GEFRAN

Elevator Drives

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Elevator Drives

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GEFRAN
ADL300 Series Elevator Drive

State-of-the-Art Traction Control System for the Elevator Industry

ADL300 is available in Basic and Advanced models.

LISTED
ELEVATOR ACCESSORY
E365347, ASME A17.2, CSA B44.1

Sprecher + Schuh is recognized for supplying high quality electro-mechanical wye-delta starters for use in hydraulic elevator applications for more than three decades. Our contactors and relays are widely used in elevator controllers and door openers. Sprecher + Schuh first introduced their first solid state soft starter for hydraulic elevator applications more than a decade ago. Sprecher + Schuh's current PCEC hydraulic elevator solid state starter was introduced in 2006 and has become the first choice in hydraulic elevator modernization because of its high reliability, ease in upgrading competitive units, and initial cost. Gefran is a leading supplier of definite purpose variable frequency drives and other automation components. Gefran and Sprecher + Schuh have now joined forces to offer the most advanced traction elevator drive in the market. Sprecher + Schuh is the exclusive authorized supplier in North America of the Gefran elevator control system.

Leader in Components for Automation and Industrial Processing Control Systems

Gefran is headquartered in Italy and brings forty-five years of experience with extensive knowledge in the electric drive industry. The Gefran Drive & Motion Control Unit, based in Gerenzano (Varese, Italy), designs, develops and manufactures electric drives and power regeneration systems used to control motors and application systems in the main industrial sectors including: plastics, water treatment and ventilation, as well as control of traction elevators.

Gefran has representation in 16 countries with 7 production plants and a global sales network including the United States. It's US corporate office is headquartered in Winchester, Massachusetts with a Technical Support Center in Charlotte, North Carolina.

Gefran continuously invests in research and development with a focus on fulfilling their customers' requirements, working together with leading elevator manufacturers on an international scale. By specializing in the traction elevator sector Gefran has contributed to the production of dedicated, well-thought-out product lines to satisfy the most varied types of systems. This dedication to innovation makes Gefran a leader in the field of components for automation industrial process control systems as well as traction elevators.

Gefran drives offer a flexible solution for a variety of elevator drive needs. Solutions include modernization of existing traction elevator systems to installation of new systems with or without a machine room. Applications include induction or permanent magnet motors, with and without a gear reducer. Flexible and complete, with a vast range of dedicated options and accessories, the ADL300 elevator inverters represent the most rapid and

Gefran has three engineering and production facilities in Italy and 7 production plants and a global sales network stretched across 12 countries including the United States. US Corporate Headquarters are located in Winchester, Massachusetts with a full Technical Support Team in Charlotte, North Carolina.

immediate solution to traction elevator application requirements. The thousands of functioning systems throughout the world are the best testimony to Gefran's expertise and the high quality of the product.

ADL300 Elevator Drive. Simple. Safe. Superior.

The ADL300 Elevator Drive product line is a vector inverter for traction elevators or lift systems with synchronous or asynchronous motors.

The ADL300 drive has an easy-to-use, simple programming technology. It follows the Emergency Rescue Protocol Standard making it one of the safest in the industry and provides a superior ride and comfort.

The ADL300 Drive is the VFD for traction elevator lift systems that can be adapted to open loop speed regulator (V/F), closed loop with an induction motor with pulse tachometer feedback or as a servo with a permanent magnet motor as it can control both conventional asynchronous winches with reduction gears and more advanced permanent magnet motors (gearless).

Designed and produced to meet the full range of requirements in the elevator market, the ADL300 Drive features the following as standard:
- Integrated LED keypad (1-Line) to display parameters for set-up and fault display with real time clock
- "Safety" inputs for use with a single output contactor or in contactorless mode.
- IGBT Braking module (up to 75HP @400V ADL300-4 and up to40HP@230V ADL300-2T).
- Overload Relay
- RS232 for PC connection

The ADL300 Traction Elevator Drive is available in two models:

Basic - with pre-selected input and output card as well as a pre-selected feedback expansion card. In short, a ready-to-operate pre-packaged deal.

Advanced - the input and output card as well as the feedback expansion card must be selected. This offers flexibility for more advanced and demanding system requirements.

Both the **Basic** and the **Advanced** models can have accessories added. Accessories can include:
- External Programming keypad
- EMI Filter
- AC input choke (reactor)
- DC input choke
- AC output choke (reactor)
- External braking unit for select models
- External braking resistors

Efficient Design Lowers Costs and Down Time

The ADL300 Drive is manufactured for geared and gearless motors improving availability and ultimately lower costs.

The state-of-the-art technology provides:
- an emergency mode which allows single phase operation during main power loss via battery UPS backup.
- management of different types of speed feedback devices (digital, SinCos, EnDal, SSI Hiperface encoders)

- zero speed (stand still) autotune allows the drive to tune without unroping the car of motor parameters and automatic phasing for brushless motors is possible.
- automatic fan control which reduces noise in hoist way when machine is not in use.
- a 32 bit micro-processor with advanced algorithms to provide superior ride quality.

Wide Power Range
- 3 PH x 200-230 VAC 7.5HP – 50HP
- 3 PH X 400-480 VAC 5HP – 100HP

International standards and approvals

UL   in compliance with USA and Canadian directives file E183859

cULus   Elevator Duty Listed ASME A17.5, CSA B44.1 file E365347

For European applications

CE   in compliance with IEC directives, for low voltage devices

EMC   in compliance with EN 12015 electromagnetic compatibility directive, using internal filter

The ADL300 SIL-3 Rating can be used to reduce the number of contactors in accordance to EN 81-1:1998 + A3; according to EN61800-5-2-2007.


Size 1   Size 2   Size 3   Size 4   Size 5

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The "Smooth Ride" Software

The ADL300 integrates the most complete and advanced elevator inverter technology; however cutting edge electronic hardware must be paired with flexible and easy to use software/firmware to achieve true superiority in drive application. Gefran has combined extensive experience in applying variable frequency drives in traction elevator applications with a commitment to working in close partnership with leading elevator manufacturers to develop the most powerful software in the industry today. It is all about simple input of a few system parameters to achieve the "smooth ride" and the GF eXpress software/firmware achieves that goal at no additional cost.

One of the powerful features of Gefran's software as well as the hardware is the ability to adapt to open-loop speed regulator (V/F), closed-loop with an induction motor with encoder feedback or as a servo with a permanent magnet motor. This software can control both conventional asynchronous winches with reduction gears and more advanced permanent magnet motors (gearless).

You can use either the GF _eXpress set-up Wizard which uses preselected defaults to get up-and-running in short order or you can program complex parameters. Features like Elevator Floor Control, Elevator Positioning Control, Autotune, Emergency return to floor, and Flexible Ramp Generation makes it easy to accelerate and decelerate through the four jerk points using two independent "S-curves." Communication with a network or simply to an individual PC is all made simple with powerful software. All these features and more are designed into the GF _eXpress software to help the user easily create the ultimate "smooth ride."
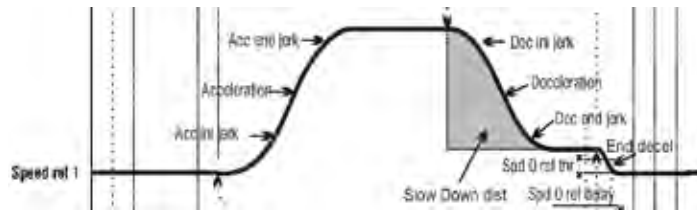
Wizard function for commissioning

Wizard menu for immediate system start-up. The wizard contains sufficient default values for immediate system start-up after providing basic mechanical parameters.

Management of synchronous and asynchronous motors

The operating mode is selectable via a single parameter.

Elevator Floor Control

The EFC function controls means direct arrival at the floor and automatic calculation of deceleration point. Speed control includes 8 preset speeds as reference values including the possibility of overwriting at start with an additional value to achieve smooth start.

Position Control

EPC (Elevator Positioning Control) provides position regulator for automatic management of direct arrival at the floor. This interfaces with the automatic speed control and saving of floor distances which ties into the system Autotuning feature.

Autotune

Device connection parameters can be configured manually or by using the Autotune feature.

Autophasing

When the ADL300 is used with encoders this feature can be used to detect and align the system with the encoders.

Softscope

Softscope is a software oscilloscope with synchronous sampling. Using Softscope the user can easily display specific variables for commissioning or test performance by tuning the control loops.

Lift Sequence

Typical sequence of input/output signals, I/O management, braking, output contactor and door control.

Parameters in linear unit

Availability of different engineering units for the main movement parameters, rpm or m/s for speed, m/s^2, m/s^3 (ft/s^2, ft/s^3) for cabin acceleration.

Lift mechanical parameters

Mechanical system parameters such as pulley diameter and speed ratio can be entered. Then the system will automatically calculate inertia and speed regulation for the desired response.

Ramp generation

Provides independent configuration of acceleration and deceleration ramp parameters. Two independent S-shaped ramps, selectable via digital input with 4 independent jerk settings. Provides maximum travelling comfort in the elevator cabin. There is also a dedicated deceleration ramp corresponding to the stop command.

Multiple speeds

8 internally settable speed reference values. Default values can be accepted or operator can input their own values.

Pre-torque (load compensation)

Initialization of the speed regulator by the weight sensor to prevent jerks or bumpy starting.

Overload

Overload capacity in line with typical elevator application load cycles.
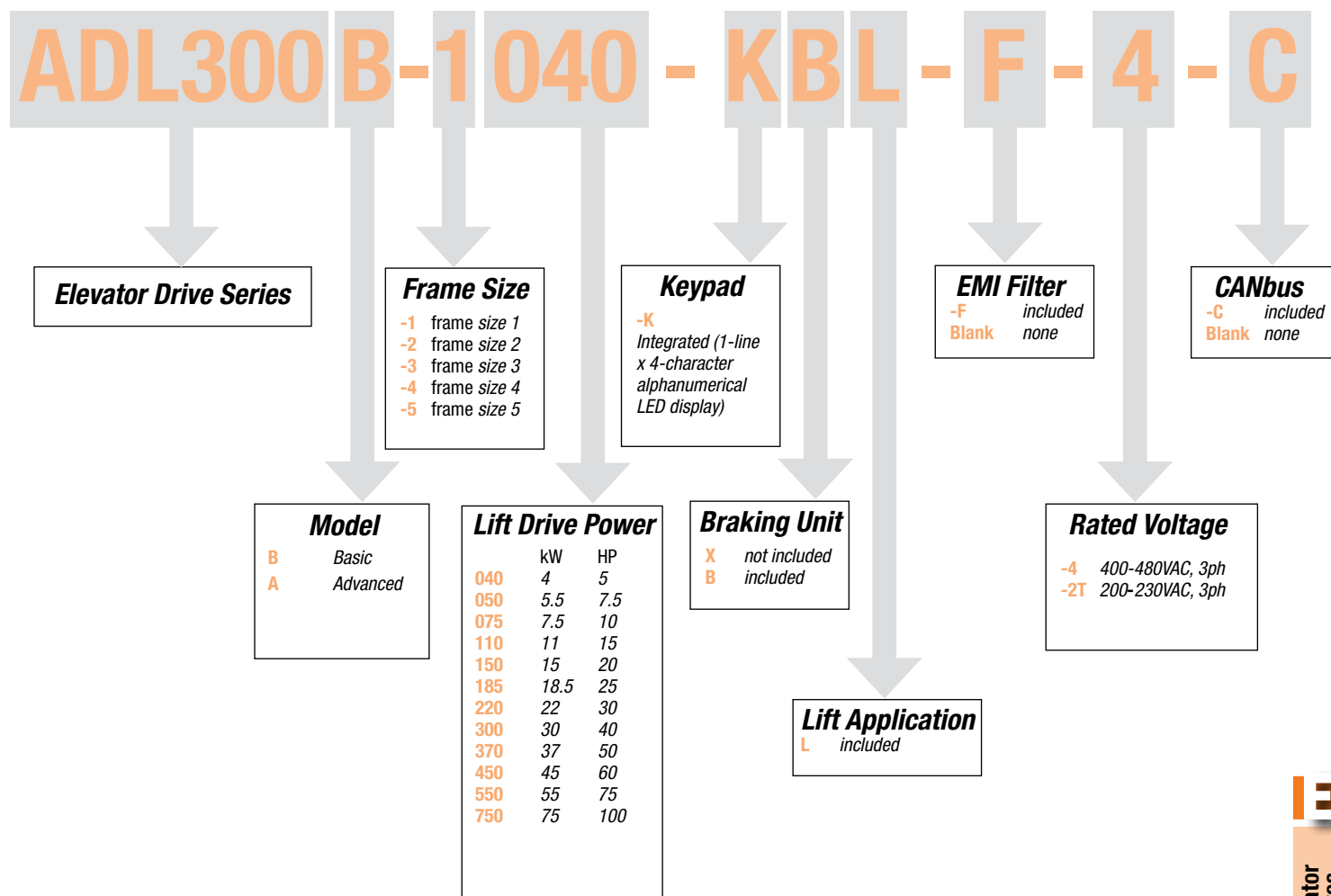
Automatic fan control

The fan control logic activates the internal fan according to the temperature.

Emergency single-phase power supply to return to the floor

In emergency conditions a 230 V single-phase supply voltage can be used to return the cabin to the floor (via UPS power supply or back-up batteries).

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Catalog Number Coding

GEFRAN employs a catalog number coding system for drives that follows a logical pattern. Every digit signifies a specific device attribute. Where indicated, the use of dashes (–) serves to separate device characteristics and should always be used when ordering.

