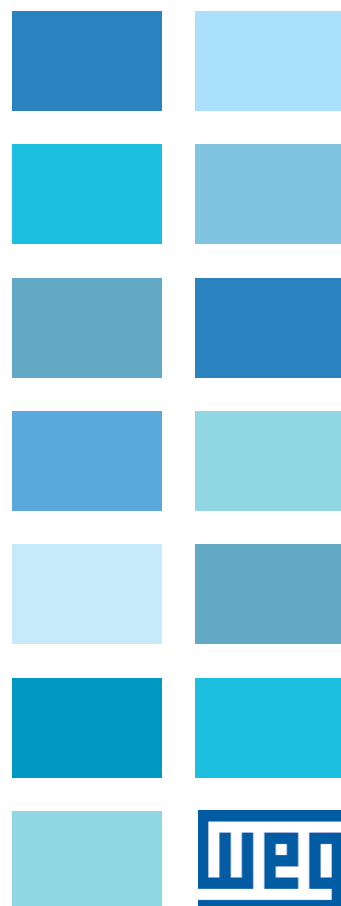
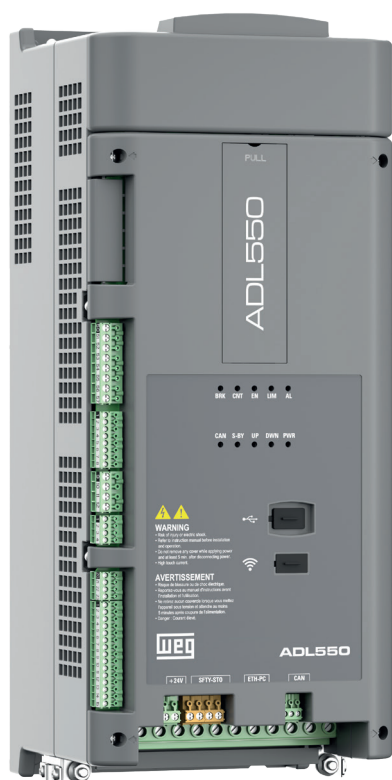


# Vector inverter for lifts with synchronous/asynchronous motors

## ADL500

### Hardware and start up User Manual

Language: English



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# Information about this manual

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The ADL500 HW+QS (Hardware and Quick start guide) is a handy-sized manual for mechanical installation, electrical connection and fast start-up.  
The manual of functions and parameter descriptions (ADL500 SW) can be found on the WEG website, Downloads section ([https://www.weg.net/...](https://www.weg.net/)).

## Firmware version

This manual is updated according to:

- firmware version V 2.x.2
- Lift application, EFC V 2.x.0

The identification number of the firmware version can be read in the datamatrix (see section 2.3 of this manual) or on parameter PAR 174 **Firmware Version** (DRIVE INFO menu).

## General information

### Note !

.....  
In industry, the terms "Inverter", "Regulator" and "Drive" are sometimes interchanged. In this document, the term "Drive" will be used.  
.....

Before using the product, read the safety instruction section carefully. Keep the manual in a safe place and available to engineering and installation personnel during the product functioning period.

WEG Automation Europe S.r.l. has the right to modify products, data and dimensions without notice. The data can only be used for the product description and they can not be understood as legally stated properties.

Thank you for choosing this WEG product.

We will be glad to receive any possible information which could help us improving this manual. The e-mail address is the following: [techdoc@weg.net](mailto:techdoc@weg.net).

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<b>Information about this manual .....</b>	<b>2</b>
<b>1 - Safety Precautions .....</b>	<b>5</b>
1.1 Symbols used in the manual .....	5
1.2 Safety precaution.....	5
1.3 General warnings .....	6
1.4 Instruction for compliance with UL Mark (UL requirements), U.S. and Canadian electrical codes.....	7
1.5 Disclaimer.....	7
<b>2 - Introduction to the product.....</b>	<b>8</b>
2.1 Dedicated features .....	9
2.2 Identification of components.....	10
2.3 Product identification .....	11
<b>3 - Transport and storage.....</b>	<b>12</b>
3.1 General.....	12
3.2 Permissible Environmental Conditions .....	12
<b>4 - Specification .....</b>	<b>13</b>
4.1 Environmental Conditions.....	13
4.2 Standards .....	13
4.3 Control modes .....	13
4.4 Precision.....	13
4.4.1 Speed control .....	13
4.4.2 Speed control limits.....	13
4.4.3 Torque control.....	14
4.4.4 Current rating .....	14
4.5 Input electrical data .....	14
4.6 Output electrical data.....	15
4.6.1 Derating values in overload condition .....	15
4.6.2 Derating values for switching frequency.....	15
4.6.3 Kt: Ambient temperature reduction factor.....	16
4.7 Voltage level of the inverter for safe operations .....	16
4.8 No-load consumption (Energy rating).....	16
4.9 Cooling .....	16
4.10 Weights and dimensions.....	17
<b>5 - Options .....</b>	<b>18</b>
5.1 External fuses.....	18
5.1.1 Network side fuses (F1) .....	18
5.2 Input chokes .....	18
5.2.1 DC input chokes.....	18
5.2.2 AC input chokes .....	18
5.3 AC output chokes .....	19
5.4 External braking resistors .....	19
5.5 EMC Filter.....	20
5.6 Ultracapacitor energy storage module.....	21
5.7 Emergency floor return battery (ADL5...-EMS).....	22
Emergency operation and connection diagram .....	22
<b>6 - Mechanical installation .....</b>	<b>23</b>
6.1 Maximum inclination and assembly clearances .....	23
6.2 Fastening positions.....	24
<b>7 - Wiring Procedure.....</b>	<b>25</b>
7.1 Location and identification of terminals and LEDs.....	27
7.2 Power section .....	28
7.2.1 Power terminals and connection .....	28
7.2.2 Cable cross-sections.....	28
7.2.3 Connection of shielding (recommended).....	28
7.2.4 EMC guide line .....	29
7.2.5 Block diagram of power section .....	29
7.2.6 Internal EMC filter (standard).....	30
7.2.7 Connection of AC and DC chokes (optional).....	30
7.3 Regulation section .....	31
7.3.1 Cable cross-sections.....	31
7.3.2 I/O and Relays connection .....	31
7.3.3 Feedback Connection .....	32
7.3.3.1 Phasing.....	38

7.3.4 +24V supply connection .....	39
7.3.5 Safety STO connection (SFTY-STO).....	39
7.3.6 Led .....	39
7.4 ETH-PC Ethernet Interface (RJ45 connector).....	40
7.4.1 Ethernet Configuration .....	40
7.4.2 Point-to-point network topology.....	40
7.5 CAN interface .....	41
7.6 Optional Keypad interface (RJ45 connector).....	42
7.7 USB port for data storage .....	42
7.8 Wi-Fi module port .....	42
7.9 Connection diagrams.....	43
7.9.1 Regulation potentials, digital I/O.....	43
7.9.2 Typical connection diagram.....	44
7.9.3 Emergency connection diagram.....	45
7.9.3.1 Emergency connection diagram with EMS module (ADL5.0-...EMS modes).....	46
7.9.3.2 Emergency connection diagram with UPS .....	47
7.9.4 Safety connections .....	48
7.9.5 Connection diagram for emergency maneuver .....	50
7.10 Braking .....	51
7.10.1 Braking unit (internal) .....	51
<b>8. Use of the optional keypad (KB-ADL500) .....</b>	<b>52</b>
8.1 Description.....	52
8.1.1 Membrane keypad.....	52
8.1.2 Meaning of LEDs.....	52
8.2 Navigating with the optional keypad .....	53
8.2.1 Scanning of the first and second level menu.....	53
8.2.2 Display of a parameter .....	53
8.2.3 Scanning of the parameters .....	54
8.2.4 List of the last parameters modified .....	54
8.2.5 "FIND" function.....	54
8.2.6 Parameter modification .....	54
8.2.7 How to save parameters .....	56
8.2.8 Configuration of the display.....	57
8.2.8.1 Language selection .....	57
8.2.8.2 Access level selection.....	58
8.2.9 Startup display.....	58
8.2.10 Back-lighting of the display.....	58
8.2.11 Alarms.....	58
8.2.11.1 Alarm reset.....	59
8.2.12 Messages.....	59
8.2.13 Saving and recovery of new parameter settings .....	59
8.2.14 Saving and recovery of new parameter settings on USB.....	59
8.2.15 Asynchronous/Synchronous selection.....	60
<b>9 - Commissioning via keypad .....</b>	<b>61</b>
9.1 DRIVE SETUP .....	63
9.2 STARTUP WIZARD for Asynchronous motor .....	65
9.3 STARTUP WIZARD for brushless motors.....	72
9.4 OPTIMIZATION WIZARD.....	78
9.5 TROUBLESHOOTING.....	79
<b>10 - Troubleshooting.....</b>	<b>80</b>
10.1 Alarms.....	80
10.1.1 EFC application alarms .....	83
10.2 Speed fbk loss alarm according to the type of feedback .....	84
10.2.1 Reset Speed fbk loss alarm .....	86
10.2.2 Encoder error alarm .....	86
10.3 Messages .....	87
<b>Appendix.....</b>	<b>90</b>
A.1 - Optional cards.....	90
A.1.1 - Installation.....	90
A.1.2 - Optional card EXP-IO1-ADL500.....	91
A.1.3 - Optional card EXP-DCP-ADL500 .....	92
A.2 - Input/Output features .....	93
A.2.1 Selection of Voltage/Current at analog input AI1 .....	95
A.3 Windows PC Network Configuration .....	96
A.4 - Brake monitoring system .....	97
A.4.1 Introduction .....	97
A.4.2 Configuration of the brake fault alarm.....	97
A.4.3 Maintenance of the brake fault alarm function .....	98
A.4.4 Troubleshooting .....	98



# 1 - Safety Precautions

## 1.1 Symbols used in the manual



**Warning!**

Indicates a procedure, condition, or statement that, if not strictly observed, could result in personal injury or death.

*Indique le mode d'utilisation, la procédure et la condition d'exploitation. Si ces consignes ne sont pas strictement respectées, il y a des risques de blessures corporelles ou de mort.*



**Caution**

Indicates a procedure, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment.

*Indique le mode d'utilisation, la procédure et la condition d'exploitation. Si ces consignes ne sont pas strictement respectées, il y a des risques de détérioration ou de destruction des appareils.*



Indicates that the presence of electrostatic discharge could damage the appliance. When handling the boards, always wear a grounded bracelet.

*Indique que la présence de décharges électrostatiques est susceptible d'endommager l'appareil. Toujours porter un bracelet de mise à la terre lors de la manipulation des cartes.*



**Attention**

Indicates a procedure, condition, or statement that should be strictly followed in order to optimize these applications.

*Indique le mode d'utilisation, la procédure et la condition d'exploitation. Ces consignes doivent être rigoureusement respectées pour optimiser ces applications.*

**Note !**

Indicates an essential or important procedure, condition, or statement.

*Indique un mode d'utilisation, de procédure et de condition d'exploitation essentiels ou importants*

### Qualified personnel

For the purpose of this Instruction Manual, a "Qualified person" is someone who is skilled to the installation, mounting, start-up and operation of the equipment and the hazards involved. This operator must have the following qualifications:

- trained in rendering first aid.
- trained in the proper care and use of protective equipment in accordance with established safety procedures.
- trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.

### Personne qualifiée

*Aux fins de ce manuel d'instructions, le terme « personne qualifiée » désigne toute personne compétente en matière d'installation, de montage, de mise en service et de fonctionnement de l'appareil et au fait des dangers qui s'y rattachent. L'opérateur en question doit posséder les qualifications suivantes :*

- formation lui permettant de dispenser les premiers soins
- formation liée à l'entretien et à l'utilisation des équipements de protection selon les consignes de sécurité en vigueur
- formation et habilitation aux manoeuvres suivantes : branchement, débranchement, vérification des isolations, mise à la terre et étiquetage des circuits et des appareils selon les consignes de sécurité en vigueur

### Use for intended purpose only

The power drive system (electrical drive + application plant) may be used only for the application stated in the manual and only together with devices and components recommended and authorized by WEG.

### Utiliser uniquement dans les conditions prévues

*Le système d'actionnement électrique (drive électrique + installation) ne peut être utilisé que dans les conditions d'exploitation et les lieux prévus dans le manuel et uniquement avec les dispositifs et les composants recommandés et autorisés par WEG.*

## 1.2 Safety precaution

The following instructions are provided for your safety and as a means of preventing damage to the product or components in the machines connected. This section lists instructions, which apply generally when handling electrical drives. Specific instructions that apply to particular actions are listed at the beginning of each chapter.

Les instructions suivantes sont fournies pour la sécurité de l'utilisateur tout comme pour éviter l'endommagement du produit ou des composants à l'intérieur des machines raccordées. Ce paragraphe dresse la liste des instructions généralement applicables lors de la manipulation des drives électriques.

Les instructions spécifiques ayant trait à des actions particulières sont répertoriées au début de chaque chapitre.

Read the information carefully, since it is provided for your personal safety and will also help prolong the service life of your electrical drive and the plant you connect to it.

Lire attentivement les informations en matière de sécurité personnelle et visant par ailleurs à prolonger la durée de vie utile du drive tout comme de l'installation à laquelle il est relié.

## 1.3 General warnings

.....  
This equipment contains dangerous voltages and controls potentially dangerous rotating mechanical parts. Non-compliance with Warnings or failure to follow the instructions contained in this manual can result in loss of life, severe personal injury or serious damage to property.

*Cet appareil utilise des tensions dangereuses et contrôle des organes mécaniques en mouvement potentiellement dangereux. L'absence de mise en pratique des consignes ou le non-respect des instructions contenues dans ce manuel peuvent provoquer le décès, des lésions corporelles graves ou de sérieux dégâts aux équipements.*

Only suitable qualified personnel should work on this equipment, and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual. The successful and safe operation of this equipment is dependent upon its proper handling, installation, operation and maintenance.

*Seul un personnel dûment formé peut intervenir sur cet appareil et uniquement après avoir assimilé l'ensemble des informations concernant la sécurité, les procédures d'installation, le fonctionnement et l'entretien contenues dans ce manuel. La sécurité et l'efficacité du fonctionnement de cet appareil dépendent du bon accomplissement des opérations de manutention, d'installation, de fonctionnement et d'entretien.*

In the case of faults, the drive, even if disabled, may cause accidental movements if it has not been disconnected from the mains supply.

*En cas de panne et même désactivé, le drive peut provoquer des mouvements fortuits s'il n'a pas été débranché de l'alimentation secteur.*

### Electrical Shock

The DC link capacitors remain charged at a hazardous voltage even after cutting off the power supply.

Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or inside the device is listed in section "4.7 Voltage level of the inverter for safe operations" on page 16.

### Risque de décharge électrique

*Les condensateurs de la liaison à courant continu restent chargés à une tension dangereuse même après que la tension d'alimentation a été coupée.*

*Ne jamais ouvrir l'appareil lorsqu'il est sous tension. Le temps minimum d'attente avant de pouvoir travailler sur les bornes ou bien à l'intérieur de l'appareil est indiqué dans la section "4.7 Voltage level of the inverter for safe operations" on page 16.*

### Electrical Shock and Burn Hazard:

When using instruments such as oscilloscopes to work on live equipment, the oscilloscope's chassis should be grounded and a differential probe input should be used. Care should be used in the selection of probes and leads and in the adjustment of the oscilloscope so that accurate readings may be made. See instrument manufacturer's instruction book for proper operation and adjustments to the instrument.

*Décharge Électrique et Risque de Brûlure : Lors de l'utilisation d'instruments (par exemple oscilloscope) sur des systèmes en marche, le châssis de l'oscilloscope doit être relié à la terre et une sonde différentiel devrait être utilisé en entrée. Les sondes et conducteurs doivent être choisis avec soin pour effectuer les meilleures mesures à l'aide d'un oscilloscope. Voir le manuel d'instruction pour une utilisation correcte des instruments.*

### Fire and Explosion Hazard:

Fires or explosions might result from mounting Drives in hazardous areas such as locations where flammable or combustible vapors or dusts are present. Drives should be installed away from hazardous areas, even if used with motors suitable for use in these locations.

*Risque d'incendies et d'explosions: L'utilisation des drives dans des zones à risques (présence de vapeurs ou de poussières inflammables), peut provoquer des incendies ou des explosions. Les drives doivent être installés loin des zones dangereuses, et équipés de moteurs appropriés.*

.....

## 1.4 Instruction for compliance with UL Mark (UL requirements), U.S. and Canadian electrical codes

### Short circuit ratings

ADL500 inverters must be connected to a mains capable of supplying a symmetrical short-circuit power of less than or equal to “xxxx A rms.

The values of the “xxxx” A rms short-circuit current, in accordance with UL requirements ( ASME17.5/CSA B44.1 ), for each motor power rating (Pn mot in the manual) are shown in the table below.

Short current rating	
Pn mot (kW)	SCCR ( A )
1,1...37,3	5000
39...149	10000

### Note!

Drive must be protected by semiconductor Fuse type as specified in the instruction manual.

### Branch circuit protection

In order to protect drive against over-current use fuses specified in [par. 5.1](#).

### Environmental condition

The drive has to be considered “Open type equipment”. Max surrounding air temperature equal to 40°C. Pollution degree 2. Additional details on operating temperatures can be found in section 4.1.

### Wiring of the input and output power terminals

Use UL cables rated at 75°C and round crimping terminals (if necessary). If you choose to crimp the terminals, use a tool recommended by the terminal manufacturer.

Field wiring terminals shall be used with the tightening torque specified in "7.2.2 Cable cross-sections" on page 28.

### Over-voltage control

For Canadian installations only (CSA requirements), the use of a COOPER BUSSMANN model SPP40SP3480PNG DIN rail snubber (or equivalent) is recommended on the power supply line, upstream of the drive.

### Minimum time required for safe DC-link voltage

Before removing drive cover in order to access internal parts, after mains disconnection wait for time as follow :

Drive size	Safe time ( sec )
size 1.....5	300

### Over-speed; over-load/current limit; motor overload

Drive incorporate over-speed, over-current/current limit, motor overload protection. Instruction manual specify degree of protection and detailed installation instruction.

## 1.5 Disclaimer

Any remote connection functions shall be used only under adequate security conditions, in compliance with current regulatory provisions and only by properly trained personnel. The evaluation of such conditions is up to the user.

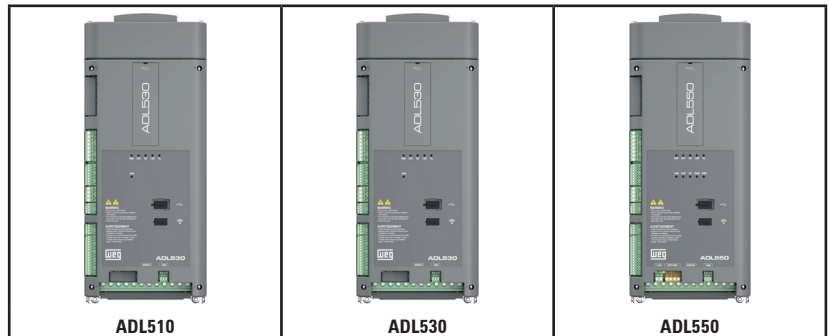
## 2 - Introduction to the product

The ADL500 is the result of WEG's experience in the civil lift engineering sector, gained from its commitment to working in close partnership with leading operators in the sector to develop technical solutions and application programs. The ADL500 integrates the most complete and advanced lift inverter technology, for maximum synergy with the full range of installation requirements but, above all, to offer a cost-effective and immediate solution for lift control systems. This drive is designed to power loads such as **asynchronous or synchronous** permanent magnet (brushless) motors, for applications in the lift sector.

This compact drive is suitable for installation in cabinets for roomless applications.

**ADL500 is available in three configurations designed to be perfect for each category of lift:**




- ADL550** for "High-end" buildings, advanced safety features (STO, SBT), DCP3 and DCP4 Green and Regeneration features, with an optional internal board;
- ADL530** for "Medium-end" buildings, motor control with and without gearboxes, simple start-up wizard and quick troubleshooting features;
- ADL510** for "Low-end" buildings or modernisations, easy to install, designed for motors with gearboxes, and optimised for open loop control;



	ADL510	ADL530	ADL550
<b>Control mode</b>	V/f open loop and closed loop Field oriented control open loop (SLS) and closed loop (FOC)		
<b>Motor Type</b>	Asynchronous	Asynchronous, Synchronous	Asynchronous, Synchronous
<b>Max Output Frequency</b>	300Hz	300Hz	300Hz
<b>Switching Frequency</b>	10kHz (default)	10kHz (default)	10kHz (default)
<b>Overload</b>	183% x 10 s	183% x 10 s	183% x 10 s / 200% x 2 s
<b>Braking Unit</b>	Integrated	Integrated	Integrated
<b>EMI filter</b>	Integrated (ADL510-...-F models)	Integrated (ADL530-...-F models)	Integrated (ADL550-...-F models)
<b>Choke</b>	-	Integrated above 22kW	Integrated above 22kW
<b>Marks</b>	CE, UL	CE, UL	CE, UL
<b>Power Range</b>	4 ... 15kW	4 ... 15kW	4 ... 15kW
<b>Input Voltage Range</b>	3 ph 400 - 480VAc, 50/60Hz	3 ph 230-380-400-460-480VAc, 50/60Hz	3 ph 230-380-400-460-480VAc, 50/60Hz
<b>I/O</b>	8 digital inputs + 1 enable + 1 analog input + 4 relay outputs	8 digital inputs + 1 enable + 2 analog inputs + 4 relay outputs	8 digital inputs + 1 enable + 2 analog inputs + 2 Fast (Freeze) inputs + 4 relay outputs
<b>Optional expansion cards:</b>			
• I/O (EXP-IO1-ADL500) card (*)	-	-	Yes (4 digit. input + 2 digit. output)
• DCP3-DCP4 Protocols card (EXP-DCP-ADL500) (*)	-	-	Yes
<b>Encoder</b>	TTL, HTL + Repetition (Incremental)	TTL, HTL, ENDAT, SIN COS, BISS, SSI + Repetition (Inc. and Abs.)	TTL, HTL, ENDAT, SIN COS, BISS, SSI + Repetition (Inc. and Abs.)
<b>USB 2.0 port</b>	-	Yes	Yes
<b>Ethernet port (100 Mbit/s)</b>	Yes	Yes	Yes
<b>Wi-Fi port</b>	-	Yes	Yes
<b>Wi-Fi external module</b>	-	Yes (optional)	Yes (optional)
<b>CANopen Lift 417</b>	-	Yes	Yes
<b>Safety STO (SIL3 – PLe)</b>	-	-	Yes
<b>Safe Brake Test (SBT)</b>	-	-	Yes
<b>+ 24 Vdc External</b>	-	-	Yes
<b>KB-ADL500 programming keypad</b>	Yes (optional)	Yes (optional)	Yes (optional)
<b>Removable terminals (Regulation section)</b>	Yes	Yes	Yes
<b>Diagnostic Leds</b>	BRK, CNT, EN, LIM, AL	BRK, CNT, EN, LIM, AL, CAN	BRK, CNT, EN, LIM, AL, CAN, S-BY, UP, DWN, PWR

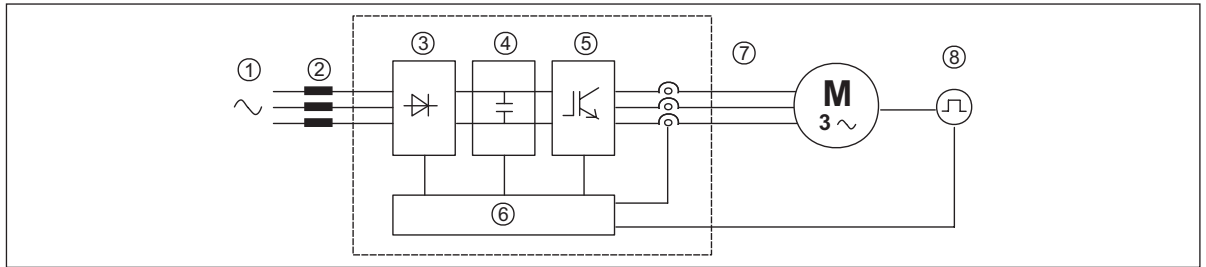
(\*) Only one of the two boards can be installed.

## 2.1 Dedicated features

			
	ADL510	ADL530	ADL550
<b>Wi-Fi communication</b> Plug-in for optional Wi-Fi Drive Link module for wireless communication via WEG_Liftouch APP.	-	Yes	Yes
<b>WEG_Liftouch (WebApp)</b> Fully responsive Web App, compatible with all major browsers on smartphones, tablets and PCs, and with any operating system.	-	Yes (optional)	Yes (optional)
<b>WEG_DriveLabs (Configurator)</b> Enhancement of WEG PC configurator features in the same "family feeling" programming. Includes an integrated real-time oscilloscope and 4 different levels of access.	Yes	Yes	Yes
<b>USB PORT</b> USB port for import/export of inverter files, motor pre-configuration files and selection of language.	-	Yes	Yes
<b>ETHERNET PORT</b> RJ-45 port for configuration via PC using the Modbus TCP/IP protocol. Can also be used to connect the inverter to a router for remote control.	Yes	Yes	Yes
<b>GREEN SOLUTIONS AND FEATURES</b> Regenerative configuration with external AFE200 modules and calculation of the energy saved. Stand-by feature that deactivates the power section when the system is stopped.	-	-	Yes
<b>Emergency batteries</b> Emergency battery management External batteries recharged during braking phase (with system external to the ADL500 drive).	Yes -	Yes -	Yes Yes
<b>Smooth Emergency</b> To be implemented by adding external systems.	-	Yes	Yes
<b>Optimised SLS control</b> Sensorless control optimised for asynchronous motors.	Yes	Yes	Yes
<b>Speed control</b> 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.	Yes	Yes	Yes
<b>Position control</b> 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). In preparation.	-	Yes	Yes
<b>Lift sequence</b> Typical sequence of input/output signals used in civil lift engineering applications such as I/O management, braking, output contactor and door control.	Yes	Yes	Yes
<b>Parameters in linear unit</b> 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> (ft/s <sup>2</sup> , ft/s <sup>3</sup> ) for cabin acceleration.	Yes	Yes	Yes
<b>Lift mechanical parameters</b> 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.	Yes	Yes	Yes
<b>Ramp generation</b> 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.	Yes	Yes	Yes
<b>Multiple speeds</b> 8 internally settable speed reference values. Possibility of overwriting at start-up with additional values to ensure smooth starting.	Yes	Yes	Yes
<b>Pre-torque (load compensation)</b> Initialisation of the speed regulator by the weight sensor to prevent jerks or bumpy starting.	Yes	Yes	Yes
<b>Increased overload</b> Overload capacity in line with typical lift application load cycles.	Yes	Yes	Yes
<b>Fan control logic</b> The fan control logic activates the internal fans according to the temperature.	Yes	Yes	Yes
<b>Emergency single-phase power supply to return to the floor</b> In emergency conditions a 230 V single-phase supply voltage can be used to return the cabin to the floor by UPS power supply or batteries with EMS (integrated on ADL5...-...-EMS models).	Yes	Yes	Yes
<b>User-friendly menus</b> The menus feature lift-specific DISPLAY and motor STARTUP terminology	Yes	Yes	Yes
<b>Saving parameters</b> Drive parameters can be saved on USB memory.	No	Yes	Yes

## 2.2 Identification of components

The inverter converts 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 and synchronous motors can be controlled continuously.



- 1. Mains supply voltage**
- 2. Mains choke** (see chapter "5.2 Input chokes" on page 18).
- 3. Three-phase rectifier bridge**  
Converts AC voltage into DC voltage via a three-phase full wave bridge.
- 4. Intermediate circuit**  
With pre-load resistor and levelling capacitors DC voltage ( $U_{DC} = \sqrt{2} \times \text{mains voltage (ULN)}$ )
- 5. IGBT inverter bridge**  
Converts 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** (see section "7.3.3 Feedback Connection" on page 32).

## 2.3 Product identification

The basic technical data of the inverter are included in the product code, data plate and on DataMatrix code. In addition, the firmware version, the application version and other information such as the power board version and serial number and the control board serial number can be read in the dedicated parameters of the DRIVE INFO menu.

The inverter must be selected according to the rated current of the motor.

The rated output current of the drive must be higher than or equal to the rated current of the motor used.

The speed of the asynchronous motor depends on the number of pole pairs and frequency (plate and catalog data).

If using a motor at speeds above the rated speed, contact the motor manufacturer for any related mechanical problems (bearings, unbalance, etc.). The same applies in case of continuous operation at frequencies of less than approx. 20 Hz (inadequate cooling, unless the motor is provided with forced ventilation).

