedicated deceleration ramp corresponding to the stop command.



## INTEGRATED KEYPAD

The integrated programming keypad allows fast programming and immediate start-up.

- 1-line x 4-character alphanumeric LED display with sign
- Simple parameter modification
- Menu and individual parameters displayed in numerical format
- Fast navigation keys
- Alarms / messages and startup wizard displayed in text format
- Resetting of alarms from keypad.

## SD CARD PORT

The SD memory card makes saving and loading data and configurations with the ADL300 very simple.



Special adapter required  
KIT KEY SD-CARD, cod. S72644.

## FIELDBUSES

The ADL300 integrates the most advanced fieldbus technology used in the lift sector:

- DCP3 for use in EFC (Elevator Floor Control) mode
- DCP4 for use in EPC (Elevator Positioning Control) mode
- CANopen and CANopen Lift (CiA®417) for lift control systems.



## CONFIGURATION TECHNOLOGY

The ADL300 is fitted with RS232 serial communication with **Modbus RTU** protocol.

## OPTIONAL PROGRAMMING KEYPAD

The optional KB-ADL programming keypad featuring full display of parameters and variables in 5 languages makes the ADL300 extremely intuitive and easy to use.

It has a strip of magnetic material on the back so that it can be attached to the front of the drive or other metal surface (e.g. door of the electrical panel).

The keypad can be used remotely from distances of up to 15 m. A 70 cm-long connection cable is supplied as standard.

Up to 5 sets of parameters can be saved using the KB-ADL keypad and sent to other drives.



- 5 line x 21 character display
- Alphanumeric plaintext
- Complete information regarding each parameter
- Fast navigation keys
- Key for displaying the last 10 parameters that have been changed
- DISP key for rapid display of operating parameters
- Uploading-Downloading and saving of 5 complete sets of drive parameters

# GENERAL CHARACTERISTICS

| MODEL                                | ADL300-2T  | ADL300-2M   | ADL300-4  |
|--------------------------------------|--|---|---|
| Control mode                         | Field Oriented Control   | Field Oriented Control  | Field Oriented Control  |
| Power                                | 5.5 ... 37kW   | 1.1 ... 5.5kW   | 4 ... 75kW  |
| Voltage                              | 3 x 200-230Vac, ±10%<br>50/60Hz  | 1 x 200 Vac, ±10%<br>1 x 230 Vac, -15%+10%<br>50/60Hz   | 3 x 230-400-480Vac, -15%+10%,<br>50/60Hz  |
| Motor type                           | Asynchronous / Synchronous   | Asynchronous / Synchronous  | Asynchronous / Synchronous  |
| Speed control (Accuracy)             | ± 0.01% Motor rated speed (1)  | ± 0.01% Motor rated speed (1)   | ± 0.01% Motor rated speed (1)   |
| Analog inputs                        | ADL300B: 0; ADL300A: upon request  | ADL300B: 0; ADL300A: upon request   | ADL300B: 0; ADL300A: upon request   |
| Analog outputs                       | ADL300B: 0; ADL300A: upon request  | ADL300B: 0; ADL300A: upon request   | ADL300B: 0; ADL300A: upon request   |
| Digital inputs                       | ADL300B: 8 + 1 enable<br>ADL300A: upon request   | ADL300B: 8 + 1 enable<br>ADL300A: upon request  | ADL300B: 8 + 1 enable<br>ADL300A: upon request  |
| Digital outputs                      | ADL300B : 4 (relay)<br>ADL300A: upon request   | ADL300B : 4 (relay)<br>ADL300A: upon request  | ADL300B : 4 (relay)<br>ADL300A: upon request  |
| Overload                             | up to 200% In * 10" (up to 11kW)<br>up to 180% In * 10" (≥ 15kW)   | up to 200% In * 3"  | up to 200% In * 10" (up to 22kW)<br>up to 180% In * 10" (≥ 30kW)  |
| Max output frequency                 | 300Hz  | 300Hz   | 300Hz   |
| EMI filter                           | Integrated (ADL300.-F models)<br>(EN 12015; EN 61800-3)  | Optional external<br>(EN 12015; EN 61800-3)   | Integrated (ADL300.-F models)<br>(EN 12015; EN 61800-3)   |
| Choke                                | DC side choke: no<br>AC side choke: external optional  | no  | DC side choke: integrated (sizes ≥ 4300),<br>external optional on lower sizes<br>AC side choke: external optional |
| Braking unit                         | Integrated up to 30kW with external resistor   | Integrated with external resistor   | Integrated up to 55kW with external resistor  |
| Port for SD card                     | yes  |   |   |
| Dimensions for roomless applications | yes  |   |   |
| Emergency operation                  | Optional (UPS or buffer battery with EMS module)   |   |   |
| Max system speed                     | 4.0 m/s  | 1.0 m/s   | 4.0 m/s   |
| Type of lift                         | Geared / Gearless  |   |   |
| Installations                        | New installation & Retrofitting  |   |   |
| Functions                            | <ul style="list-style-type: none"> <li>Speed control</li> <li>Position control with direct landing at floor (EPC Elevator Positioning Control)</li> <li>Automatic calculation of deceleration point</li> <li>Short floor management</li> <li>Off-floor stop detection</li> <li>Lift sequence management</li> <li>Ramp generation</li> <li>Management of up to 8 Multispeeds</li> <li>Load compensation</li> <li>DCP3/DCP4 protocol communication</li> <li>CANopen communication</li> </ul> | <ul style="list-style-type: none"> <li>CANopen -Lift (Cia® 417) communication</li> <li>Configuration via keypad with LEDs</li> <li>Configuration via optional keypad (5 languages)</li> <li>Configuration via PC (GF_express)</li> <li>Wizard for commissioning</li> <li>Menu for setting electrical and mechanical parameters</li> <li>Programming with linear engineering units</li> <li>DC power supply or emergency single-phase power supply to return to floor with optimized consumption</li> <li>External +24VDC power supply</li> <li>Regenerative configuration with AFE200 external modules</li> </ul> |   |
| Serial communication                 | RS232 (2), Modbus RTU, DCP3, DCP4 and CAN  |   |   |
| Protection class                     | IP20   |   |   |
| Safety Certification                 | <ul style="list-style-type: none"> <li>Safety Certification for a CONTACTORLESS operations: ADL300 is CERTIFIED as EN81-20, EN81-50; SIL3 according to EN61800-5-2-2007.</li> <li>The ADL300 is certified for the use of a single output contactor, in accordance with EN81-20, EN81-50.</li> <li>Monitoring function of the correct lifting or dropping of the machine brake according to 5.6.7.3 of EN 81-20:2014 and 5.8 of EN 81-50:2014.</li> </ul>                                   |   |   |
| Immunity / Emissions                 | In compliance with EN 12015 electromagnetic compatibility directive, using internal filter (ADL300-...-2M series with optional external filter)  |   |   |
| Operating temperature                | -10...45°C (32°...113°F), +45°C...+50°C (+113 ... +122°F) with derating  |   |   |
| Altitude                             | Max 2000 m. (up to 1000 m without derating)  |   |   |
| Markings                             | CE <sup>(4)</sup> , cULus (UL508C) <sup>(3)</sup>  |   |   |