ADL300 B -1 040 - KBL - F - 4 - C

Elevator Drive Series

Frame Size

- **-1** frame *size 1*
- **-2** frame *size 2*
- **-3** frame *size 3*
- **-4** frame *size 4*
- **-5** frame *size 5*

Keypad

- **-K** Integrated (1-line x 4-character alphanumerical LED display)

EMI Filter

- **-F** included
- **Blank** none

CANbus

- **-C** included
- **Blank** none

Model

- **B** Basic
- **A** Advanced

Lift Drive Power

	kW	HP
040	4	5
050	5.5	7.5
075	7.5	10
110	11	15
150	15	20
185	18.5	25
220	22	30
300	30	40
370	37	50
450	45	60
550	55	75
750	75	100

Braking Unit

- **X** not included
- **B** included

Rated Voltage

- **-4** 400-480VAC, 3ph
- **-2T** 200-230VAC, 3ph

Lift Application

- **L** included

Elevator Drives

This illustration is for reference only.

Turn to the appropriate page to determine specific catalog number & pricing.

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ADL300B 400-480V 3-Phase Elevator Drive

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	List Price
kW		HP						
400V / 415V	Output AMPS	460V	Output AMPS		m/s	fpm	Catalog Number	
4	9	5	8.1	1	4.0	787.4	ADL300B-1040-KBL-4	2820
5.5	13.5	7.5	12.2	1	4.0	787.4	ADL300B-1055-KBL-4	3015
7.5	18.5	10	16.7	2	4.0	787.4	ADL300B-2075-KBL-4	3495
11	24.5	15	22	2	4.0	787.4	ADL300B-2110-KBL-4	3760
15	32	20	28.8	3	4.0	787.4	ADL300B-3150-KBL-4	4910
18.5	39	25	35.1	3	4.0	787.4	ADL300B-3185-KBL-4	5553
22	45	30	40.5	3	4.0	787.4	ADL300B-3220-KBL-4	6230
30	60	40	54	4	4.0	787.4	ADL300B-4300-KBL-4	9060
37	75	50	67.5	4	4.0	787.4	ADL300B-4370-KBL-4	9985
45	90	60	81	4	4.0	787.4	ADL300B-4450-KBL-4	11785
55	105	75	94	5	4.0	787.4	ADL300B-5550-KBL-4	14665
75	150	100	135	5	4.0	787.4	ADL300B-5750-KXL-4❷	17280

Includes:
- Internal LED keyboard
- Safety function
- 8 Digital inputs
- 4 output relays
- 1 digital input (enable)
- Digital incremental SinCos TTL encoder 5VDC
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

ADL300B 400-480V 3-Phase Elevator Drive

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	List Price
kW		HP						
400V / 415V	Output AMPS	460V	Output AMPS		m/s	fpm	Catalog Number	
4	9	5	8.1	1	4.0	787.4	ADL300B-1040-KBL-F-4-C	3120
5.5	13.5	7.5	12.2	1	4.0	787.4	ADL300B-1055-KBL-F-4-C	3390
7.5	18.5	10	16.7	2	4.0	787.4	ADL300B-2075-KBL-F-4-C	3915
11	24.5	15	22	2	4.0	787.4	ADL300B-2110-KBL-F-4-C	4480
15	32	20	28.8	3	4.0	787.4	ADL300B-3150-KBL-F-4-C	5140
18.5	39	25	35.1	3	4.0	787.4	ADL300B-3185-KBL-F-4-C	6495
22	45	30	40.5	3	4.0	787.4	ADL300B-3220-KBL-F-4-C	7240
30	60	40	54	4	4.0	787.4	ADL300B-4300-KBL-F-4-C	9360
37	75	50	67.5	4	4.0	787.4	ADL300B-4370-KBL-F-4-C	10275
45	90	60	81	4	4.0	787.4	ADL300B-4450-KBL-F-4-C	12140
55	105	75	94	5	4.0	787.4	ADL300B-5550-KBL-F-4-C	15075
75	150	100	135	5	4.0	787.4	ADL300B-5750-KXL-F-4-C❷	17800

Includes:
- Internal LED keyboard
- Safety function
- 8 Digital inputs
- 4 output relays
- 1 digital input (enable)
- Digital incremental SinCos TTL encoder 5VDC
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 Port for PC
- SD card port

PLUS
- Integrated EMI Filter
- CANbus RS-485

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❶ See dimensional data starting on page E24.
❷ ADL300_-5750-KBL-_ does not include braking unit. See page E10.

ADL300B 200-230V 3-Phase Elevator Drive

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
230V	Output AMPS	200V / 230V	Output AMPS		m/s	fpm	Catalog Number	List Price
5.5	24.5	7.5	24.5	2	1.2	236.2	ADL300B-2055-KBL-2T	3760
7.5	32	10	32	3	1.2	236.2	ADL300B-3075-KBL-2T	4910
11	45	15	45	3	1.2	236.2	ADL300B-3110-KBL-2T	6230
15	60	20	60	4	1.2	236.2	ADL300B-4150-KBL-2T	9060
18.5	75	25	75	4	1.2	236.2	ADL300B-4185-KBL-2T	9975
22	90	30	90	4	1.2	236.2	ADL300B-4220-KBL-2T	11785
30	105	40	105	5	1.2	236.2	ADL300B-5300-KBL-2T	14665
37	150	50	150	5	1.2	236.2	ADL300B-5370-KXL-2T ❷	17280

Includes:
- Internal LED keyboard
- Safety function
- 8 Digital inputs
- 4 output relays
- 1 digital input (enable)
- Digital incremental SinCos TTL encoder 5VDC
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

ADL300B 200-230V 3-Phase Elevator Drive

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
230V	Output AMPS	200V / 230V	Output AMPS		m/s	fpm	Catalog Number	List Price
5.5	24.5	7.5	24.5	2	1.2	236.2	ADL300B-2055-KBL-F-2T-C	4480
7.5	32	10	32	3	1.2	236.2	ADL300B-3075-KBL-F-2T-C	5140
11	45	15	45	3	1.2	236.2	ADL300B-3110-KBL-F-2T-C	7240
15	60	20	60	4	1.2	236.2	ADL300B-4150-KBL-F-2T-C	9360
18.5	75	25	75	4	1.2	236.2	ADL300B-4185-KBL-F-2T-C	10275
22	90	30	90	4	1.2	236.2	ADL300B-4220-KBL-F-2T-C	12140
30	105	40	105	5	1.2	236.2	ADL300B-5300-KBL-F-2T-C	15075
37	150	50	150	5	1.2	236.2	ADL300B-5370-KXL-F-2T-C ❷	17800

Includes:
- Internal LED keyboard
- Safety function
- 8 Digital inputs
- 4 output relays
- 1 digital input (enable)
- Digital incremental SinCos TTL encoder 5VDC
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 Port for PC
- SD card port

PLUS
- Integrated EMI Filter
- CANbus RS-485

Elevator Drives

ADL

❶ See dimensional data starting on page E24.
❷ ADL300_-5370-KBL-_ does not include braking unit. See page E10.

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ADL300A 400-480V 3-Phase Elevator Drive ❸

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
400V / 415V	Output AMPS	460V	Output AMPS		m/s	fpm	Catalog Number	List Price
4	9	5	8.1	1	4.0	787.4	ADL300A-1040-KBL-4	2608
5.5	13.5	7.5	12.2	1	4.0	787.4	ADL300A-1055-KBL-4	2792
7.5	18.5	10	16.7	2	4.0	787.4	ADL300A-2075-KBL-4	3270
11	24.5	15	22	2	4.0	787.4	ADL300A-2110-KBL-4	3758
15	32	20	28.8	3	4.0	787.4	ADL300A-3150-KBL-4	4528
18.5	39	25	35.1	3	4.0	787.4	ADL300A-3185-KBL-4	5400
22	45	30	40.5	3	4.0	787.4	ADL300A-3220-KBL-4	6300
30	60	40	54	4	4.0	787.4	ADL300A-4300-KBL-4	8940
37	75	50	67.5	4	4.0	787.4	ADL300A-4370-KBL-4	9950
45	90	60	81	4	4.0	787.4	ADL300A-4450-KBL-4	11130
55	105	75	94	5	4.0	787.4	ADL300A-5550-KBL-4	14610
75	150	100	135	5	4.0	787.4	ADL300A-5750-KXL-4❷	17361

Includes:
- Internal LED keyboard
- Safety function
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

Items that must be added:
» I/O expansion card ❸
» Feedback expansion card ❸

ADL300A 400-480V 3-Phase Elevator Drive ❸

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
400V / 415V	Output AMPS	460V	Output AMPS		m/s	fpm	Catalog Number	List Price
4	9	5	8.1	1	4.0	787.4	ADL300A-1040-KBL-F-4-C	2910
5.5	13.5	7.5	12.2	1	4.0	787.4	ADL300A-1055-KBL-F-4-C	3085
7.5	18.5	10	16.7	2	4.0	787.4	ADL300A-2075-KBL-F-4-C	3585
11	24.5	15	22	2	4.0	787.4	ADL300A-2110-KBL-F-4-C	4058
15	32	20	28.8	3	4.0	787.4	ADL300A-3150-KBL-F-4-C	4828
18.5	39	25	35.1	3	4.0	787.4	ADL300A-3185-KBL-F-4-C	5700
22	45	30	40.5	3	4.0	787.4	ADL300A-3220-KBL-F-4-C	6600
30	60	40	54	4	4.0	787.4	ADL300A-4300-KBL-F-4-C	9240
37	75	50	67.5	4	4.0	787.4	ADL300A-4370-KBL-F-4-C	10170
45	90	60	81	4	4.0	787.4	ADL300A-4450-KBL-F-4-C	11430
55	105	75	94	5	4.0	787.4	ADL300A-5550-KBL-F-4-C	14910
75	150	100	135	5	4.0	787.4	ADL300A-5750-KXL-F-4-C❷	17660

Includes:
- Internal LED keyboard
- Safety function
- IGBT braking unit ❷ (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

PLUS
- Integrated EMI Filter
- CANbus RS-485

Items that must be added:
» I/O expansion card ❸
» Feedback expansion card ❸

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❶ See dimensional data starting on page E24.
❷ ADL300_-5750-KBL-_ does not include braking module - purchase separately on page E10.
❸ ADL300A units require the selection of an I/O card and Feedback card. See page E11 for selection

Variable Frequency Drives - Elevator Control System

Advanced Elevator Drive

GEFRAN

ADL300A 200-230V 3-Phase Elevator Drive ❸

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
230V	Output AMPS	200V / 230V	Output AMPS		m/s	fpm	Catalog Number	Price
5.5	24.5	7.5	24.5	2	1.2	236.2	ADL300A-2055-KBL-2T	3750
7.5	32	10	32	3	1.2	236.2	ADL300A-3075-KBL-2T	4528
11	45	15	45	3	1.2	236.2	ADL300A-3110-KBL-2T	6300
15	60	20	60	4	1.2	236.2	ADL300A-4150-KBL-2T	8940
18.5	75	25	75	4	1.2	236.2	ADL300A-4185-KBL-2T	9950
22	90	30	90	4	1.2	236.2	ADL300A-4220-KBL-2T	11130
30	105	40	105	5	1.2	236.2	ADL300A-5300-KBL-2T	14610
37	150	50	150	5	1.2	236.2	ADL300A-5370-KXL-2T ❷	17361

Includes:
- Internal LED keyboard
- Safety function
- IGBT braking unit ❷
  (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

Items that must be added:
» I/O expansion card ❸
» Feedback expansion card ❸

ADL300A 200-230V 3-Phase Elevator Drive ❸

Ratings for Controlling AC Motors				Frame Size ❶	Speed Range up to		Open Type	
kW		HP						
230V	Output AMPS	200V / 230V	Output AMPS		m/s	fpm	Catalog Number	List Price
5.5	24.5	7.5	24.5	2	1.2	236.2	ADL300A-2055-KBL-F-2T-C	4058
7.5	32	10	32	3	1.2	236.2	ADL300A-3075-KBL-F-2T-C	4828
11	45	15	45	3	1.2	236.2	ADL300A-3110-KBL-F-2T-C	6600
15	60	20	60	4	1.2	236.2	ADL300A-4150-KBL-F-2T-C	9240
18.5	75	25	75	4	1.2	236.2	ADL300A-4185-KBL-F-2T-C	10170
22	90	30	90	4	1.2	236.2	ADL300A-4220-KBL-F-2T-C	11430
30	105	40	105	5	1.2	236.2	ADL300A-5300-KBL-F-2T-C	14910
37	150	50	150	5	1.2	236.2	ADL300A-5370-KXL-F-2T-C ❷	17660

Includes:
- Internal LED keyboard
- Safety function
- IGBT braking unit ❷
  (not including external braking resistor)
- Internal fan
- RS232 port for PC
- SD card port

PLUS
- Integrated EMI Filter
- CANbus RS-485

Items that must be added:
» I/O expansion card ❸
» Feedback expansion card ❸

Elevator Drives

ADL

❶ See dimensional data starting on page E24.
❷ ADL300_-5750-KBL-_ does not include braking module - purchase separately on page E10.
❸ ADL300A units require the selection of an I/O card and Feedback card. See page E11 for selection

Discount Schedule E-1

E9

SSNA2012   visit www.sprecherschuh.com/ecatalog for the most up to date information

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Accessories

Options	Description	For use with…	Catalog Number	List Price
Options				
	External 6-line programing alphanumeric keypad display with memory up to 5 profiles ❶	All ADL300	S5P2T	357
	5-meter keypad serial extension cable ❹		8S8F59	81
	10-meter keypad serial extension cable ❹		8S874C	144
	Adapter for SD card (memory for loading data) including SD card		S72644	99
	Power cable shielding kit	ADL300-1_- ADL300-2_-	S72610	57
	Power cable shield kit and cables port	ADL300-3_-	S72650	57
	RS232 serial line connector cable to USB	All ADL300	S5A20	150

Options	Description	For use with…	Catalog Number	List Price
Braking Unit				
	Braking unit for 230Vac..480Vac lines, In = 20Arms	ADL300A-5370 ADL300A-5750 or ADL300B-5370 ADL300B-5750	BUy 1020 ❷	2865
	Braking unit for 230Vac..480Vac lines, In = 50Arms		BUy 1050 ❷	3093
	Braking unit for 230Vac..480Vac lines, In = 85Arms		BUy 1085 ❷	3654

❶ This option is recommended.
❷ See page E21 for dimensional data. See page E13 for braking resistors.
❸ External keypad connects to the keypad port on the drive. Do not connect PC to keypad port or vice versa.