### Name of model (code)

**ADL550 1 040 - X B L - F -4-EMS**

#### Emergency Supply module:

EMS = integrated

#### Rated voltage:

4 = 230-400-480Vac, three-phase

#### EMI Filter:

F = integrated

#### Lift application:

L = included

#### Braking unit:

X = not included

B = included

#### Keypad:

X = without integrated keypad

#### Inverter power in kW:

040 = 4kW

055 = 5.5kW

075 = 7.5kW

110 = 11kW

150 = 15kW

185 = 18.5kW

220 = 22kW

300 = 30kW

370 = 37kW

450 = 45kW

550 = 55kW

750 = 75kW

#### Mechanical dimensions of the drive:

1 = size 1

2 = size 2

3 = size 3

4 = size 4

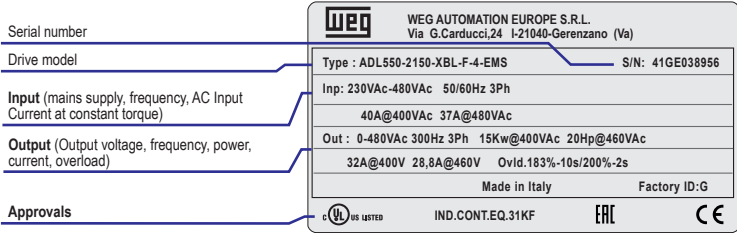
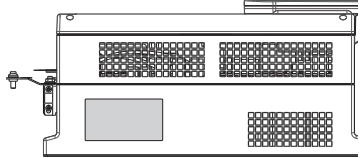
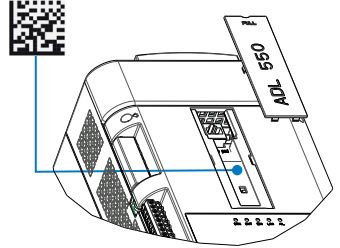
5 = size 5

#### Inverter series:

ADL550

ADL530

ADL510

Data plate	Position on the drive
<p>Serial number</p> <p>Drive model</p> <p>Input (mains supply, frequency, AC Input Current at constant torque)</p> <p>Output (Output voltage, frequency, power, current, overload)</p> <p>Approvals</p> 	
<p><b>DataMatrix code</b></p> <p>Two-dimensional matrix barcode, contains the following information:</p> <ul style="list-style-type: none"> <li>code</li> <li>type</li> <li>serial number</li> <li>versions of HMI firmware and DSP application firmware</li> <li>EFC application</li> <li>hardware revision</li> </ul> <p>The code can be read by smartphones using dedicated applications or with specific industrial readers.</p> <p><i>I.e.:</i></p> <p>S9DL5565. ADL550-2150-XBL-F-4-EMS. 41GE038956 - Fw. 222 210 Appl. EFC 2.2.0 REV. HW A1</p>	

# 3 - Transport and storage



**Caution**

Correct transport, storage, erection and mounting, as well as careful operation and maintenance are essential for proper and safe operation of the equipment.

Protect the inverter against physical shocks and vibration during transport and storage. Also be sure to protect it against water (rainfall) and excessive temperatures.

*Le bon accomplissement des opérations de transport, de stockage, d'installation et de montage, ainsi que l'exploitation et l'entretien minutieux, sont essentiels pour garantir à l'appareil un fonctionnement adéquat et sûr.*

Protéger le variateur contre les chocs et les vibrations pendant le transport et le stockage. Il faut également s'assurer qu'il est protégé contre l'eau (pluie), l'humidité et contre des températures excessives.

If the Drives have been stored for longer than two years, the operation of the DC link capacitors may be impaired and must be "reformed". Before commissioning devices that have been stored for long periods, connect them to a power supply for two hours with no load connected in order to regenerate the capacitors, (the input voltage has to be applied without enabling the drive).

*En cas de stockage des variateurs pendant plus de deux ans, il est conseillé de contrôler l'état des condensateurs CC avant d'en effectuer le branchement. Avant la mise en service des appareils, ayant été stockés pendant long temps, il faut alimenter variateurs à vide pendant deux heures, pour régénérer les condensateurs : appliquer une tension d'alimentation sans actionner le variateur.*

## 3.1 General

A high degree of care is taken in packing the ADL Drives and preparing them for delivery. They should only be transported with suitable transport equipment (see weight data). Observe the instructions printed on the packaging. This also applies when the device is unpacked and installed in the control cabinet.

Upon delivery, check the following:

- the packaging for any external damage
- whether the delivery note matches your order.

Open the packaging with suitable tools. Check whether:

- any parts were damaged during transport
- the device type corresponds to your order

In the event of any damage or of an incomplete or incorrect delivery please notify the responsible sales offices immediately. The devices should only be stored in dry rooms within the specified temperature ranges.

### Note!

A certain degree of moisture condensation is permissible if this arises from changes in temperature. This does not, however, apply when the devices are in operation. Always ensure that there is no moisture condensation in devices that are connected to the power supply!

## 3.2 Permissible Environmental Conditions

### Temperature:

storage	-25...+55°C (-13...+131°F), class 1K4 per EN50178
	-20...+55°C (-4...+131°F), for devices with keypad
transport	-25...+70°C (-13...+158°F), class 2K3 per EN50178
	-20...+60°C (-4...+140°F), for devices with keypad

### Air humidity:

storage	5% to 95 %, 1 g/m <sup>3</sup> to 29 g/m <sup>3</sup> (Class 1K3 as per EN50178)
transport	95 % (3), 60 g/m <sup>3</sup> (4)

A light condensation of moisture may occur for a short time occasionally if the device is not in operation (class 2K3 as per EN50178)

### Air pressure:

storage	[kPa] 86 a 106 (class 1K4 as per EN50178)
transport	[kPa] 70 a 106 (class 2K3 as per EN50178)

- (3) Greatest relative air humidity occurs with the temperature @ 40°C (104°F) or if the temperature of the device is brought suddenly from -25...+30°C (-13°...+86°F).  
(4) Greatest absolute air humidity if the device is brought suddenly from 70...15°C (158°...59°F).




## 4 - Specification

### 4.1 Environmental Conditions

<b>Installation location</b> _____	Pollution degree 2 or lower (free from direct sunlight, vibration, dust, corrosive or inflammable gases, fog, vapour oil and dripped water, avoid saline environment)
<b>Installation altitude</b> _____	Max 2000m (6562 feet) above sea level. With 1.2% reduction in output current for every 100 m starting from 1000 m.
<b>Mechanical conditions for installation</b> _____	Vibrational stress: EN 61800-2 Class 3M1
<b>Operating temperature</b> _____	<b>ADL550:</b> -10... +50°C (32°...122°F) without derating <b>ADL530, ADL510:</b> -10... +40°C (+32...104°F) without derating <b>ADL530, ADL510:</b> +40 ... +50°C (+104 ... 122°F) with 1% derating every °C starting from 40°C and up to 50°C. .
<b>Air humidity (operating)</b> _____	from 5 % to 85 % and from 1 g/m <sup>3</sup> to 25 g/m <sup>3</sup> with no humidity (or condensation)
<b>Air pressure (operating)</b> _____	from 70 to 106 kPa
<b>Storage</b> _____	CEI EN 61800-2 Class 1K4, CEI EN 61800-2 Class 1K3
<b>Maximum period of inactivity</b> _____	12 months

### 4.2 Standards

<b>Climatic conditions</b> _____	EN 60721-3-3
<b>Electrical safety</b> _____	EN 61800-5-1, ASME17.5/CSA B44.1
<b>EMC compatibility</b> _____	EN 12015* (with integrated filter), EN 12016, IEC/EN 61800-3 * <i>Must be guaranteed by the installer in the final equipment.</i>
<b>Protection degree</b> _____	IP20
<b>Approvals</b> _____	
<b>EC Directive</b> _____	LVD 2014/35/EU, EMC 2014/30/EU, Lift 2014/33/EU, RoHS 2011/65/EU, EN 50581:2012, Reach (1907/2006)
<b>Other elevator standards</b> _____	EN 81-20, EN 81-50, ASME 17.1/CSA B44.1

### 4.3 Control modes

<b>Motor control modes</b> _____	Open loop scalar V-f control for IM motors (OL-VF) Closed loop field-oriented control for IM motors (FOC-IM) Closed-loop field-oriented control for permanent magnet synchronous motors (FOC-PMSM)
----------------------------------	--

### 4.4 Precision

#### 4.4.1 Speed control

<b>Speed control precision</b> _____	Flux vector CL control (FOC) with feedback: 0.01 % motor rated speed Open loop scalar V-f control (OL-VF) : ± 60 % rated slip of motor
--------------------------------------	---

#### 4.4.2 Speed control limits

<b>Speed range (*)</b> _____	± 32000 rpm
<b>Speed format (*)</b> _____	32 bit
<b>Frequency range</b> _____	± 2000 Hz
<b>Max frequency</b> _____	Flux vector CL control with feedback and brushless: 300Hz, FVOL: 150 Hz, VF: 600 Hz
<b>Min frequency</b> _____	0 Hz

(\*) referred to Full scale speed, PAR:680.

### 4.4.3 Torque control

Torque resolution (\*) \_\_\_\_\_ > 0.1 %  
 Torque control precision (\*) \_\_\_\_\_ Flux vector CL with feedback: ± 3%, Flux vector OL with feedback: ± 6%,  
 Direct torque control \_\_\_\_\_ yes  
 Current limitation \_\_\_\_\_ Limits ±, Mot/gen limits, Variable limits

(\*) referred to rated torque

### 4.4.4 Current rating

Overload \_\_\_\_\_ **ADL550:** 183% \*10 sec e 200% \* 2 sec (output frequency from 0 Hz)  
**ADL530 and ADL510:** 183% \*10 sec (output frequency from 0 Hz)  
*Overload Cycle characteristics: current 0Hz: 1 p.u. of rated output current for 1 s, OL max: 2 p.u. of the rated output current for 2 s, Total cycle duration: 18 s (corresponding to 200 cycle hours), CDF (Cyclic duration factor - Cycle S4 IEC 60034-1): 40%.*  
 Switching frequency \_\_\_\_\_ 10 kHz (4-5-8-10 kHz)  
*The switching frequency is managed by the control algorithm in relation to the drive temperature.*

## 4.5 Input electrical data

Input voltage U<sub>LN</sub> \_\_\_\_\_ **ADL550:** three-phase 230 - 380 - 400 - 460 - 480 Vac -15%+10%  
**ADL530:** three-phase 230 - 380 - 400 - 460 - 480 Vac -15%+10%  
**ADL510:** three-phase 380 - 400 Vac -15%+10%  
 Maximum input voltage unbalance \_\_\_\_\_ 3 %  
 Connection to TT and TN Networks \_\_\_\_\_ yes, standard version  
 Connection to IT Networks or Regenerative \_\_\_\_\_ only on request (\*), please contact the WEG Customer Service.  
 Choke \_\_\_\_\_ Sizes 1...2: Optional (DC or AC)

#### Note!

See chapter "5.2 Input chokes" on page 18 for THD values in accordance with EN 12015 and for selection of external inductances.

SIZE	Input frequency (Hz)	Overvoltage threshold (Vdc)	Undervoltage threshold (Vdc)	EFFECTIVE INPUT CURRENT I <sub>N</sub> (@ I <sub>N</sub> OUT)			DC-Link Capacity (μF)
				@ 230 Vac (A)	@ 400 Vac (A)	@ 480 Vac (A)	
<b>ADL5...-4, 3ph</b>							
1040	50/60 Hz, ± 2%	820 Vdc	@ 480 Vac = 470 Vdc @ 460 Vac = 450 Vdc @ 400 Vac = 391 Vdc @ 380 Vac = 371 Vdc @ 230 Vac = 225 Vdc	12	11	10	470
1055				17	16	15	680
1075				23	22	20	680
2110				31	29	26	1020
2150				42	40	37	1500

(\*) ADL500 can only operate on IT networks devoid of any faults (between active parts and PE) or in the presence of temporary faults.

Therefore an insulation monitor **MUST** be used to detect and enable prompt removal of any fault condition.

#### Insulation monitor

Since the ADL500 drive is normally used in a ground-insulated system (IT), in accordance with IEC 61557-8, use of insulation resistance monitoring is required.

The monitoring system must be able to detect insulation loss, both on the AC and DC power supply sides and on the motor side.

A ground fault must be promptly detected and removed as quickly as possible to avoid damage to either the inverter or the entire system as a unit (in the event of insulation loss, the drive must be immediately disabled and disconnected from power sources).

The insulation monitor must be selected on a case-by-case basis according to the power supply, connection system and type of drive.

Recommended insulation monitors e.g.: see the BENDER © ISOMETER® line.

**The insulation monitor must be plugged into the main power supply (if ADL500 is AC powered) or the DC side (if ADL300 is DC-powered).**

**The insulation monitor alarm threshold should be set to the highest possible resistance value.**



Attention

## 4.6 Output electrical data

Maximum output voltage  $U_2$  \_\_\_\_\_  $0.98 \times U_{LN}$  ( $U_{LN}$  = AC input voltage)  
 Maximum output frequency  $f_2$  \_\_\_\_\_ 300 Hz

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:  $I_{drive} = I_n \times K_{ALT} \times K_T \times K_v$ .

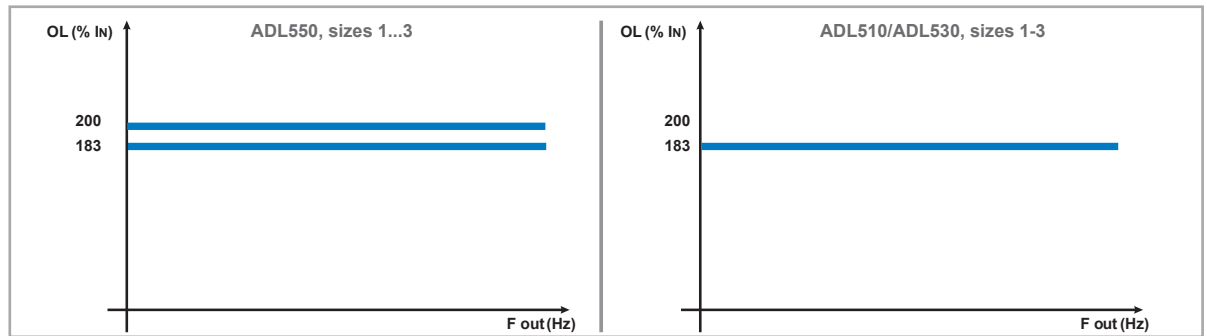
SIZE	I <sub>n</sub> Rated output current (fsw = default)			P <sub>n</sub> mot (Recommended motor power, fsw = default)			Reduction factor				IGBT braking unit
	@U <sub>LN</sub> = 230V <sub>AC</sub>	@U <sub>LN</sub> = 400V <sub>AC</sub>	@U <sub>LN</sub> = 460V <sub>AC</sub>	@U <sub>LN</sub> = 230V <sub>AC</sub>	@U <sub>LN</sub> = 400V <sub>AC</sub>	@U <sub>LN</sub> = 460V <sub>AC</sub>	K <sub>v</sub>	K <sub>T</sub> ADL550	K <sub>T</sub> ADL510 ADL530	K <sub>ALT</sub>	
	(A)	(A)	(A)	(kW)	(kW)	(Hp)	(1)	(2)	(3)	(4)	
<b>ADL500-...-4, 3ph</b>											
1040	9	9	8.1	2	4	5	0.95	1	0.90	1.2	Standard internal (with external resistor); braking torque 150% MAX
1055	13.5	13.5	12.2	3	5.5	7.5	0.95	1	0.90	1.2	
1075	18.5	18.5	16.7	4	7.5	10	0.95	1	0.90	1.2	
2110	24.5	24.5	22	5.5	11	15	0.95	1	0.90	1.2	
2150	32	32	28.8	7.5	15	20	0.95	1	0.90	1.2	

- (1) K<sub>v</sub> : Derating factor for mains voltage at 460Vac and power supply from AFE200.
- (2) K<sub>T</sub> (ADL550): no derating.
- (3) K<sub>T</sub> (ADL510/ADL530): Derating factor for ambient temperature of 50°C (1% every °C above 40°C).
- (4) K<sub>ALT</sub> : 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, K<sub>alt</sub> = 1.2% \* 10 = 12% derating; I<sub>n</sub> derated = (100 - 12) % = 88 % I<sub>n</sub>

### 4.6.1 Derating values in overload condition

In overload conditions the output current DO NOT depends on the output frequency, as shown in the figure below.

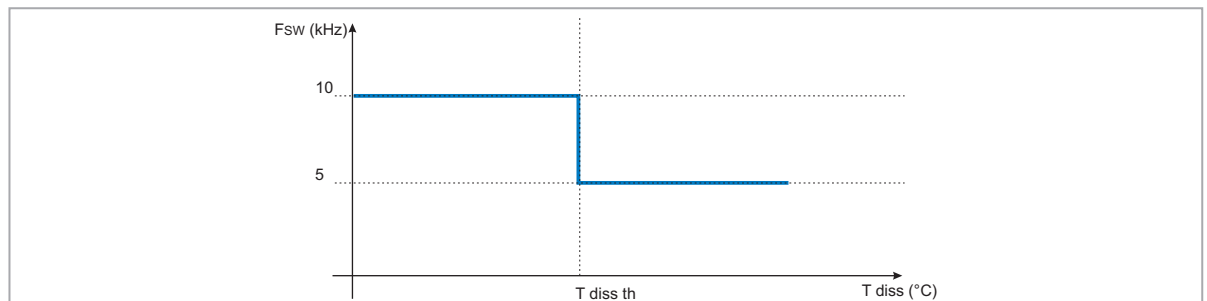
Figure 4.6.1: Ratio between overload/output frequency (ADL500-...-4)



### 4.6.2 Derating values for switching frequency

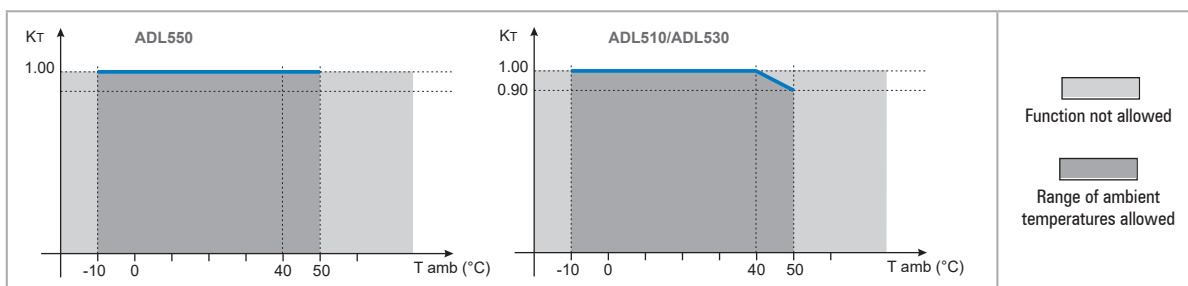
The switching frequency is modified according to the inside temperature of the drive, as shown in the figure below.

Figure 4.6.2: Ratio between switching frequency/heat sink temperature



### 4.6.3 KT: Ambient temperature reduction factor

Figure 4.6.3: Tamb reduction coefficient



### 4.7 Voltage level of the inverter for safe operations

The **minimum time** between the moment in which an ADL500 inverter is disabled from the mains and that in which an operator can operate on internal parts of the inverter, without the danger of electric shock, **is 5 minutes**.



Attention

.....  
 This value takes into account the time to turn off an inverter supplied at 460 VAC + 10%, without any options (time indicated for disabled inverter condition).  
 .....

### 4.8 No-load consumption (Energy rating)

Size	No. of pre-loads allowed	Power-on time [secs]	Idle* consumption "Fan Off" [W]	Fan consumption [W]	Idle* consumption "Fan On" [W]
<b>ADL5...-...-4, 3ph</b>					
1040	1 each 20 sec.	5 abt.	20	8	28
1055	1 each 20 sec.	5 abt.	20	10	30
1075	1 each 20 sec.	5 abt.	20	10	30
2110	1 each 20 sec.	5 abt.	20	10	30
2150	1 each 20 sec.	5 abt.	20	16	36

\* Idle = drive powered by three-phase power supply and ready to start.

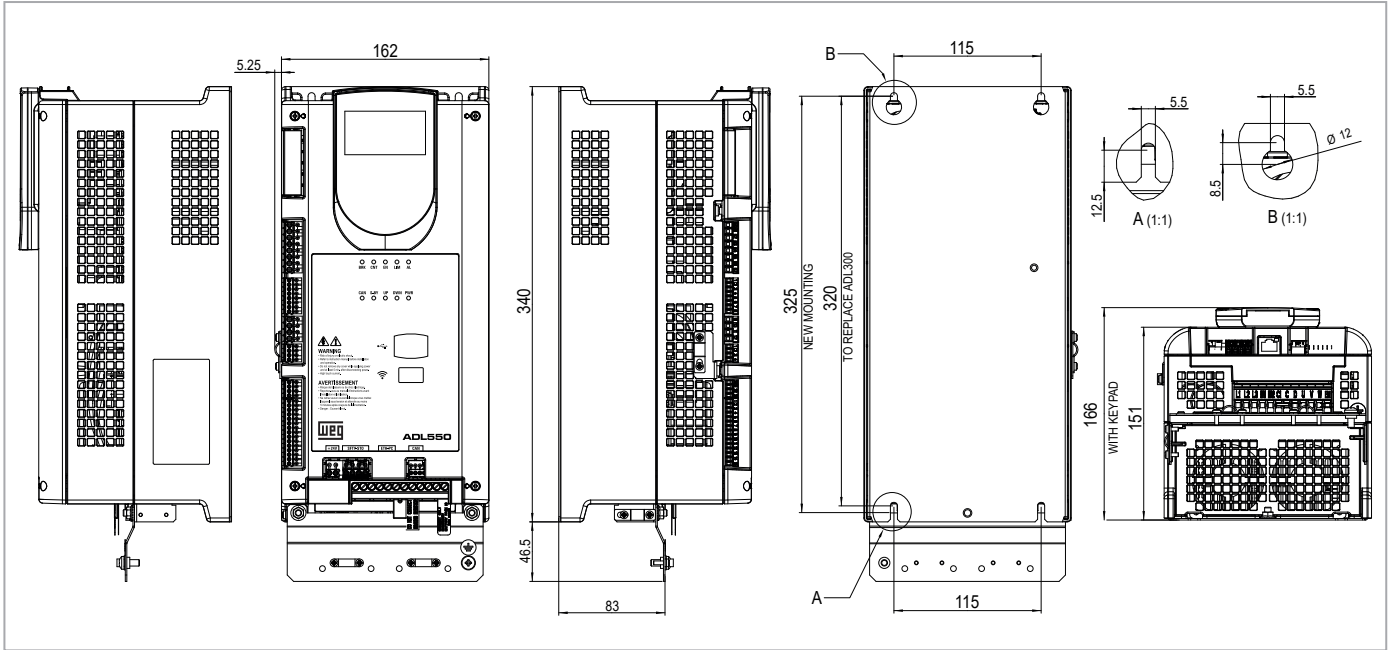
### 4.9 Cooling

Size	Pv (Heat dissipation)	Fan capacity		Minimum cabinet opening for cooling (cm <sup>2</sup> )
	@ULN=230...460VAC (*)	Heat sink (m <sup>3</sup> /h)	Internal (m <sup>3</sup> /h)	
<b>ADL5...-...-4, 3ph</b>				
1040	150	2 x 35	-	72
1055	250	2 x 58	-	144
1075	350	2 x 58	-	144
2110	400	2 x 58	-	144
2150	600	2 x 58	-	328

(\*) values that refer to operation at default switching frequency.

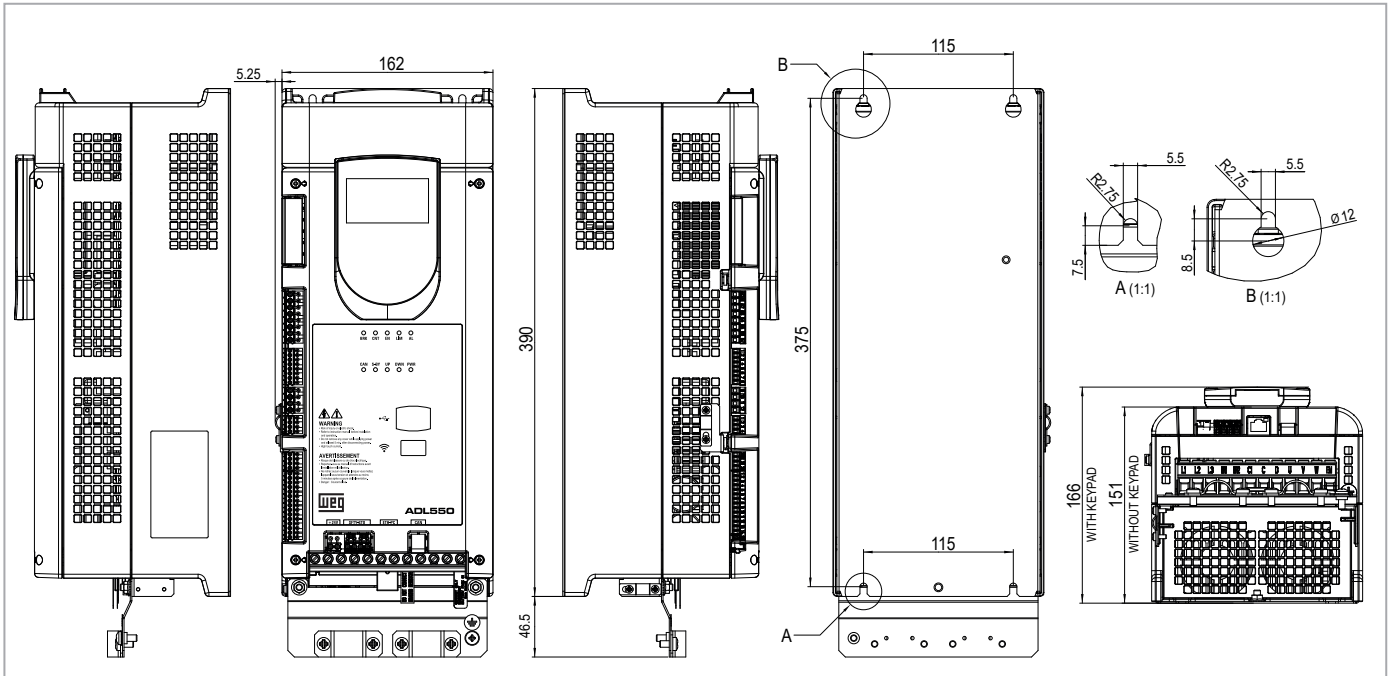
## 4.10 Weights and dimensions

Figure 4.9.1: Size 1 dimensions



Sizes	Dimensions: Width x Height x Depth		Weight	
	(mm)	(inches)	(kg)	(lbs)
ADL510-1... ADL530-1... ADL550-1...	162 x 340 x 151	6.38 x 13.38 x 5.9	5.5	12.1

Figure 4.9.2: Size 2 dimensions



Sizes	Dimensions: Width x Height x Depth		Weight	
	(mm)	(inches)	(kg)	(lbs)
ADL510-2... ADL530-2... ADL550-2...	162 x 390 x 151	6.38 x 15.35 x 5.94	7.0	15.4

# 5 - Options

## 5.1 External fuses

### 5.1.1 Network side fuses (F1)

The inverter must be fused upstream on the network side.  
Use fast-acting fuses only.

Size	F1 - External network side fuses				
	DC link capacitor hours of service life [h]	EUROPE		AMERICA	
		Type	Code	Type	Code
<b>ADL5...-4, 3ph</b>					
1040	> 15000	GRD2/20	F4D15	A70P20	S7G48
1055	> 15000	GRD2/25	F4D16	A70P25	S7G51
1075	> 15000	GRD3/35	F4D20	A70P40	S7G52
2110	> 15000	Z22GR40	F4M16	A70P40	S7G52
2150	> 15000	Z22GR63	F4M17	A70P60-4	S7I34

Technical data for fuses, including dimensions, weights, power leakage, fuse carriers etc. are reported in the corresponding manufacturers' data sheets:  
GRD... (Size E27), Z22... = Jean Müller, Eltville; A70... = Ferraz.

## 5.2 Input chokes

In accordance with EN 12015 (THD values < 35%), provide DC input inductance (see paragraph 5.2.1).

The AC input chokes are strongly recommended in order to:

- limit the RMS input current of the ADL500 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 ( $\leq 1\%$ ).

### 5.2.1 DC input chokes

Size	Effective input current $I_n$ (with external DC chokes)			External DC chokes					
	@230V/50Hz	@400V/50Hz	@480V/50Hz	Rated current (Arms)	Overload current (*)(Arms)	Model	Code	Dimensions: Width x Height x Depth mm [inches]	Weight kg [lbs]
	(A)	(A)	(A)						
<b>ADL5...-4, 3ph</b>									
1040	8	8	7.5	10	20	LDC-004	S7AI10	99 x 96 x 93 [3.90 x 3.78 x 3.66]	2.4 [5.3]
1055	12	12	11	16	31	LDC-005	S7AI11	125 x 112 x 98 [4.92 x 4.41 x 3.86]	4.1 [9.0]
1075	16	16	14	21	41	LDC-007	S7AI12	125 x 127 x 122 [4.92 x 5.00 x 4.80]	4.9 [10.8]
2110	21	21	18	28	54	LDC-011	S7AI13	125 x 127 x 142 [4.92 x 5.00 x 5.59]	6.6 [14.6]
2150	28	28	25.5	36	70	LDC-015	S7AI14	125 x 127 x 152 [4.92 x 5.00 x 5.98]	8 [17.6]

### 5.2.2 AC input chokes

Size	Effective input current $I_n$ (@400V/50Hz, with AC input chokes) (A)	Model	Code	Dimensions: Width x Height x Depth mm [inches]	Weight kg [lbs]
<b>ADL5...-4, 3ph</b>					
1040	9	LR3y-2040	S7AAG	120 x 125 x 65 [4.7 x 4.9 x 2.6]	2 [4.4]
1055	13.5	LR3y-2055	S7AB5	120 x 125 x 75 [4.7 x 4.9 x 2.6]	2.2 [4.4]
1075	18	LR3y-2075	S7AB6	150 x 155 x 79 [5.9 x 6.1 x 3.1]	4.9 [10.8]
2110	24	LR3y-3110	S7AB7	150 x 155 x 79 [5.9 x 6.1 x 3.1]	5 [11]
2150	32	LR3y-3150	S7AB8	150 x 169 x 85 [5.9 x 6.7 x 3.3]	5.5 [12.1]

(\*) 10s every 60s.  
Max room operating temperature = 50°C [122°F].