(1) For standard 4-pole motors

(2) The serial port is used for programming (PC) and control (Modbus communication standard in all drives)

(3) ADL300-2M series is not cULus approved.

(4) Complies with the EC Directive concerning low voltage equipment (Directives LVD 2014/35/EU, EMC 2014/30/EU, Lift 2014/33/EU, RoHS 2011/65/EU)



## CHOOSING THE INVERTER - INPUT DATA

| SIZES - ADL300-...-4   |           | 1040   | 1055 | 2075 | 2110 | 3150 | 3185 | 3220 | 4300 | 4370 | 4450 | 5550 | 5750 |     |
|--|-----------|--|------|------|------|------|------|------|------|------|------|------|------|-----|
| ULN · AC Input voltage   | VAC       | three-phase network 230 - 400 - 480 Vac -15%+10%                                   |      |      |      |      |      |      |      |      |      |      |      |     |
| FLN · Input frequency  | Hz        | 50/60 Hz, ± 5%   |      |      |      |      |      |      |      |      |      |      |      |     |
| Overvoltage threshold  | VDC       | 820 Vdc  |      |      |      |      |      |      |      |      |      |      |      |     |
| Undervoltage threshold   | VDC       | 225 Vdc (@ 230 VAC); 391 Vdc (@ 400 VAC); 450 Vdc (@ 460 VAC); 470 Vdc (@ 480 VAC) |      |      |      |      |      |      |      |      |      |      |      |     |
| DC-Link Capacity   | µF        | 470  | 680  | 680  | 1020 | 1500 | 2250 | 2700 | 2350 | 2350 | 2800 | 4700 | 5600 |     |
| IN · Effective input current (@ In out)                                |           |  |      |      |      |      |      |      |      |      |      |      |      |     |
|  | @ 230 VAC | A  | 12   | 17   | 23   | 31   | 42   | 50   | 55   | 55   | 72   | 89   | 97   | 136 |
|  | @ 400 VAC | A  | 11   | 16   | 22   | 29   | 40   | 47   | 53   | 55   | 72   | 89   | 97   | 136 |
|  | @ 480 VAC | A  | 10   | 15   | 20   | 26   | 37   | 45   | 50   | 49   | 65   | 81   | 89   | 122 |
| THD @ I2n, with optional external choke (*)<br>(according to EN I2015) |           | < 35%  |      |      |      |      |      |      |      |      |      |      |      |     |
| No-load consumption (Energy rating):<br>Stand-by consumption "Fan Off" | W         | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 25   | 25   | 25   | 25   | 25   |     |

| SIZES - ADL300-...-2T  |               | 2055  | 3075 | 3110 | 4150 | 4185 | 4220 | 5300 | 5370 |      |
|--|---------------|---|------|------|------|------|------|------|------|------|
| ULN · AC Input voltage   | VAC           | three-phase network: 200 VAC ±10%, 230 VAC ±10% |      |      |      |      |      |      |      |      |
| FLN · Input frequency  | Hz            | 50/60 Hz, ± 2%                                  |      |      |      |      |      |      |      |      |
| Overvoltage threshold  | VDC           | 500 Vdc   |      |      |      |      |      |      |      |      |
| Undervoltage threshold   | VDC           | 196 Vdc (@ 200 VAC), 225 Vdc (@ 230 VAC),       |      |      |      |      |      |      |      |      |
| DC-Link Capacity   | µF            |   | 1020 | 1500 | 2700 | 2350 | 2350 | 2800 | 4700 | 5600 |
| IN · AC input current without choke                                    |               |   |      |      |      |      |      |      |      |      |
|  | @ 200-230 VAC | A   |      | 31   | 42   | 53   | 55   | 72   | 89   | 97   |
| THD @ I2n, with optional external choke (*)<br>(according to EN I2015) |               | < 35%   |      |      |      |      |      |      |      |      |
| No-load consumption (Energy rating):<br>Stand-by consumption "Fan Off" | W             |   | 20   | 20   | 20   | 20   | 20   | 20   | 25   | 25   |

| SIZES - ADL300-...-2M  |           | 1011   | 1015 | 2022 | 2030 | 3040 | 3055 |
|--|-----------|--|------|------|------|------|------|
| ULN · AC Input voltage   | VAC       | single-phase network: 1 x 200 -10%...+10%, 1 x 230 -15%...+10% |      |      |      |      |      |
| FLN · Input frequency  | Hz        | 50/60 Hz, ± 2%   |      |      |      |      |      |
| Overvoltage threshold  | VDC       | 410 Vdc  |      |      |      |      |      |
| Undervoltage threshold   | VDC       | 196 Vdc (@ 200 Vac); 225 Vdc (@ 230 VAC)                       |      |      |      |      |      |
| DC-Link Capacity   | µF        | 2200   | 2200 | 4050 | 4050 | 4950 | 4950 |
| IN · Effective input current (@ In out)                                |           |  |      |      |      |      |      |
|  | @ 230 Vac | A  | 16   | 18   | 24   | 31   | 35   |
| No-load consumption (Energy rating):<br>Stand-by consumption "Fan Off" | W         | 20   | 20   | 20   | 20   | 20   | 20   |