❹ The pin configuration of the keypad port and RS232 (PC) port is the same DB9 configuration. Alternative cables may be used to extend the PC connection.

Elevator Drives

ADL

Discount Schedule E-1

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Expansion Cards

Options	Description	For use with…	Catalog Number	List Price
	I/O Expansion Cards			
	Expansion card: 8 digital inputs - 4 relays	Required for all ADL300A Advanced	EXP-IO-D8R4-ADL	378
	Expansion card: 8 digital inputs - 4 digital outputs - 2 analog inputs - 4 relays		EXP-IO-D12A2R4-ADL	606
	Expansion card: 12 digital inputs - 4 digital outputs - 4 relays		EXP-IO-D16R4-ADL	450
	Expansion card: 2 digital inputs - 2 digital outputs		EXP-IO-D4-ADL	291
	Expansion card: 6 digital inputs - 2 relays ❶		EXP-IO-D6R2-F-ADL	357
	Expansion card: 6 digital inputs - 2 analog inputs - 2 analog outputs - 2 relays		EXP-IO-D6A4R2-F-ADL	555
	Expansion card: 8 digital inputs - 2 analog inputs - 2 analog outputs - 4 relays		EXP-IO-D8A4R4-ADL	648

Options	Description	For use with…	Catalog Number	List Price
	Feedback Expansion Cards			
	Digital encoder 3 Channels card + Repeat + 2 Freeze	Required for all ADL300A Advanced	EXP-DE-I1R1F2-ADL	588
	Sinusoidal encoder card - Absolute EnDat + Repeat + 2 Freeze		EXP-EN/SSI-I1R1F2-ADL	636
	Hiperface encoder 3 Channels card + Repeat + 2 Freeze		EXP-HIP-I1R1F2-ADL	708
	Sinusoidal encoder 3 Channels card + Repeat + 2 Freeze		EXP-SE-I1R1F2-ADL	648
	Sinusoidal SinCos encoder 3 Channels card + Repeat + 2 Freeze		EXP-SESC-I1R1F2-ADL	648

Elevator Drives

ADL

❶ All expansion cards have removable terminal strips expect EXP-IO-D6R2-F-ADL

Chokes❶

Description	For Use With		Catalog Number	List Price
	HP	VFD		
AC input choke (reactor)				

The three-phase mains choke is strongly recommended in order to: limit the RMS input current of the ADL inverter
- increase the life of intermediate circuit capacitors and reliability of input diodes
- reduce mains harmonic content
- reduce problems due to power supply via a low impedance line (≤1%)

Description	HP	VFD	Catalog Number	List Price
AC input choke	5	ADL-300_-1040	LR3y-2040	183
	7.5	ADL-300_-1055	LR3y-2055	219
		ADL-300_-2055		
	10	ADL-300_-2075	LR3y-2075	250
		ADL-300_-3075		
	15	ADL-300_-2110	LR3y-3110	345
		ADL-300_-3110		
	20	ADL-300-_3150	LR3y-3150	420
		ADL-300_-4150		
	25	ADL-300_-3185	LR3-022	576
		ADL-300_-4185		
	30	ADL-300_-3220		
		ADL-300_-4220		
DC Input Choke integrated into VFD	>30	ADL-300_-4300...5750	~	~
DC input choke				

- For ADL units sizes 1...3, the typical Total Harmonic Distortion (THD) <70% with AC Input Choke
- For Improved THD typically <35%, use a DC input Choke in lieu of AC Input Choke

Description	HP	VFD	Catalog Number	List Price
DC input choke	5	ADL-300_-1040	LDC-004	243
	7.5	ADL-300_-1055	LDC-005	309
	10	ADL-300_-2075	LDC-007	350
	15	ADL-300_-2110	LDC-011	423
	20	ADL-300_-3150	LDC-015	475
	25	ADL-300_-3185	LDC-022	315
		ADL-300_-4185		
	30	ADL-300_-3220		
		ADL-300_-4220		
DC Input Choke integrated into VFD ADL Sizes 4 & 5 integrated DC choke, with typical THD <35%	>30	ADL-300_-4300...5750	~	~
AC output choke (reactor)				

The ADL300 Inverter can be used with standard motors or motors designed specifically for use with inverters. The latter usually have a higher isolation rating to better withstand PWM voltage. Examples of reference regulations: motors designed for use with inverters do not require any specific filtering of output from the inverter. For standard motors, especially with long cable runs (typically over 100m), an output choke maybe necessary to maintain the voltage waveform within the specified limits. The rated current of the chokes should be approximately 20% higher than that of the inverter in order to take into account additional losses due to modulation of the output waveform.

Description	HP	VFD	Catalog Number	List Price
AC output choke	5	ADL-300_-1040	LU3-005	489
	7.5	ADL-300_-1055		
		ADL-300_-2055		
	10	ADL-300_-2075	LU3-011	645
		ADL-300_-3075		
	15	ADL-300_-2110		
		ADL-300_-3110		
	20	ADL-300_-3150	LU3-015	660
		ADL-300_-4150		
	25	ADL-300_-3185	LU3-022	690
		ADL-300_-4185		
	30	ADL-300_-3220		
		ADL-300_-4220		
	40	ADL-300_-4300	LU3-030	900
		ADL-300_-5300		
	50	ADL-300_-4370	LU3-037	915
		ADL-300_-5370		
	60	ADL-300_-4450	LU3-055	1190
	75	ADL-300_-5550		
	100	ADL-300_-5750	LU3-090	1675

❶ See page E27 for dimensional data.

Elevator Drives

ADL

Braking Resistors ❶

Description	Speed	For Use With		Catalog Number	List Price
		HP	VFD		
Braking Resistor For ADL300-1040...5550-KBL-4					
Braking resistor	< 1 m/s (196.9 fpm)	5	ADL-300_-1040	RF 300 D 100R	222
		7.5	ADL-300_-1055	RF 300 D 68R	250
		10	ADL-300_-2075		
		15	ADL-300_-2110	RFPD 1100 DT 40R	438
		20	ADL-300_-3150	RFPR 1900 D 28R	837
		25	ADL-300_-3185	BRT4K0-15R4	1245
		30	ADL-300_-3220		
		40	ADL-300_-4330	BRT4K0-11R6	1275
		50	ADL-300_-4370		
		60	ADL-300_-4450	BRT8K0-7R7	2045
		75	ADL-300_-5550		
Braking resistor	> 1 m/s (196.9 fpm)	5	ADL-300_-1040	RFPD 750 DT 100R	360
		7.5	ADL-300_-1055	RFPR 750 D 68R	726
		10	ADL-300_-2075		
		15	ADL-300_-2110	RFPR 1200 D 49R	792
		20	ADL-300_-3150	RFPR 1900 D 28R	837
		25	ADL-300_-3185	BRT4K0-15R4	1245
		30	ADL-300_-3220		
		40	ADL-300_-4300	BRT4K0-11R6	1275
		50	ADL-300_-4370		
		60	ADL-300_-4450	BRT8K0-7R7	2045
		75	ADL-300_-5550		
Braking Resistor For ADL300-2055...5300-KBL-2T					
Braking resistor	< 1 m/s (196.9 fpm)	7.5	ADL-300_-2055	RF PR 1200 D 49R	792
		10	ADL-330_-3075	RFPR 1900 D 28R	837
		15	ADL-300_-3110	BRT4K0-15R4	1245
		20	ADL-300_-4150	BRT4K0-11R6	1275
		25	ADL-300_-4185		
		30	ADL-300_-4220	BRT8K0-7R7	2045
		40	ADL-300_-5300		
Braking resistor	> 1 m/s (196.9 fpm)	7.5	ADL-300_-2055	RFPR 1200 D 49R	792
		10	ADL-330_-3075	RFPR 1900 D 28R	837
		15	ADL-300_-3110	BRT4K0-15R4	1245
		20	ADL-300_-4150	BRT4K0-11R6	1275
		25	ADL-300_-4185		
		30	ADL-300_-4420	BRT8K0-7R7	2045
		40	ADL-300_-5300		

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ADL

❶ See page E28 for dimensional data.
❷ ADL300_-5750 and ADL300_5370 may have an external braking unit applied and external braking resistor if required. Consult Factory Representative.

EMI Filters ❶

Description	For Use With		Catalog Number	List Price
	HP	VFD		
External EMI Filter For ADL300-1040...5750-KBL-4				
External EMI filter	5	ADL-300_-1040	EMI FTF-480-7	237
	7.5	ADL-300_-1055	EMI FTF-480-16	333
	10	ADL-300_-2075		
	15	ADL-300_-2110	EMI FTF-480-30	546
	20	ADL-300_-3150		
	25	ADL-300_-3185	EMI FTF-480-42	702
	30	ADL-300_-3220		
	40	ADL-300_-4300	EMI FTF-480-75	936
	50	ADL-300_-4370		
	60	ADL-300_-4450	EMI FTF-480-100	1257
	75	ADL-300_-5550	EMI FTF-480-130	1510
	100	ADL-300_-5750	EMI FTF-480-180	1776

Description	For Use With		Catalog Number	List Price
External EMI Filter For ADL300-2055...5370-KBL-2T				
External EMI filter	7.5	ADL-300_-2055	EMI FTF-480-16	333
	10	ADL-300_-3075		
	15	ADL-300_-3110	EMI FTF-480-30	546
	20	ADL-300_-4150		
	25	ADL-300_-4185	EMI FTF-480-42	702
	30	ADL-300_-4220		
	40	ADL-300_-5300	EMI FTF-480-75	936
	50	ADL-300_-5370		

❶ See page E29 for dimensional data.

Input Data

Size - ADL300-...4		1040	1055	2075	2110	3150	3185	3220	4300	4370	4450	5550	5750
U$_{LN}$ • AC Input voltage	V$_{AC}$	three-phase network 400 - 480 Vac -15%+10%											
F$_{LN}$ • Input frequency	Hz	50/60 Hz, ± 5%											
Overvoltage threshold	V$_{AC}$	820 V$_{AC}$											
Undervoltage threshold	V$_{AC}$	391 V$_{AC}$ (@ 400 V$_{AC}$); 450 V$_{DC}$ (@ 460 V$_{AC}$); 470 V$_{AC}$ (@ 480 V$_{AC}$)											
DC-Link Capacity	µF	470	680	680	1020	1500	2250	2700	2350	2350	2350	4700	5600
I$_N$ • Effective input current (@ I$_N$ out)													
@ 400 V$_{AC}$	A	11	16	22	29	40	47	53	55	72	89	97	136
@ 460 V$_{AC}$	A	10	15	20	26	37	45	50	49	65	81	89	122
THD with DC choke @ I2n (according to EN 12015)		< 35%											
No-load consumption (Energy rating): Stand-by consumption "Fan Off"	W	20	20	20	20	20	20	20	25	25	25	25	25

Output Data

Size - ADL300-...4		1040	1055	2075	2110	3150	3185	3220	4300	4370	4450	5550	5750
I$_N$ • Rated output current (fsw = default)													
@ U$_{LN}$=400 V$_{AC}$	A	9	13.5	18.5	24.5	32	39	45	60	75	90	105	150
@ U$_{LN}$=460 V$_{AC}$	A	8.1	12.2	16.7	22	28.8	35.1	40.5	54	67.5	81	94	135
P$_N$ mot (Recommended motor power, fsw = default)													
@ U$_{LN}$=400 V$_{AC}$	kW	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75
@ U$_{LN}$=460 V$_{AC}$	Hp	5	7.5	10	15	20	25	30	40	50	60	75	100
Reduction factor													
K$_T$ ❶		0.95											
K$_{ALT}$ ❶		1.2											
Overload ❶		200% ❷10 sec with output frequency more than 3 Hz 150%❷10 with output frequency less than 3 Hz							180% ❷10 sec with output frequency more than 3 Hz 150% ❷10 with output frequency less than 3 Hz				
Maximum Switching frequency	kHz	10 ❶											
U2 • Maximum output voltage		0.98 x U$_{LN}$ (U$_{LN}$ = AC input voltage)											
f2 • Maximum output frequency	Hz	300											
IGBT braking unit		Standard internal (with external resistor); braking torque 150% MAX											Optional External

Cooling (all inverters are equipped with internal fans)

Size - ADL300-...4		1040	1055	2075	2110	3150	3185	3220	4300	4370	4450	5550	5750
Pv (Heat dissipation) @ U$_{LN}$=400...460Vac ❷	W	150	250	350	400	600	700	900	1200	1400	1700	2100	2900
Fan capacity — Heat sink	m³/h	35	2 x 58	2 x 58	2 x 35	2 x 98	2 x 98	2 x 104	2 x 98	2 x 190	2 x 190	2 x 285	2 x 285
Internal	m³/h	-	-	-	-	32	32	32	2 x 64	2 x 64	2 x 64	170	2 x 170
Minimum cabinet opening for cooling	cm²	72	144	144	144	328	328	328	512	595	595	864	1152

❶ See environmental conditions on page E17.
❷ Values that refer to operation at default switching frequency. See page E17.