## 5.3 AC output chokes

The ADL500 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 are provided below: 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 100 m) an output choke may be necessary to maintain the voltage waveform with the specified limits.

The range of recommended chokes are listed in the following table. The rated current of the chokes should be approx. 20% higher than that of the inverter in order to take into account additional losses due to modulation of the output waveform.

Size	Model	Code	Dimensions:	Weight
			Width x Height x Depth mm [inches]	
<b>ADL5...-4, 3ph</b>				
1040	LU3-005	S7FG3	180 x 170 x 110 [7.1 x 6.7 x 4.3]	5.8 [12.8]
1055	LU3-005	S7FG3	180 x 170 x 110 [7.1 x 6.7 x 4.3]	5.8 [12.8]
1075	LU3-011	S7FG4	180 x 180 x 130 [7.1 x 7.1 x 5.1]	8 [17.6]
2110	LU3-011	S7FG4	180 x 180 x 130 [7.1 x 7.1 x 5.1]	8 [17.6]
2150	LU3-015	S7FH2	180 x 160 x 170 [7.1 x 6.3 x 6.7]	7.5 [16.5]

### Note !

With the inverter operated at the rated current and a frequency of 50 Hz, the output chokes cause a voltage drop of approx. 2% of the output voltage.

## 5.4 External braking resistors

Recommended combinations for use with internal braking unit.

Table 5.4.1: Recommended combination

Size	List and technical data of standard external resistors									
	Resistor type	Code	Q.ty	PBR Braking Power		PNBR (W)	RBR (Ω)	Housing	Dimensions: Width x Height x Depth (mm)	Weight (kg)
				Duty cycle 10% (*) (kW)	Duty cycle 25% (*) (kW)					
<b>Low &amp; Mid Demand - ADL5...-4, 3ph</b>										
1040	BRK RES EC 1K5 68R T	S8SZ7	1	6,90	3,84	1500	68	IP20	431 x 135 x 80	2,2
1055	BRK RES EC 1K5 68R T	S8SZ7	1	6,90	3,84	1500	68	IP20	431 x 135 x 80	2,2
1075	BRK RES EC 1K5 49R T	S8SZ8	1	6,90	3,84	1500	49	IP20	431 x 135 x 80	2,2
2110	BRK RES EC 2K 28R T	S8SZ9	1	9,20	5,12	2000	28	IP20	431 x 135 x 80	2,2
2150	BRK RES EC 2K 28R T	S8SZ9	1	9,20	5,12	2000	28	IP20	431 x 135 x 80	2,2
<b>High Demand - ADL5...-4, 3ph</b>										
1040	BRK RES EC 3K 68R T	S8SZ10	1	13,80	7,68	3000	68	IP20	431 x 135 x 180	5,0
1055	BRK RES EC 3K 68R T	S8SZ10	1	13,80	7,68	3000	68	IP20	431 x 135 x 180	5,0
1075	BRK RES EC 4K 49R T	S8SZ11	1	18,40	10,24	4000	49	IP20	431 x 135 x 180	5,0
2110	BRK RES EC 5K 28R T	S8SZ12	1	23,00	12,80	5000	28	IP20	431 x 135 x 266	7,5
2150	BRK RES EC 8K 28R T	S8SZ13	1	36,80	20,48	8000	28	IP20	431 x 135 x 352	10,0

**PNBR** Braking resistor rated power

**RBR** Braking resistor ohmic value

(\*) Max cycle period = 120s



**Warning!**

Braking resistors may be subject to unexpected overloads due to faults. Resistors **MUST** be protected using thermal cutouts. These devices must not interrupt the circuit in which the resistor is inserted but their auxiliary contact must cut off the power supply to the power section of the drive. If the resistor requires a protection contact, this must be used together with that of the thermal cutout.

*A la suite de pannes, les résistances de freinage peuvent être sujettes à des surcharges imprévues. La protection des résistances au moyen de dispositifs de protection thermique est absolument capitale. Ces dispositifs ne doivent pas interrompre le circuit qui abrite la résistance, mais leur contact auxiliaire doit couper l'alimentation du côté puissance du drive. Si la résistance prévoit un contact de protection, ce dernier doit être utilisé conjointement à celui du dispositif de protection thermique.*

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## 5.5 EMC Filter

The **ADL-...-F** models are standard equipped with an internal EMC filter to ensure compliance with the EN 12015 standard.

Shielded motor power cables with a maximum length of 10 m must be used and the shielding must be grounded at both ends.

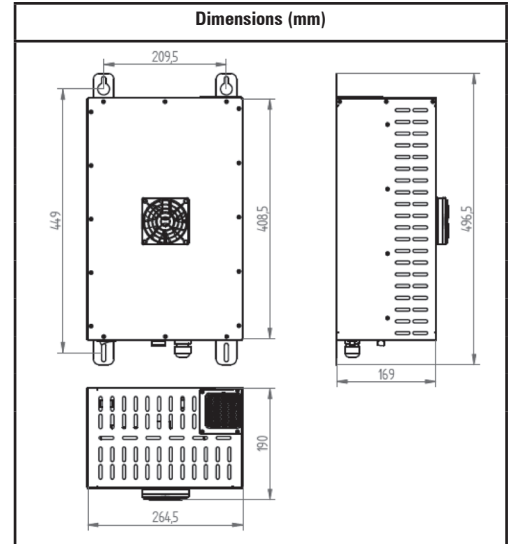


## 5.6 Ultracapacitor energy storage module

The ADL500 inverter can be connected to energy recovery systems with ultra-capacitor modules. These modules store the energy lost by the lift during the motor braking stage and return it on the next travel, thus saving energy (the closer together the trips, the greater the savings) without harmonic distortion and no additional stand-by consumption.

The system recommended by WEG is a high-efficiency bidirectional DC/DC converter that integrates the ultra-capacitor energy storage module and connects it to the ADL500 inverter with a simple, two-wire connection.

Characteristics	Value
Voltage range of the DC connection to the frequency inverter	500 ... 800V
Maximum current through the DC connection to the frequency inverter	12.4A
Maximum power	6.3kW
Unidirectional efficiency	≤ 98%
Storage temperature	-10 ÷ 70°C
Operation temperature	5 ... 40°C
Weight	13 kg
IP protection degree	IP2X
Minimum top and bottom distance	> 250 mm
<b>Directive</b>	Low Voltage Directive (2014/35/UE): EN 50178:1998 Electromagnetic Compatibility Directive (2014/30/UE): EN 12015:2014, EN 12016:2014



Additional technical specifications are available from the catalogue of the manufacturer: Epic Power Converters S.L. ®.

Recommended combination:

Sizes ADL5.....-4, 3ph	Energy Recovery System module		Maximum cable cross-section (flexible conductor)	
	Model	Q.ty	(mm <sup>2</sup> )	AWG
1040	ERS 2G	1	4	10
1055	ERS 2G	1	4	10
1075	ERS 2G	1	4	10
2110	ERS 2G	1	16	6
2150	ERS 2G	1	16	6

The ERS 2G ® module is connected in parallel with the DC-Link, downstream of the drive's precharge resistor, directly to the DC-Link capacitors via terminals BR1 (+) and D (-).

The ERS 2G ® module DOES NOT REPLACE the braking resistor; this part remains mandatory.

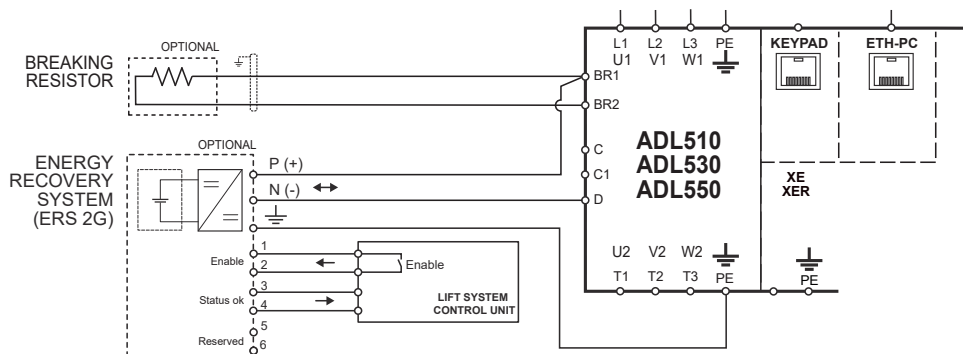
Operation requires an enable signal, otherwise the module remains in stand-by and does not store or return energy to the drive.



**Warning!**

Install as indicated in the module manufacturer's installation manual, paying particular attention to the procedure and safety recommendations.

Figure 5.6.1: Connection for energy storage module ERS 2G



## 5.7 Emergency floor return battery (ADL5...-EMS)

Only for ADL510/530/550-...-EMS models (with integrated Emergency Mode Supply module).

In the event of a failure of the main power supply, the optional external battery pack powers the EMS circuit of ADL5...-EMS drives so the cabin can return to the floor.

Under such emergency conditions, the lift can move for a short travel (i.e. to reach the next floor).

The connection diagram is described in "Figure 7.9.5: Emergency connection diagram with EMS module" on page 46.

### Specifications

Battery voltage \_\_\_\_\_ 48V<sub>DC</sub> ...96V<sub>DC</sub> (120V<sub>DC</sub> considering an upper limit tolerance of 25%)  
 Rated battery current \_\_\_\_\_ equal to rated inverter current  
 Battery protection \_\_\_\_\_ the EMS circuit has an internal diode that protects the battery from the high DC LINK voltage.

### Battery connection

Battery terminals	ADL5...-EMS terminals	Cable section
+	EM	See section "7.2.1 Power terminals and connection" on page 28
-	D	

### Operating description

When the main input power supply fails, if the battery is connected and provides a voltage greater than 48V<sub>DC</sub>, the DC/DC converter is switched on (including the regulation board and all auxiliary circuitry for the gate drive, thermal sense, current feedback, etc.) and the microprocessor receives the "BATTERY\_ON" (battery connected) signal.

This signal does not provide any information about the battery charge.

If emergency input is not activated (dedicated digital input, PAR 11242), the precharge relay remains open because the DC\_LINK is below the minimum voltage threshold; no alarm is signalled until PWM is enabled.

Before enabling the emergency input, the main contactor K1M must open (to prevent unexpected reset of the main power supply which could damage the drive). A delay must be arranged to consider contactor K1M opening time before any further action can be taken (e.g. by providing an interlock between the main contactor and the emergency contactor KE so that the latter can only be enabled if K1M has opened).

Under normal and emergency operations, the KE contactor can remain closed and only be opened to switch off the system, thus saving the batteries after the emergency operation is completed.

To enable motor movement, the digital input must be activated to emergency mode (previously set through parameter 11242).

After selecting the emergency state, the undervoltage condition is eliminated and the precharge relay is closed. The unit is ready to operate and the lift can move to the evacuation floor.

After the lift has completed its travel (PWM OFF) and the external brake has been disabled (PAR 11242), emergency input must be disabled. Disabling the emergency input opens the precharge relay in about 200 ms and only afterwards the K1M contactor can be closed. Therefore, a minimum delay of 200 ms is mandatory from disabling the emergency digital input to connection of the main power supply to the contactor K1M.

When power is restored, the precharge relay is closed, the DC/DC converter is switched on and the drive is ready.

Under such conditions, the drive and lift system can operate normally.

The main power supply may be reinstated during the emergency trip: this will not damage the drive as the main contactor K1M must be kept open until the emergency trip has been terminated.

### **Note !**

**The battery can always be connected to the drive (KE always closed).**

**Arrange for external battery charge monitoring and for an external charger; under this condition, the battery will supply a small amount of power to the drive.**

**An alternative is to close the KE only when emergency mode is selected.**

**In any case, battery monitoring and charger must be supplied externally.**

### Emergency operation and connection diagram

See section "7.9.5 Connection diagram for emergency maneuver" on page 50 and "Figure 7.9.5: Emergency connection diagram with EMS module" on page 46.

## 6 - Mechanical installation



**Caution**

The Drive must be mounted on a wall that is constructed of heat resistant material. While the Drive is operating, the temperature of the Drive's cooling fins can rise to a temperature of 158° F (70°C).

*Le drive doit être monté sur un mur construit avec des matériaux résistants à la chaleur. Pendant le fonctionnement du drive, la température des ailettes du dissipateur thermique peut arriver à 70°C (158° F).*

Because the ambient temperature greatly affects Drive life and reliability, do not install the Drive in any location that exceeds the allowable temperature.

*Étant donné que la température ambiante influe sur la vie et la fiabilité du drive, on ne devrait pas installer le drive dans des places où la température permise est dépassée.*

Be sure to remove the desiccant dryer packet(s) when unpacking the Drive. (If not removed these packets may become lodged in the fan or air passages and cause the Drive to overheat).

*Lors du déballage du drive, retirer le sachet déshydraté. (Si celui-ci n'est pas retiré, il empêche la ventilation et provoque une surchauffe du drive).*

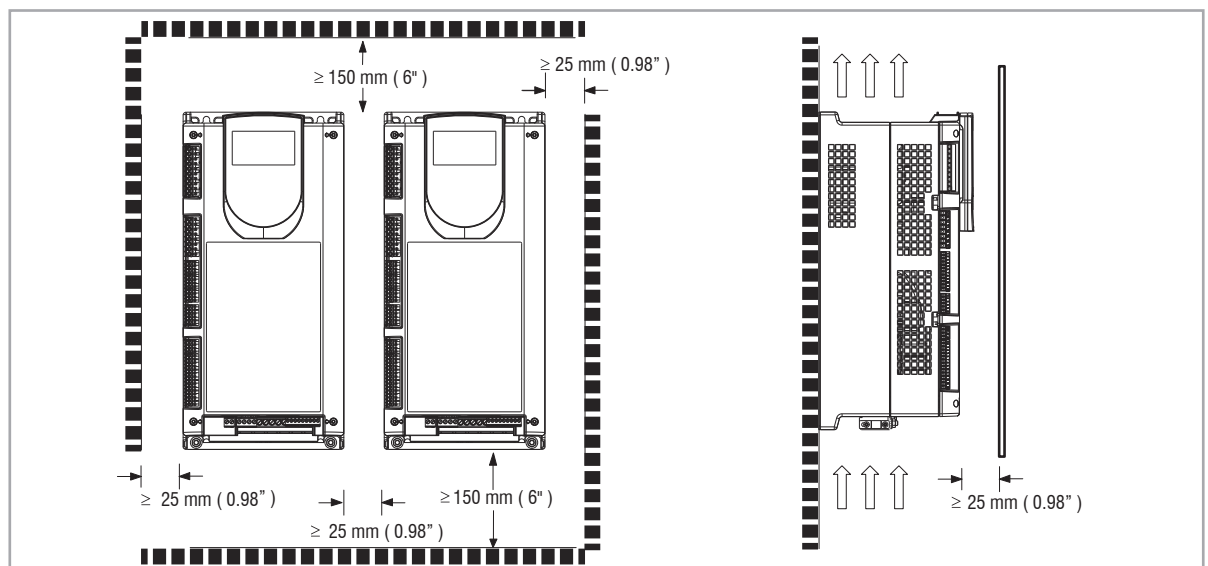
Protect the device from impermissible environmental conditions (temperature, humidity, shock etc.).

*Protéger l'appareil contre des effets extérieurs non permis (température, humidité, chocs etc.).*

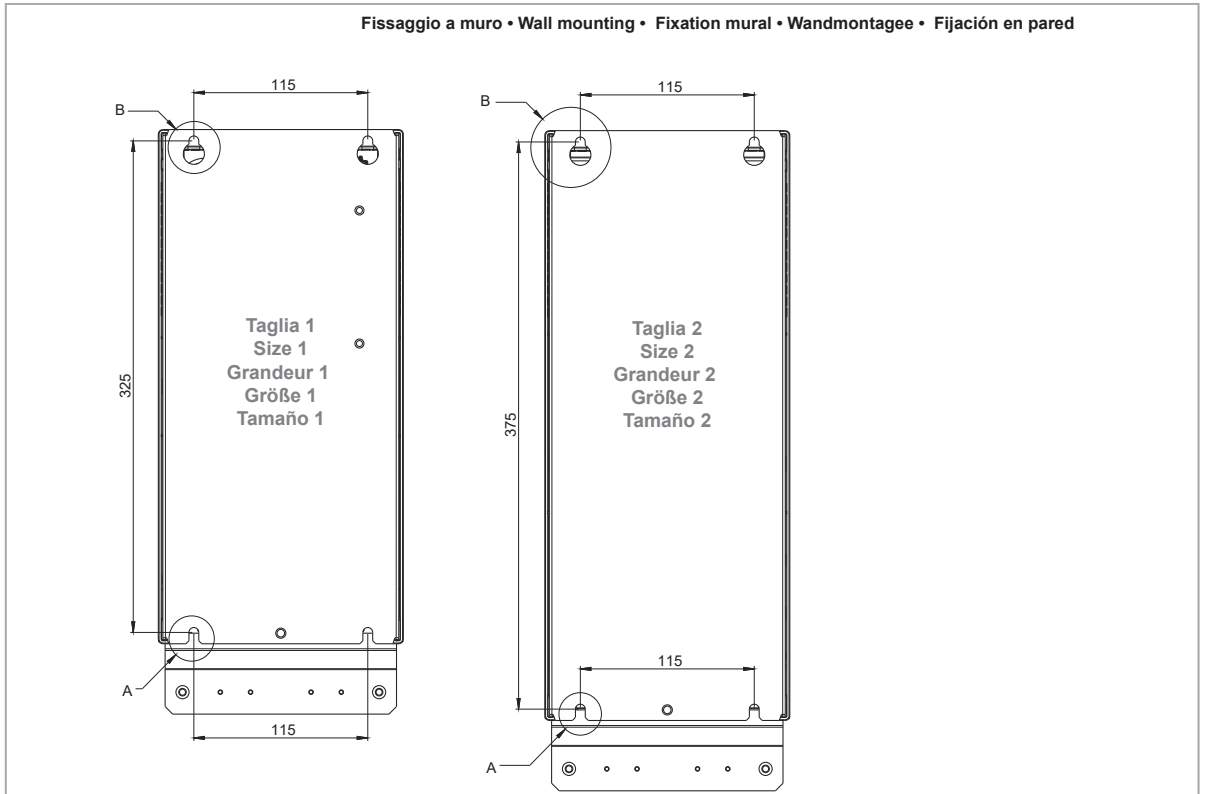
### 6.1 Maximum inclination and assembly clearances

The inverters must be mounted in such a way that air can flow freely around them, **see paragraph 4.8 Cooling.**

Maximum angle of inclination	_____	30° (referred to vertical position)
Minimum top and bottom distance	_____	150 mm
Minimum free space to the front	_____	25 mm
Minimum distance between drives	_____	25 mm
Minimum distance to the side with the cabinet	_____	25 mm



## 6.2 Fastening positions



	Recommended screws for fastening
Size 1 (ADL5...-1...)	4 x M5 x 12 mm screws + Grover (spring-lock) washer + flat washer
Size 2 (ADL5...-2...)	4 x M5 x 12 mm screws + Grover (spring-lock) washer + flat washer

**Note!**

Other dimensions see chapter "4.10 Weights and dimensions" on page 17.

# 7 - Wiring Procedure



**Warning!**

Adjustable frequency ADL500 drives are electrical apparatus for use in for civil lifting installations. Parts of the Drives are energized during operation. The electrical installation and the opening of the device should therefore only be carried out by qualified personnel. Improper installation of motors or Drives may therefore cause the failure of the device as well as serious injury to persons or material damage. Drive is not equipped with motor overspeed protection logic other than that controlled by software. Follow the instructions given in this manual and observe the local and national safety regulations applicable.

*Les drives à fréquence variable ADL500 sont des dispositifs électriques utilisés dans des installations de levage civiles. Une partie des drives sont sous tension pendant l'opération. L'installation électrique et l'ouverture des drives devrait être exécuté uniquement par du personnel qualifié. De mauvaises installations de moteurs ou de drives peuvent provoquer des dommages matériels ou blesser des personnes. On doit suivre les instructions données dans ce manuel et observer les règles nationales de sécurité.*

Replace all covers before applying power to the Drive. Failure to do so may result in death or serious injury.

*Remettre tous les capots avant de mettre sous tension le drive. Des erreurs peuvent provoquer de sérieux accidents ou même la mort.*



**Warning!**

The drive must always be grounded. If the drive is not connected correctly to ground, extremely hazardous conditions may be generated that may result in death or serious injury.

*Le drive doit toujours être raccordé au système de mise à la terre. Un mauvais raccordement du drive au système de mise à la terre peut se traduire par des conditions extrêmement dangereuses susceptibles d'entraîner le décès ou de graves lésions corporelles.*

Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or inside the device is listed in section "4.7 Voltage level of the inverter for safe operations" on page 16.

*Ne jamais ouvrir l'appareil lorsqu'il est sous tension. Le temps minimum d'attente avant de pouvoir travailler sur les bornes ou bien à l'intérieur de l'appareil est indiqué dans la section "4.7 Voltage level of the inverter for safe operations" on page 16.*

Do not touch or damage any components when handling the device. The changing of the isolation gaps or the removing of the isolation and covers is not permissible.

*Manipuler l'appareil de façon à ne pas toucher ou endommager des parties. Il n'est pas permis de changer les distances d'isolement ou bien d'enlever des matériaux isolants ou des capots.*



**Caution**

Do not connect power supply voltage that exceeds the standard specification voltage fluctuation permissible. If excessive voltage is applied to the Drive, damage to the internal components will result.

*Ne pas raccorder de tension d'alimentation dépassant la fluctuation de tension permise par les normes. Dans le cas d'une alimentation en tension excessive, des composants internes peuvent être endommagés.*

## Operation with Residual Current Device (Differential switch)

When a residual current device (RCD) is used for protection against electric shock, only a type B RCD is allowed on the supply side of this product. All upstream RCDs, up to the power transformer, must be type B. This device must have a high leakage current ( $\geq 300$  mA).

RCD: Residual Current Device

RCCB: Residual Current Circuit Breaker

ELCB: Earth Leakage Circuit Breaker

### **Note:**

The residual current operated circuit-breakers used must provide protection against direct-current components in the fault current and must be suitable for briefly suppressing power pulse current peaks. It is recommended to protect the frequency inverter by fuse separately.

The regulations of the individual country (e.g. VDE regulations in Germany) and the regional power suppliers must be observed!

*Les RCD utilisés doivent assurer la protection contre les composants à courant continu présents dans le courant de défaut et doivent être capables de supprimer des crêtes de courant en peu de temps. Il est recommandé de protéger séparément l'onduleur au moyen de fusibles.*

*Respecter la réglementation des pays concernés (par exemple, les normes VDR en Allemagne) et des fournisseurs locaux d'énergie électrique.*



**Caution**

Functioning of the Drive without a ground connection is not permitted. To avoid disturbances, the armature of the motor must be grounded using a separate ground connector from those of other appliances.

*Défense de faire fonctionner le drive sans qu'il y ait eu raccordement de mise à la terre préalable. Pour éviter les perturbations, la carcasse du moteur doit être mise à la terre à l'aide d'un raccord de mise à la masse séparé de ceux des autres appareils.*

The grounding connector shall be sized in accordance with regulations and national electrical codes (NEC) of reference. For applications according to North American standards, the connection shall be made by a UL listed or CSA certified closed-loop terminal connector sized for the wire gauge involved. The connector is to be fixed using the crimp tool specified by the connector manufacturer.

*Le connecteur de mise à la terre doit être dimensionné conformément aux réglementations et aux codes électriques nationaux (NEC) de référence. Pour les applications conformes aux normes nord-américaines, le raccordement devrait être fait par un connecteur certifié et mentionné à boucle fermée par les normes CSA et UL et dimensionné pour l'épaisseur du câble correspondant. Le connecteur doit être fixé à l'aide d'un instrument de serrage spécifié par le producteur du connecteur.*

Do not perform a megger test between the Drive terminals or on the control circuit terminals.

*Ne pas exécuter un test megger entre les bornes du drive ou entre les bornes du circuit de contrôle.*

No voltage should be connected to the output of the drive (terminals U2, V2 W2). The parallel connection of several drives via the outputs and the direct connection of the inputs and outputs (bypass) are not permissible.

*Aucune tension ne doit être appliquée sur la sortie du convertisseur (bornes U2, V2 et W2). Il n'est pas permis de raccorder la sortie de plusieurs convertisseurs en parallèle, ni d'effectuer une connexion directe de l'entrée avec la sortie du convertisseur (Bypass).*

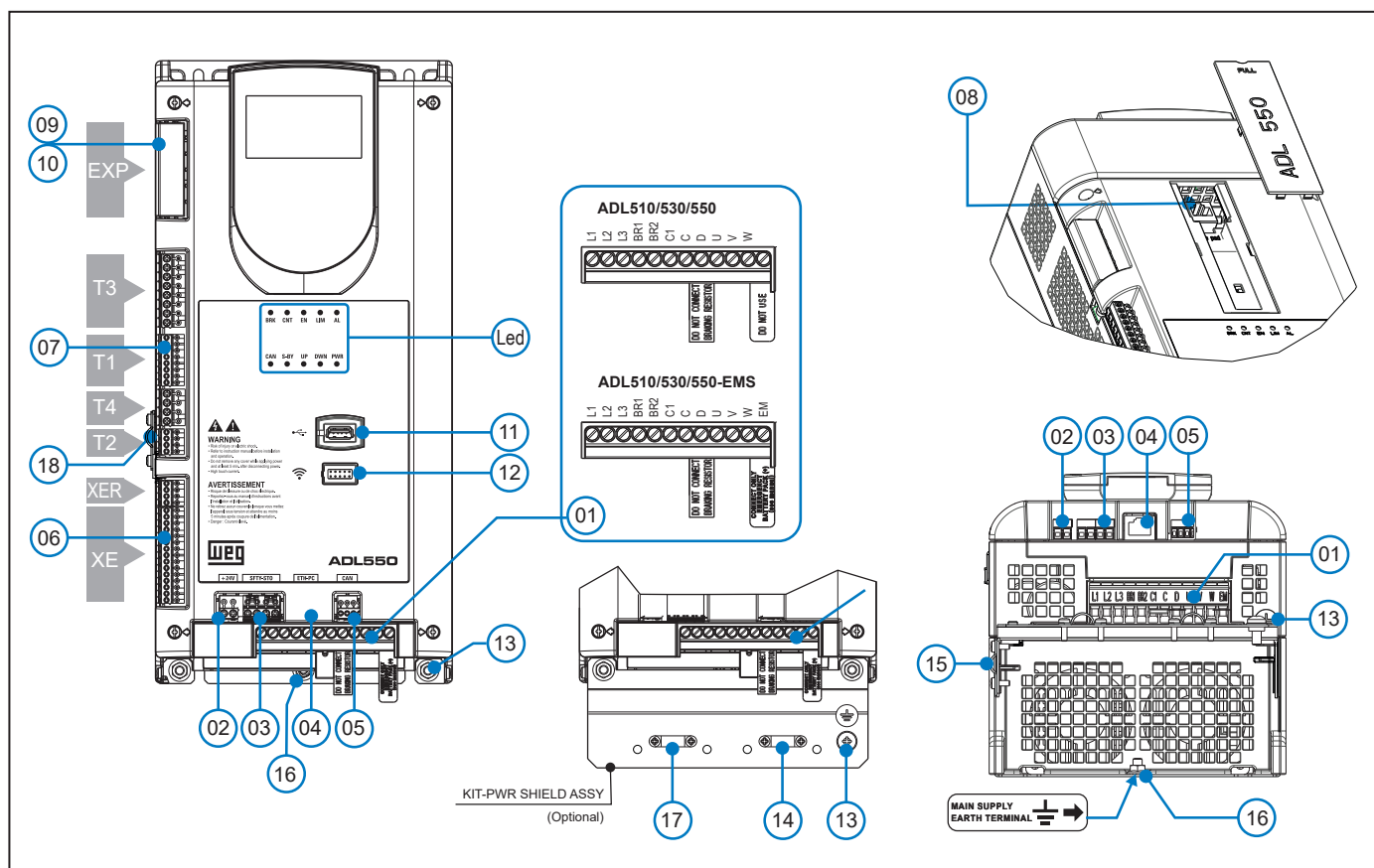
The electrical commissioning should only be carried out by qualified personnel, who are also responsible for the provision of a suitable ground connection and a protected power supply feeder in accordance with the local and national regulations. The motor must be protected against overloads.

*La mise en service électrique doit être effectuée par un personnel qualifié. Ce dernier est responsable de l'existence d'une connexion de terre adéquate et d'une protection des câbles d'alimentation selon les prescriptions locales et nationales. Le moteur doit être protégé contre la surcharge*

If the Drives have been stored for longer than two years, the operation of the DC link capacitors may be impaired and must be "reformed". Before commissioning devices that have been stored for long periods, connect them to a power supply for two hours with no load connected in order to regenerate the capacitors, (the input voltage has to be applied without enabling the drive).