(\*) Sizes ≤22kW with DC input choke, sizes ≥30kW with AC input choke, for more information refer to Quick Startup manual.

# CHOOSING THE INVERTER - OUTPUT DATA

| SIZES - ADL300-...-4                                      |               |  | 1040 | 1055 | 2075 | 2110 | 3150 | 3185 | 3220   | 4300 | 4370 | 4450 | 5550 | 5750              |  |
|---|---------------|--|------|------|------|------|------|------|--|------|------|------|------|-------------------|--|
| <b>IN • Rated output current</b> (fsw = default)          |               |  |      |      |      |      |      |      |  |      |      |      |      |                   |  |
|   | @ ULN=230 VAC | A  | 9    | 13.5 | 18.5 | 24.5 | 32   | 39   | 45   | 60   | 75   | 90   | 105  | 150               |  |
|   | @ ULN=400 VAC | A  | 9    | 13.5 | 18.5 | 24.5 | 32   | 39   | 45   | 60   | 75   | 90   | 105  | 150               |  |
|   | @ ULN=460 VAC | A  | 8.1  | 12.2 | 16.7 | 22   | 28.8 | 35.1 | 40.5   | 54   | 67.5 | 81   | 94   | 135               |  |
| <b>PN mot</b><br>(Recommended motor power, fsw = default) |               |  |      |      |      |      |      |      |  |      |      |      |      |                   |  |
|   | @ ULN=230 VAC | kW   | 2    | 3    | 4    | 5.5  | 7.5  | 9    | 11   | 15   | 18.5 | 22   | 30   | 37                |  |
|   | @ ULN=400 VAC | kW   | 4    | 5.5  | 7.5  | 11   | 15   | 18.5 | 22   | 30   | 37   | 45   | 55   | 75                |  |
|   | @ ULN=460 VAC | Hp   | 5    | 7.5  | 10   | 15   | 20   | 25   | 30   | 40   | 50   | 60   | 75   | 100               |  |
| <b>Reduction factor *</b>                                 |               |  |      |      |      |      |      |      |  |      |      |      |      |                   |  |
|   | Kv (1)        |  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95   | 0.95 | 0.95 | 0.95 | 0.95 | 0.95              |  |
|   | KT (2)        |  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95   | 0.95 | 0.95 | 0.95 | 0.95 | 0.95              |  |
|   | KALT (3)      |  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2               |  |
| <b>Overload</b>   |               | 200% * 10 sec with output frequency more than 3 Hz<br>150% * 10 sec with output frequency less than 3 Hz |      |      |      |      |      |      | 180% * 10 sec with output frequency more than 3 Hz<br>150% * 10 sec with output frequency less than 3 Hz |      |      |      |      |                   |  |
| <b>Maximum Switching frequency</b>                        | kHz           | 10   |      |      |      |      |      |      |  |      |      |      |      |                   |  |
| <b>U2 • Maximum output voltage</b>                        |               | 0.98 x ULN (ULN = AC input voltage)  |      |      |      |      |      |      |  |      |      |      |      |                   |  |
| <b>f2 • Maximum output frequency</b>                      | Hz            | 300  |      |      |      |      |      |      |  |      |      |      |      |                   |  |
| <b>IGBT braking unit</b>                                  |               | Standard internal (requires external resistor); braking torque 150% MAX                                  |      |      |      |      |      |      |  |      |      |      |      | Optional External |  |

| SIZES - ADL300-...-2T                                     |                                   |  | 2055 | 3075 | 3110 | 4150   | 4185 | 4220 | 5300 | 5370              |  |
|---|-----------------------------------|--|------|------|------|--|------|------|------|-------------------|--|
| <b>IN • Rated output current</b> (fsw = default)          |                                   |  |      |      |      |  |      |      |      |                   |  |
|   | @ ULN=200-230 VAC                 | A  | 24.5 | 32   | 45   | 60   | 75   | 90   | 105  | 150               |  |
|   | Inverter output @ ULN=200-230 VAC | kVA  | 9.8  | 12.8 | 17.9 | 23.9   | 29.9 | 35.8 | 41.8 | 59.8              |  |
| <b>PN mot</b><br>(Recommended motor power, fsw = default) |                                   |  |      |      |      |  |      |      |      |                   |  |
|   | @ ULN=200-230 VAC                 | kW   | 5.5  | 7.5  | 11   | 15   | 18.5 | 22   | 30   | 37                |  |
|   | @ ULN=200-230 VAC                 | Hp   | 7.5  | 10   | 15   | 20   | 25   | 30   | 40   | 50                |  |
| <b>Reduction factor *</b>                                 |                                   |  |      |      |      |  |      |      |      |                   |  |
|   | KT (1)                            |  | 0.95 | 0.95 | 0.95 | 0.95   | 0.95 | 0.95 | 0.95 | 0.95              |  |
|   | KALT (3)                          |  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2  | 1.2               |  |
| <b>Overload</b>   |                                   | 200% * 10 sec with output frequency more than 3 Hz<br>150% * 10 sec with output frequency less than 3 Hz |      |      |      | 180% * 10 sec with output frequency more than 3 Hz<br>150% * 10 sec with output frequency less than 3 Hz |      |      |      |                   |  |
| <b>Maximum Switching frequency</b>                        | kHz                               | 10   |      |      |      |  |      |      |      |                   |  |
| <b>U2 • Maximum output voltage</b>                        |                                   | 0.98 x ULN (ULN = AC input voltage)  |      |      |      |  |      |      |      |                   |  |
| <b>f2 • Maximum output frequency</b>                      | Hz                                | 300  |      |      |      |  |      |      |      |                   |  |
| <b>IGBT braking unit</b>                                  |                                   | Standard internal (requires external resistor); braking torque 150% MAX                                  |      |      |      |  |      |      |      | Optional External |  |