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Input Data

Sizes - ADL300-...-2T		2055	3075	3110	4150	4185	4220	5300	5370
U$_{LN}$ • AC Input voltage	V$_{AC}$	three-phase network: 200 Vac ±10% / 230 Vac ±10%							
F$_{LN}$ • Input frequency	Hz	50/60 Hz, ± 2%							
Overvoltage threshold	V$_{AC}$	500 V$_{AC}$							
Undervoltage threshold	V$_{AC}$	196 V$_{AC}$ (@ 200 V$_{AC}$), 225 V$_{AC}$ (@ 230 V$_{AC}$),							
DC-Link Capacity	µF	680	680	1020	1500	2250	2700	2350	2350
I$_N$ • AC input current without choke									
@ 200-230 V$_{AC}$	A	31	42	53	55	72	89	97	136
THD with DC choke @ I2n (according to EN 12015)		< 35%							
No-load consumption (Energy rating): Stand-by consumption "Fan Off"	W	20	20	20	20	20	20	25	25

Output Data

Sizes - ADL300-...-2T		2055	3075	3110	4150	4185	4220	5300	5370
AC output current (duty cycle 80%)									
@ U$_{LN}$=200-230 V$_{AC}$	A	24.5	32	45	60	75	90	105	150
Inverter output @ U$_{LN}$=200-230 V$_{AC}$	kVA	9.8	12.8	17.9	23.9	29.9	35.8	41.8	59.8
P$_N$ mot (Recommended motor power)									
@ U$_{LN}$=200-230 V$_{AC}$	kW	5.5	7.5	11	15	18.5	22	30	37
@ U$_{LN}$=200-230 V$_{AC}$	Hp	7.5	10	15	20	25	30	40	50
Reduction factor									
K$_T$ ❶		0.95							
K$_{ALT}$ ❶		1.2							
Overload ❶		200% ❷10 sec with output frequency more than 3 Hz 150% ❷10 with output frequency less than 3 Hz						180% ❷10 sec with output frequency more than 3 Hz 150% ❷10 with output frequency less than 3 Hz	
Maximum Switching frequency	kHz	10 / 5 according to Heat-sink temperature ❶							
U2 • Maximum output voltage		0.98 x U$_{LN}$ (U$_{LN}$ = AC input voltage)							
f2 • Maximum output frequency	Hz	300							
IGBT braking unit		Standard internal (with external resistor); braking torque 150% MAX							Optional External

Cooling (all inverters are equipped with internal fans)

Sizes - ADL300-...-2T		2055	3075	3110	4150	4185	4220	5300	5370
Pv (Heat dissipation) @U$_{LN}$=230...460Vac ❷	W	250	350	400	600	700	900	1200	1400
Fan capacity Heat sink	m^3/h	2 x 58	2 x 58	2 x 35	2 x 98	2 x 98	2 x 104	2 x 98	2 x 190
Internal	m^3/h	-	-	-	32	32	32	2 x 64	2 x 64
Minimum cabinet opening for cooling	cm^2	144	144	144	328	328	328	512	595

❶ See environmental conditions on page E17.
❷ Values that refer to operation at default switching frequency. See page E17.

Elevator Drives

ADL

Environmental Condition

Enclosures	IP20
Ambient temperature	-10...45°C (14...113°F)
	+45°C…+50°C (113°F...122°F) with derating ❶
Altitude	Max 2000 m (up to 1000 m without current limitation) ❷

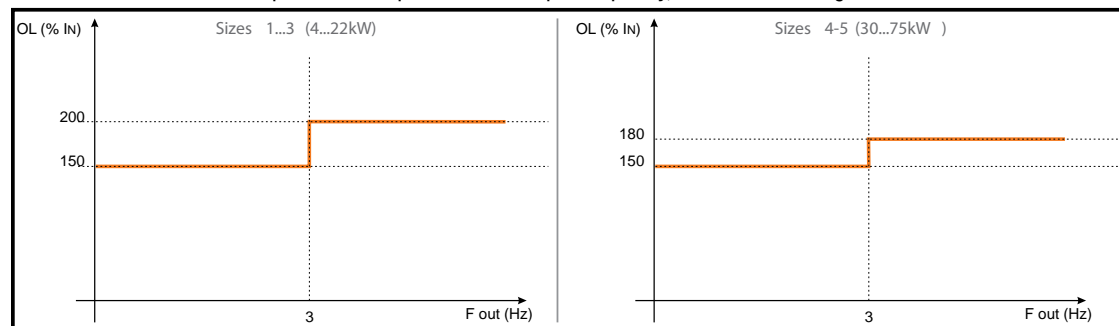## Ambient temperature reduction factor

Function not allowed

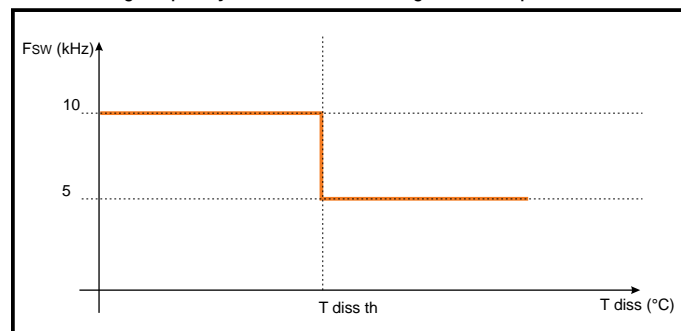Range of ambient temperatures allowed
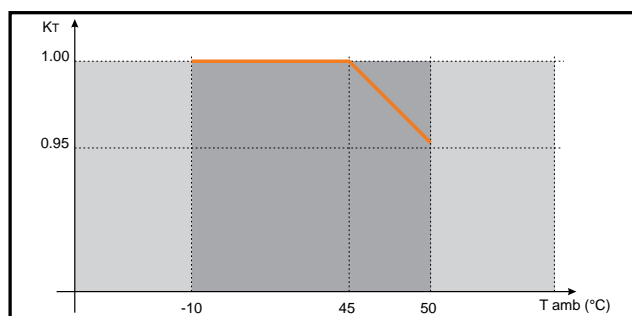
K_T=Thermal Reduction Factor

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.

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❷ Derating factor for installation at altitudes above 1000 meters. Value to be applied = 1.2% per 100 m increase above 1000 m. (Example: Altitude 2000 m, or 1000 m / 100 = 10 = 12% derating or 88 % I$_N$)
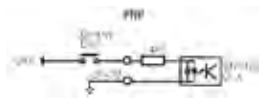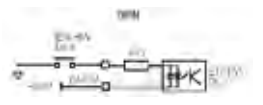
❶ Derating factor for ambient temperature of 50°C (1% every °C above 45°C)
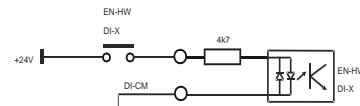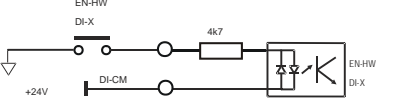
Input/Output Features

24 VDC Power Supply	
Tolerance	±10%
Maximum current	150mA
Isolation	1 KV

Digital Inputs (DI) and Enable Hardware Inputs (EN-HW)

Description	Features
Type	24V PNP / NPN
Operation Voltage	0V to + 24V (+ 30V max)
Load	5mA @ +24V - R_L = 4.7 kΩ
Thresholds	$V_{IC} < 5V$ - $V_{IH} > 15V$
Isolation	Yes - Functional (> 1kV)

Digital Outputs (DO)

Description	Features
Type	24V PNP / NPN
Operation Voltage	0V to + 24V (+ 30V max)
Load	20mA @ +24V - R_L = 1.2 kΩ (40µA $\mu\alpha\xi$)
Thresholds	$V_{OL} < 1V$ - $V_{OH} > V_{ALI}-1$
Isolation	Yes - Functional (> 1kV)

Relay Outputs (RO)

Description	Features
Type	NO Relay (single contact)
Operation Voltage	250VAC / - 30VDC / 2A
Load	50mA @ +10V
Isolation	Yes - 4kV

Analog Inputs (AI)

Description	Features
Type	Voltage differential
Input Voltage	±10V to (±12.5V full scale)
Input Resistance	10 kΩ
Resolution	12 Bits (11 + sign)
Precision	1% of full scale
Isolation	NO

Description	Features
Type	Current differential
Input Current	0 (4)mA to 20mA
Input Resistance	500 kΩ
Resolution	12 Bits (11 + sign)

Braking Resistors

Size	Speed Range	(kJ) kiloJoule[1]	(kJ) kiloJoule[2]	Watts	Ohms	Encl.	Res. Type
Braking Resistor For ADL300-1040...5550-KBL-4							
ADL-300_-1040		2.5	19	300	100	IP44	RF 300 D 100R
ADL-300_-1055		2.5	19	300	68	IP44	RF 300 D 68R
ADL-300_-2075		2.5	19	300	68	IP44	RF 300 D 68R
ADL-300_-2110		11	58	1100	40	IP44	RFPD 1100 DT 40R
ADL-300_-3150		19	75	1900	28	IP44	RFPR 1900 D 28R
ADL-300_-3185	≤ 1 m/s	40	150	4000	15.4	IP20	BRT4K0-15R4
ADL-300_-3220	(196.9 fpm)	40	150	4000	15.4	IP20	BRT4K0-15R4
ADL-300_-4330		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4370		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4450		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_-5550		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_ 5750		CONSULT FACTORY[3]					
ADL-300_-1040		7.5	38	750	100	IP44	RFPD 750 DT 100R
ADL-300_-1055		7.5	28	750	68	IP44	RFPR 750 D 68R
ADL-300_-2075		7.5	28	750	68	IP44	RFPR 750 D 68R
ADL-300_-2110		12	43	1200	49	IP44	RFPR 1200 D 49R
ADL-300_-3150		19	75	1900	28	IP44	RFPR 1900 D 28R
ADL-300_-3185	> 1 m/s	40	150	4000	15	IP20	BRT4K0-15R4
ADL-300_-3220	(196.9 fpm)	40	150	4000	15	IP20	BRT4K0-15R4
ADL-300_-4330		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4370		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4450		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_-5550		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_ 5750		CONSULT FACTORY[3]					

Size	Speed Range	(kJ) kiloJoule[1]	(kJ) kiloJoule[2]	Watts	Ohms	Encl.	Res. Type
Braking Resistor For ADL300-2055...5300-KBL-2T							
ADL-300_-2055		12	43	1200	49	IP44	RFPR 1200 D 49R
ADL-330_-3075		19	75	1900	28	IP44	RFPR 1900 D 28R
ADL-300_-3110	≤ 1 m/s	40	150	4000	15.4	IP20	BRT4K0-15R4
ADL-300_-4150	(196.9 fpm)	40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4185		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4220		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_-5300		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_-2055		12	43	1200	49	IP44	RFPR 1200 D 49R
ADL-330_-3075		19	75	1900	28	IP44	RFPR 1900 D 28R
ADL-300_-3110	> 1 m/s	40	150	4000	15.4	IP20	BRT4K0-15R4
ADL-300_-4150	(196.9 fpm)	40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4185		40	150	4000	11.6	IP20	BRT4K0-11R6
ADL-300_-4420		40	150	8000	7.7	IP20	BRT8K0-7R7
ADL-300_-5300		40	150	8000	7.7	IP20	BRT8K0-7R7
5370		CONSULT FACTORY[3]					

Elevator Drives

ADL

[1] Max overload energy, 1s - duty-cycle 10%
[2] Max overload energy, 30s -duty-cycle 25%
[3] Consult Factory Representative for optional external braking unit.

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Recommended Input Side External Fuses (not included in VFD)

For Use With...	Fuse Type	
	Europe	North America
ADL300-1040-...-4	GRD2/20	A70P20
ADL300-1055-...4	GRD2/25	A70P25
ADL300-2075-..-4	GRD3/35	A70P35
ADL300-2110-...-4	Z22GR40	A70P40
ADL300-3150-...-4	Z22GR63	A70P60-4
ADL300-3185-...-4	Z22GR80	A70P80
ADL300-3220-...-4	Z22GR80	A70P80
ADL300-4300-...-4	Z22GR80	A70P80
ADL300-4370-...-4	Z22GR100	A70P100
ADL300-4450-...-4	Z22GR100	A70P100
ADL300-5550-...-4	S00/üf1/80/200A/690V	A70P200
ADL300-5750-...-4	S00/üf1/80/200A/690V	A70P200
ADL300-2055-...-2T	GRD2/25	A70P25
ADL300-3075-...-2T	GRD3/35	A70P35
ADL300-3110-...-2T	Z22GR40	A70P40
ADL300-4150-...-2T	Z22GR63	A70P60-4
ADL300-4185-...-2T	Z22GR80	A70P80
ADL300-4220-...-2T	Z22GR80	A70P80
ADL300-5300-...-2T	Z22GR80	A70P80
ADL300-5370-...-2T	Z22GR100	A70P100

Recommended DC Input External Fuses (not included in VFD)

For Use With...	Fuse Type	
	Europe	North America
ADL300-1040-...-4	GRD2/16	A70P20-1
ADL300-1055-...4	GRD2/16	A70P20-1
ADL300-2075-..-4	GRD2/20	A70P30-1
ADL300-2110-...-4	GRD3/35	A70P40
ADL300-3150-...-4	GRD3/50	A70P50
ADL300-3185-...-4	GRD3/50	A70P50
ADL300-3220-...-4	S00C+/üf1/80/80A/690V	A70P80
ADL300-4300-...-4	S00C+/üf1/80/80A/690V	A70P80
ADL300-4370-...-4	S00C+/üf1/80/100A/690V	A70P100
ADL300-4450-...-4	S00C+/üf1/80/125A/690V	A70P150
ADL300-5550-...-4	S00C+/üf1/80/160A/690V	A70P150
ADL300-5750-...-4	S00/üf1/80/200A/690V	A70P200

Elevator Drives

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Braking Unit

Model	Max. dissipated power @ Duty cycle	Peak Current	Current		Duty cycle ❶ (max)
	(W)	(A)	Medium (A)	(Arms)	
BUy-1020	50	40	20	28	50%
BUy-1050	180	100	50	70	50%
BUy-1085	280	170	85	120	50%

Warning

The electronic circuit of the braking unit is directly connected to the DC Link, where the voltage can reach 850Vdc.If the device cover is removed, the live parts can not be touched (IP20).