*En cas de stockage des variateurs pendant plus de deux ans, il est conseillé de contrôler l'état des condensateurs CC avant d'en effectuer le branchement. Avant la mise en service des appareils, ayant été stockés pendant long temps, il faut alimenter variateurs à vide pendant deux heures, pour régénérer les condensateurs : appliquer une tension d'alimentation sans actionner le variateur.*

## 7.1 Location and identification of terminals and LEDs



Ref.	Description	Manual section	ADL510	ADL530	ADL550
(01)	Power terminals	"7.2 Power section" on page 28	Yes	Yes	Yes
(02)	<b>+24V</b> Input + 24 Vdc external	"7.3.4 +24V supply connection" on page 39	-	-	Yes
(03)	<b>SFTY-STO</b> STO Safety terminals	"7.3.5 Safety STO connection (SFTY-STO)" on page 39	-	-	Yes
(04)	<b>ETH-PC</b> RJ45 terminal, Ethernet port (100 Mbit/s)	"7.4 ETH-PC Ethernet Interface (RJ45 connector)" on page 40	Yes	Yes	Yes
(05)	<b>CAN</b> CANopen 417 Lift terminals	"7.5 CAN interface" on page 41	-	Yes	Yes
(06)	<b>XE/XER</b> Encoder terminals	"7.3.3 Feedback Connection" on page 32	Yes	Yes	Yes
(07)	<b>T1</b> Digital input terminal	"7.3.2 I/O and Relays connection" on page 31	Yes	Yes	Yes
	<b>T2</b> Analogue input terminal				
	<b>T3</b> Relay output terminal				
	<b>T4</b> Digital and +24V input enable / reference terminal				
(08)	RJ45 terminal, KB-ADL500 optional keypad	"7.6 Optional Keypad interface (RJ45 connector)" on page 42	Yes	Yes	Yes
(09)	Optional EXP-I01-ADL500 card terminals	"A.1.2 - Optional card EXP-I01-ADL500" on page 91	-	-	Yes
	Optional EXP-DCP-ADL500 card terminals	"A.1.3 - Optional card EXP-DCP-ADL500" on page 92			
(11)	USB 2.0 port	"7.7 USB port for data storage" on page 42	-	Yes	Yes
(12)	Wi-Fi Port	"7.8 Wi-Fi module port" on page 42	-	Yes	Yes
(13)	Motor Earth terminals	"7.2 Power section" on page 28	Yes	Yes	Yes
(14)	Omega motor cable shield connection	"7.2.3 Connection of shielding (recommended)" on page 28	Yes	Yes	Yes
(15)	Omega feedback cable shield connection	"7.3.3 Feedback Connection" on page 32	Yes	Yes	Yes
(16)	Mains supply earth terminals	"7.2 Power section" on page 28	Yes	Yes	Yes
(17)	Securing of Omega power cable		Yes	Yes	Yes
(18)	Omega connection for shielding of terminal T2	"7.3.2 I/O and Relays connection" on page 31	Yes	Yes	Yes
Led	Operation and diagnostics LEDs	"7.3.6 Led" on page 39	Yes	Yes	Yes

## 7.2 Power section

**Note!**

For the position of the terminals see section "7.1 Location and identification of terminals and LEDs" on page 27.

### 7.2.1 Power terminals and connection

Terminal	Description	IN/OUT	ADL510/530/550	ADL510/530/550-EMS
L1	Three-phase main supply, phase L1	OUT	Yes	Yes
L2	Three-phase main supply, phase L2	OUT	Yes	Yes
L3	Three-phase main supply, phase L3	OUT	Yes	Yes
BR1	Brake resistor	IN	Yes	Yes
BR2	Brake resistor	OUT	Yes	Yes
C1	DC choke (tie to C if not used)	OUT	Yes	Yes
C	DC choke	IN	Yes	Yes
D	DC Link (-)	OUT	Yes	Yes
U	Motor connection, phase U	OUT	Yes	Yes
V	Motor connection, phase V	OUT	Yes	Yes
W	Motor connection, phase W	OUT	Yes	Yes
EM	Battery main supply (+)	IN	- (1)	Yes (2)

(1) Do not use.

(2) Connect only emergency battery pack (+)

### 7.2.2 Cable cross-sections

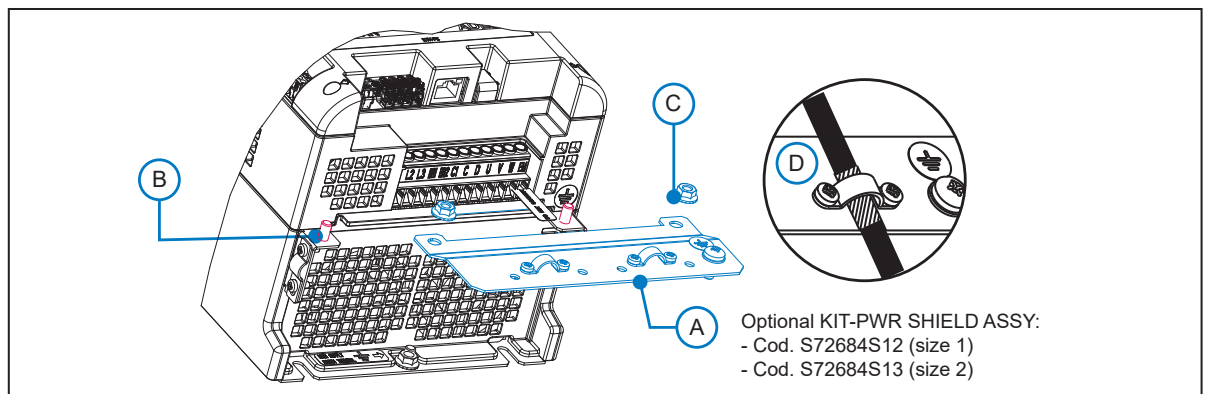
Sizes	Terminals: L1 - L2 - L3 - BR1 - BR2 - C1 - C - D - U - V - W - EM				
	Maximum cable cross-section (flexible conductor)		Recommended stripping (mm)	Recommended terminal (mm)	Tightening torque (min) (Nm)
	(mm <sup>2</sup> )	AWG			
1040	4	10	8	None / pin	0.5 ... 0.6
1055	4	10	8	None / pin	0.5 ... 0.6
1075	4	10	8	None / pin	0.5 ... 0.6
2110	16	6	10	None / pin	1.2 ... 1.5
2150	16	6	10	None / pin	1.2 ... 1.5

Sizes	Terminals: $\frac{1}{2}$ on structural work (see ref. (16) on previous page)				
	Cable cross-section		Lock screw diameter (mm)	Recommended terminal (mm)	Tightening torque (min) (Nm)
	(mm <sup>2</sup> )	AWG			
1040 ... 2150	Same as the maximum cross-section used for the power terminal strip		M5	Eyelet - Fork	6

**Note!**

The minimum cross-section for both ground connections must comply with EN61800-5-1 prescriptions. Always ground both points on structural steel.

### 7.2.3 Connection of shielding (recommended)



For compliance with EN 12016: put the optional metal support KIT-PWR SHIELD ASSY (A) on bolts (B) and tighten the two nuts fully (C).

Fasten the power cable shield to the omega sections (D).



## 7.2.4 EMC guide line



In a domestic environment, this product may cause radio interference, in which case supplementary mitigation measures may be required.



The converters are protected in order to be used in industrial environments where, for immunity purposes, large amounts of electromagnetic interference can occur. Proper installation practices will ensure safe and trouble-free operation. If you encounter problems, follow the guidelines which follow.

- Check for all equipment in the cabinet are well grounded using short, thick grounding cable connected to a common star point or busbar. Better solution is to use a conductive mounting plane and use that as EMC ground reference plane.
- Flat conductors, for EMC grounding, are better than other type because they have lower impedance at higher frequencies.
- Make sure that any control equipment (such as a PLC) connected to the inverter is connected to the same EMC ground or star point as the inverter via a short thick link.
- Connect the return ground from the motors controlled by the drives directly to the ground connection ( $\perp$ ) on the associated inverter.
- Separate the control cables from the power cables as much as possible, using separate trunking, if necessary at 90° to each other.
- Whenever possible, use screened leads for the connections to the control circuitry
- Ensure that the contactors in the cubicle are suppressed, either with R-C suppressors for AC contactors or 'flywheel' diodes for DC contactors fitted to the coils. Varistor suppressors are also effective. This is important when the contactors are controlled from the inverter relay.
- Use screened or armored cables for the motor connections and ground the screen at both ends using the cable clamps.
- Use power shield kit to connect shield of motor cable to drive.

### Note!

For further information regarding electro-magnetic compatibility standards, according to Directive 2014/30/EU, conformity checks carried out on WEG appliances, connection of filters and mains inductors, shielding of cables, ground connections, etc., consult the "Electro-magnetic compatibility guide" (1S5E84) you can download from [www.weg.net](http://www.weg.net).

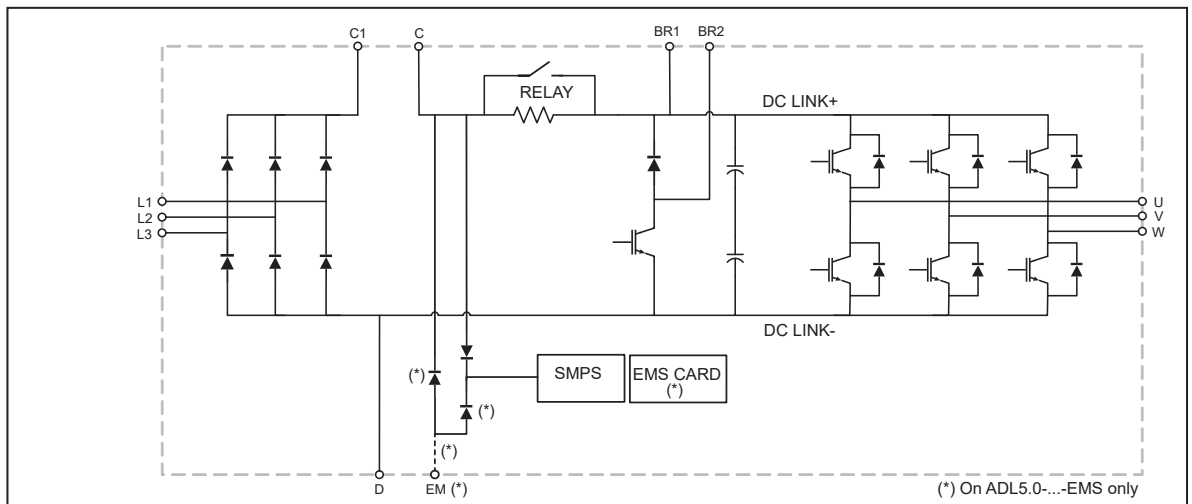
## 7.2.5 Block diagram of power section

This type is equipped with an EMI input filter (models ADL5.0-...-F-...), an AC/DC converter, a system for pre-loading DC capacitors, a DC/AC converter, a power supply unit and an integrated braking unit.

A specific external resistor must be connected to perform the braking function between terminals BR1 and BR2. An optional external BUy braking unit can be used and connected to terminals C and D. Refer to the BUy handbook for further information.

To manage emergency situations (drive power failure) the unit also envisages ordering the option with an emergency module inside the drive (ADL5.0-...-EMS models) and powering the emergency unit between terminals EM and D with a battery.

### Sizes 1040 ... 2150



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### 7.2.6 Internal EMC filter (standard)

The ADL550/530/510-...-F-... series of inverters are equipped with an internal EMI filter able to guarantee the performance levels required by EN 12015, first environment, with max 10 m of shielded motor cable. Compliance with these requirements means the drive can be incorporated into lift systems built to EN 12015.

### 7.2.7 Connection of AC and DC chokes (optional)

(For three-phase ADL500 only). The drive can use both a three-phase choke on the AC power line and, for 1040 ... 2150 sizes only, a DC choke between terminals C1 and C.

Refer to chapter "5.2 Input chokes" on page 18 for the recommended connections.

If no DC choke is used on 1040 ... 2150 sizes, terminals C1 and C must be bridged.



**Attention**

.....  
If no DC choke is used, terminals C1 and C must be bridged (sizes 1-2).  
.....

## 7.3 Regulation section

**Note!**

All terminal strips are extractable. For electrical properties of analog, digital and relay inputs/outputs see section A.2 of the Appendix.

### 7.3.1 Cable cross-sections

Terminals	Maximum cable cross-section		Recommended stripping (mm)	Tightening torque (min) (Nm)
	(mm <sup>2</sup> )	(AWG)		
T3, T4, SFTY-ST0	0.2 ... 2.5 (1 cable) 0.2 ... 0.75 (2 cables)	26 ... 12 26 ... 19	5	0.4
T1, T2, XER, XE	0.2 ... 1.5 (1 cable) 0.2 ... 0.5 (2 cables)	26 ... 16 26 ... 19	5	0.25

### 7.3.2 I/O and Relays connection

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

#### T3 terminal – Relays Output

Pin	Signal	Description	Command Associated parameter	ADL510	ADL530	ADL550
50	RO_40	Relay 4 output (contact N.O., 24Voc)	1416, Dig output 4 src	Yes	Yes	Yes
51	RO_4C	Common Relay 4	DoopOpen	Yes	Yes	Yes
52	RO_30	Relay 3 output (contact N.O., 24Voc)	1414, Dig output 3 src	Yes	Yes	Yes
53	RO_3C	Common Relay 3	Run Contactor	Yes	Yes	Yes
54	RO_20	Relay 2 output (contact N.O., 24Voc)	1412, Dig output 2 src	Yes	Yes	Yes
55	RO_2C	Common Relay 2	Brake Contactor	Yes	Yes	Yes
56	RO_10	Relay 1 output (contact N.O., 24Voc)	1410, Dig output 1 src	Yes	Yes	Yes
57	RO_1C	Common Relay 1	Drive OK	Yes	Yes	Yes

#### T1 terminal – Digital inputs

Pin	Signal	Description	Command Associated parameter	ADL510	ADL530	ADL550
1	DI_8	Digital input 8	Contactor feedback	Yes	Yes	Yes
2	DI_7	Digital input 7	Feedback brake	Yes	Yes	Yes
3	DI_6	Digital input 6	Multispeed 2	Yes	Yes	Yes
4	DI_5	Digital input 5	Multispeed 1	Yes	Yes	Yes
5	DI_4	Digital input 4	Multispeed 0	Yes	Yes	Yes
6	DI_3	Digital input 3	Emergency	Yes	Yes	Yes
7	DI_2	Digital input 2	Start reverse	Yes	Yes	Yes
8	DI_1	Digital input 1	Start forward	Yes	Yes	Yes

#### T4 terminal – Enable / reference digital inputs and +24V

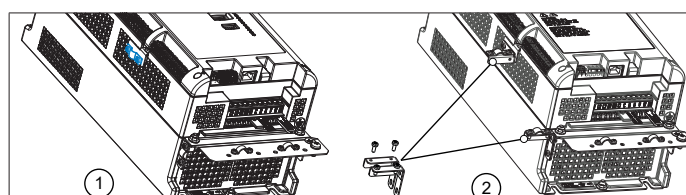
Pin	Signal	Description	Command Associated parameter	ADL510	ADL530	ADL550
9	EN_HW	Enable digital inputs		Yes	Yes	Yes
10	DI_CM	Common reference digital inputs		Yes	Yes	Yes
11	0V24_OUT	Ground reference output voltage		Yes	Yes	Yes
12	+24V_OUT	+24 Vdc output voltage power supply		Yes	Yes	Yes

#### T2 terminal – Analog inputs

Pin	Signal	Description	Command Associated parameter	ADL510	ADL530	ADL550
1	AI_2N	Common reference analog input 2		-	Yes	Yes
2	AI_2P	Analog input 2		-	Yes	Yes
3	AI_1P	Analog input 1		Yes	Yes	Yes
4	AI_1N	Common reference analog input 1		Yes	Yes	Yes

#### T2 terminal shield connection (recommended)

(1) Secure the braided shielded cable to the omega at terminal T2 (in the case of reduced lateral space it is possible to use the GND PLATE KIT (2), code S72684G13).



### 7.3.3 Feedback Connection

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

#### XER terminal

Pin	Signal	Description	Direction	ADL510	ADL530	ADL550
20	BR-	Channel B (-) repeat	OUT	Yes	Yes	Yes
21	BR+	Channel B (+) repeat	OUT	Yes	Yes	Yes
22	AR-	Channel A (-) repeat	OUT	Yes	Yes	Yes
23	AR+	Channel A (+) repeat	OUT	Yes	Yes	Yes

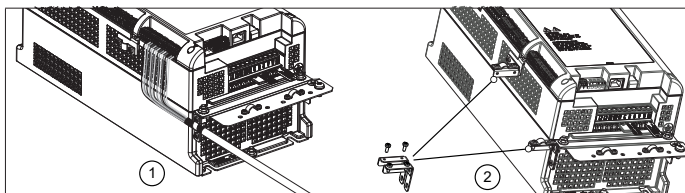
#### XE terminal

Pin	Signal		Description	Digital Incremental	Sinusoidal Incremental	Sinusoidal Incremental + Sin/Cos	Sinusoidal Incremental + Absolute	Direction	ADL510	ADL530	ADL550
	#1	#2									
1	FH2		Fast (Freeze) 2 input	x	x	x	x	IN	-	-	Yes
2	FH1		Fast (Freeze) 1 input	x	x	x	x	IN	-	-	Yes
3	COM_FH		Common Fast inputs	x	x	x	x	IN	-	-	Yes
4	COS-	DT-	Channel Cos - / Data -			x	x	IN / BID	-	Yes	Yes
5	COS+	DT+	Channel Cos + / Data +			x	x	IN / BID	-	Yes	Yes
6	SIN-	CK-	Channel Sen - / Clock -			x	x	IN / OUT	-	Yes	Yes
7	SIN+	CK+	Channel Sen + / Clock +			x	x	IN / OUT	-	Yes	Yes
8	Z-		Channel Z -	x	x	x	x	IN	Yes	Yes	Yes
9	Z+		Channel Z +	x	x	x	x	IN	Yes	Yes	Yes
10	B-		Channel B -	x	x	x	x	IN	Yes	Yes	Yes
11	B+		Channel B +	x	x	x	x	IN	Yes	Yes	Yes
12	A-		Channel A -	x	x	x	x	IN	Yes	Yes	Yes
13	A+		Channel A +	x	x	x	x	IN	Yes	Yes	Yes
14	OVE		Encoder reference	x	x	x	x	OUT	Yes	Yes	Yes
15	+VE		Encoder supply	x	x	x	x	OUT	Yes	Yes	Yes

Figure 7.3.2: Connection of shielding (recommended)

#### XE terminal shield connection (recommended)

(1) Secure the braided shielded cable to the omega at terminal XE (in the case of reduced lateral space it is possible to use the GND PLATE KIT (2), code S72684G13).



Encoders provide motor speed and position feedback.

The regulation algorithms in the ADL500 drive are capable of controlling asynchronous and permanent magnet synchronous (brushless) motors. With asynchronous motors the regulation algorithm may or may not use the speed measurement obtained from the encoder reading. With brushless motors the regulation algorithm needs an encoder that also allows the absolute motor position to be verified.



**Attention**

The ADL500 supports several encoder types.

The type of encoder that is connected must be selected via software: PAR 2132 **Encoder mode** (menu ENCODER).

Possible configurations are summarised in the next table:

	ADL510	ADL530	ADL550	Asynchronous		Brushless
				ASY SSC (1)	ASY FOC (1)	SYN FOC (1)
Incremental digital	Yes	Yes	Yes	-	Recommended	Possible
Incremental sinusoidal	Yes	Yes	Yes	-	Recommended	Possible
Incremental sinusoidal + absolute SinCos	-	Yes (2)	Yes	-	Possible	Recommended
Incremental sinusoidal + Absolute Endat	-	Yes (2)	Yes	-	Possible	Recommended
Absolute Endat	-	Yes	Yes	-	Possible	Recommended
Absolute Biss	-	Yes	Yes	-	Possible	Recommended

(1) PAR 540 **Control type**.

(2) ADL530: "freeze" not available. - = encoder not used

Encoders must be fitted to the motor shaft using anti-backlash couplings. The best control is achieved with configurations that have incremental sinusoidal channels. For electrical connections always use good quality cables with shielded twisted pairs, according to the procedures and specifications described in the following paragraphs.

The configuration parameters for each encoder can be found in the ENCODER.

In the event of an encoder malfunction the drive generates the **Speed fbk back loss** alarm and the cause of the malfunction is shown in parameter 2172 **SpdFbkLoss code**.

If the encoder is not used by the regulation algorithm the drive still manages the encoder position reading but does not generate an alarm in case of malfunctioning.

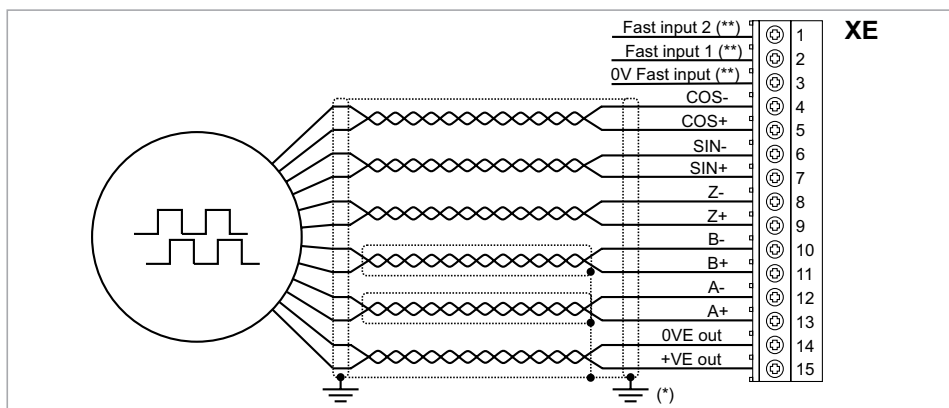
### (1) Connection SinCos encoder (ADL510, ADL530) - Connection SinCos encoder + 2 Freeze (ADL550)

#### Technical specification

Channels	A+ A-, B+ B-, Z+ Z-, Sin+ Sin-, Cos+ Cos-, differential Management of loss of encoder signals.
Max frequency	200 kHz (check the number of encoder impulses according to the maximum speed)
Electrical interface	Channels A/B/Sin/Cos $0.6\text{ V} \leq V_{pp} \leq 1.2\text{ V}$ (typ. 1.0 V) – Channel Z* $0.2\text{ V} \leq V_{pp} \leq 0.8\text{ V}$
Load capacity	Channels A/B/Z* 8 mA @ 1.0 Vpp (Zin 120Ω) Channels Sin/Cos 1 mA @ 1.0 Vpp (Zin 1kΩ)
Programmable internal power supply	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA. The internal power supply of the encoder can be selected from the keypad (ENCODER menu, parameter <b>Encoder supply</b> (PAR 2102) to balance the loss of voltage due to the length of the encoder cable and load current.
Cable length	PAR 2102 <b>Encoder supply</b> , range: min=5.2V, max=20V, step of 0.1V; default=5.2V. max 50m

\* Channel Z = I (Index mark)

Figure 7.3.3: Connection SinCos encoder + 2 Freeze



(\*) Connection of shielding, see figure 7.3.2

(\*\*) on ADL550 only

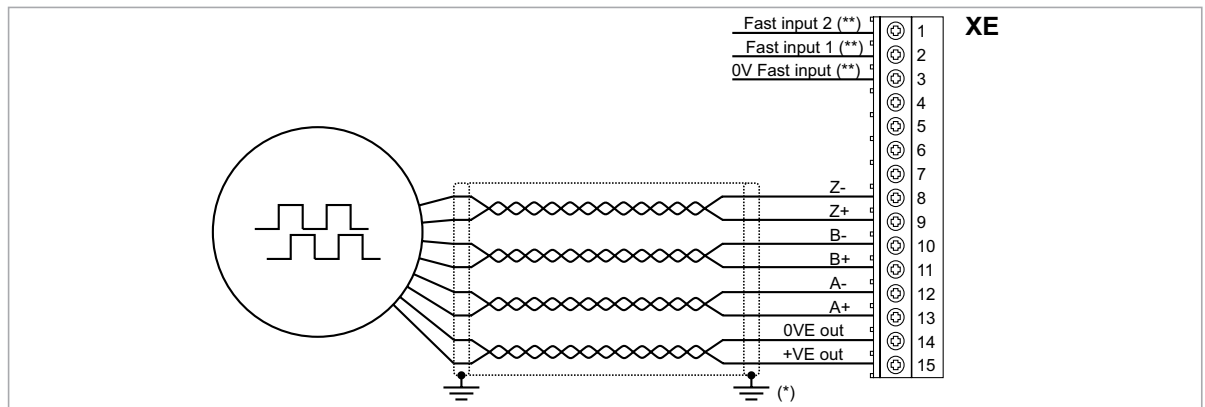
## (2) Connection sinusoidal encoder 3 Channels (ADL510, ADL530) - Connection sinusoidal encoder 3 Channels + 2 Freeze (ADL550)

### Technical specification

Channels _____	A+ A-, B+ B-, Z+ Z-, differential Management of loss of encoder signals.
Max frequency _____	200 kHz (check the number of encoder impulses according to the maximum speed)
Number of impulses _____	min 128, max 16384 (default 1024)
Electrical interface _____	Channels A/B $0.6\text{ V} \leq V_{pp} \leq 1.2\text{ V}$ (typ. 1.0 V) – Channel Z* $0.2\text{ V} \leq V_{pp} \leq 0.8\text{ V}$
Load capacity _____	Channels A/B/Z* 8 mA @ 1.0 Vpp (Zin 120Ω)
Programmable internal power supply _____	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA. The internal power supply of the encoder can be selected from the keypad (ENCODER menu, parameter <b>Encoder supply</b> (PAR 2102) to balance the loss of voltage due to the length of the encoder cable and load current. PAR 2102 <b>Encoder supply</b> , range: min=5.2V, max= 20V step of 0.1V; default=5.2V.
Cable length _____	max 50m

\* Channel Z = I (Index mark)

Figure 7.3.4: Connection sinusoidal encoder 3 Channels + 2 Freeze



(\*) Connection of shielding, see figure 7.3.2

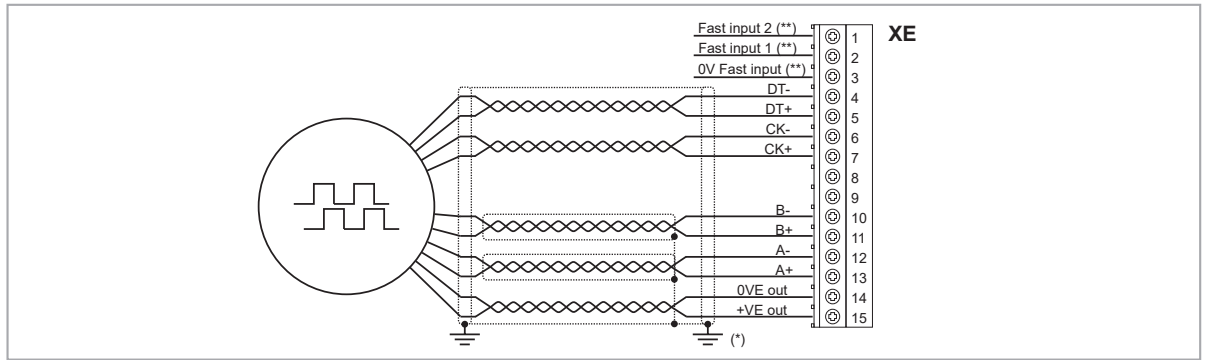
(\*\*) on ADL550 only

## (3) Connection EnDat Encoder (ADL510, ADL530) - Connection EnDat Encoder + 2 Freeze (ADL550)

### Technical specification

Channels _____	A+ A-, B+ B-, differential Management of loss of encoder signals.
Max frequency _____	200 kHz (check the number of encoder impulses according to the maximum speed)
Number of impulses _____	min 128, max 16384 (automatic recognition at initialisation)
Electrical interface _____	$0.6\text{ V} \leq V_{pp} \leq 1.2\text{ V}$ (typ. 1.0 V)
Load capacity _____	8 mA @ 1.0 Vpp (Zin 120Ω)
Programmable internal power supply _____	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA. The internal power supply of the encoder can be selected from the keypad (ENCODER menu, parameter <b>Encoder supply</b> (PAR 2102) to balance the loss of voltage due to the length of the encoder cable and load current. PAR 2102 <b>Encoder supply</b> , range: min=5.2V, max= 20V step of 0.1V; default=5.2V.
Cable length _____	max 50m
Absolute channels _____	CK+ CK-, DT+ DT- differential, RS-485 Management of loss of encoder signals.
Interface _____	EnDat: 2.1/2.2 single/multi-turn (command set managed only compatible with 2.1) SSI: Standard Sick/Stegman single/multi-turn
Max frequency _____	EnDat: 1 MHz with delay compensation (not programmable) SSI: 400 KHz (not programmable)
Number of bits _____	EnDat: max 32 bit/turn* max 32bit/turn (automatic recognition at initialisation) SSI:13-25 bits (default 25)