\* The derating factors shown in the table below are applied to the rated DC output by the user. They are not automatically implemented by the drive: Idrive = IN x KALT x KT x KV

(1) Kv: Derating factor for mains voltage at 460Vac and power supply from AFE200.

(2) Kt: Derating factor for ambient temperature of 50°C (1% every °C above 45°C)

(3) Kalt: Derating factor for installation at altitudes above 1000 meters a.s.l. Value to be applied = 1.2% each 100 m increase above 1000 m.

E.g.: Altitude 2000 m, Kalt = 1.2% \* 10 = 12% derating; In derated = (100 - 12) % = 88 % In

# CHOOSING THE INVERTER - OUTPUT DATA

| SIZES - ADL300-...-2M                               |               |  | 1011  | 1015    | 2022  | 2030 | 3040 | 3055 |
|---|---------------|--|---|---------|-------|------|------|------|
| <b>IN · Rated output current</b><br>(fsw = default) | @ ULN=230 VAC | A  | 6   | 6.8     | 9.6   | 13   | 15   | 22   |
|   |               | <b>Pn mot</b><br>(Recommended motor power, fsw = default)<br>@ ULN=230 VAC | kW  | 1.1     | 1.5   | 2.2  | 3    | 4    |
| <b>Reduction factor</b>                             | KT (1)        | KALT (2)   | 1.5   | 1.5 - 2 | 2 - 3 | 3    | 5    | 7.5  |
|   |               | KT (1)   | 0.95  | 0.95    | 0.95  | 0.95 | 0.95 | 0.95 |
| <b>Overload</b>                                     |               | KALT (2)   | 1.2   | 1.2     | 1.2   | 1.2  | 1.2  | 1.2  |
|   |               | <b>Maximum Switching frequency</b>   | kHz   | 10      |       |      |      |      |
| <b>U2 · Maximum output voltage</b>                  |               |  | 0.98 x ULN (ULN = AC input voltage)                                     |         |       |      |      |      |
| <b>f2 · Maximum output frequency</b>                |               |  | 300   |         |       |      |      |      |
| <b>IGBT braking unit</b>                            |               |  | Standard internal (requires external resistor); braking torque 150% MAX |         |       |      |      |      |

\* The derating factors shown in the table below are applied to the rated DC output by the user. They are not automatically implemented by the drive:

$$I_{drive} = I_N \times KALT \times KT$$

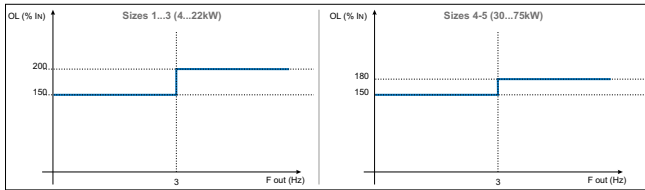
(1) Kt : Derating factor for ambient temperature of 50°C (1% every °C above 45°C)

(2) Kalt : Derating factor for installation at altitudes above 1000 meters a.s.l. Value to be applied = 1.2% each 100 m increase above 1000 m.

E.g: Altitude 2000 m, Kalt = 1.2% \* 10 = 12% derating; In derated = (100 - 12) % = 88 % In

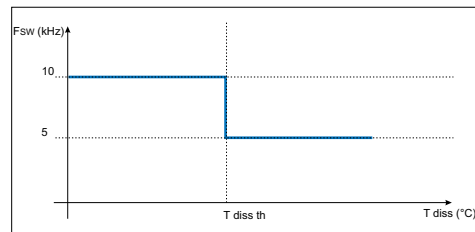
## Derating values in overload condition (ADL300-...-4 - ADL300-...-2T)

In overload conditions the output current depends on the output frequency, as shown in the figure below.



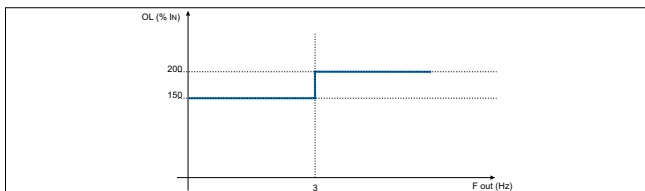
## Derating values for switching frequency

The switching frequency is modified according to the temperature of the drive (measured on the heat sink), as shown in the figure below.

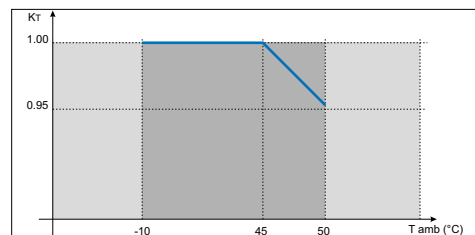


## Derating values in overload condition (ADL300-...-2M)

In overload conditions the output current depends on the output frequency, as shown in the figure below.