Weights and Dimensions
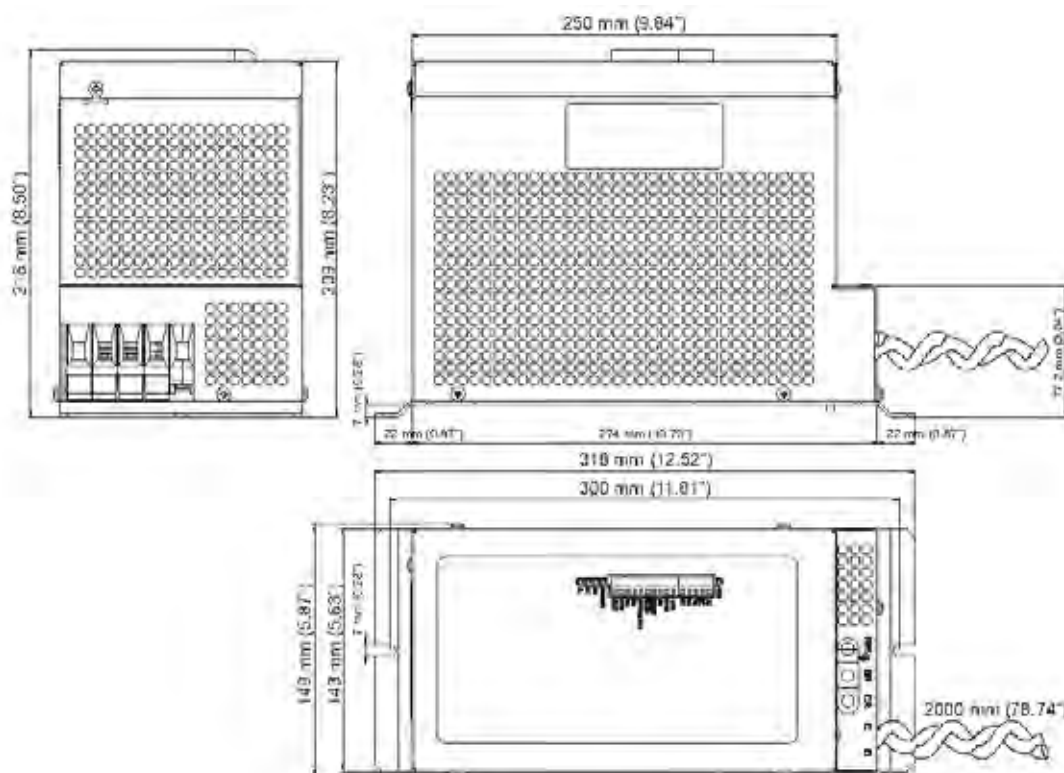
Model	lbs (kg)
BUy-1020	12.1 (5.5)
BUy-1050	13.2 (6
BUy-1085	16.7 (7.6)

Elevator Drives

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(1040 ...3220 sizes) - Standard connections

Drive standard connections and default configurations

Connection with UPS or EMS emergency module

Elevator Drives

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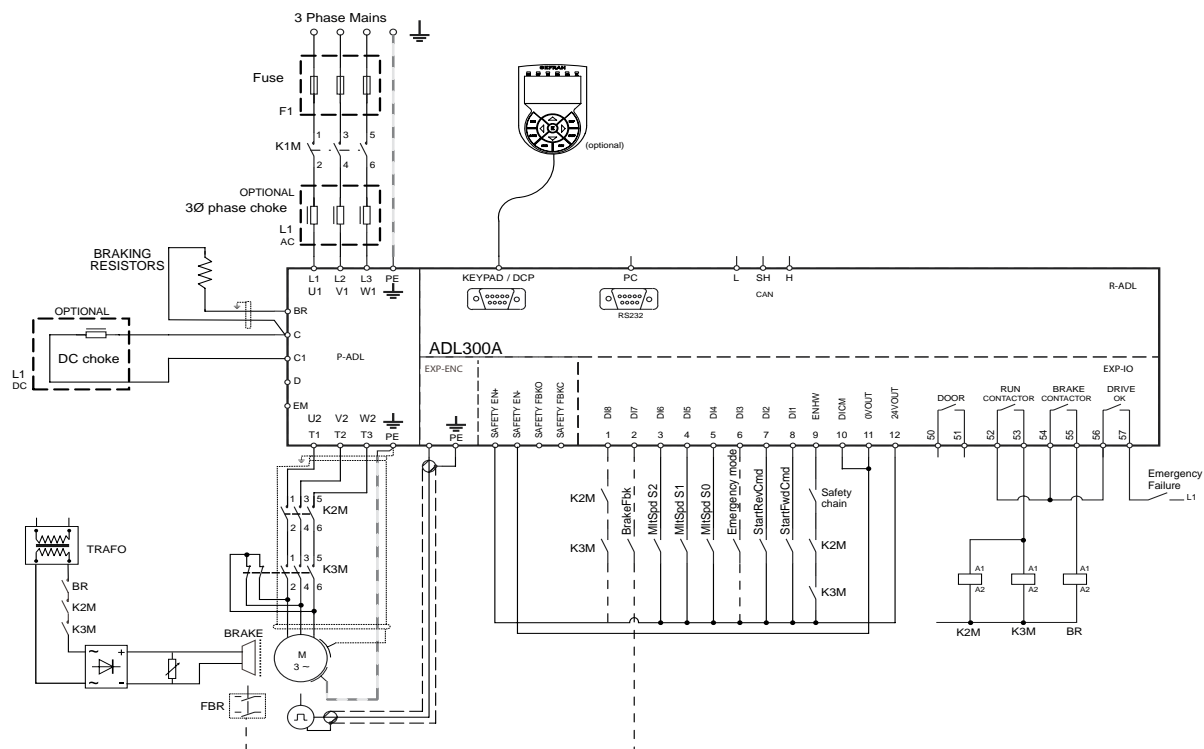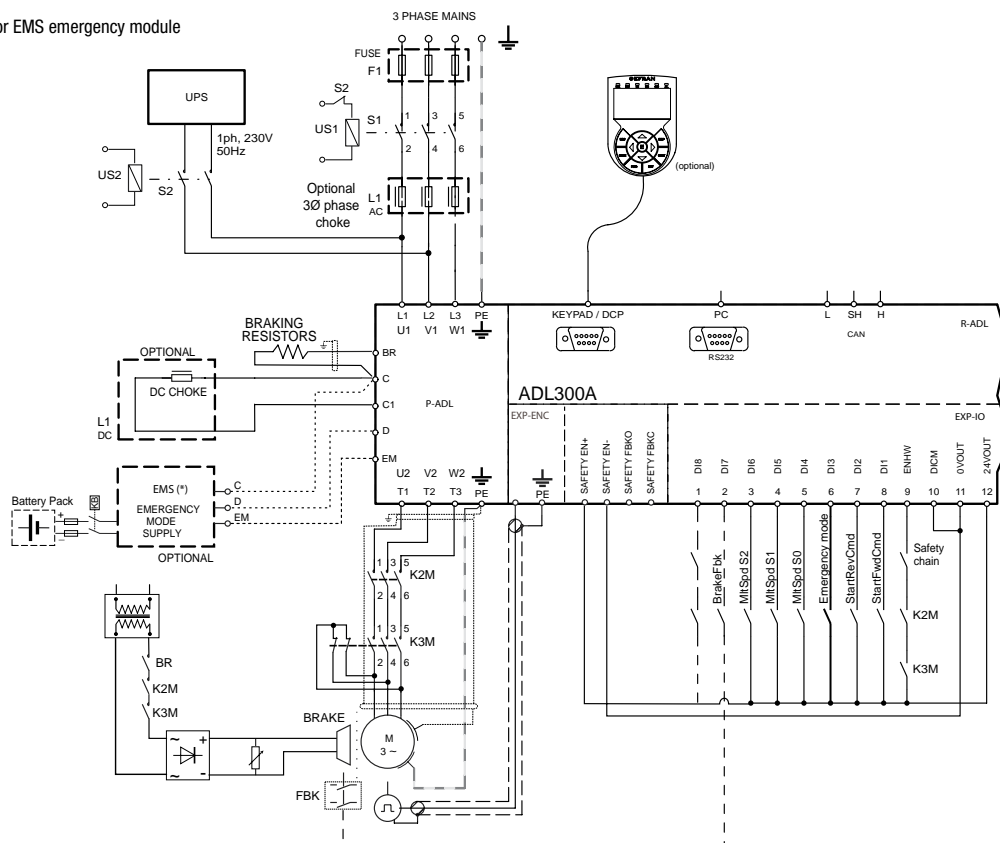
(4300...5750 sizes) - Standard connections

Drive standard connections and default configurations
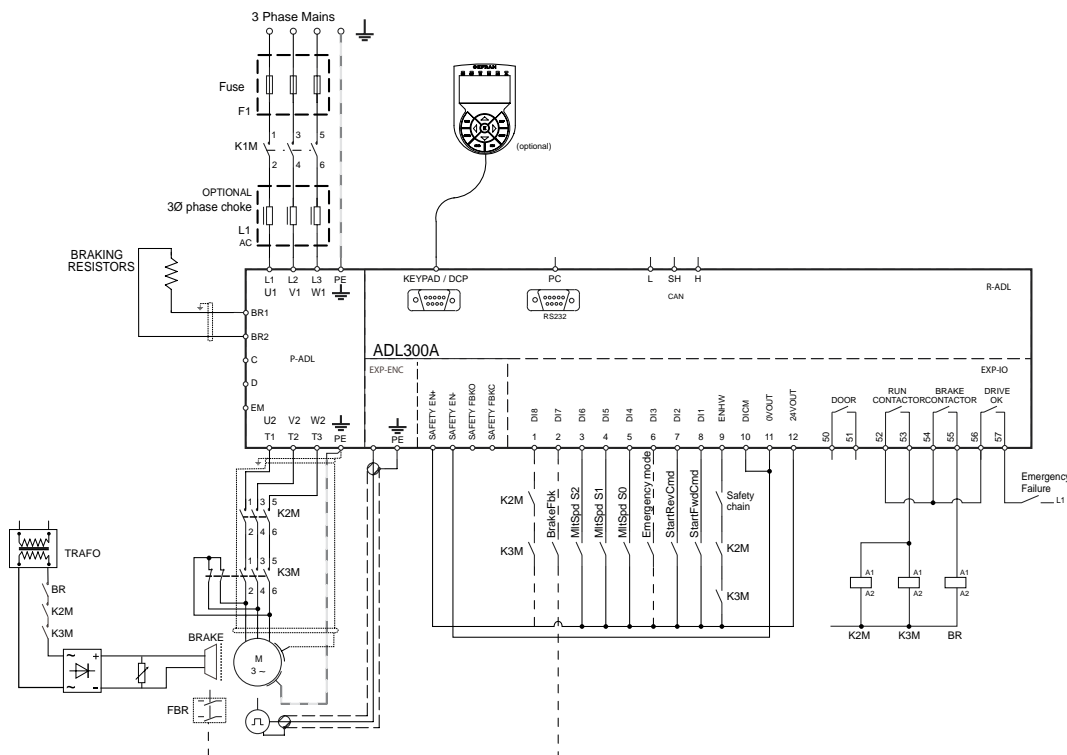
Connection with UPS or EMS emergency module
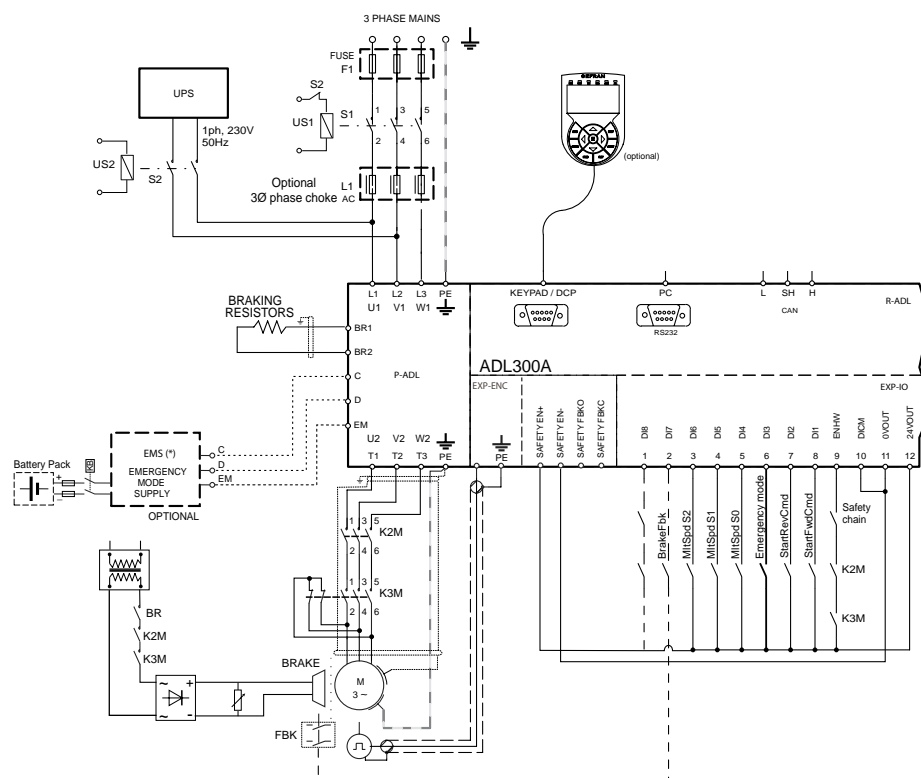
❶ ADL-300_-5750 and _-5370 resistors do not connect to BR1 and BR2. External brake and resistors are required.