Figure 7.3.5: Connection EnDat Encoder + 2 Freeze



(\*) Connection of shielding, see figure 7.3.2

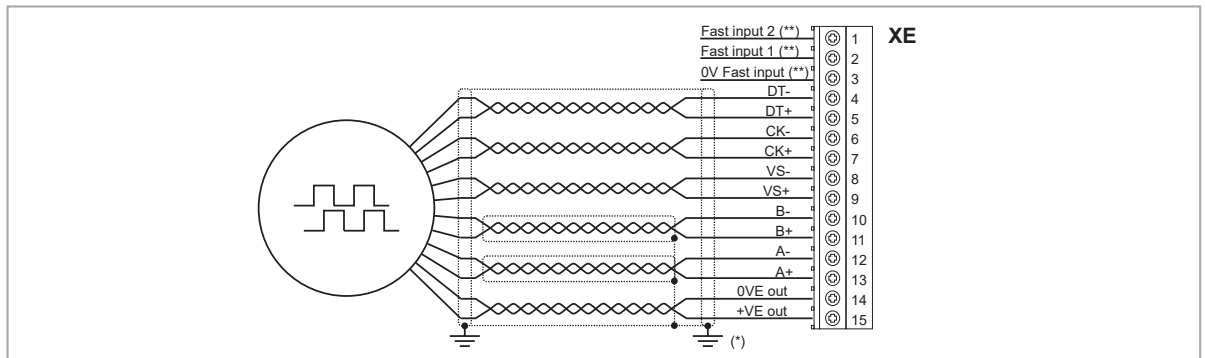
(\*\*) on ADL550 only

#### (4) Connection Encoder Biss (ADL530, ADL550) - Connection Encoder Biss + 2 Freeze (ADL550)

##### Technical specification

Channels	A+ A-, B+ B-, differential Management of loss of encoder signals.
Max frequency	200 kHz (check the number of encoder impulses according to the maximum speed)
Number of impulses	min 128, max 16384 (automatic recognition at initialisation)
Electrical interface	$0.6\text{ V} \leq V_{pp} \leq 1.2\text{ V}$ (typ. 1.0 V)
Load capacity	8 mA @ 1.0 Vpp ( $Z_{in} 120\Omega$ )
Programmable internal power supply	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA. The internal power supply of the encoder can be selected from the keypad (ENCODER menu, parameter <b>Encoder supply</b> (PAR 2102) to balance the loss of voltage due to the length of the encoder cable and load current.
Cable length	max 100m
Absolute channels	CK+ CK-, DT+ DT- differential, RS-485 Management of loss of encoder signals.
Interface	BiSS Rev. C6 single / multi-turn point-to-point network
Max frequency	10 MHz up to 100 m cable length
Number of bits	64 max

Figure 7.3.6: Connection Encoder Biss + 2 Freeze



(\*) Connection of shielding, see figure 7.3.2

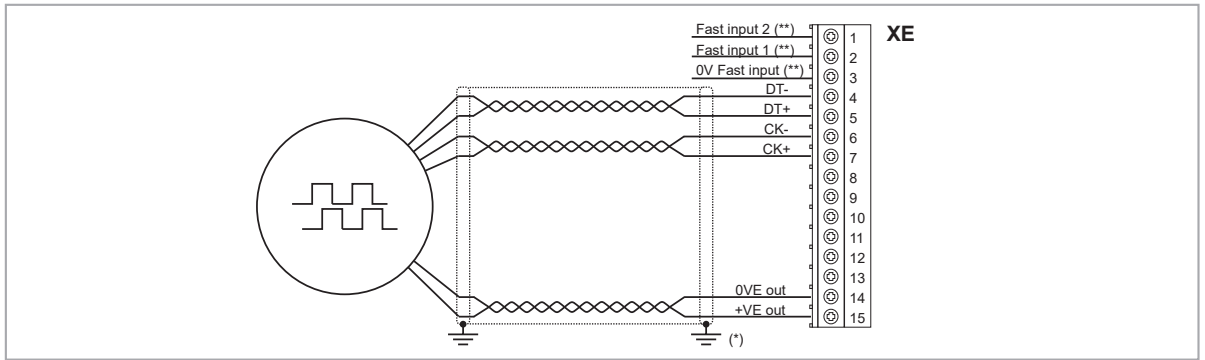
(\*\*) on ADL550 only

#### (5) Connection Encoder EnDat Full Digital (ADL510, ADL530) - Connection Encoder EnDat Full Digital + 2 Freeze (ADL550)

##### Technical specification

Programmable internal power supply	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA.
Cable length	max 50m
Absolute channels	CK+ CK-, DT+ DT- differential, RS-485 Management of loss of encoder signals.
Interface	EnDat: 2.1/2.2 single/multi-turn (command set managed only compatible with 2.1)
Max frequency	EnDat: 1.5 MHz with delay compensation (not programmable)
Number of bits	EnDat: max 32 bit/turn* max 32bit/turn (automatic recognition at initialisation)

Figure 7.3.7: Connection EnDat Full Digital Encoder + 2 Freeze



(\*) Connection of shielding, see figure 7.3.2

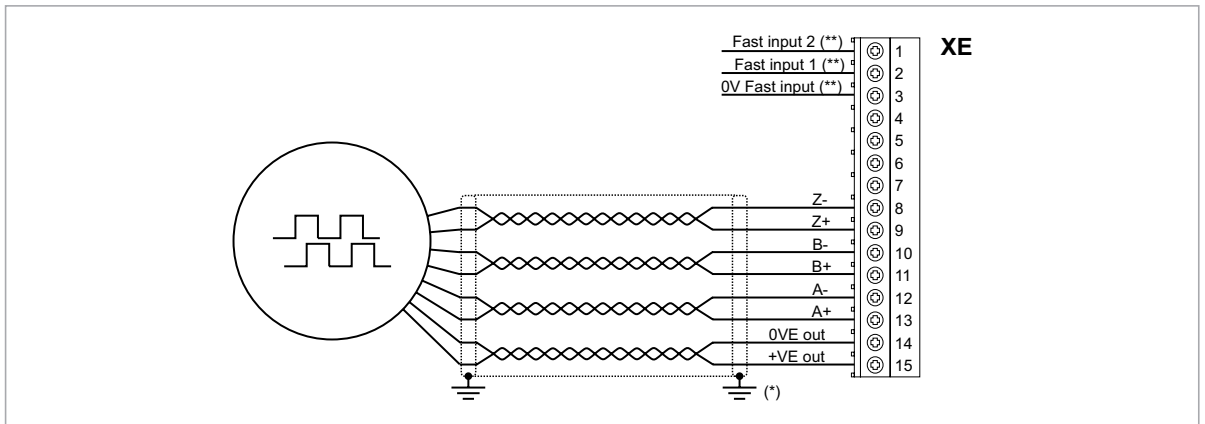
(\*\*) on ADL550 only

**(6) Connection digital Encoder 3 channels (ADL510, ADL530) - Connection digital Encoder 3 channels + 2 Freeze (ADL550) (TTL Line Driver / push pull)**

**Technical specification**

Channels	A+ A-, B+ B-, Z+ Z-, differential line drivers.
Max frequency	100 kHz (check the number of encoder impulses according to the maximum speed)
Number of impulses	min 128, max 16384 (default 1024)
Electrical interface	TTL (ref. GND) $U_{low} \leq 0.5 V$ $U_{high} \leq 2.5 V$
Load capacity	13 mA @ 5.5 V ( $Z_{in} 300\Omega$ )
Programmable internal power supply	min +5.2 V, max +20V (default + 5.2 V) – I <sub>max</sub> 150 mA. The internal power supply of the encoder can be selected from the keypad (ENCODER menu, parameter <b>Encoder supply</b> (PAR 2102) to balance the loss of voltage due to the length of the encoder cable and load current.
Cable length	PAR 2102 <b>Encoder supply</b> , range: min=5.2V, max= 20V, step of 0.1V; default=5,2V. max 50m

Figure 7.3.8: Connection digital encoder 3 Channels + 2 Freeze (TTL Line Driver / push pull)



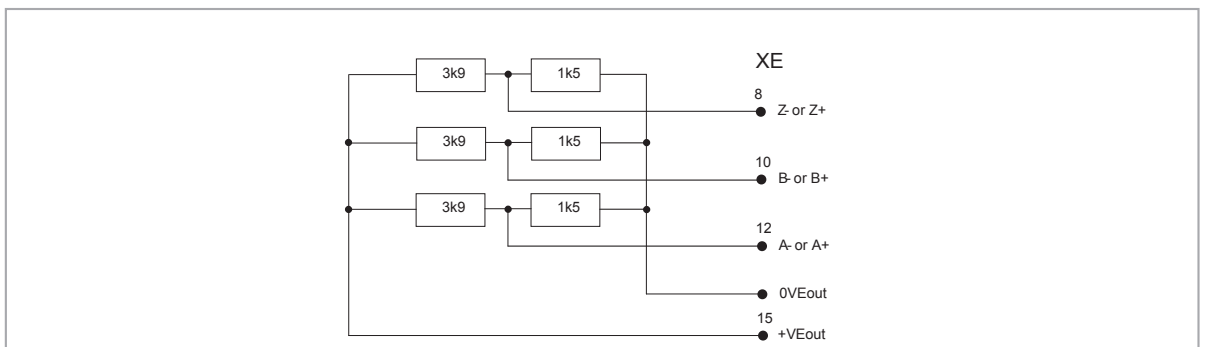
(\*) Connection of shielding, see figure 7.3.2

(\*\*) on ADL550 only

**(7) Connection Single Ended Digital Encoder (ADL510-530-550)**

The following resistive divider must be added on single-ended configurations.

Figure 7.3.9: resistive divider for single-ended configurations





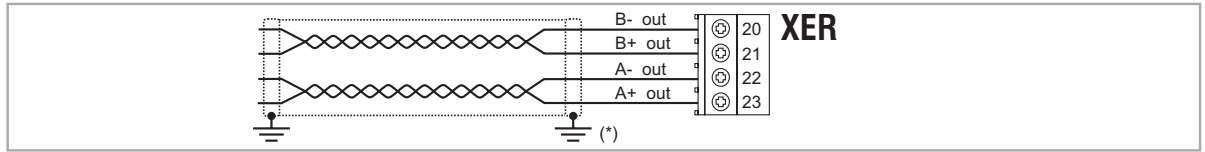
### (8) Repeat Encoder (TTL line-driver) (ADL510-530-550)

ADL500 have an incremental encoder output with TTL Line Driver levels to be used to repeat the servomotor feedback device.

This function is performed via HW and an encoder output can be repeated with a programmable divider.

The encoder output signals are available on the XER connector:

Figure 7.3.10: Repeat Encoder



(\*) Connection of shielding, see figure 7.3.2

#### Technical specification:

Channels	A+ A-, B+ B-, differential line drivers, optoisolated.
Max frequency	200 kHz
Number of impulses	1/1-1/2-1/4-1/8 repeat (default 1/1)
Electrical interface	TTL (ref. GND) $U_{low} \leq 0.5V$ $U_{high} \leq 2.5V$
Load capacity	TTL 20mA for each channel
Cable length	max 50m

### 7.3.3.1 Phasing

In order for the ADL500 Brushless regulation algorithm to function correctly, it is necessary to know the position of the rotor with respect to the stator power phases. Therefore the 0° position provided by the absolute encoder must be known with respect to the position of a motor pole and the encoder count direction must match the motor power phases.

This is called phasing. Phasing can be performed manually, directly by means of the mechanical encoder assembly position on the motor shaft and on the phases, or using the automatic procedures available in the drive.

Phasing must always be repeated whenever:

- the encoder assembly position is changed
- the phase sequence of the motor power supply connection is changed
- the encoder incremental signal connection is changed
- the encoder absolute signal connection is changed
- the value of the PAR 2008 **Pole pairs** parameter is changed
- the value of the PAR 2100 **Encoder pulses** parameter is changed
- the drive is replaced (alternatively, download parameters taken from previous drive)

There are two different procedures that can be launched by writing two different parameters:

- PAR 2190 **Autophase rotation** -> rotation phasing:  
this procedure must be performed with the motor free to turn and with no load applied.
- PAR 2192 **Autophase still** -> static phasing:  
this procedure must be performed with the motor still and brake applied.

#### Rotation phasing

This procedure is based on the possibility of moving the motor, by a maximum angle of two pole pairs, to find correct encoder phasing, cross-check the available encoder and motor data and, if the encoder count direction does not match the phase sequence of the motor power supply, correct it by automatically modifying PAR 2130 **Encoder direction**.

#### Note!

~~~~~  
In the case described above, a positive speed reference could generate a rotation in reverse with respect to that defined as positive for the encoder (usually clockwise), while still ensuring good motor control.  
~~~~~

The encoder direction defined as positive can be stored as the positive reference direction by inverting two motor power phases and repeating the rotation phasing procedure.

If the procedure is terminated without any errors, code 0 is shown on the keypad, otherwise if any differences have been detected that cannot be corrected by the drive, one of the codes listed in Autotune (phasing), [see chapter 10.3 Messages](#), is shown.

Possible faults:

- faults in electric signals not detected with a "**Speed fbk loss [22]**" alarm
- error in the PAR 2008 **Pole pairs** parameter setting
- error in the PAR 2100 **Encoder pulses** parameter setting

#### Static phasing

Using this method, in which the motor cannot move, the encoder and motor data cannot be cross-checked to verify the matching of parameters or count direction.

This condition must therefore be checked before launching the procedure.

### 7.3.4 +24V supply connection

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

Terminal	Description	IN/OUT
1	+ 24 Vdc External power supply of the regulation board	IN
2	0 Vdc external power supply reference	IN

### 7.3.5 Safety STO connection (SFTY-STO)

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

Terminal	Description	IN/OUT
EN+	Enable Safety (+)	IN
EN-	Enable Safety (-)	IN
OK1	Safety OK, Output 1	OUT
OK2	Safety OK, Output 2	OUT

The EN+ , EN-, OK1 and OK2 terminals must be connected as shown in the typical connection diagrams in chapter "7.9 Connection diagrams" on page 43.

Safety management is integrated in the firmware.

The Safety must be enabled to enable the drive.

The drive is disabled if the Safety enable command is removed while it is enabled.

To re-enable the drive, re-enable the Safety then remove and re-send both the Enable and Start commands.

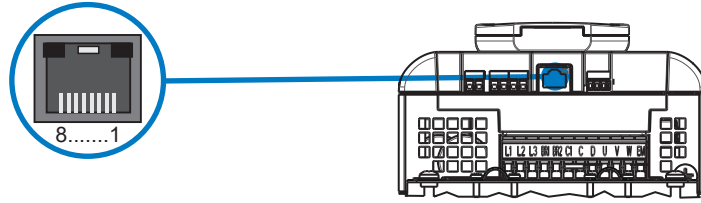
### 7.3.6 Led

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

Led	Colour	Meaning	ADL510	ADL530	ADL550
BRK	Yellow	Braking	Yes	Yes	Yes
CNT	Yellow	Contacting closing command status	Yes	Yes	Yes
EN	Green	Enable	Yes	Yes	Yes
LIM	Red	Current limit	Yes	Yes	Yes
AL	Red	Generic alarm	Yes	Yes	Yes
CAN	Green	CAN 1	-	Yes	Yes
S-BY	Yellow	Stand-by	-	-	Yes
UP	Green	Direction up	-	-	Yes
DOWN	Green	Direction down	-	-	Yes
PWR	Green	Power Supply ON	-	-	Yes

## 7.4 ETH-PC Ethernet Interface (RJ45 connector)



The ADL Drive is standard equipped with an RJ45 port for connection via ModbusTCP protocol, used for Drive-PC communication (with WEG\_DriveLabs configuration software), and HTTPS protocol used for Drive-PC / network communication (with WEG\_DriveLabs web application).

Minimum requirements for Ethernet cable: shielded category 5E, maximum length 10 m.

Speed: 100 Mbit/s.

Pin	Signal	Description	IN/OUT	ADL510	ADL530	ADL550
1	ENOTX+	Data transmission (+)	OUT	Yes	Yes	Yes
2	ENOTX-	Data transmission (-)	OUT	Yes	Yes	Yes
3	ENORX+	Data reception (+)	IN	Yes	Yes	Yes
4	N.C.	n.c.	-	Yes	Yes	Yes
5	N.C.	n.c.	-	Yes	Yes	Yes
6	ENORX-	Data reception (-)	IN	Yes	Yes	Yes
7	N.C.	n.c.	-	Yes	Yes	Yes
8	N.C.	n.c.	-	Yes	Yes	Yes

### 7.4.1 Ethernet Configuration

Some familiarity and knowledge of IP networking topics is required to establish communication between the **ADL500** and a **PC**.

Based on the Ethernet configuration, during start-up, the drive acquires an IP address which is retained until reboot. Any change to the Ethernet configuration is applied when the drive is restarted.

The IP address is acquired based on the following configuration parameters:

Menu	Parameter	Description	
NETWORK CONFIG	9608	<b>IP Assignment</b>	IP address assignment method: static or DHCP based
NETWORK CONFIG	9556	<b>IP Address set</b>	Valid only if static assignment is selected. Statically configured IP address
NETWORK CONFIG	9558	<b>IP Netmask set</b>	Valid only if static assignment is selected. Statically configured IP netmask
NETWORK CONFIG	9560	<b>IP Gateway set</b>	Valid only if static assignment is selected. Statically configured IP gateway

The following are read-only parameters:

Menu	Parameter	Description	
DRIVE INFO	9562	<b>IP address</b>	Current IP Address. IP address acquired by ADL500
DRIVE INFO	9600	<b>MAC Address</b>	MAC Address

### 7.4.2 Point-to-point network topology

The PC is connected directly to the ADL500 drive.

If the ADL500 is configured in "**DHCP**" (IP parameterization, PAR 9608 set to "DHCP"), since no DHCP server is available in this topology, the ADL500 will acquire the local address 169.254.10.10.

Typically, PCs also implement a local connection protocol. Therefore, if the PC is configured to DHCP, it will acquire a local link address (169.254.x.y), and be able to communicate with the ADL500.

Address acquisition may take up to 2 minutes. If the PC does not implement the local link protocol or does not acquire a valid address, it can be configured with a static IP address compatible with the local link addresses:

- PC configured for static IP assignment;
- The PC IP address set to 169.254.x.y, with any value except 169.254.10.10, already assigned to ADL500;
- Set the PC IP netmask to 255.255.0.0.

The Windows PC network configuration guide is in the section below.

The ADL550 default IP assignment method is DHCP, so in this topology on first boot, the address 169.254.10.10 will be acquired and the drive will be reachable from the PC at this address.

If the ADL500 is configured as "static" (PAR 9608 **IP Assignment** set to "Static"), the ADL500 will be reachable at the address configured in the **IP Address set** parameter (PAR 9556) in the network specified by the netmask in the **IP**

**Netmask set** parameter (PAR 9558). The PC must be configured with a compatible address:

- PC configured for static IP assignment;
- The PC **IP netmask** set to the same value as the **IP Netmask set**, parameter, PAR 9558;
- The PC **IP address** set to the same network as the ADL500, with a different address.

For additional details on network configuration, see Appendix "A.3 Windows PC Network Configuration" on page 96.

## 7.5 CAN interface

**Note!**

For terminal location see section "7.1 Location and identification of terminals and LEDs" on page 27.

CANopen is a communication profile for CAL-based industrial systems (refer to the CANopen CAL-Base COMMUNICATION PROFILE for Industrial Systems; CiA Draft Standard 301 Version 4.2 Date 13 February 2002 by CAN in Automation e. V.).

The ADL500 integrates the interface for connection to CAN networks and also implements the DS417 profile according to CANopen 2.0.0 specifications (DS417 in preparation).

The CAN protocol (ISO 11898) used is CAN2.0A with 11-bit identifier. The integrated CANopen interface has been developed as a Minimum Capability Device. Data are exchanged cyclically; the master reads the data made available by the slaves and writes the reference data to the slaves.

The interface is provided with functional isolation (> 1 kV).

Connection is via the CAN connector and no power supply is required.

Terminal	Name	Function	Cable cross-section
L	CAN_L	CAN_L bus line (low dominant)	0.2 ... 2.5 mm <sup>2</sup> AWG 26 ... 12
SH	CAN_SHLD	CAN shielding	
H	CAN_H	CAN_H bus line (high dominant)	

LED	Meaning
CAN (green)	
Off	Stop
Flashing	Pre-operational
On	Operational

A shielded twin-pair (of the type described in the CANopen specifications) must be used for connection to the bus, and must be laid separately from the power cables, at a distance of at least 20 cm. Cable shielding must be grounded at the two ends. If the cable shielding is grounded at different points of the system, use equipotential connection cables to reduce the current flow between the drive and the CANbus master.

**Note!**

**As regards terminations:** the first and last termination on the CAN network must have a 120 ohm resistor between pins L and H.

If the ADL500 drive is in one of these positions, the termination resistor can also be inserted using the jumper P5 on the regulation board can be turned (ON) (the top cover must be removed, see section "A.1.1 - Installation" on page 90 or set parameter 4008 **Can Terminator** = 1 (CAN1) on 6.1 CONTROL COMM menu.

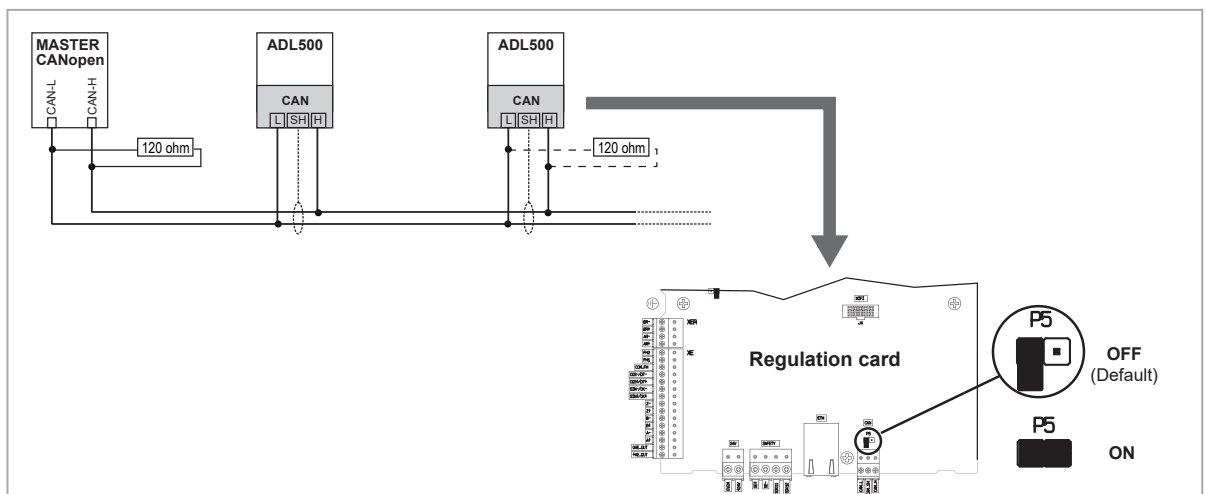
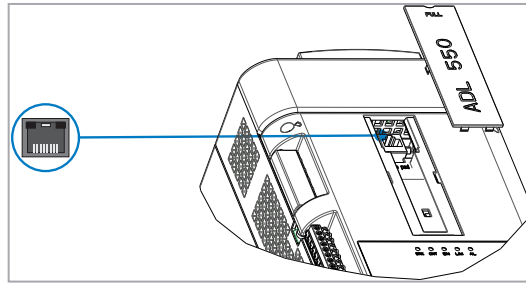


Figure 7.5.1: CANbus connection

## 7.6 Optional Keypad interface (RJ45 connector)



The female RJ45 port on the front of the inverter is used to mechanically attach and connect the optional KB-ADL500 keypad. The optional KB-ADL500 keypad is automatically recognised and managed by the drive.



**Caution**

.....  
**The connection have no galvanic isolation!**  
 .....

### KIT REMOTE KB-ADL500

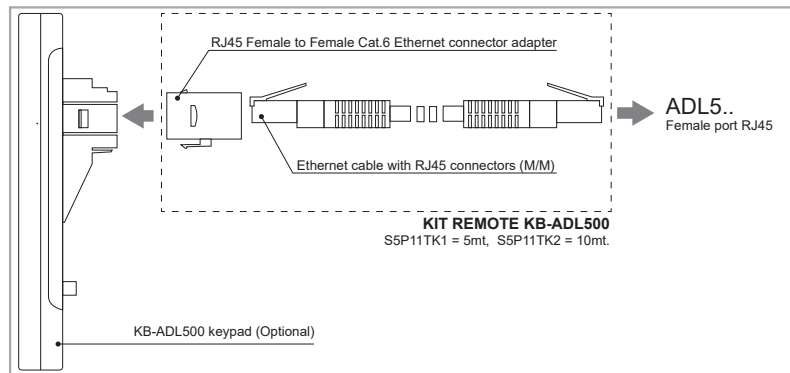
The keypad can be used remotely from distances of up to 5 or 10 m: using the appropriate KIT REMOTE KB-ADL500 5mt/10mt, codes S5P11TK1 and S5P11TK2 respectively.



**Importante!**

.....  
**The kits consist of an Ethernet cable with male RJ45 connectors and a female-to-female adapter.**  
 .....

**Properly attach the F/F adapter to the optional keypad as shown in the figure:**



## 7.7 USB port for data storage

For ADL550 and ADL530 only.

**Note!**

.....  
 For port location see section "7.1 Location and identification of terminals and LEDs" on page 27.

Connection to a PC is not possible with this USB port.  
 .....

USB 2.0 port for saving data to a common USB memory (🔌).

Type A connector.

Max current available 150 mA.

The USB memory device must be formatted in FAT 32.

For additional information see chapter "8.2.14 Saving and recovery of new parameter settings on USB" on page 59.

## 7.8 Wi-Fi module port

**Note!**

.....  
 For port location see section "7.1 Location and identification of terminals and LEDs" on page 27.  
 .....

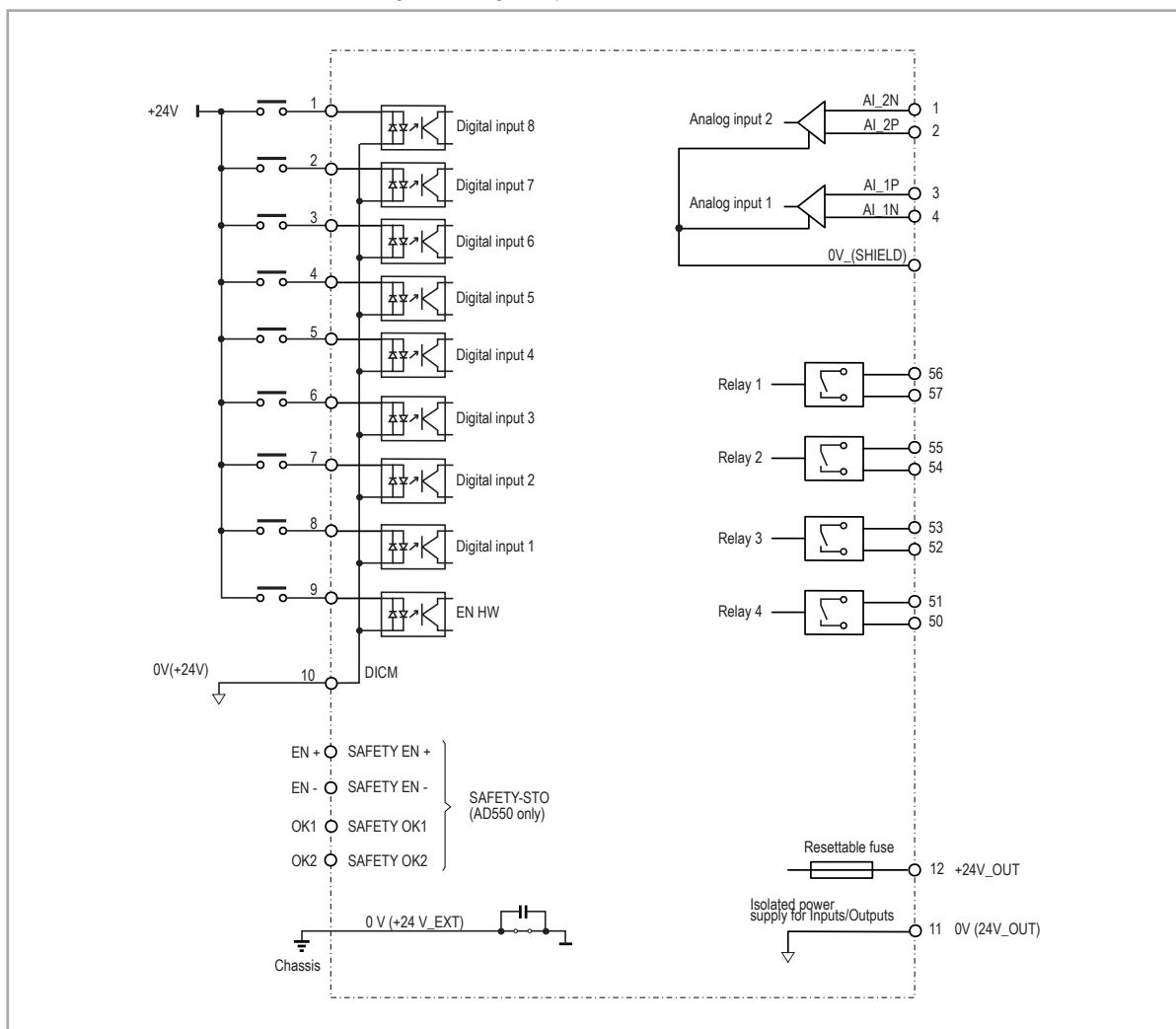
The ADL530 and ADL550 series drives are equipped with a dedicated 10-pin connector (📶) for the optional external **Wi-Fi Drive Link** module.

The module enables local wireless communication between the ADL530 and ADL550 series drives and other wireless devices such as smartphones, tablets and PCs and the WEG\_Liftouch Web App.