## Ambient temperature reduction factor



Function not allowed  
Range of ambient temperatures allowed

# GF\_eXpress PROGRAMMING SOFTWARE

GF\_eXpress is the software tool used to configure all the drives available in the GEFran catalogue.

Product selection is immediate by mean of a drop down menu and thanks to the graphical interface the configuration is easy and intuitive.

## Configure your Drive

The configuration of the drive is organized in various contextual menus, available in 6 different languages, where the operator through a graphical layout is guided step by step in the configuration process, with clear indication of the available parameters and the range of possible values to set.

The specific menu "Lift" groups all the parameters strictly related to the elevator systems.

Divided by functional contexts, the setting of parameters about mechanical data, lift sequences, acceleration and deceleration ramps, multispeed setting, is fast and easy.

For the commissioning two modes are available: easy and expert, where the operator can select to perform a faster configuration with a limited set of parameters, or a refined configuration where the setting of more parameters is required.

The selected product can be configured using a text interface or a guided graphical interface.

To check and monitor the configuration, the integrated Oscilloscope can simultaneously monitor up to 8 curves.

The reference value for the curve being displayed can be selected from among all the variables that are available for the selected drive.



## Save time with Wizard and Still Autotune

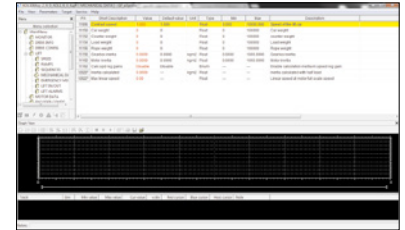
Thanks to the Wizard, the start-up of the motor is easy and fast by filling the parameters requested step by step.

The still autotune is quickly performed, avoiding operators to decouple the car from the ropes, assuring a safe working environment, and a faster commissioning.

## Export your configuration

All details for configuration of each single device are sent out in XML format to facilitate expansion of the catalogue and parameters.

The parameters can be exported and printed.

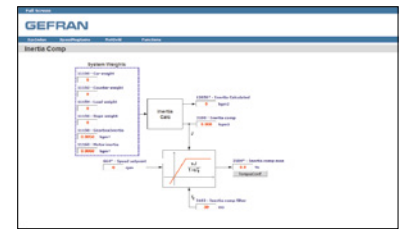


## Customize the tool

Based on different needs and context, the tool allows to create and store recipes, where the configuration can be saved with a sub-set of configured parameters. Custom parameter menus with a limited sub-set of data can be created, to enable a better and more effective device configuration.

It's possible the management of parameter archives for multiple configurations.

GF\_eXpress is indisputably the perfect tool to allow a fast, flexible, intuitive and easy commissioning of the drive for the elevator systems.



## Technical data

### Operating systems:

- > Windows © 2000, XP, Vista, Windows 7.

### Minimum PC requirements:

- > Pentium class CPU
- > RAM 512 MB
- > Free space of > 200 MB
- > Graphic card min. VGA (1024x768)
- > N. 1 RS232 or USB serial port
- > N. 1 Ethernet port
- > CD-ROM drive

### Communication protocols supported:

- > Serial communication with the device (Modbus)
- > Ethernet communication with TCP Modbus devices.

## SOFTSCOPE

SoftScope is a software oscilloscope with synchronous sampling (buffered with a minimum sampling time of 1ms).

Using SoftScope the user can fast and easily display some specific variables.

To give an example: commissioning variables, variables to test performance of the systems, or variables to tune for control system optimization, can be monitored without the need of external oscilloscopes.

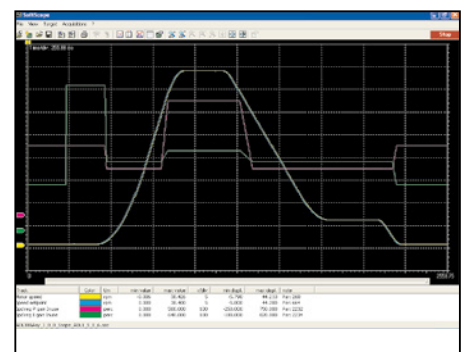
To understand if the approach to the floor is following the wished ramps or there is some rollback in the system, thanks to the SoftScope the analysis is faster and accurate. It's possible to analyse the speed profile of the car showing details about actual floor approach, ramps, jerks.

The curves can be displayed with different colours and they can be singularly enabled/disabled.

The zoom function allows enlargement of the details, while the cursor allows detection of the signal peaks and duration.

Trigger conditions (e.g. climbing leading edge of a specific signal), recording quality (a multiple of the basic clock at 1ms), recording duration period are parameters that the tool allows to control.

The displayed curves can be printed and stored in ASCII format and can be used with the most common data processing tools (for example Excel, Matlab).



# APPLICATION SOFTWARE

## Elevator Position Control

The EPC (Elevator Positioning Control) function is a separate application for independent management of direct arrival at the floor with internal position regulator and saving of floor distances (system autotuning).

There are two possible configurations for this application:

- Digital I/O control, which requires the use of an I/O expansion card with an appropriate number of I/Os (EXP-IO-D16R4-ADL). To use this card the ADVANCED version is required (ADL300A).
- Remote control via CANopen fieldbus, in which case the BASIC version (ADL300B), with built-in I/O card EXP-IO-D8R4-ADL includes a sufficient number of I/Os.

The main requirements for the EPC function are:

- > Maximum operating speed (4m/s).
- > Maximum number of floors 32.
- > Stop at floor without approaching at reduced speed (positioning for direct arrival at floor).
- > Automatic management of speed and ramp times according to the floor of call and arrival.
- > Management of brake and contactor command sequences.
- > Availability of configurator for complete configuration and monitoring of operating variables.
- > Possibility of calling floors directly (floor booked) or of requesting stops at floors during travel.
- > Possibility of entering corrections and compensations on floor levels.