Elevator Drives

ADL

ADL300 Size 1

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.
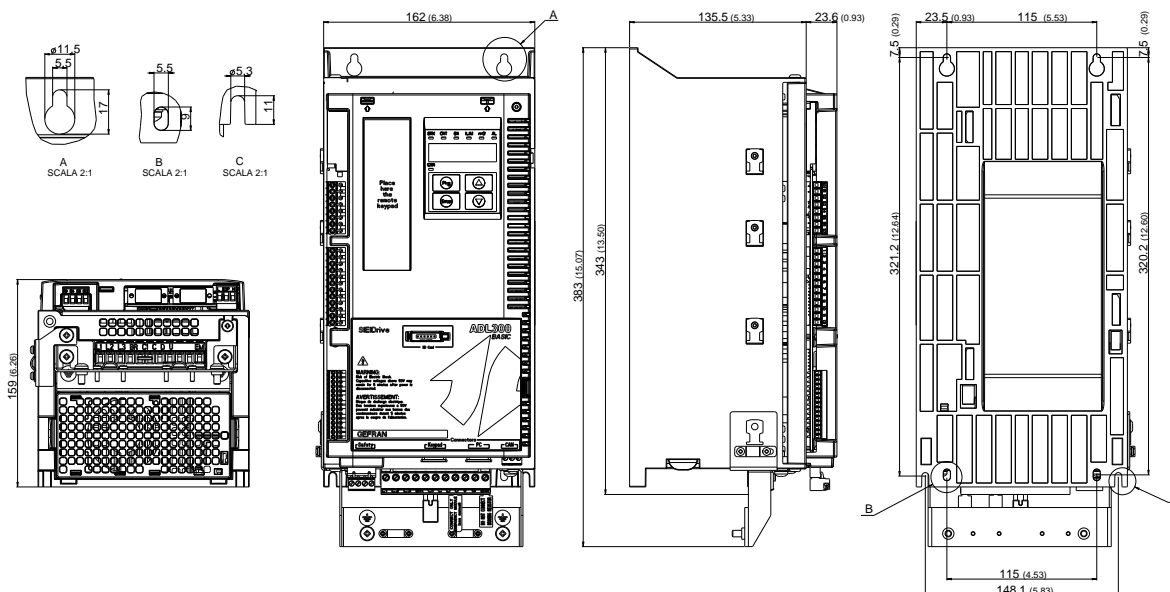
Size	Dimensions - Width x Height x Depth		Weight	
	mm	inches	kg	lbs
ADL300.- 1040/1055-...-4	162 x 343 x 159	6.38 x 13.50 x 6.26	5.8	12.8

ADL300 Size 2
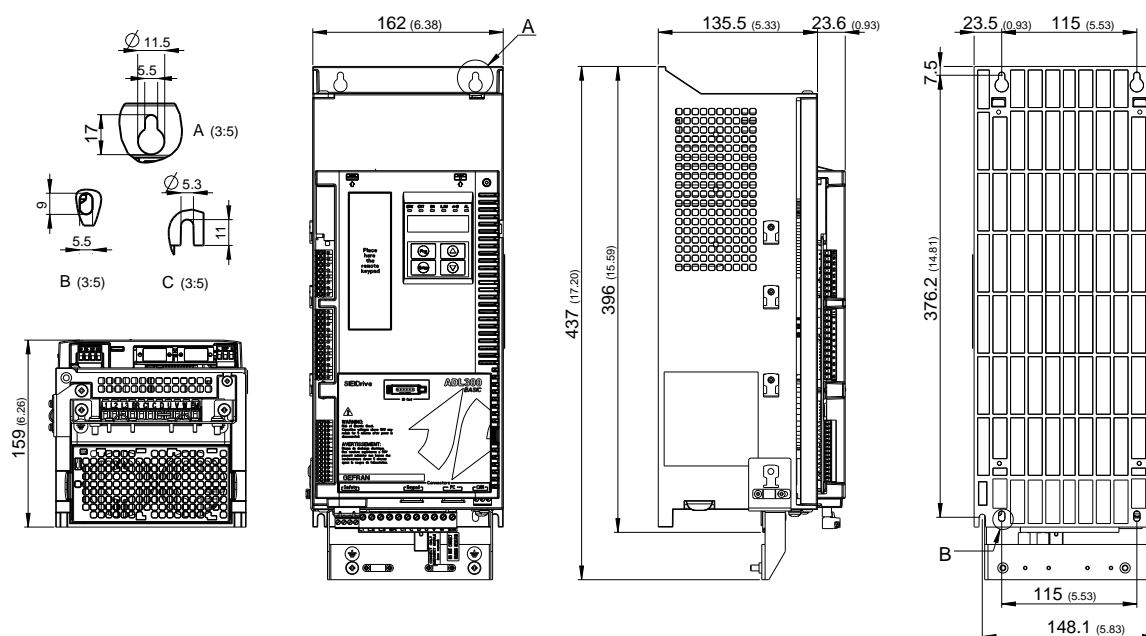
Size	Dimensions - Width x Height x Depth		Weight	
	mm	inches	kg	lbs
ADL300.- 2075/2110-...-4	162 x 396 x 159	6.38 x 15.59 x 6.26	7.8	17.2
ADL300.- 2055-...-2T				

Elevator Drives

ADL

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ADL300 Size 3

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.
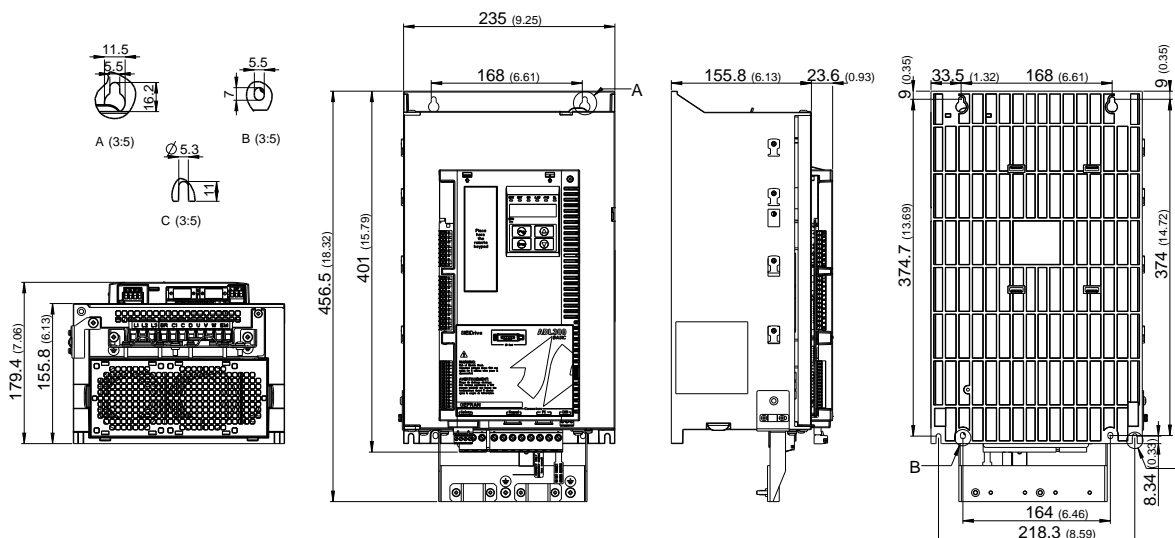
Size	Dimensions - Width x Height x Depth		Weight	
	mm	inches	kg	lbs
ADL300.- 3150/ 3185/ 3220-...-4	235 x 401 x 179.4	9.25 x 15.79 x 7.06	10.5	23.15
ADL300.- 3075/3110-...-2T				

ADL300 Size 4
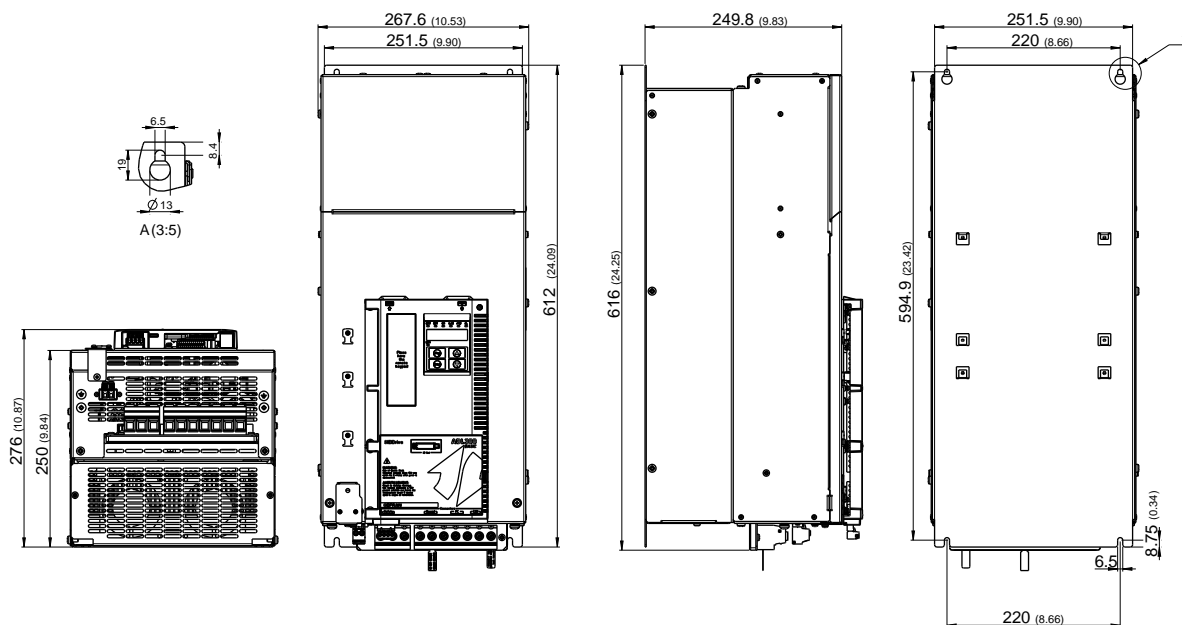
Size	Dimensions - Width x Height x Depth		Weight	
	mm	inches	kg	lbs
ADL300.- 4300/ 4370/ 4450-...-4	267.6 x 616 x 276	10.53 x 24.25 x 10.87	32	70.6
ADL300.- 4150/4185-...-2T				

Elevator Drives

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ADL300 Size 5

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.
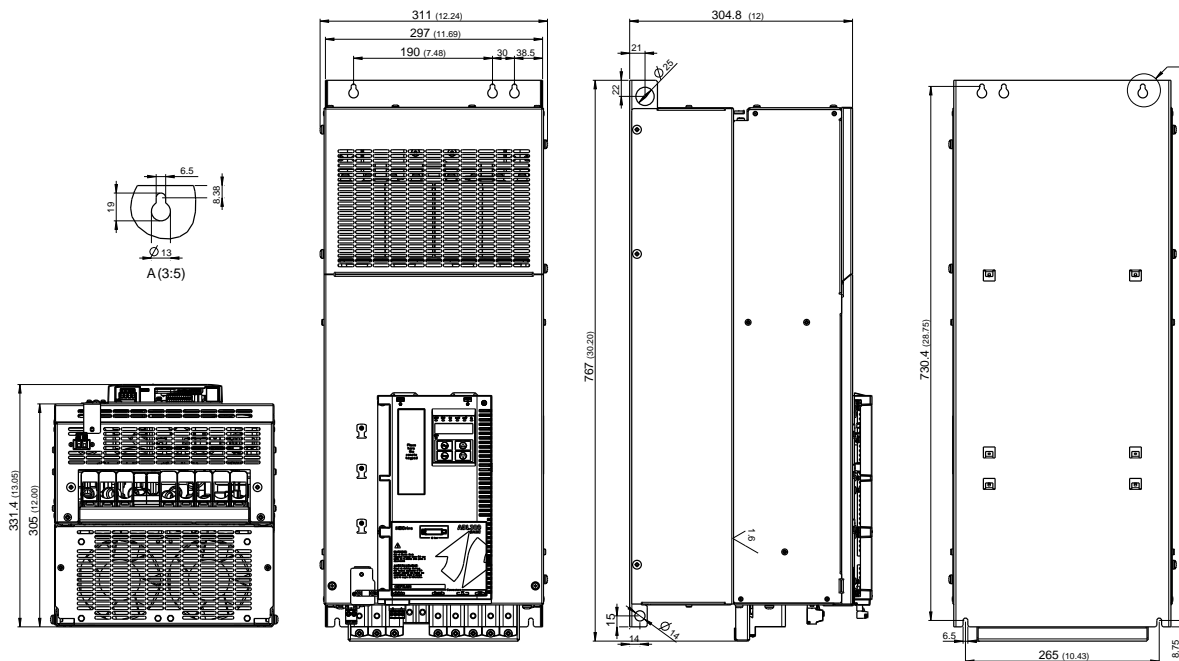
Size	Dimensions - Width x Height x Depth		Weight	
	mm	inches	kg	lbs
ADL300.- 5550/5750-...-4	311 x 767 x 331.4	12 x 30.2 x 13.05	60	132.30
ADL300.- 5300/5370-...-2T				