## 7.9 Connection diagrams

### 7.9.1 Regulation potentials, digital I/O

Figure 7.9.1: Regulation potentials



## 7.9.2 Typical connection diagram

**Note!**

Recommended combination F1 fuses: see chapter "5.1 External fuses" on page 18.

Figure 7.9.2: Typical connection diagram (Sizes ADL550-1040 ...2150)

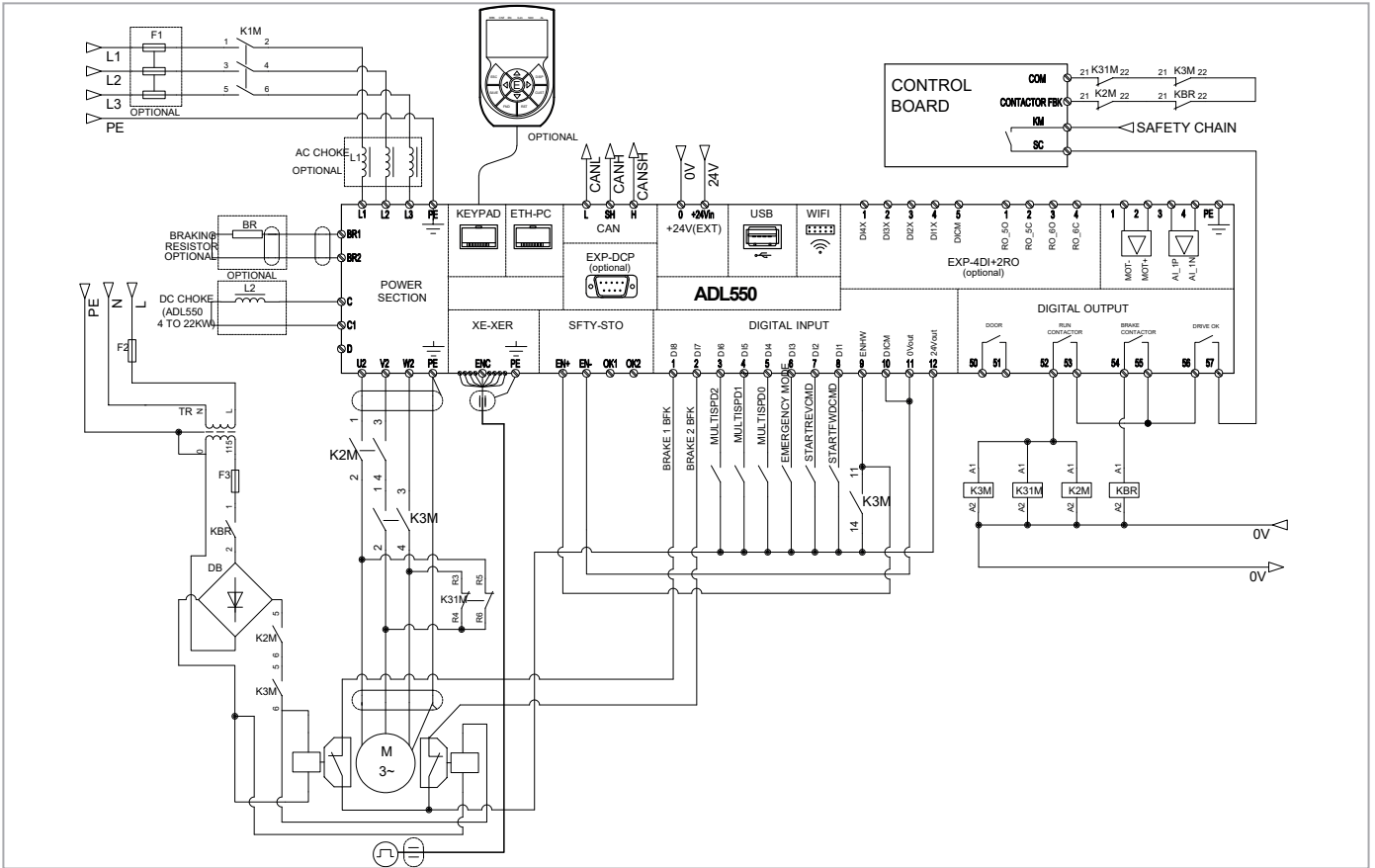


Figure 7.9.3: Typical connection diagram (Sizes ADL530-1040 ...2150)

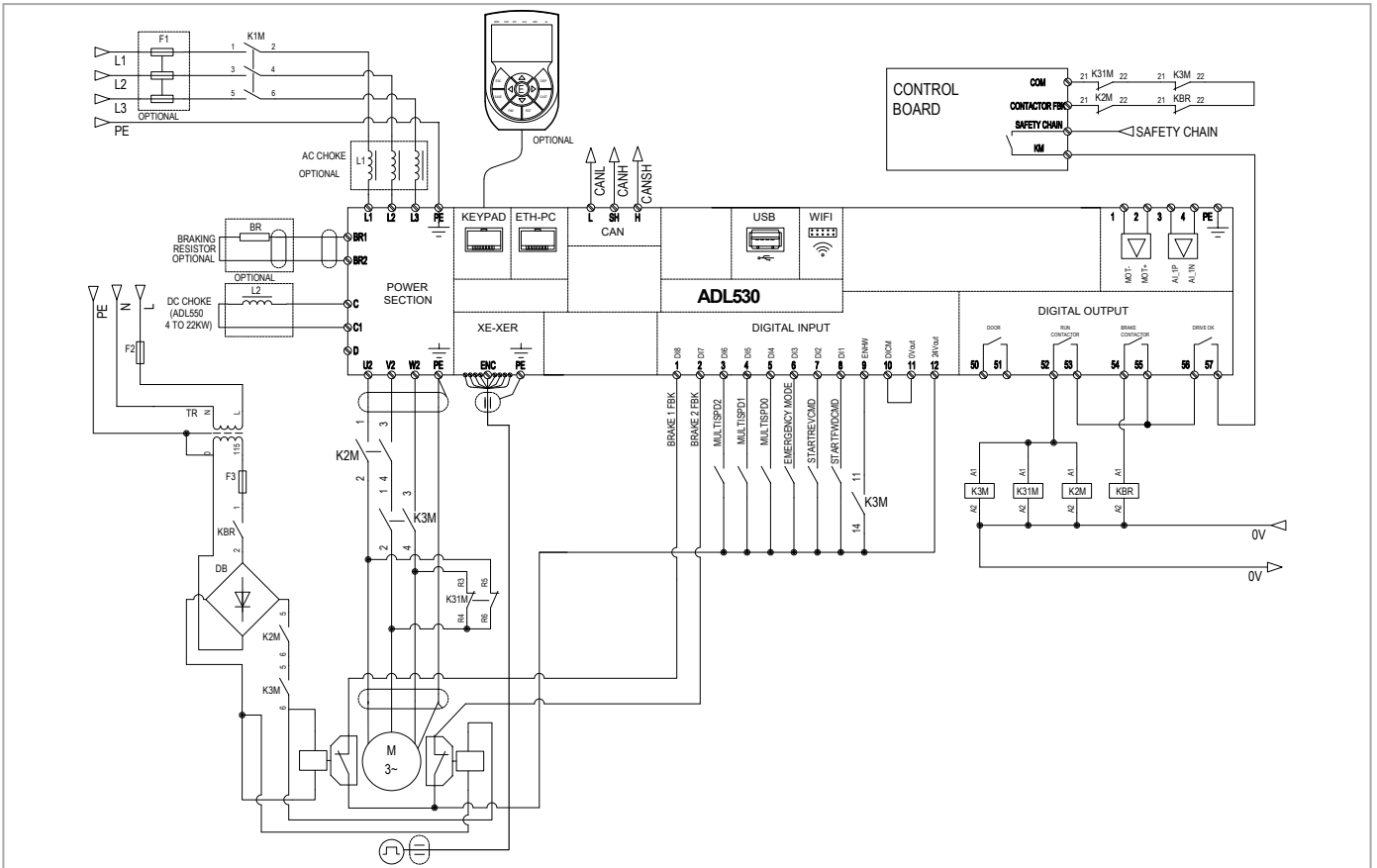
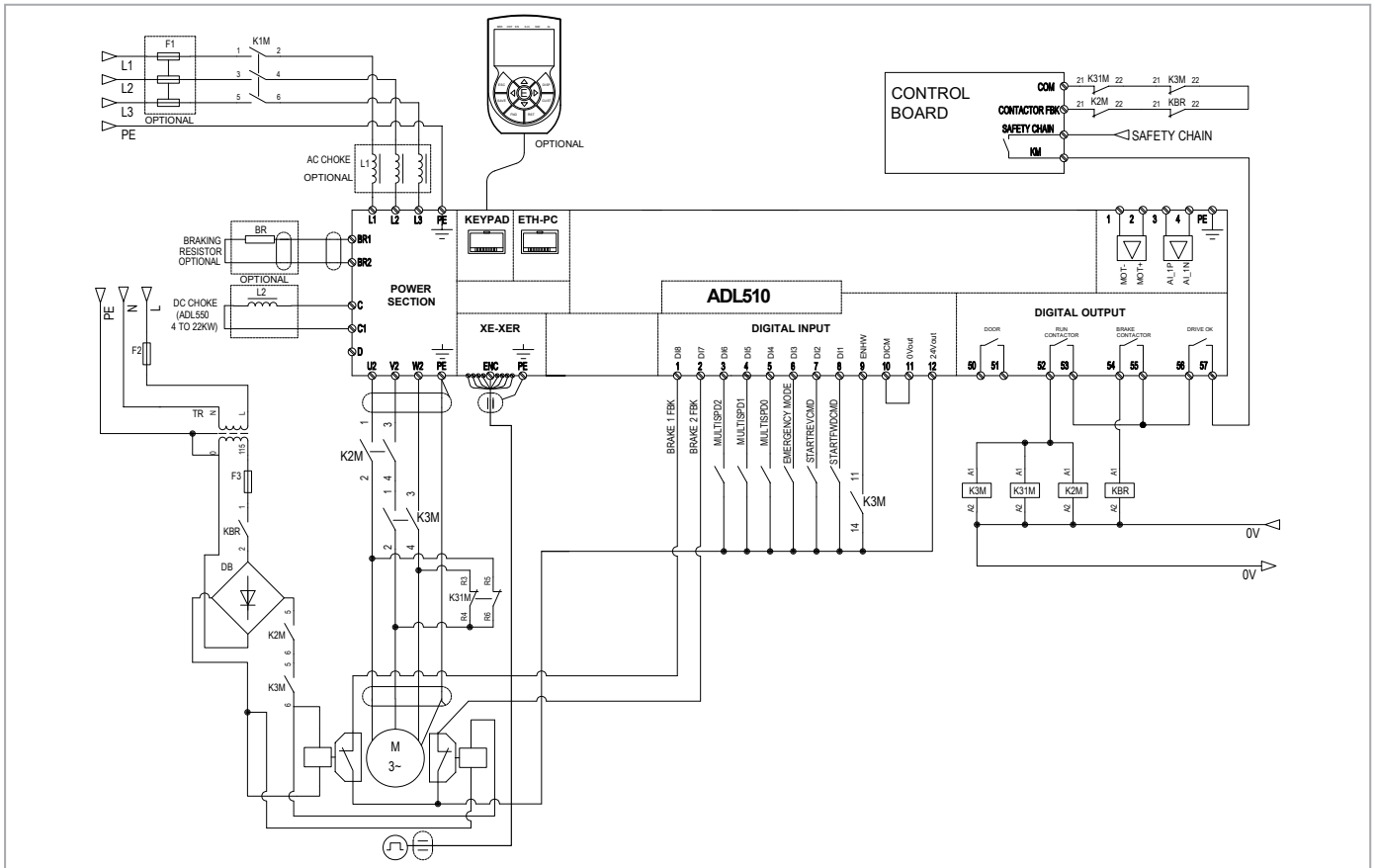




Figure 7.9.4: Typical connection diagram (Sizes ADL510-1040 ...2150)



### 7.9.3 Emergency connection diagram



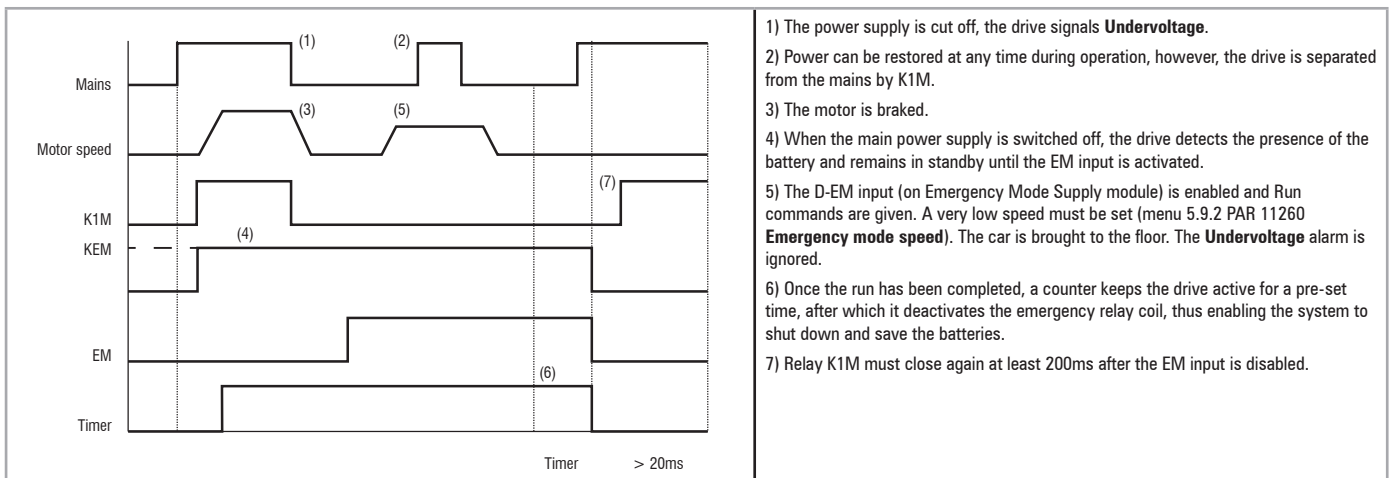
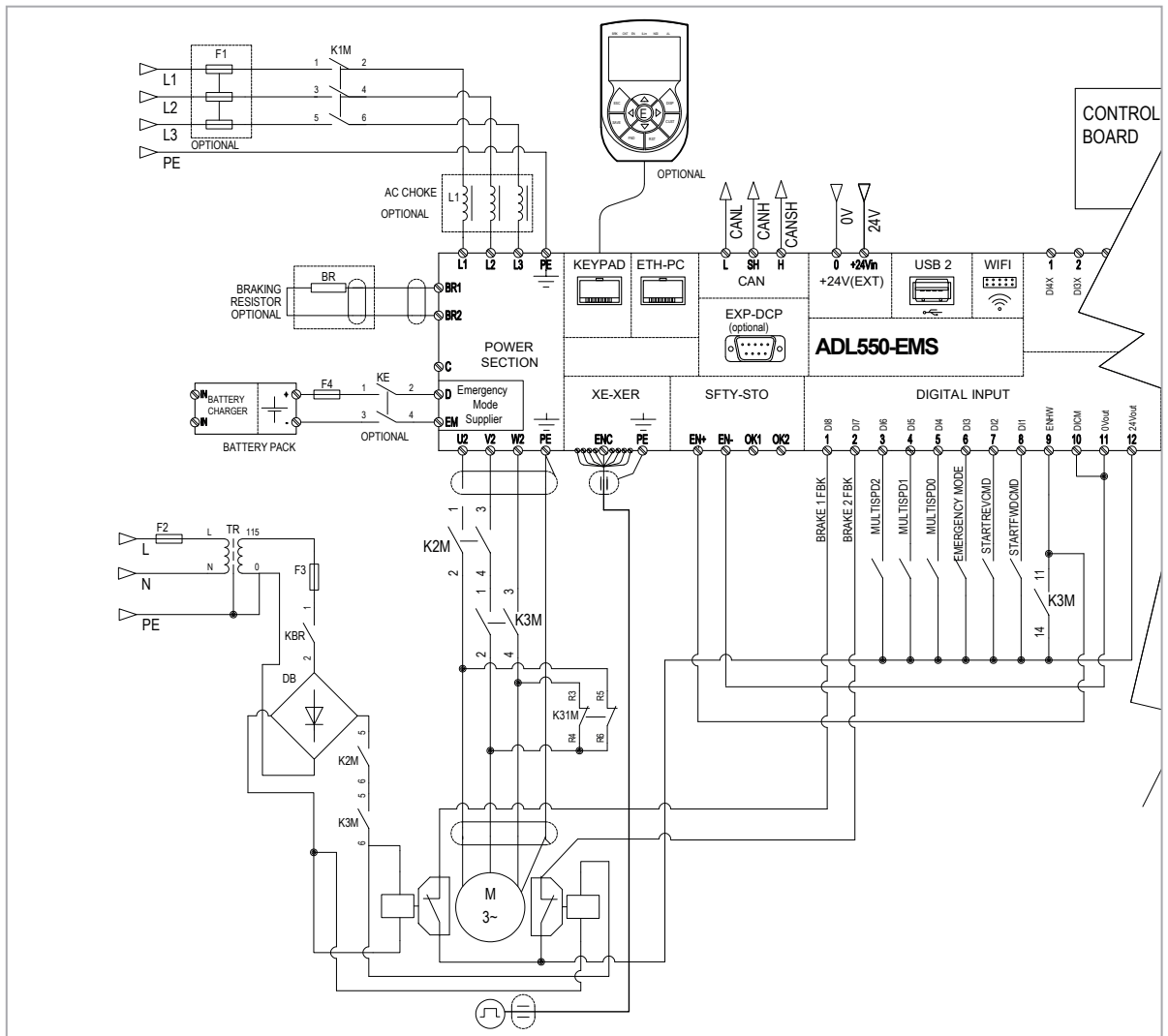
To use this type of connection reference should be made to the safety and installation instructions in the ADL550 / ADL550-ICS "Safe Torque Off", cod. 1S95STOENW, downloadable from the WEG website (<https://www.weg.net/...>).

### 7.9.3.1 Emergency connection diagram with EMS module (ADL5.0...-EMS modes)

In the event of a three-phase power failure, the system manages motor movement in an emergency condition through an external battery connected to the EMS module built into the ADL510/530/550...-EMS models.

The battery contactor can be kept closed to reduce the cabin stop time.

Figure 7.9.5: Emergency connection diagram with EMS module



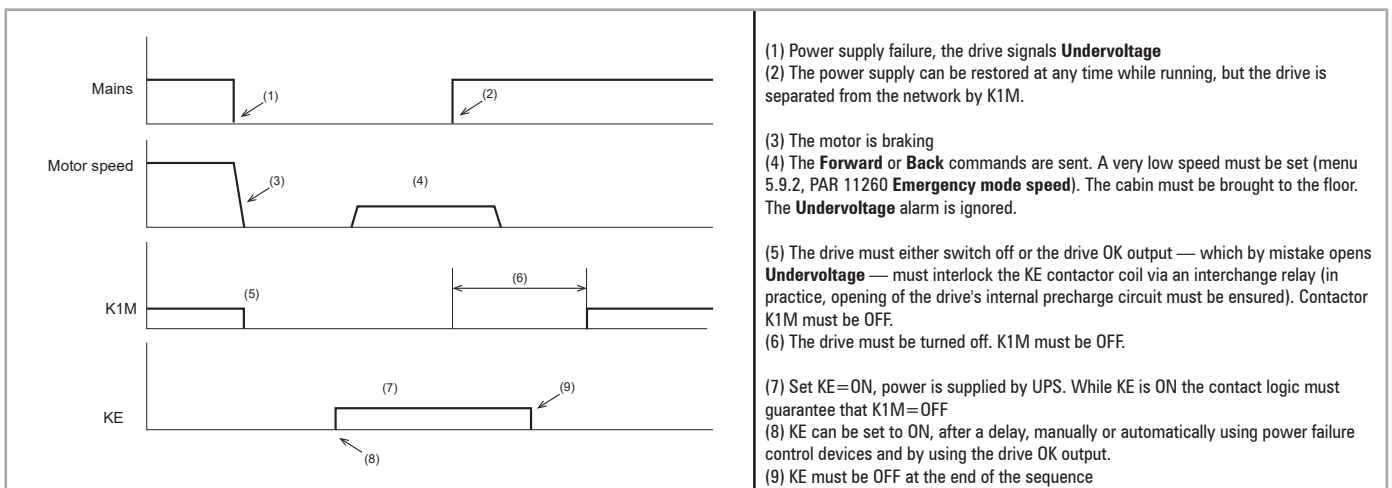
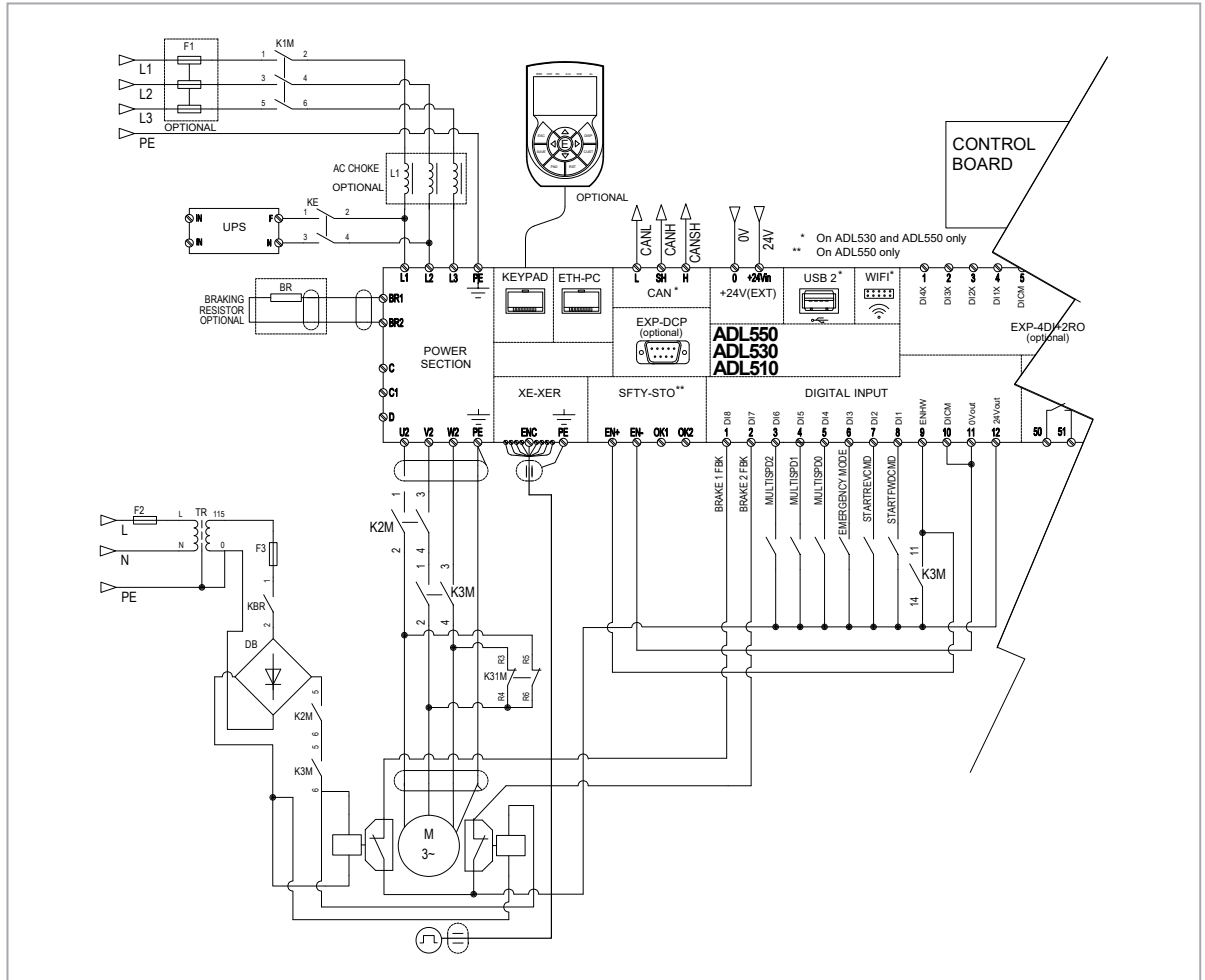
### 7.9.3.2 Emergency connection diagram with UPS

In the event of a three-phase power failure, the system manages motor movement in an emergency condition through a single-phase 230 Vac power supply from a UPS device.

The UPS must be sized to independently support the DC\_LINK (minimum threshold of 230V).

The EM terminal (on power terminal) will not be used with this connection.

Figure 7.9.6: Emergency connection diagram with UPS



## 7.9.4 Safety connections

Diagram of a lift system complying with **EN81-20 5.9.2.5.4 d**, without using contactors and with STO integrated safety function (EN 61800-5-2- SIL3).

Figure 7.9.7: Safety connections for control using a single contactor

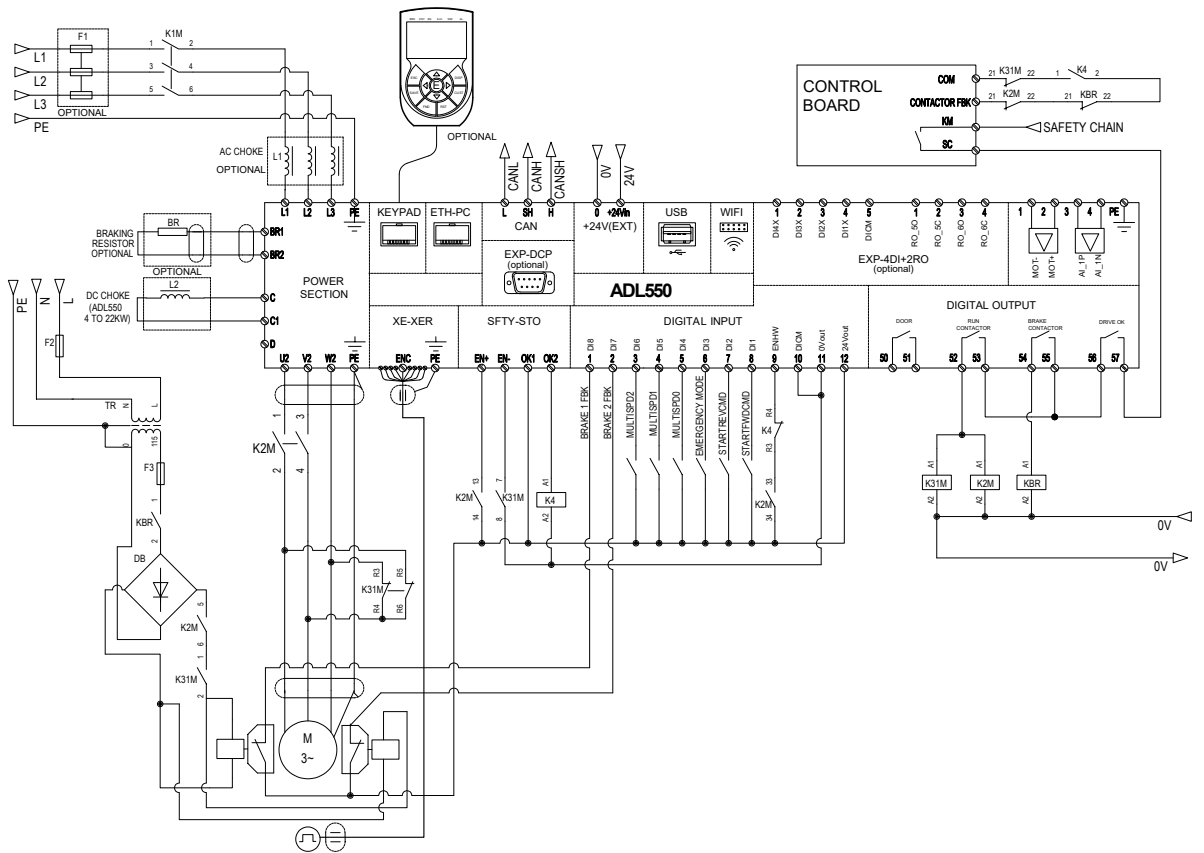


Diagram of a lift system complying with EN 81-20 5.9.2.5.3 d, without contactors and STO integrated safety function (EN61800-5-2- SIL3).