## Advanced controls:

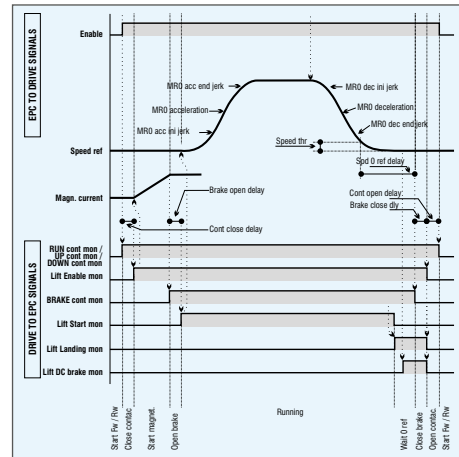
- > Inertia Compensation
- > Battery run mode with choice of preferred direction
- > Over Permissible Speed protection

The following functions are managed externally, by an external PLC or electromechanical unit:

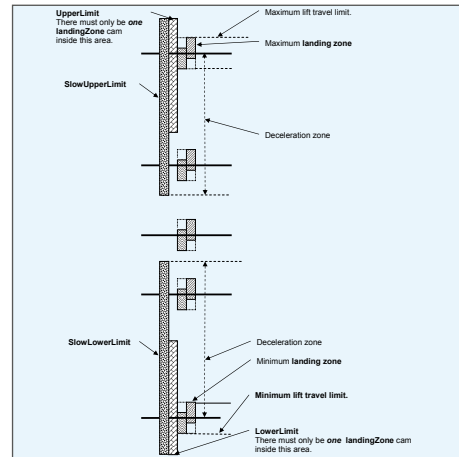
- > Floor call logic
- > Safety logic

The control system recognises the position of the floors via a series of cams installed along the path of the lift car. It uses a Self Study initialisation sequence to detect the position of these cams, on the basis of which it determines the level of each floor and the number of floors.

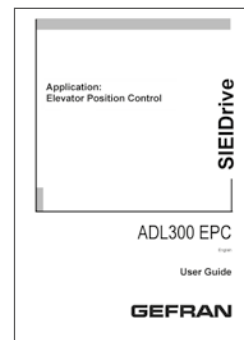
The distance between floors may vary from floor to floor, subject to certain restrictions.



Lift movements and Stop sequences in case of a floor call command.



I.e.: floor management cams.



## VDL200 · DESCRIPTION AND DIMENSIONS



The VDL200 drive series is designed for low and medium rise geared applications in both open and closed loop with asynchronous motors.

High-performance control algorithms allow installation in sensorless configuration while maintaining the comfort level provided by high-range inverters.

Simple installation and configuration make the VDL200 ideal for modernizing obsolete systems as well as for new installations.

### Main features

- Multispeed control
- Short floor management
- Emergency single-phase power supply for floor return with low energy optimization
- Flexible ramp management
- Integrated braking unit
- Communication with control board via I/O
- Management of TTL incremental digital encoders
- Integrated EMI filter for versions (VDL200...-F)
- 200% overload for 10 seconds
- The drive complies with the monitoring requirements of the correct lifting or dropping of the machine brake according to 5.6.7.3 of EN 81-20:2014 and 5.8 of EN 81-50:2014.
- CE mark.

## WEIGHTS AND DIMENSIONS

| Sizes       | Dimensions: Width x Height x Depth |                     | Weight |       |
|-------------|------------------------------------|---------------------|--------|-------|
|             | (mm)                               | (inches)            | (kg)   | (lbs) |
| VDL200-1... | 162 x 343 x 159                    | 6.38 x 13.50 x 6.26 | 5.6    | 12.3  |
| VDL200-2... | 162 x 396 x 159                    | 6.38 x 15.59 x 6.26 | 7.6    | 16.7  |
| VDL200-3... | 235 x 456.5 x 180                  | 9.25 x 17.97 x 7.08 | 10.5   | 23.15 |

# VDL200 LIFT-FIELD-ORIENTED VECTOR INVERTER

## GENERAL CHARACTERISTICS

| MODEL                                | VDL200   |
|--------------------------------------|--|
| Control mode                         | Field Oriented Control   |
| Power                                | 4 ... 22kW   |
| Voltage                              | 3 x 230-400Vac, -15%+10%, 50Hz   |
| Motor type                           | Asynchronous   |
| Speed control (Accuracy)             | ± 0.01% Motor rated speed <sup>(1)</sup>   |
| Analog inputs                        | 1  |
| Analog outputs                       | no   |
| Digital inputs                       | 8 + 1 enable   |
| Digital outputs                      | 4 (relay)  |
| Overload                             | up to 200% I <sub>n</sub> * 10"  |
| Max output frequency                 | 300Hz  |
| EMI filter                           | Integrated (VDL200-F models)<br>(EN 12015; EN 61800-3 category C2 and C3)  |
| Choke                                | DC side choke: external optional<br>AC side choke: external optional   |
| Braking unit                         | Integrated with external resistor  |
| Port for SD card                     | no   |
| Dimensions for roomless applications | yes  |
| Emergency operation                  | Optional (UPS single phase 230V)   |
| Type of lift                         | Geared   |
| Installations                        | New installation & Retrofitting  |
| Functions                            | <ul style="list-style-type: none"> <li>• Speed control</li> <li>• Short floor management</li> <li>• Lift sequence management</li> <li>• Ramp generation</li> <li>• Management of up to 8 Multispeeds</li> <li>• Load compensation</li> <li>• Configuration via optional keypad (5 languages)</li> <li>• Configuration via PC (GF_eXpress)</li> <li>• Wizard for commissioning</li> <li>• Menu for setting electrical and mechanical parameters</li> <li>• Programming with linear engineering units</li> <li>• DC power supply or emergency single-phase power supply to return to floor with optimized consumption</li> </ul> |
| Serial communication                 | RS232 <sup>(2)</sup>   |
| Protection class                     | IP20   |
| Immunity / Emissions                 | In compliance with EN 12015 electromagnetic compatibility directive, using internal filter (VDL200-F series)   |
| Operating temperature                | -10...45°C (32° ...113°F), +45°C...+50°C (+113 ... +122°F) with derating   |
| Altitude                             | Max 2000 m. (up to 1000 m without derating)  |
| Markings                             | CE<br>(Directives LVD 2014/35/EU, EMC 2014/30/EU, Lift 2014/33/EU, RoHs 2011/65/EU)  |

(1) For standard 4-pole motors.