Elevator Drives

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Choke dimensions

Choke type	Dimensions mm [inches]					Weight kg [lbs]
	a	**b**	**c**	**D1**	**E1**	
LDC-004	99 [3.90]	96 [3.78]	93 [3.66]	80 [3.15]	61 [2.40]	2.4 [5.3]
LDC-005	125 [4.92]	112 [4.41]	98 [3.86]	112 [4.41]	70 [2.76]	4.1 [9.0]
LDC-007	125 [4.92]	127 [5.00]	122 [4.80]	112 [4.41]	80 [3.15]	4.9 [10.8]
LDC-011	125 [4.92]	127 [5.00]	142 [5.59]	112 [4.41]	100 [3.94]	6.6 [14.6]
LDC-015	125 [4.92]	127 [5.00]	152 [5.98]	112 [4.41]	110 [4.33]	8 [17.6]
LDC-022	155 [6.10]	160 [6.30]	148 [5.83]	95 [3.74]	88 [3.46]	8.5 [18.7]
LR3y-2040	120 [4.7]	125 [4.9]	65 [2.6]	100 [3.9]	45 [1.8]	2 [4.4]
LR3y-2055	120 [4.7]	125 [4.9]	75 [2.6]	100 [3.9]	55 [2.2]	2.2 [4.4]
LR3y-2075	150 [5.9]	155 [6.1]	79 [3.1]	90 [3.5]	54 [2.1]	4.9 [10.8]
LR3y-3110	150 [5.9]	155 [6.1]	79 [3.1]	90 [3.5]	54 [2.1]	5 [11]
LR3y-3150	150 [5.9]	169 [6.7]	85 [3.3]	90 [3.5]	56 [2.2]	5.5 [12.1]
LR3-022	180 [7.1]	182 [7.2]	130 [5.1]	150 [5.9]	74 [2.9]	7.8 [17.2]
LU3-003	180 [7.1]	170 [6.7]	110 [4.3]	150 [5.9]	60 [2.4]	5.2 [11.5]
LU3-005	180 [7.1]	170 [6.7]	110 [4.3]	150 [5.9]	60 [2.4]	5.8 [12.8]
LU3-011	180 [7.1]	180 [7.1]	130 [5.1]	150 [5.9]	70 [2.8]	8 [17.6]
LU3-015	180 [7.1]	160 [6.3]	170 [6.7]	150 [5.9]	70 [2.8]	7.5 [16.5]
LU3-022	180 [7.1]	160 [6.3]	170 [6.3]	150 [5.9]	70 [2.8]	8 [17.6]
LU3-030	180 [7.1]	170 [6.3]	185 [7.3]	150 [5.9]	84 [3.3]	10 [22]
LU3-037	180 [7.1]	170 [6.3]	185 [7.3]	150 [5.9]	84 [3.3]	10 [22]
LU3-055	240 [9.4]	170 [6.3]	216 [8.5]	200 [7.9]	76 [3]	16 [35.3]
LU3-090	180 [7.1]	195 [7.7]	165 [4.5]	150 [5.9]	109 [4.3]	15 [33.1]
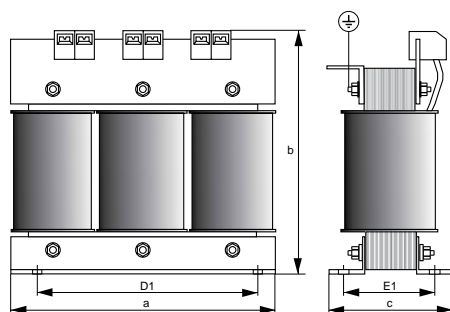
LR3y series
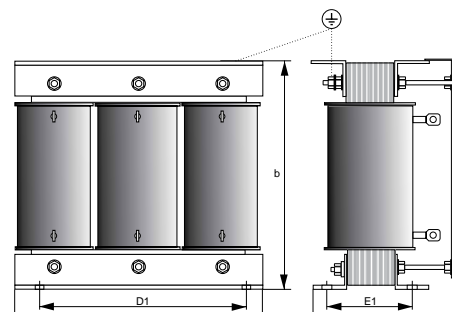
LU3 - LR3 series
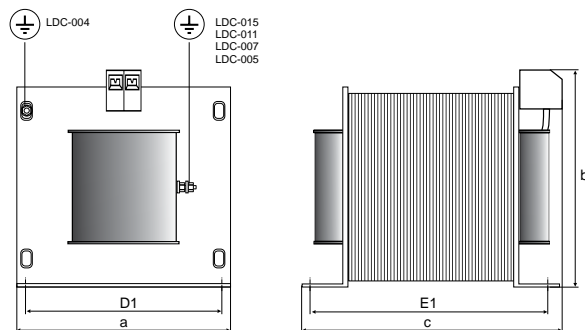
LDC-004...015 series
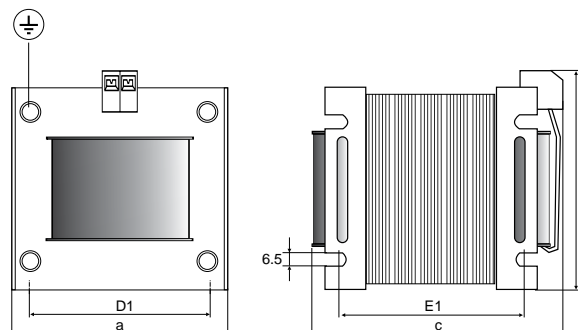
LDC-022

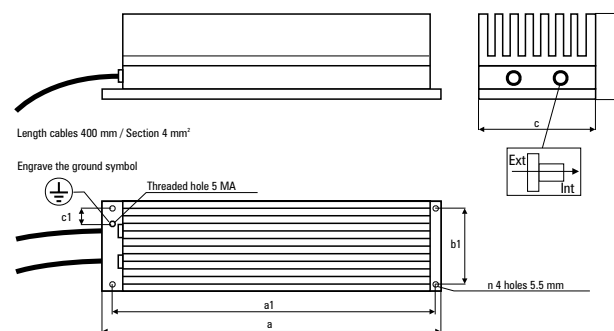Elevator Drives

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Resistors dimensions

Resistor type	Dimensions mm [inches]						Weight kg [lbs]
	a	b	c	a1	b1	c1	
BR T4K0-11R6	625 [24.6]	100 [3.9]	250 [9.8]	605 [23.8]	40 [1.6]		7.0 [15.43]
BR T4K0-15R4	625 [24.6]	100 [3.9]	250 [9.8]	605 [23.8]	40 [1.6]		7.0 [15.43]
BR T8K0-7R7	625 [24.6]	165 [6.5]	250 [9.8]	605 [23.8]	60 [2.4]		10.0 [22.04]
RF 200 68R	300 [8.7]	27 [1.06]	36 [1.41]	290 [11.41]	-	-	0.57 [1.25]
RF 300 D 100R	260 [10.24]	47 [1.85]	106 [4.17]	-	17.5 [0.69]	93.5 [3.68]	1.4 [3.09]
RF 300 D 68R	625 [10.24]	47 [1.85]	106 [4.17]	-	17.5 [0.69]	93.5 [3.68]	1.4 [3.09]
RFPD 750 DT 100R	200 [7.9]	70 [2.8]	106 [4.17]	-	17.5 [0.69]	93.5 [3.68]	1.7 [3.75]
RFPD 1100 DT 40R	320 [12.6]	70 [2.8]	106 [4.17]	-	17.5 [0.69]	93.5 [3.68]	2.7 [5.95]
RFPR 750 D 68R	245 [9.6]	75 [2.95]	100 [3.9]	230 [9.1]	70 [2.8]	30 [1.2]	4.2 [9.3]
RFPR 1200 D 49R	310 [12.2]	75 [2.95]	100 [3.9]	350 [13.78]	70 [2.8]	30 [1.2]	3.2 [7.1]
RFPR 1900 D 28R	365 [14.4]	75 [2.95]	100 [3.9]	350 [13.78]	70 [2.8]	30 [1.2]	4.2 [9.3]

BR T2K0: PG 11/PG16
BR T4K0: PG 13
BR T8K0: PG 16

PG 7: on version with Thermostat only

13x6.5

BR T4K0..., IP20 series

Slot for screw M5

Cable length = 400mm (15.75 inches)

RF ... series

Cables length 500 mm / Section 4 mm²

Thermal protection cable

RFPD… series

Length cables 400 mm / Section 4 mm²

Engrave the ground symbol

Threaded hole 5 MA

Ext Int

n 4 holes 5.5 mm

RFPR… series, RF200 ... series

Elevator Drives

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EMI Filters dimensions

Filter type	Dimensions mm [inches]						Weight kg [lbs]
	a	b	c	D1	E1	M	
EMI-FTF-480-7	190 [7.48]	40 [1.57]	70 [2.76]	175 [6.89]	20 [.79]	Ø5	0.6 [1.3]
EMI-FTF-480-16	250 [9.84]	45 [1.77]	70 [2.76]	235 [9.25]	25 [0.98]	Ø6	0.8 [1.8]
EMI-FTF-480-30	270 [10.63]	50 [1.97]	85 [3.35]	255 [10.04]	30 [1.18]	Ø6	1 [2.2]
EMI-FTF-480-42	310 [12.20]	50 [1.97]	85 [3.35]	295 [11.61]	30 [1.18]	Ø6	1.3 [2.9]
EMI-FTF-480-75	270 [10.6]	80 [3.54]	135 [5.31]	255 [10.0]	60 [2.36]	Ø6.7	0.6 [1.3]
EMI-FTF-480-100	270 [10.6]	90 [3.54]	150 [5.91]	255 [10.0]	65 [2.56]	Ø6.7	0.8 [1.8]
EMI-FTF-480-130	270 [10.6]	90 [3.54]	150 [5.91]	255 [10.0]	65 [2.56]	Ø6.7	3.6
EMI-FTF-480-180	400 [15.8]	120 [4.72]	170 [6.69]	373 [14.7]	102 [4.02]	Ø6.7	6.2 [13.2]
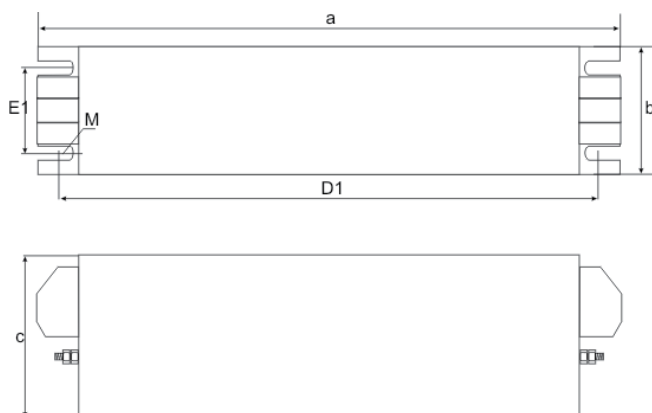
EMI-FTF-480-....

Elevator Drives

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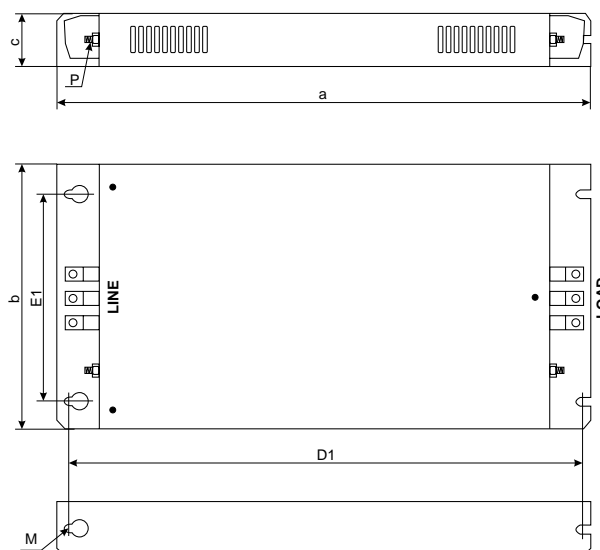
Elevator Drive Terms and Acronyms

Asynchronous Motor
A squirrel cage induction motor with a wound stator typical of NEMA Design B.

Auto tuning
Also referred to as "standstill tuning" usually applied to the ability of the VFD to pulse the motor during set-up but the pulse is insufficient to cause the motor to rotate. This means there is no need to mechanically disconnect the gearbox while setting parameters.

Auto phasing
A term applied to the ability of the drive to set parameters of encoders (feedback sensors) without rotating the brushless (permanent magnetic) motor.

Braking Resistor
When a VFD reduces speed, the motor acts as a generator and brakes which supplies energy to the drive and is collected in the braking circuitry of the VFD. The function of the braking resistor is to provide a load during braking, which makes sure the braking power (energy) is absorbed by the braking resistor. This facilitates braking of a heavy load quickly and is typical of traction elevator applications.

Brushless Motor *(BSHL)*
Refer to Permanent-magnet motors

CAN bus *(Controlled Area Network)*
A standard designed to allow micro-controllers and other devices to communicate with other devices within a network without a host computer.

Choke
Also called reactor which is a passive two-terminal electrical inductor which is designed specifically for blocking higher-frequency alternating current (AC) in a circuit, while allowing lower frequency or DC current to pass. A choke usually consists of a coil of insulated wire often wound on a magnetic core. The choke will resist changes to the current passing through. Therefore, alternating currents of higher frequency, which reverse direction rapidly, are resisted more than currents of lower frequency; the choke's impedance increases with frequency. It's low electrical resistance allows it to pass steady DC current with little power loss, while blocking AC current. ❶

Closed Loop Systems
Also referred to as an automatic system or feedback control system, or negative feedback system
Consists of a sensor(s) used to monitor the actual operating state of the system and to feed back to the input of the controller an analogue or digital signal representing the output state. The actual and desired reference states are continually compared and if the actual state is different from the reference state, an error signal is generated; which the controller uses to force a change in the controllable parameters to eliminate the error by driving the system back towards the desired operating point.❷

Contactorless (SIL-3) Output Operation
Most countries require a fault contactor to be incorporated into the elevator controller. Fault contactors are required in solid state reduced voltage elevator starters to de-energize the motor in case of failure. Fault contactors are also used in conjunction with the application of variable frequency drives. A fault contactor must fail safe. Some European countries have adapted a new standard (EN81-1: 1998 + A3:209 article 9.11.13; SIL3 in compliance with EN6 1800-5-2-2007) which allows 'contactorless' operation if the VFD is certified to these standards.