Figure 7.9.8-A: Contactorless connections (Asynchronous motor)

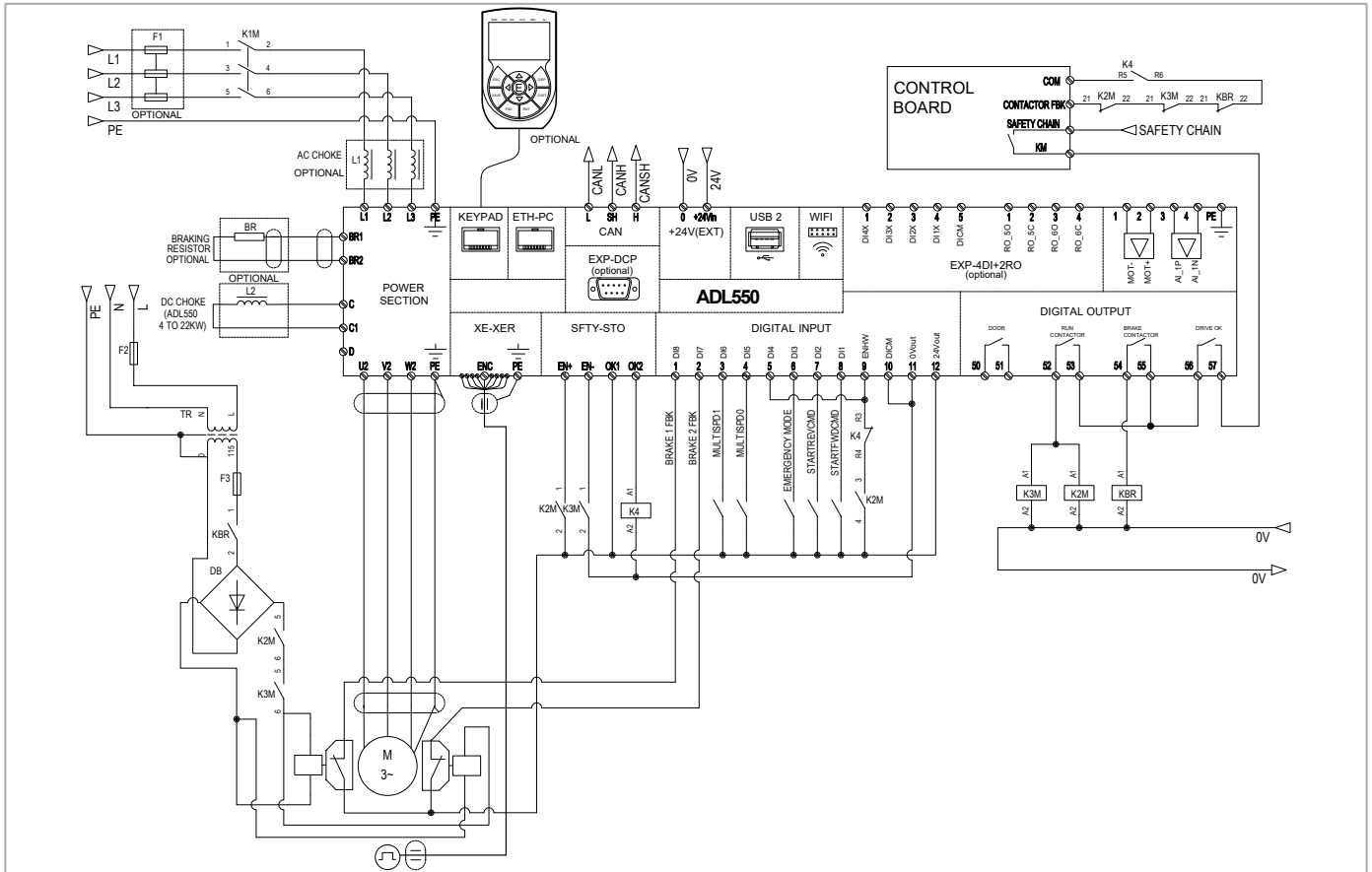
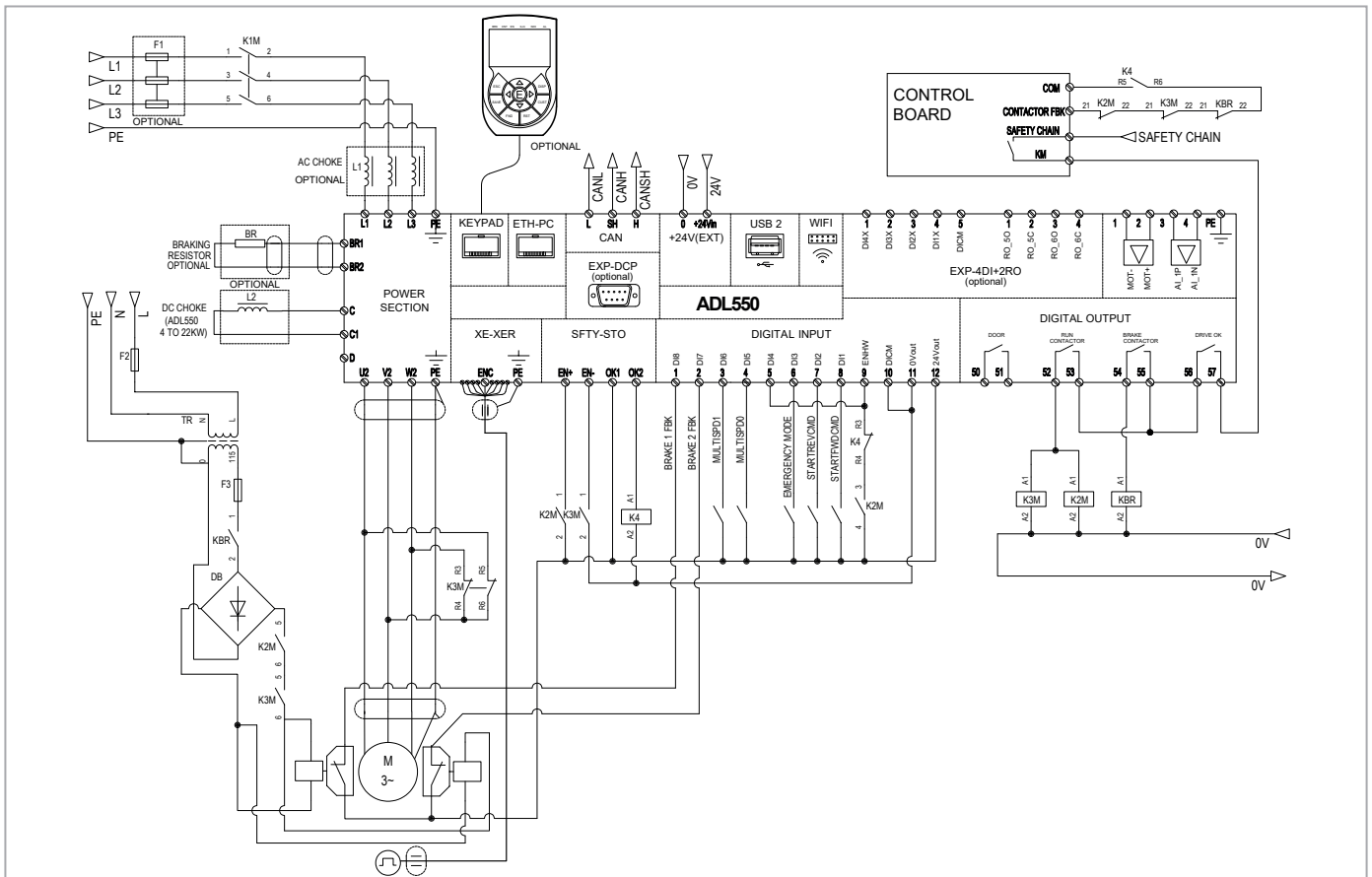


Figure 7.9.8-B: Contactorless connections (Synchronous motor)

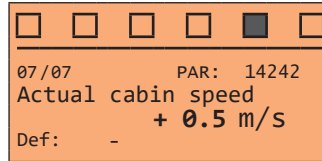


### 7.9.5 Connection diagram for emergency maneuver

Emergency maneuver with operator present for gearless or geared non self-braking motors.

This function allows the car to move when there is a power failure in order to bring it to the closest floor by gravity.

- This maneuver can be performed only when the drive is in emergency mode, which the control card indicates with the "Emergency Mode" digital input.
- There must be a digital input ("Digital input Y" in the figure below) connected to a **"Start emergency maneuver"** button on the control panel that will enable car movement. The input is configurable by the **Brake release src** (PAR 11820).
- When the button is pushed the inverter opens the brake contactor via the **Brake Contactor Relay** output.
- The operator then pushes the button to move the car.
- With parameter 11822 **Em max speed** (Emergency manual max. speed) you can set maximum car (or motor) speed during this maneuver. The speed can be expressed in m/s (for the car) or in rpm (for the motor).
- If the car reaches the maximum allowed speed, the drive locks the brake for a time T configurable by parameter 11824 **Brake lock time**, disabling use of the button (which will not release the brake even if pushed).
- As soon as emergency manual maneuver is resumed, the display automatically shows the current car speed (or motor speed if set in rpm) and direction (Fwd or Rev) indicated by the positive or negative sign.



Since the direction of motor rotation vs. car direction depends on the mechanical arrangement of the motor in relation to the ropes and car, during installation, check what the positive and negative directions indicate and report this on the specific emergency manoeuvre instructions (e.g. if the car is descending when the motor is moving, it must be specified that the + sign means that the car is descending).

- This maneuver must be disabled in case of inspection.

The car will move (Brake Contactor = Open) only in the following conditions:

- Emergency Mode: ON (Contactor Closed)
- **Brake release src**: ON (Contactor Closed)
- Emergency Manual V: < Em max speed
- Contactor Lock Time = 0



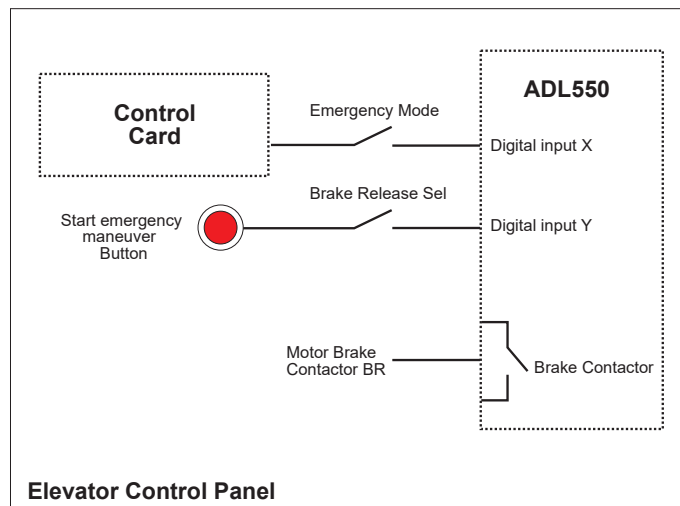
Attention

=====

This emergency manoeuvre, performed as outlined in chapter 5.12.1.6 of EN 81-20, requires that the other contactors - those in series with the contactor actuated by the drive brake contactor output - be bypassed following the safety specifications given in that chapter and in chapter 5.11.2 (Electrical safety devices); if not, the brake power supply circuit will not close and the brake cannot be opened electronically.

=====

Figure 7.9.9: Diagram of main emergency maneuver



## 7.10 Braking

There are various possible types of braking:

- Internal Braking Unit
- Injection of direct current from the Inverter into the motor (D.C. braking)

There are two essential differences between the two braking methods:

- A braking unit can be used for speed reduction (e.g.: from 1000 to 800 rpm), whereas D.C. braking can only be used for braking to standstill.
- The energy in the drive is converted into heat in both cases. This conversion takes place in a braking resistor encased in the braking unit. With D.C. braking, the energy is converted into heat in the motor itself, resulting in a further rise in motor temperature.

### 7.10.1 Braking unit (internal)

Frequency-regulated asynchronous motors during hyper-synchronous or regenerative functioning behave as generators, recovering energy that flows through the inverter bridge, in the intermediate circuit as continuous current. This leads to an increase in the intermediate circuit voltage.

Braking units (BU) are therefore used in order to prevent the DC voltage rising to an impermissible value. When used, these activate a braking resistor that is connected in parallel to the capacitors of the intermediate circuit. The feedback energy is converted to heat via the braking resistor (RBR), thus providing very short deceleration times and restricted four-quadrant operation.

**In the standard configuration, ADL drives ( $\leq 55\text{kW}$ ) comprise an internal braking unit.**

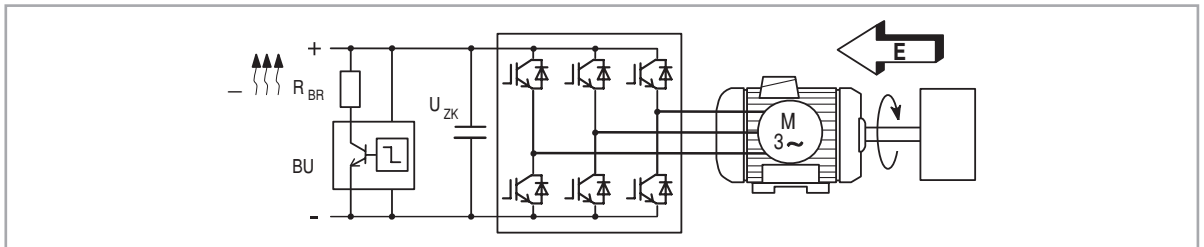


Figure 7.10.1: Operation with braking unit (circuit diagram)

#### Note!

When the internal braking unit is present the protection must consist of fast-acting fuses! Follow the relative assembly instructions.

A twisted or shielded cable must be used for the connection of the braking resistor (terminals BR and C or BR1 and BR2). If the resistor includes a thermal protection device (Klixon), this must be connected to the "External fault" input of the drive.

Tabella 7.10.1: Technical data of the internal braking unit

Size	$I_{RMS}$ (A)	$I_{PK}$ (A)	$R_{BR}$ ( $\Omega$ )
<b>ADL5...-4, 3ph</b>			
1040	8.3	11.8	68
1055	8.3	11.8	68
1075	11.5	16.3	49
2110	20.2	28.5	28
2150	20.2	28.5	28

**$I_{RMS}$**  Braking unit rated current, duty cycle = 50%

**$I_{PK}$**  Peak current that can be delivered for max 60 seconds

**$R_{BR}$**  Minimum braking resistance value

Tabella 7.10.2: Braking unit intervention threshold

Size	$V_{BR} @ 480\text{ V}$		$V_{BR} @ 460\text{ V}$		$V_{BR} @ 400\text{ V}$		$V_{BR} @ 230\text{ V}$	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
<b>ADL5...-4, 3ph</b>								
1040 ... 2150	800 Vdc	790 Vdc	768 Vdc	758 Vdc	670 Vdc	660 Vdc	394 Vdc	384 Vdc

#### Note!

For the combination of recommended braking resistors refer to chapter "5.4 External braking resistors" on page 19.

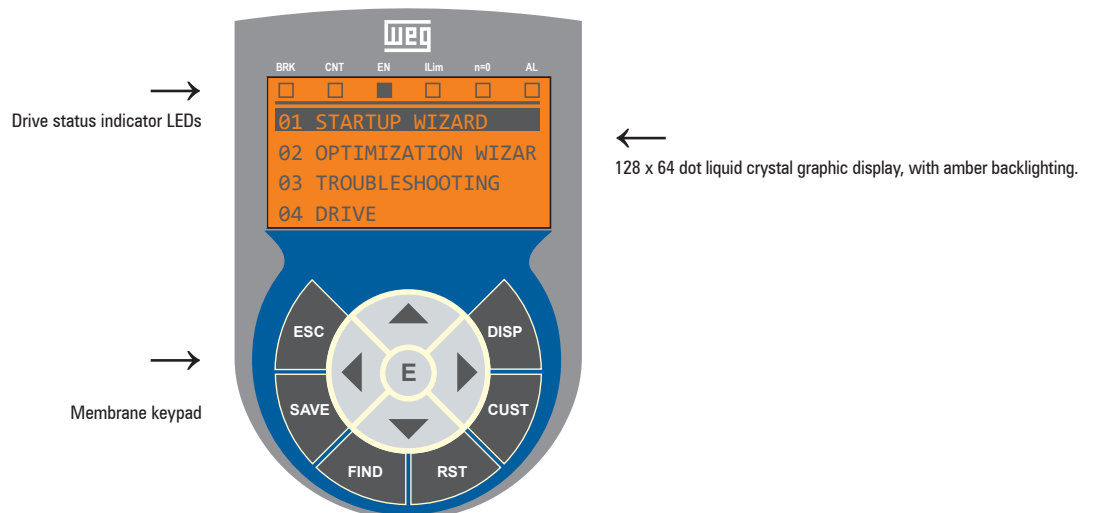
## 8. Use of the optional keypad (KB-ADL500)

This section describes the optional KB-ADL500 programming keypad (cod. S5P11T) and how to use it (display and programming parameters).

### Note !

For the connection refer to section "7.6 Optional Keypad interface (RJ45 connector)" on page 42.

### 8.1 Description



#### 8.1.1 Membrane keypad

This section describes the keys on the membrane keypad and their functions

Symbol	Reference	Description
ESC	Escape	Returns to the higher level menu or submenu. Exits a parameter, a list of parameters, the list of the last 10 parameters and the FIND function. Can be used to exit a message that requires use of this.
SAVE	Save	Saves the parameters directly in the non-volatile memory without having to use PAR 550 <b>Save parameters</b>
FIND	Find	Enables the function for accessing a parameter using its number. To exit these functions, press the ◀ key.
RST	Reset	Resets alarms, only if the causes have been eliminated.
CUST	Custom	Displays the last 10 parameters that have been modified. To exit these functions, press the ◀ key.
DISP	Display	Displays a list of drive functioning parameters.
E	Enter	Enters the submenu or selected parameter, or selects an operation. It is used when modifying parameters to confirm the new value that has been set.
▲	Up	Moves the selection up in a menu or list of parameters. During modification of a parameter, increases the value of the digit under the cursor.
▼	Down	Moves the selection down in a menu or list of parameters. During modification of a parameter, decreases the value of the digit under the cursor.
◀	Left	Returns to the higher level menu. During modification of a parameter, moves the cursor to the left.
▶	Right	Accesses the submenu or parameter selected. During modification of a parameter, moves the cursor to the right.

#### 8.1.2 Meaning of LEDs

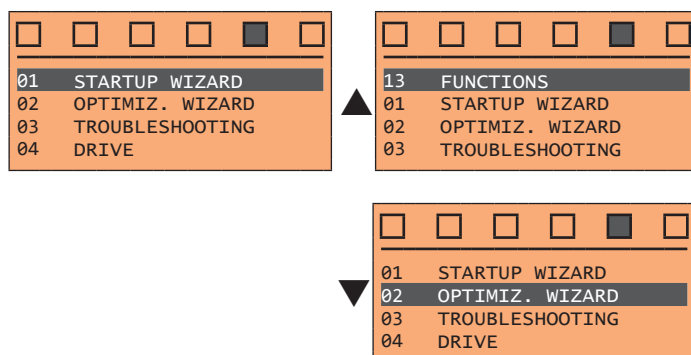
LEDs	Meaning of LEDs
BRK	The LED is lit when the drive has activated the brake release command
CNT	The LED is lit when the drive has activated the close contactors command
EN	The LED is lit during IGBT modulation (drive operating)
ILIM	When this LED is lit the drive has reached a current limit condition. During normal functioning, this LED is off.
N=0	The LED is lit when motor speed is 0.
AL	The LED is lit when the drive signals that an alarm has been triggered



## 8.2 Navigating with the optional keypad

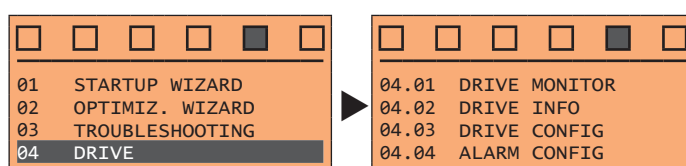
### 8.2.1 Scanning of the first and second level menu

First level

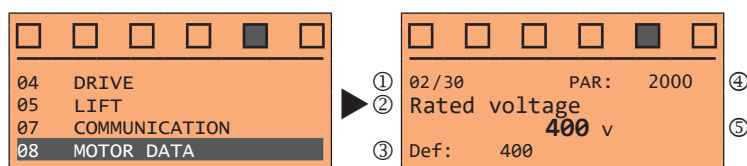


First level

Second level



### 8.2.2 Display of a parameter



(1) Reference to the menu where the parameter is to be found, in this case menu MOTOR DATA (02/30)

(2) Description of the parameter (**Rated voltage**)

(3) Depends on the type of parameter:

- Numeric parameter: displays the numeric value of the parameter, in the format required, and unit of measurement.
- Binary selection: the parameter may assume only 2 states, indicated as **On - Off** or 0 - 1.
- LINK type parameter: displays the description of the parameter set from the selection list.
- ENUM type parameter: displays the description of the selection
- Command: displays the method of execution of the command

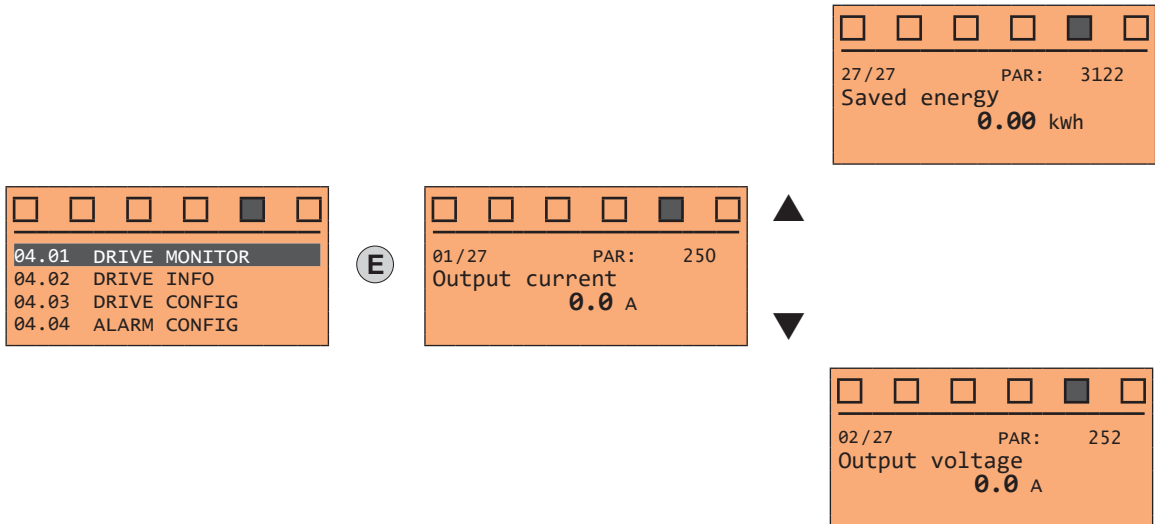
(4) Parameter number

(5) In this position, the following may be displayed:

- Numeric parameter: displays the default, minimum and maximum values of the parameter. These values are displayed in sequence pressing the ► key.
- LINK type parameter: displays the number (PAR) of the parameter set.
- ENUM type parameter: displays the numeric value corresponding to the current selection.
- Command: in the case of an error in the command, indicates that **ESC** must be pressed to terminate the command.
- Messages and error conditions:

<b>Param read only</b>	attempt to modify a read-only parameter
<b>Drive enabled</b>	attempt to modify a non-modifiable parameter with the drive enabled
<b>Input value too high</b>	the value entered too high
<b>Input value too low</b>	the value entered too low
<b>Out of range</b>	attempt to insert a value outside the min. and max. limits

### 8.2.3 Scanning of the parameters



### 8.2.4 List of the last parameters modified

Pressing the **CUST** key, a list containing the last 10 parameters modified is accessed. One parameter is displayed at a time and the list can be scrolled using the ▲ and ▼ keys.

To exit this list, press the ► key.

### 8.2.5 "FIND" function

Pressing the **FIND** key activates the function that makes it possible to access any parameter simply by entering the parameter software number (PAR).

When the parameter reached by the "FIND" command is displayed, it is possible to navigate all the parameters forming part of the same group using the ▲ and ▼ keys. Pressing the ◀ key returns to the "FIND" function.

To exit, press the **ESC** key.

### 8.2.6 Parameter modification

To enter parameter modification mode, press the **E** key when the parameter to be modified is displayed.

To save the value of the parameter, following modification, press the **E** key again.

**Note !**

To save permanently, see paragraph 8.2.7.

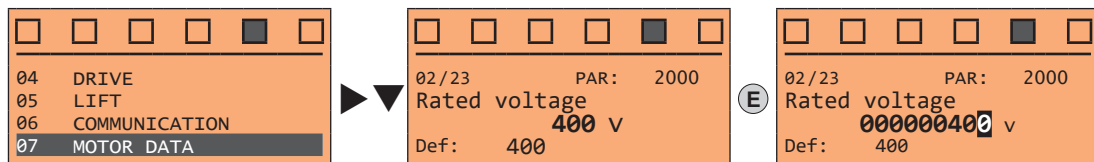
To exit modification mode without saving the value, press the **ESC** key.

The operations to be carried out to modify the value depend on the type of the parameter, as described below.

**Note !**

For further information about the type of parameters displayed, see paragraph 8.2.2.

- **Numeric parameters**



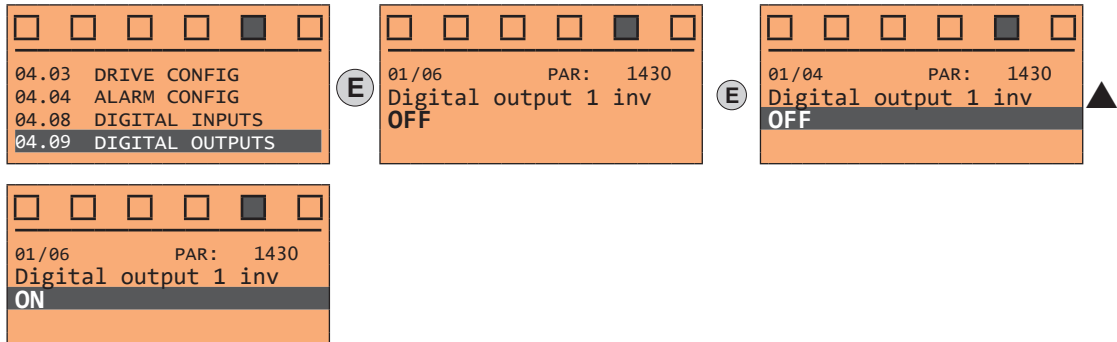
When **E** is pressed to access modification mode, the cursor is activated on the digit corresponding to the unit. Using the ◀ and ► keys, the cursor can be moved to all the digits, including trailing zeros that are normally not displayed.

With the ▲ and ▼ keys, the digit under the cursor is increased or decreased.

Press **E** to confirm the modification or **ESC** to cancel.

- **Binary parameters (BIT type)**

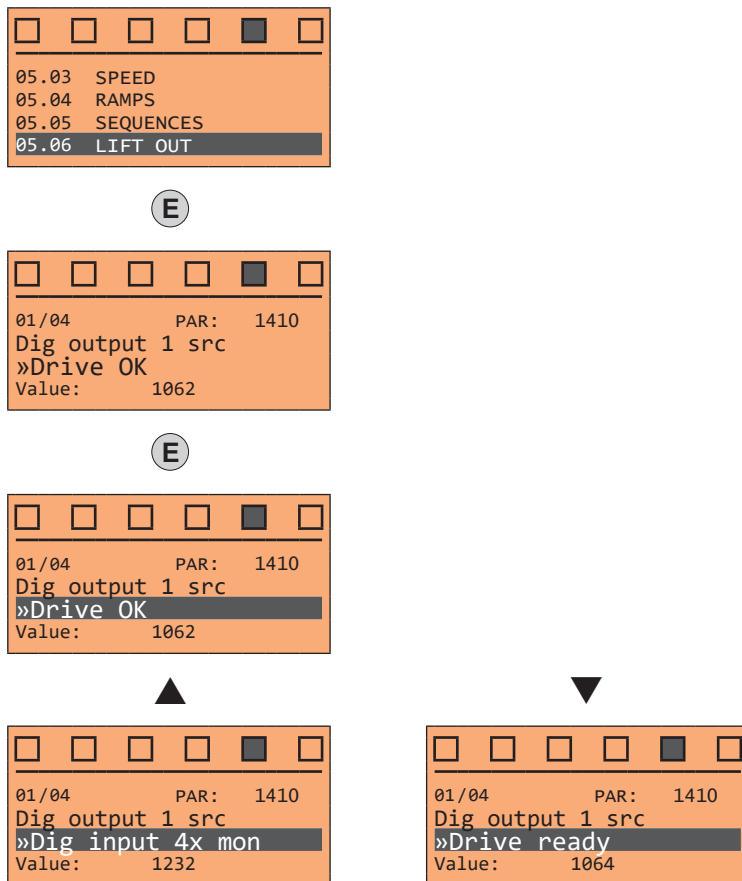
The parameter may assume only two states which are indicated as **On-Off** or 0-1.



Press **E** to activate modification mode. The entire line is displayed in reverse. Use the **▲** and **▼** keys to move from one state to another. Press **E** to confirm the modification or **ESC** to cancel.

- **LINK parameters**

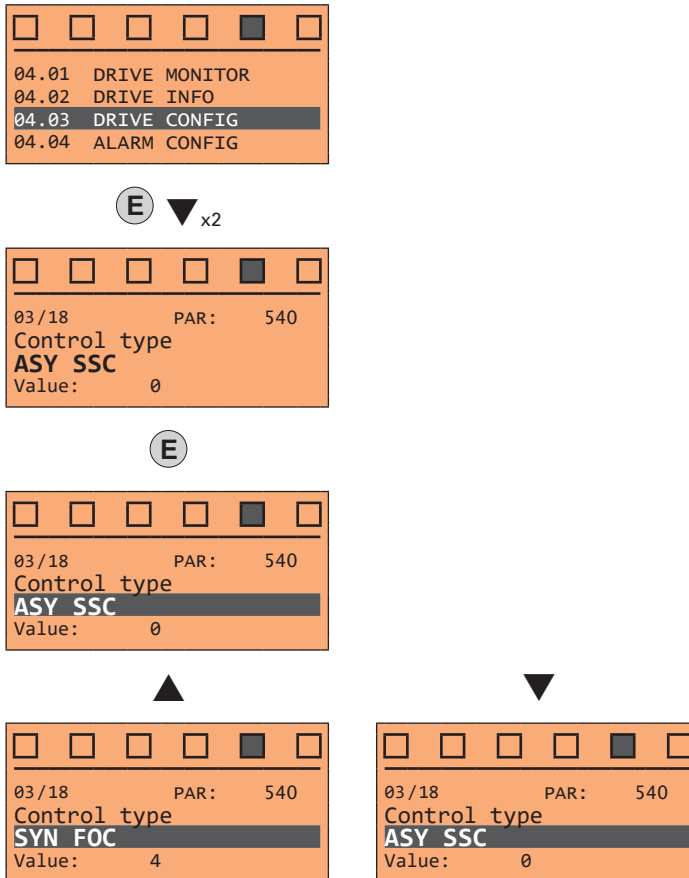
The parameter may assume the number of another parameter as value.