(2) The serial port is used for programming (PC).

# GENERAL CHARACTERISTICS

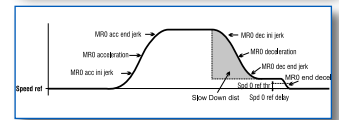
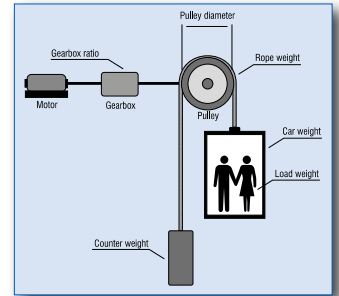
## UNIVERSAL MECHANICAL STRUCTURE

The extremely compact VDL200 reduces the size of conventional lift systems and it is suitable for installation in roomless systems.

## LIFT CONTROL SYSTEM

Basic and advanced lift functions are incorporated in a single product, to ensure maximum comfort for all systems at all times:

- Speed control: EFC (Elevator Floor Control) function: separate function for independent management of short floors, landing zone, re-starting with lift not at floor and automatic deceleration point calculation.
- Lift sequence: Typical sequence of input/output signals used in civil lift engineering applications such as I/O management, braking, output contactor and door control.
- Parameters in linear unit: Possibility of selecting different engineering units (also with values for the US) for the main movement parameters, rpm (fpm) or m/s for speed,  $m/s^2$ ,  $m/s^3$  for cabin acceleration.
- Lift mechanical parameters: Mechanical system parameters such as pulley diameter and speed ratio for converting system units and weights, system for calculating inertia and speed regulation for the desired response.
- Ramp generation: Independent configuration of acceleration and deceleration ramp parameters and of the 4 jerk values for maximum travelling comfort in the lift cabin. Two independent S-shaped ramps, selectable via digital input with 4 independent jerk settings. Dedicated deceleration ramp corresponding to the stop command.



## ENCODER MANAGEMENT

**VDL200** integrates as standard:

- Input for 5 Vdc TTL incremental digital encoder

## BACK-UP POWER SUPPLY

The VDL200 guarantees operation even in the event of a power failure. It features an automatic return-to-floor function managed by an external device such as UPS or buffer battery via a singlephase 230V AC power supply (with EMS module).

## OPTIONAL PROGRAMMING KEYPAD

The optional KB-ADL programming keypad featuring full display of parameters and variables in 5 languages makes the VDL200 extremely intuitive and easy to use.

It has a strip of magnetic material on the back so that it can be attached to the front of the drive or other metal surface (e.g. door of the electrical panel).

The keypad can be used remotely from distances of up to 15 m. A 70 cm-long connection cable is supplied as standard.

Up to 5 sets of parameters can be saved using the KB-ADL keypad and sent to other drives.



- 5 line x 21 character display
- Alphanumeric plaintext
- Complete information regarding each parameter
- Fast navigation keys
- Key for displaying the last 10 parameters that have been changed
- DISP key for rapid display of operating parameters
- Uploading-Downloading and saving of 5 complete sets of drive parameters

# SOFTWARE

Please refer to "GF\_eXpress Programming Software" section on page 12.



# CHOOSING THE INVERTER - INPUT AND OUTPUT DATA

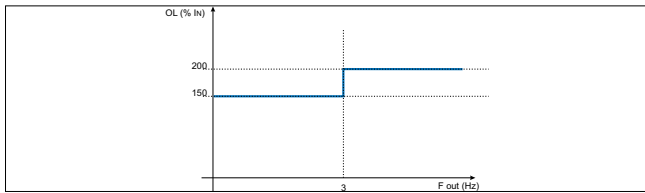
| INPUT DATA   |           | 1040   | 1055 | 2075 | 2110 | 3150 | 3185 | 3220 |    |
|--|-----------|--|------|------|------|------|------|------|----|
| ULN · AC Input voltage   | VAC       | three-phase network<br>230 - 400VAC -15%+10% |      |      |      |      |      |      |    |
| FLN · Input frequency  | Hz        | 50 Hz, ± 5%                                  |      |      |      |      |      |      |    |
| Overvoltage threshold  | VDC       | 820 Vdc                                      |      |      |      |      |      |      |    |
| Undervoltage threshold   | VDC       | 225 Vdc (@ 230 VAC)<br>391 Vdc (@ 400 VAC)   |      |      |      |      |      |      |    |
| DC-Link Capacity   | µF        | 470  | 680  | 680  | 1020 | 1500 | 2250 | 2700 |    |
| In · Effective input current<br>(@ In out)                                   |           |  |      |      |      |      |      |      |    |
|  | @ 230 VAC | A  | 12   | 17   | 23   | 31   | 42   | 50   | 55 |
|  | @ 400 VAC | A  | 11   | 16   | 22   | 29   | 40   | 47   | 53 |
| THD with DC choke @ I2n<br>(according to EN 12015)                           |           | < 35%  |      |      |      |      |      |      |    |
| No-load consumption<br>(Energy rating):<br>Stand-by consumption<br>"Fan Off" | W         | 20   | 20   | 20   | 20   | 20   | 20   | 20   |    |