DC Injection Braking
The drive injects a DC current in the motor windings generating braking torque in the motor resulting in additional neat in the motor. The kinetic energy is dissipated in the motor. DC Injection braking can only be used in the sensorless scalar control mode. DC injection braking is an alternative method to using a braking resistor, but with critical limitations.

DCP *(Drive Control and Position)*
A protocol between lift controller and VFD drive via RS-485 serial line. Versions DCP3 or DCP4 are possible, primarily utilities in European applications.

EMC (*Electromagnetic interference compatibility)*
Most countries have legal requirements that mandate electromagnetic compatibility: electronic and electrical hardware must still work correctly when subjected to certain amounts of EMI, and should not emit EMI, which could interfere with other equipment (such as radios). In the United States, the 1982 Public Law 97-259 allowed the Federal Communications Commission (FCC) to regulate the susceptibility of consumer electronic equipment. European counties (EU) have adapted a strict directive or testing standard (EN 12015) covering electromagnetic compatibility of devices to determine if a EMI filter is required to comply.

EMI *(Electromagnetic interference)*
A disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an electrical circuit or electronic devices. The disturbance may interrupt or degrade the effective performance of the nearby devices. EMI may be emitted or naturally from the Sun or the Northern Lights or an electrical circuit with rapidly changing electrical currents. Integrated circuits are often a source of EMI, but they must usually couple their energy to larger objects such as heat sinks, circuit board planes and cables to radiate significantly. EMI can affect cell phone, FM radio

Elevator Drives

❶ Wikipedia The Free Encyclopedia. Wikipedia.com, Inc. 2013. Web. 4 June. 2013. <http://www.wikipedia.com/>
❷ The Electropedia. Woodbanks Communications Ltd. 2005. Web. 23 July. 2013. <http://www.mpoweruk.com/index.htm>

and television reception, although to a lesser extent.❶

Encoder

A device, circuit, transducer, software program, algorithm or person that converts information from one format or code to another, for the purposes of standardization, speed, secrecy, security, or compressions. ❶ In traction elevator applications encoders are used to feedback speed.

EPR *(Emergency power operation)*

Many elevator installations feature emergency power systems which allows the elevator to be used in blackout situations and prevent people from becoming trapped in elevators. ❶

Flux Vector Control

A type of variable frequency drive which uses internal algorithms to calculate parameters for the requester speed. Flux Vectors maybe in closed-loop (with sensors) applications but in more typically is open-loop (without sensors).

FOC *(Field Oriented Control)*

A type of variable frequency drive which uses the closed loop (with sensor feedback) method. See the definition Vector control.

Geared Traction Elevator

Elevators driven by electric motors. Geared machines use worm gears to control mechanical movement of elevator cars by "rolling" steel hoist cables over a drive sheave which is attached to a gearbox driven by a high speed motor.

These machines are generally the best option for basement or overhead traction use for speeds up to 500 ft/min (2.5 m/s). In order to allow accurate speed control of the motor, and accurate leveling for passenger comfort, a DC hoist motor powered by an AC/DC motor-generator (MG) set was the preferred solution in high-traffic elevator installations for many decades. The widespread availability of solid state AC variable frequency drives has allowed infinitely variable speed AC motors to be used universally, bringing with it the advantages of the older motor-generator based systems. ❶

Gearless Motor

Direct driven without gear box or gear ratio.

Gearless Traction Elevators

A Low speed (low RPM), high torque electric motor. In this case, the drive sheave is directly attached to the end of the motor. Gearless traction elevators can reach speeds of up to 2,000 ft/min (10 m/s), or even higher. A brake is mounted between the motor and drive sheave to hold the elevator stationary at a floor. This brake is usually an external drum type and is actuated by spring force and held open electrically; a power failure will cause the brake to engage and prevent the elevator from falling. Solid state AC variable frequency drives are widely used in gearless as well as geared lift applications allowing infinitely variable speed control of AC motors. ❶

Hydraulic Elevators

An elevator type that uses an underground cylinder to lift the elevator cab and are quite common for low level buildings with 2–5 floors and have speeds of up to 200 feet/minute (1 meter/second). A hydraulic pump is used to push fluid into the cylinder then pushes the car and its passengers upwards. This fluid is slowly released back into a tank when the car descends on its own weight. The high current draw when starting up (often called inrush current) of the pump motor is reduced by using reduced voltage starting methods. Historically only wye-delta (sometimes called star-delta) were used for reduced voltage of hydraulic elevators but the introduction smaller and less expensive solid state soft-starters is now reducing high demand on a building's electrical system. There are some environmental concerns about the lifting cylinder and/or tank leaking fluid into the ground. ❶

IGBT *(Insulated-gate Bipolar Transistor)*

A three-terminal power semiconductor device primarily used as an electronic switch which combines high efficiency and fast switching. It switches electric power in many modern appliances: Variable-Frequency Drives (VFDs), electric cars, trains, variable speed refrigerators, air-conditioners and even stereo systems with switching amplifiers. The IGBT is used in medium- to high-power applications such as switched-mode power supplies, traction motor control and induction heating. ❶

Joules *(symbol J)*

A derived unit of energy, work, or amount of heat in the International System of Units. It is equal to the energy expended (or work done) in applying a force of one newton through a distance of one meter (1 newton meter or N·m), or in passing an electric current of one ampere through a resistance of one ohm for one second. ❶

Load Cell

an electro-mechanical transducer, which converts a force applied to it, into an electrical signal. Load cells are used in traction elevator applications, to tell the drive the loaded car weight, in order to pre-torque the motor to the appropriate value.

Open Loop System

A system that does not use sensors (encoder) for feedback. Typical of single variable control VFD using the Volt per Hertz (V/F) method.

Elevator Drives

❶ Wikipedia The Free Encyclopedia. Wikipedia.com, Inc. 2013. Web. 4 June. 2013. <http://www.wikipedia.com/>

Permanent-magnet motors
Also called Brushless Motor or Servo Motor or Synchronous Motor
Historically all large industrial DC motors used wound field or rotor magnets. Permanent magnets have traditionally only been useful on small motors because it was difficult to find a material capable of retaining a high-strength field. Only recently have advances in materials technology allowed the creation of high-intensity permanent magnets, such as neodymium magnets, allowing the development of compact, high-power, high speed motors without the extra real-estate of field coils and excitation means. Permanent magnet motors and generators offer several advantages like decreased installation space for higher power and unnecessary gearboxes (gearless applications). ❶

PID *(Proportional-Integral-Derivative Controller)*
A generic control loop feedback mechanism (controller) widely used in industrial control systems. A PID controller calculates an "error" value as the difference between a measured process variable and a desired set point. The controller attempts to minimize the error by adjusting the process control outputs. The PID controller calculation algorithm involves three separate constant parameters, and is accordingly sometimes called three-term control: the proportional, the integral and derivative values, denoted P, I, and D. ❶

PWM *(Pulse-width Modulation)*
Also referred to pulse-duration modulation (PDM) is a modulation technique that conforms the width of the pulse, formally the pulse duration, based on modulator signal information. Its main use is to allow the control of the power supplied to electrical devices, especially to inertial loads such as motors. The average value of voltage (and current) fed to the load is controlled by turning the switch between supply and load on and off

at a fast pace. The longer the switch is on compared to the off periods, the higher the power supplied to the load. The PWM switching frequency has to be much faster than what would affect the load, which is to say the device that uses the power. Typically the switching frequency is from few kilohertz (kHz) to tens of kHz for a motor drive. ❶

Regenerative Energy Unit
When the term regenerative energy is applied to traction elevator applications this means that the energy of the heavy load is electronically converted to AC energy or a power source during braking cycles. Regenerative energy units represent an alternative to using braking resistors and maybe a separate unit from the variable frequency drive.

Servo Motor or Synchronous Motor
Refer to Permanent-magnet motors

SSC or SLS *(Sensorless Scalar Control)*
Where VFD uses single variable control or Volts per Hertz (V/F) method.

SinCos
A term applied to trigonometric functions where vector outputs are defined by sine and cosine algorithms. Many applications require sine and cosine data to control the function and or position of the machine.

THD *(Total harmonic distortion)*
A measurement of the harmonic distortion present and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency. THD is used to characterize the linearity of audio systems and the power quality of electric power systems. In power systems, lower THD means reduction in peak currents, heating, emissions, and core loss in motors. ❶

TTL *(Transistor-Transistor Logic)*
A class of digital circuits built from bipolar junction transistors (BJT) and

resistors. It is called transistor–transistor logic because both the logic gating function and the amplifying function are performed by transistors . TTL is notable for being a widespread integrated circuit (IC) family used in many applications such as computers, industrial controls, test equipment and instrumentation, consumer electronics, synthesizers, etc. The designation TTL is sometimes used to mean TTL-compatible logic levels, even when not associated directly with TTL integrated circuits, for example as a label on the inputs and outputs of electronic instruments. ❶

Vector control or vector drive
*Also called FOC (see FOC definition).*
A variable frequency drive (VFD) control method which controls three-phase AC electric motor output by means of two controllable VFD inverter output variables. Vector drives require sensors for a closed loop system.
• Voltage magnitude
• Frequency
(Voltage angle, or phase, is only indirectly controlled)

FOC is a control technique used in AC synchronous and induction motor applications that was originally developed for high-performance motor applications. FOC can operate smoothly over the full speed range, can generate full torque at zero speed, and is capable of fast acceleration and deceleration. FOC that is becoming increasingly attractive for lower performance applications due to motor size, cost and power consumption reduction superiority.

Not only is FOC very common in induction motor control applications due to its traditional superiority in high-performance applications, but the expectation is that it will eventually nearly universally displace single-variable scalar volts-per-Hertz (V/F) control.❶

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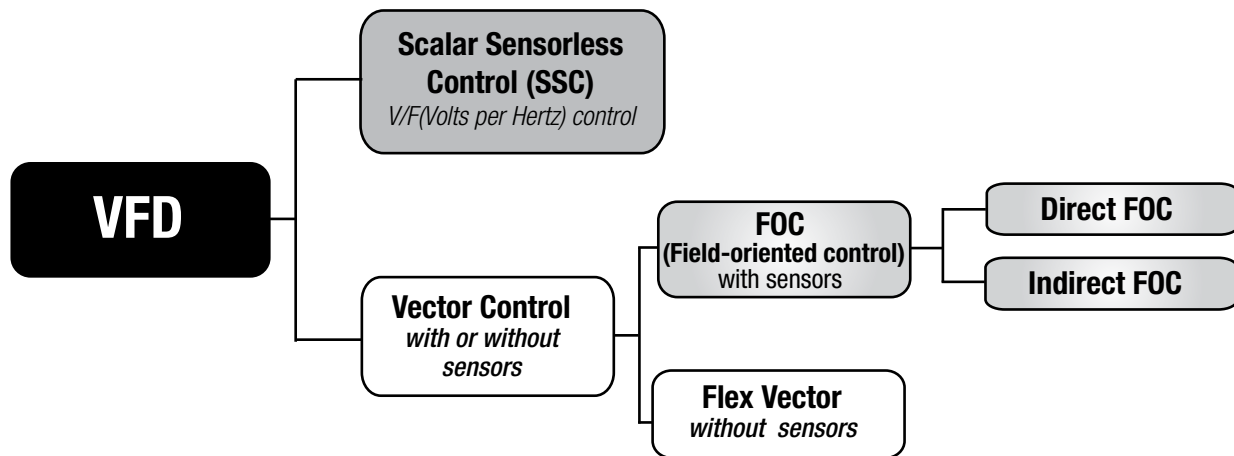
**VFD** *(Variable Frequency Drive)*
Also called adjustable-frequency drive, variable-speed drive, AC drive, micro drive or *inverter drive*
A type of adjustable-speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage. ❶

Historically, VFD's were of the single-variable scalar Volts-per-Hertz (V/F) control type which is often referred to as Sensorless Scalar Control (SSC). More recently, VFD's usually are of the vector drive type. *See Vector control.*

Components of a VFD
The inverter inverts the constant frequency and voltage of an existing three-phase network into DC voltage, from which it obtains a new three-phase network with variable voltage and frequency. With this variable three-phase network, the speed of three-phase asynchronous motors can be controlled continuously.
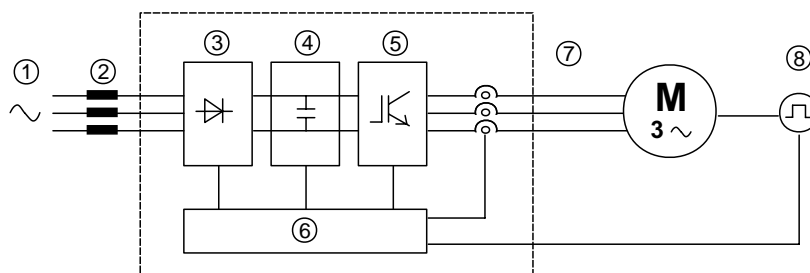
1. Main supply voltage

2. Mains choke

3. Three-phase rectifier bridge: converts the AC voltage into DC voltage via a three-phase full wave bridge

4. Intermediate circuit: with pre-load resistor and leveling capacitors DC voltage (U_{DC}) = $\sqrt{2}$ x mains voltage (U_{LN})

5. IGBT Inverter bridge: inverts DC voltage into three-phase AC voltage with variable amplitude and frequency

6. Configurable control section: cards for controlling and regulating the closed and open-loop power section. Commands, references and reactions are connected to these.

7. Output voltage: three-phase AC voltage

8. Speed feedback encoder

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Notes

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