| OUTPUT DATA   |                    | 1040  | 1055 | 2075 | 2110 | 3150 | 3185 | 3220 |      |
|---|--------------------|---|------|------|------|------|------|------|------|
| In · Rated output current<br>(fsw = default)          |                    |   |      |      |      |      |      |      |      |
|   | @ ULN=230 VAC      | A   | 9    | 13.5 | 18.5 | 24.5 | 32   | 39   | 45   |
|   | @ ULN=400 VAC      | A   | 9    | 13.5 | 18.5 | 24.5 | 32   | 39   | 45   |
| Pn mot<br>(Recommended motor power,<br>fsw = default) |                    |   |      |      |      |      |      |      |      |
|   | @ ULN=230 VAC      | kW  | 2    | 3    | 4    | 5.5  | 7.5  | 9    | 11   |
|   | @ ULN=400 VAC      | kW  | 4    | 5.5  | 7.5  | 11   | 15   | 18.5 | 22   |
| Reduction factor *                                    |                    |   |      |      |      |      |      |      |      |
|   | KT (1)<br>KALT (2) |   | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Overload  |                    | 200% * 10 sec with output frequency more than 3 Hz                      |      |      |      |      |      |      |      |
|   |                    | 150% * 10 sec with output frequency less than 3 Hz                      |      |      |      |      |      |      |      |
| Maximum Switching frequency                           | kHz                | 10  |      |      |      |      |      |      |      |
| U2 · Maximum output voltage                           |                    | 0.98 x ULN (ULN = AC input voltage)                                     |      |      |      |      |      |      |      |
| f2 · Maximum output frequency                         | Hz                 | 300   |      |      |      |      |      |      |      |
| IGBT braking unit                                     |                    | Standard internal (requires external resistor); braking torque 150% MAX |      |      |      |      |      |      |      |

\* The derating factors shown in the table below are applied to the rated DC output by the user. They are not automatically implemented by the drive: Idrive = IN x KALT x KT x KV  
 (1) KT : Derating factor for ambient temperature of 50°C (1% every °C above 45°C)  
 (2) KALT : Derating factor for installation at altitudes above 1000 meters a.s.l. Value to be applied = 1.2% each 100 m increase above 1000 m.  
 E.g.: Altitude 2000 m, KALT = 1.2% \* 10 = 12% derating; In derated = (100 - 12) % = 88 % IN

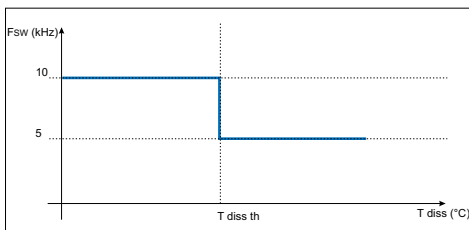
## Derating values in overload condition

In overload conditions the output current depends on the output frequency, as shown in the figure below.

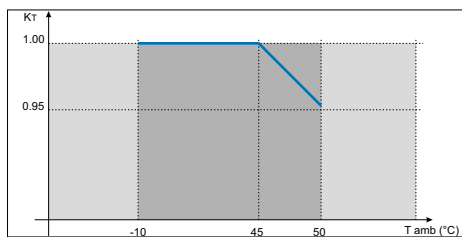


## Derating values for switching frequency

The switching frequency is modified according to the temperature of the drive (measured on the heat sink), as shown in the figure below.



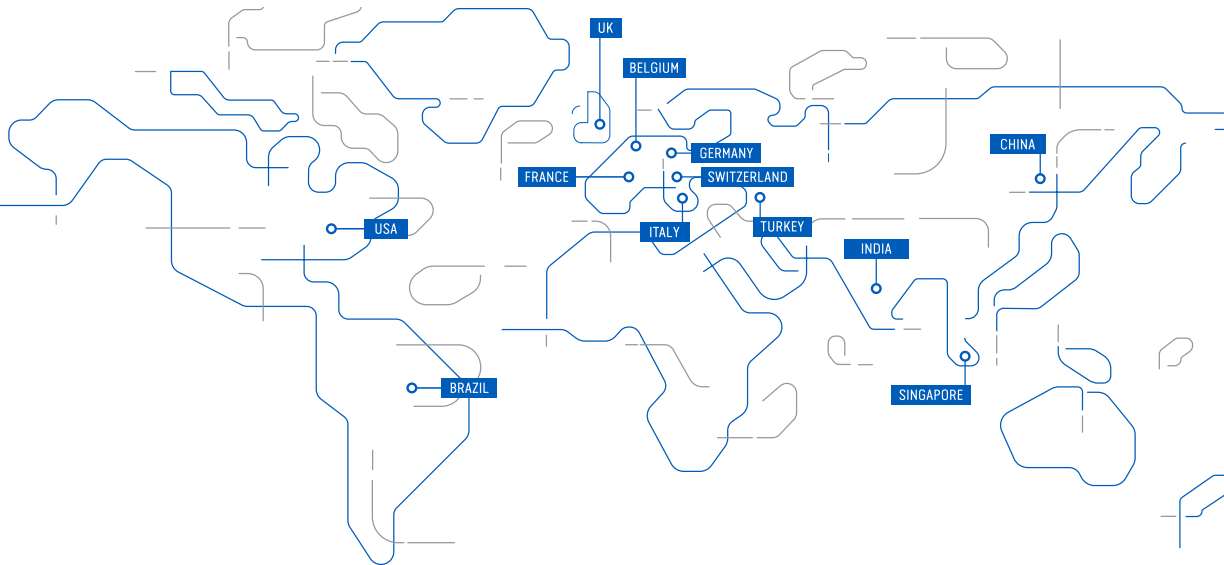
## Ambient temperature reduction factor



Function not allowed (light grey)  
 Range of ambient temperatures allowed (dark grey)







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