Press **E** to activate modification mode. The entire line is displayed in reverse. The elements of the list of parameters associated with this parameter can be scrolled using the **▲** and **▼** keys. Press **E** to confirm the modification or **ESC** to cancel.

- **ENUM parameters**

The parameter may assume only the values contained in a selection list.



Press **E** to activate modification mode. The entire line is displayed in reverse. The elements of the selection list can be scrolled using the **▲** and **▼** keys. Press **E** to confirm the modification or **ESC** to cancel.

- **Execution of commands**

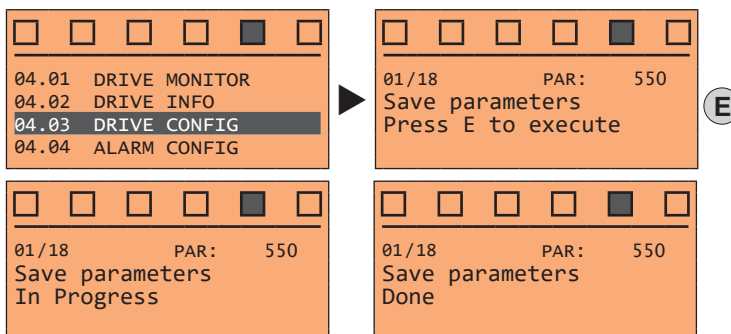
A parameter can be used to carry out a number of operations on the drive. For an example, see next paragraph: in this case the request "Press E to execute" is displayed.

To execute the command, press **E**. During execution of the command, the "In progress" caption is displayed to indicate that the operation is in course. At the end of execution, if the result is positive, the "Done" caption is displayed for few seconds. If execution has failed, an error message is displayed.

### 8.2.7 How to save parameters

There are two ways of saving parameters in the non-volatile memory of the drive:

- 1) By pressing the **SAVE** key on the keypad.
- 2) Menu CONFIG DRIVE, parameter **Save parameters**, PAR : 550. This is used to save changes to parameter settings so that they are maintained even after power-off.



To exit, press the **◀** key.

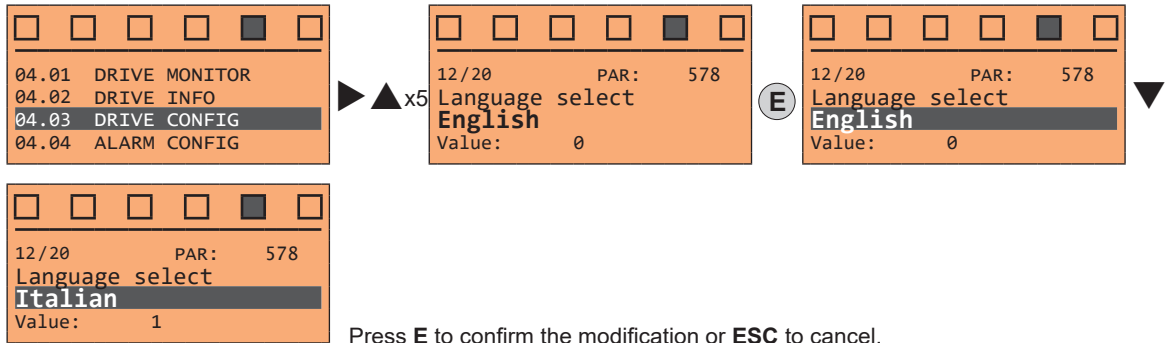
## 8.2.8 Configuration of the display

### 8.2.8.1 Language selection

Menu CONFIG DRIVE, parameter 04.19 **Language select**, PAR: 578, default=English.

This is used to set one of the languages available: English, Italian, French, German, Spanish and Turkish.

English and Italian are pre-installed on the drive. To select Italian:



To set a different language:

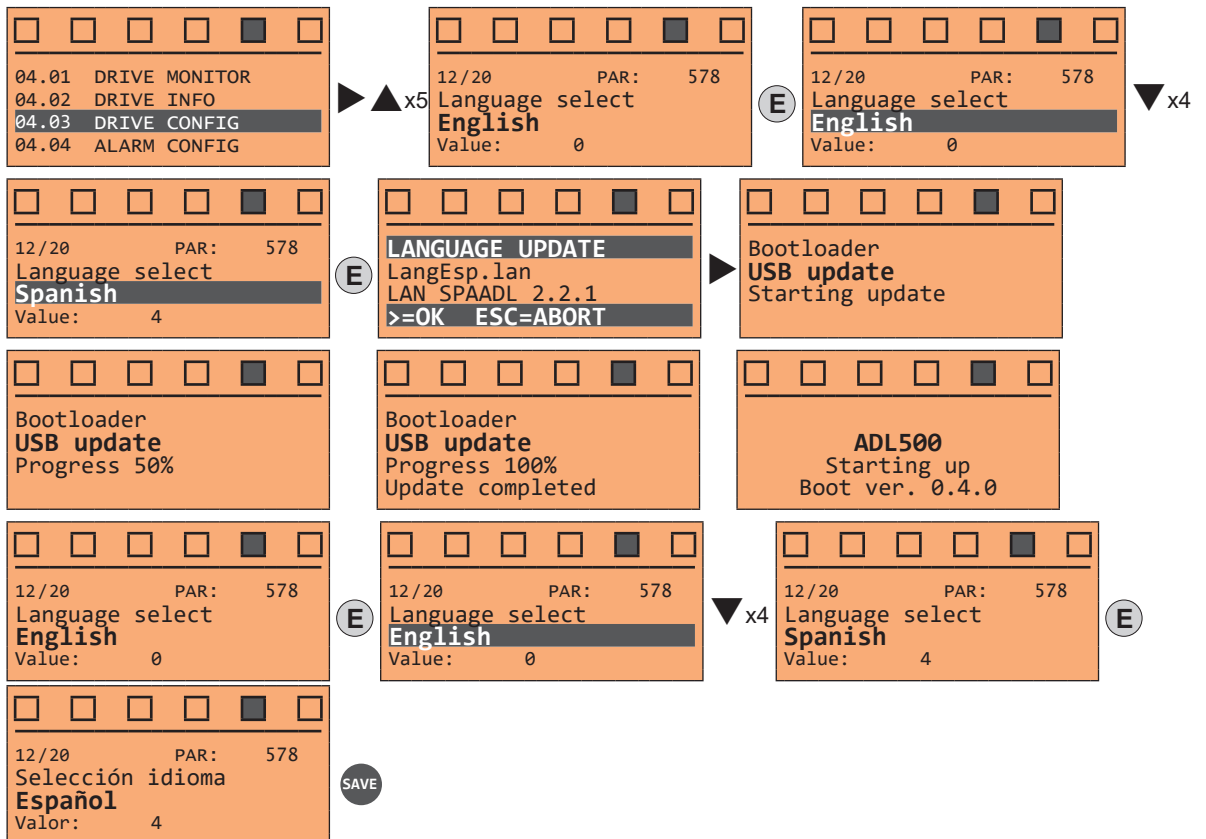
#### ADL530 and ADL550 (from keypad)

- Download the available languages file from the WEG site (<https://www.weg.net/...>, DRIVE SET-UP folder).

#### Note!

The language file must be aligned with the version of both the drive firmware and application. Check correspondence!

- Unzip and save the files on a USB flash drive, in a folder called "ADL500LN".
- Insert the flash drive into the drive's USB port.
- Select the **Language Select** parameter and set the new language as shown in the example below (note that the drive will reboot once the language loading procedure has been completed):
- Save the new configuration (press SAVE).



#### Note!

The new language will be loaded into the drive memory and replace the Italian. English cannot be replaced by another language.

#### ADL510, ADL530 and ADL550 (from WEG\_DriveLabs configurator)

- Install the WEG\_DriveLabs configurator on the PC (available on the web site at the path <https://www.weg.net/...>)
- Connect the Ethernet cable to the PC Ethernet port and the ADL5x0 drive ETH-PC port;
- Run WEG\_DriveLabs and open the WIZARD / Setup Wizard menu;
- Click "Next" to select the **Language select** menu;

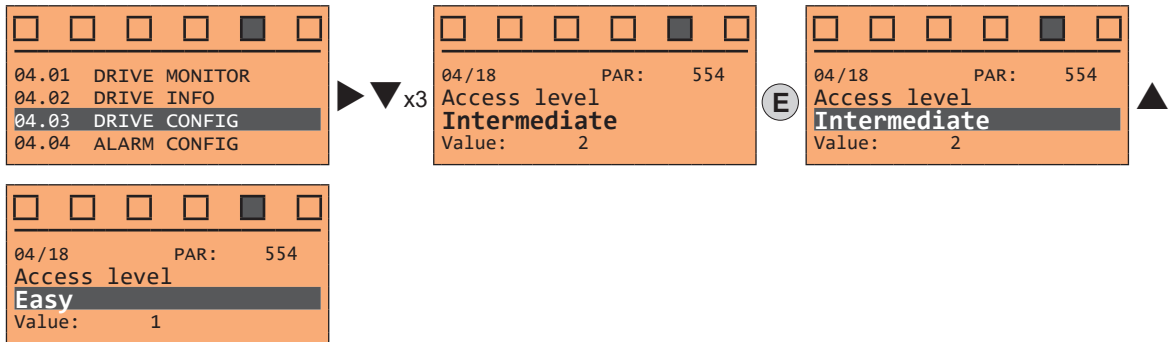
- Select the required language in the field "Value" of parameter 578 **Language select**;
- Press "Next" until selecting "Summary" and then click "Download";
- When the update is completed, "Setup done" is displayed;
- Reboot the drive and, from keypad, select the new language via the **Language Select** parameter 578

### 8.2.8.2 Access level selection

Menu CONFIG DRIVE, parameter 04.03 **Access mode**, PAR: 554.

Enables two methods of access to be configured:

<b>Readonly</b>	a read-only level, where a limited number of parameters are displayed.
<b>Easy</b>	this level allows the parameters to be displayed and modified for basic commissioning, in V/f control and without tuning.
<b>Intermediate</b>	(default) this level allows the parameters to be displayed and changed for complete commissioning and basic optimisation.
<b>Expert</b>	this level is for displaying and changing parameters for advanced optimisation.
<b>Service</b>	Reserved for WEG Service.



### 8.2.9 Startup display

Menu CONFIG DRIVE, parameter **Startup display**, PAR: 574.

This is used to set the parameter that will be displayed automatically at drive power-on.

Entering the value -1 (default), the function is disabled and the main menu is displayed at power-on.

### 8.2.10 Back-lighting of the display

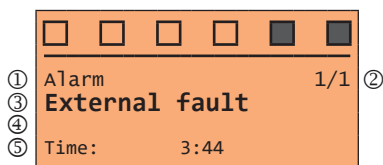
Menu CONFIG DRIVE, parameter **Display backlight**, PAR: 576. Sets lighting of the display:

On the light of the display always stays on.

Off (default) the light switches off approx. 3 minutes after the last key is pressed.

### 8.2.11 Alarms

The alarms page is displayed automatically when an alarm occurs.



(1) **Alarm:** identifies the alarm page.

**RTN:** indicates that the alarm has been reset; if the alarm is still active, nothing is displayed.

(2) **x/y:** **x** indicates the position of this alarm in the list of alarms and **y** the number of alarms (the alarm with lowest **x** is the most recent)

(3) Description of the alarm

(4) Sub-code of the alarm, provides other information in addition to the description

(5) Moment the alarm occurred in machine time.

The list of alarms is scrolled using the ▲ and ▼ keys.

#### Note !

For further information, see chapter "10.1 Alarms" on page 80.

### 8.2.11.1 Alarm reset

- **If the alarm page is displayed:**

Pressing the **RST** key, the alarms are reset and all alarms that have been reset are eliminated from the list. If, after this operation, the list of alarms is empty, the alarm page is closed. If the list is not empty, press the **ESC** key to exit the alarms page.

- **If the alarm page is not displayed:**

Press the **RST** key to reset the alarms. If active alarms are still present following reset, the alarm page is opened.

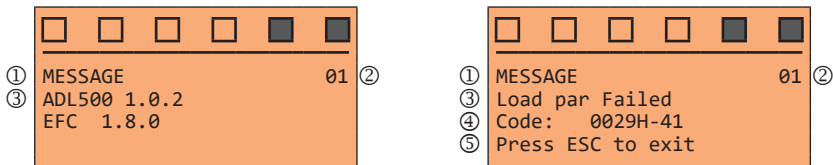
### 8.2.12 Messages

Operator messages are displayed with this page.

There are two types of messages:

- timed (closed automatically after a certain number of seconds),
- permanent (continue to be displayed until the operator presses the **ESC** key).

Several concurrent messages are enqueued and presented to the operator in sequence, starting from the most recent.



- (1) **Message:** identifies a message.
- (2) **xx** indicates how many messages are enqueued. The queue may contain a maximum of 10 messages and the message with the highest number is the most recent.
- (3) Description of the message
- (4) Sub-code of the message. Provides extra information in addition to the description.
- (5) **“Press ESC to exit”** is displayed if the message requires acknowledgment.

When a message is closed, the next message is displayed until the queue is empty.

**Note!**

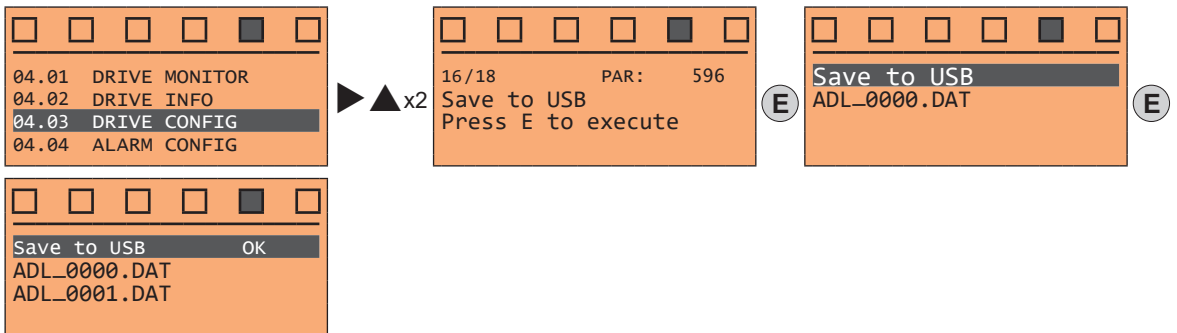
For further information, see [chapter “10.3 Messages” on page 87](#)

### 8.2.13 Saving and recovery of new parameter settings

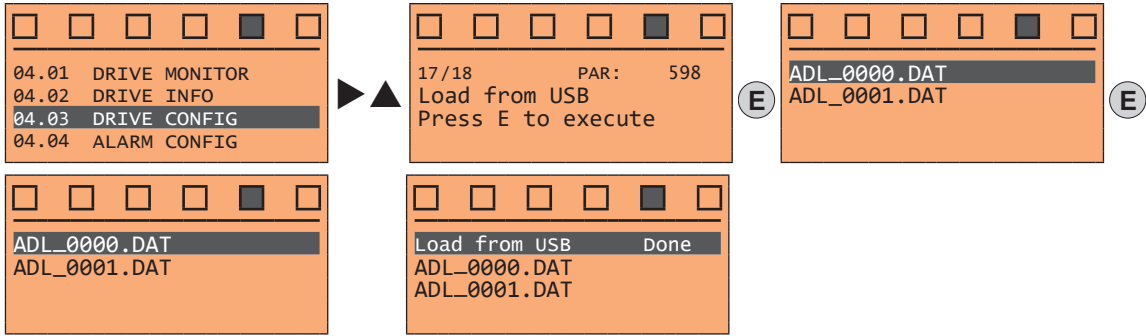
(ADL550 and ADL530 only). Drive parameters can be saved on a USB memory: this function is useful for obtaining various sets of parameters, for safety backup or transferring parameters from one drive to another.

### 8.2.14 Saving and recovery of new parameter settings on USB

(ADL550 and ADL530 only). To save drive parameters on the memory USB: Menu CONFIG DRIVE, parameter **Save to USB**, PAR 596:

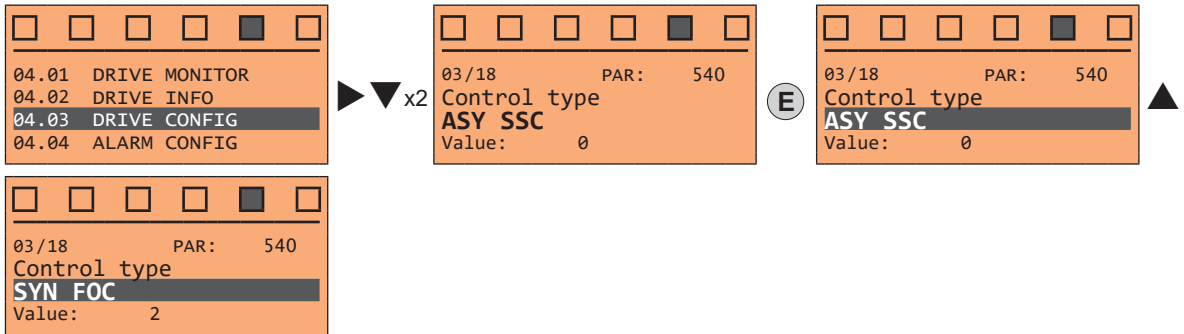


(ADL550 and ADL530 only). To transfer (recover) parameters from the memory USB to the drive: Menu CONFIG DRIVE, parameter **Load from USB**, PAR 598 :



### 8.2.15 Asynchronous/Synchronous selection

- **To switch from Asynchronous to Synchronous:**  
Menu CONFIG DRIVE, PAR 540 Control type

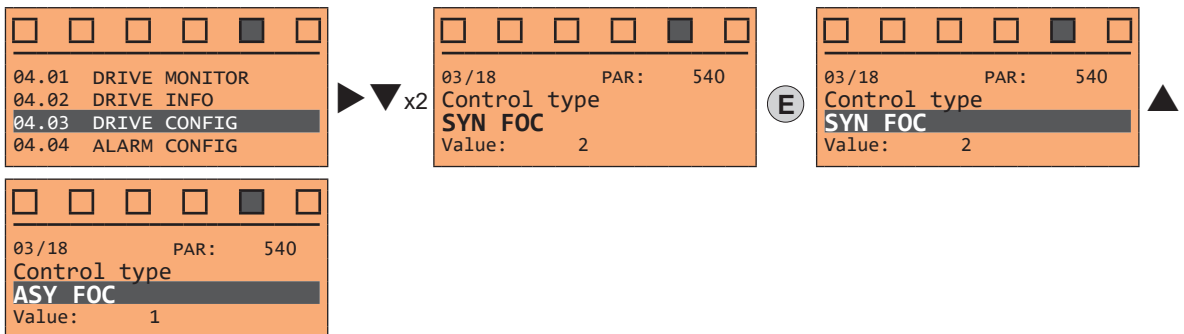


Press E to reset the drive and restart in the new operating mode.

**Note !**

Important: the default parameters including the LIFT application are reloaded.  
This can only be done with the drive disabled.

- **To switch from Synchronous to Asynchronous:**  
Menu CONFIG DRIVE, PAR 540 Control type



The example shows the selection (1) **ASY FOC**, other modes are available: (0) **ASY SSC**, (2) **SYN FOC**.

Press E to reset the drive and restart in the new operating mode.

**Note !**

Important: the default parameters including the LIFT application are reloaded.  
This can only be done with the drive disabled.



## 9 - Commissioning via keypad



Adjustable frequency drives are electrical apparatus for use in industrial or civil installations. Parts of the Drives are energized during operation. The electrical installation and the opening of the device should therefore only be carried out by qualified personnel. Improper installation of motors or Drives may therefore cause the failure of the device as well as serious injury to persons or material damage. Drive is not equipped with motor overspeed protection logic other than that controlled by software. Follow the instructions given in this manual and observe the local and national safety regulations applicable.

*Les drives à fréquence variable sont des dispositifs électriques utilisés dans des installations industriels ou civiles. Une partie des drives sont sous tension pendant l'opération. L'installation électrique et l'ouverture des drives devrait être exécuté uniquement par du personnel qualifié. De mauvaises installations de moteurs ou de drives peuvent provoquer des dommages matériels ou blesser des personnes. On doit suivre les instructions données dans ce manuel et observer les règles nationales de sécurité.*

Always connect the Drive to the protective ground  $\perp$  (PE) via the marked connection.

ADL500 Drives and AC Input filters have ground leakage currents greater than 3.5 mA. EN 61800-5-1 specifies that with leakage currents greater than 3.5 mA the protective conductor ground connection ( $\perp$ ) must be fixed type and doubled for redundancy if its section is lower than 10mm<sup>2</sup> CU or 16mm<sup>2</sup> AL.

*Il faut toujours connecter le variateur à la terre  $\perp$  (PE). Le courant de dispersion vers la terre est supérieur à 3,5 mA sur les variateurs ADL500 et sur les filtres à courant alternatif. Les normes EN 61800-5-1 spécifient qu'en cas de courant de dispersion vers la terre, supérieur à 3,5 ma, la mise à la terre ( $\perp$ ) doit avoir une double connexion pour la redondance si sa section est inférieure à 10mm<sup>2</sup> CU ou 16mm<sup>2</sup> AL.*

Only permanently-wired input power connections are allowed. This equipment must be grounded (IEC 536 Class 1, NEC and other applicable standards).

If a Residual Current-operated protective Device (RCD) is to be used, it must be an RCD type B. Machines with a three phase power supply, fitted with EMC filters, must not be connected to a supply via an ELCB (Earth Leakage Circuit-Breaker - see DIN VDE 0160).

The following terminals can carry dangerous voltages even if the inverter is inoperative:

- the power supply terminals L1, L2, L3, C1, C, D.
- the motor terminals U, V, W.

*Seuls des branchements électriques permanents par câble en entrée sont admis. Mettre l'appareil à la masse (IEC 536 Classe 1, NEC et autres normes applicables).*

*S'il s'avère nécessaire d'utiliser un dispositif protecteur de courant résiduel (RCD), il convient de choisir un RCD de type B. Les machines à alimentation triphasée et dotées de filtres EMC ne doivent pas être raccordées au bloc d'alimentation par le biais d'un disjoncteur ELCB (Earth Leakage Circuit-Breaker – cf. DIN VDE 0160).*

*Les bornes suivantes peuvent recevoir des tensions dangereuses, même si l'onduleur est désactivé :*

- bornes d'alimentation L1, L2, L3, C1, C, D.
- bornes du moteur U, V, W.

Do not touch or damage any components when handling the device. The changing of the isolation gaps or the removing of the isolation and covers is not permissible.

*Manipuler l'appareil de façon à ne pas toucher ou endommager des parties. Il n'est pas permis de changer les distances d'isolement ou bien d'enlever des matériaux isolants ou des capots.*

According to the EU directives the ADL500 and accessories must be used only after checking that the machine has been produced using those safety devices required by the 2006/42/EC set of rules, as far as the machine industry is concerned. These standards do not apply in the Americas, but may need to be considered in equipment being shipped to Europe.

*Conformément à la directive UE, les drives ADL500 et leurs accessoires doivent être employés seulement après avoir vérifié que la machine ait été produit avec les mêmes dispositifs de sécurité demandés par la réglementation 2006/42/CE concernant le secteur de l'industrie.*

Motor parameters must be accurately configured for the motor overload protection to operate correctly.

*Configurer soigneusement les paramètres du moteur afin que la protection contre les surcharges équipée sur le moteur fonctionne convenablement.*

ADL500 operate at high voltages.

*ADL500 fonctionne à des tensions élevées.*

Wherever faults occurring in the control equipment can lead to substantial material damage or even grievous bodily injury (i.e. potentially dangerous faults), additional external precautions must be taken or facilities provided to ensure or enforce safe operation, even when a fault occurs (e.g. independent limit switches, mechanical interlocks, etc.).

*Adopter des mesures de précaution supplémentaires à l'extérieur du drive (par exemple, des interrupteurs de fin de course, des interrupteurs mécaniques, etc.) ou fournir des fonctions aptes à garantir ou à mettre en place un fonctionnement sécurisé en cas de survenue d'une panne de l'appareil de commande susceptible d'occasionner des dégâts matériels d'envergure, voire même des lésions corporelles graves (par exemple, des pannes potentiellement dangereuses).*

Certain parameter settings may cause the inverter to restart automatically after an input power failure.

*Certaines configurations de paramètres peuvent provoquer le redémarrage automatique de l'onduleur après une coupure de l'alimentation.*

This equipment must not be used as an 'emergency stop mechanism' (which is defined according to EN 60204-1).

*Ne pas utiliser cet appareil en tant que « dispositif d'arrêt d'urgence » (défini conformément à la norme EN 60204-1).*

Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or inside the device is listed in section **"4.7 Voltage level of the inverter for safe operations"** on page 16.

*Ne jamais ouvrir l'appareil lorsqu'il est sous tension. Le temps minimum d'attente avant de pouvoir travailler sur les bornes ou bien à l'intérieur de l'appareil est indiqué dans la section **"4.7 Voltage level of the inverter for safe operations"** on page 16.*

**Fire and Explosion Hazard:**

Fires or explosions might result from mounting Drives in hazardous areas such as locations where flammable or combustible vapors or dusts are present. Drives should be installed away from hazardous areas, even if used with motors suitable for use in these locations.

**Risque d'incendies et d'explosions.**

*L'utilisation des drives dans des zones à risques (présence de vapeurs ou de poussières inflammables), peut provoquer des incendies ou des explosions. Les drives doivent être installés loin des zones dangereuses, et équipés de moteurs appropriés.*

|||||



Protect the device from impermissible environmental conditions (temperature, humidity, shock etc.).  
Protéger l'appareil contre des effets extérieurs non permis (température, humidité, chocs etc.).

To the output of the drive (terminals U, V, W) :

- no voltage should be connected to the output of the drive
- the parallel connection of several drives are not permissible.
- the direct connection of the inputs and outputs (bypass) are not permissible.
- capacitive load (e.g. Var compensation capacitors) should not be connected.

*à la sortie du convertisseur (bornes U, V et W) :*

- aucune tension ne doit être appliquée
- aucune charge capacitive ne doit être connectée
- il n'est pas permis de raccorder la sortie de plusieurs convertisseurs en parallèle
- l n'est pas permis d'effectuer une connexion directe de l'entrée avec la sortie du convertisseur (Bypass).

The electrical commissioning should only be carried out by qualified personnel, who are also responsible for the provision of a suitable ground connection and a protected power supply feeder in accordance with the local and national regulations. The motor must be protected against overloads.

*La mise en service électrique doit être effectuée par un personnel qualifié. Ce dernier est responsable de l'existence d'une connexion de terre adéquate et d'une protection des câbles d'alimentation selon les prescriptions locales et nationales. Le moteur doit être protégé contre la surcharge.*

Do not connect power supply voltage that exceeds the standard specification voltage fluctuation permissible. If excessive voltage is applied to the Drive, damage to the internal components will result.

*Ne pas raccorder de tension d'alimentation dépassant la fluctuation de tension permise par les normes. Dans le cas d'une alimentation en tension excessive, des composants internes peuvent être endommagés.*

Do not operate the Drive without the ground wire connected.

The motor chassis should be grounded to earth through a ground lead separate from all other equipment ground leads to prevent noise coupling.

*Ne pas faire fonctionner le drive sans prise de terre.*

*Le châssis du moteur doit être mis à la terre à l'aide d'un connecteur de terre séparé des autres pour éviter le couplage des perturbations.*

No dielectric tests should be carried out on parts of the drive. A suitable measuring instrument (internal resistance of at least 10 kΩ/V) should be used for measuring the signal voltages.

*Il ne faut pas exécuter de tests de rigidité diélectrique sur des parties du convertisseurs. Pour mesurer les tensions, des signaux, il faut utiliser des instruments de mesure appropriés (résistance interne minimale 10kΩ/V).*

|||||

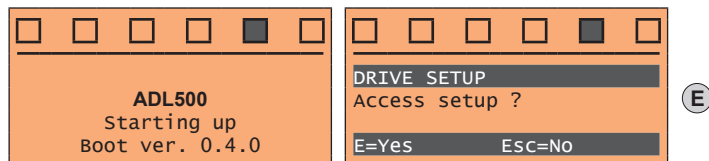
## 9.1 DRIVE SETUP

DRIVE SETUP, which is a procedure that is presented to the user **only when the drive is first turned on**, allows all the files required for the user's needs and the type of system to be imported.  
If setup has been completed but the user wishes to see it again, it is necessary to execute the **Load default** procedure (PAR 580).  
All the setup parameters are also available in the different drive menus.

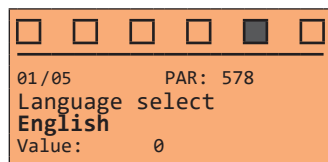
The setup steps are as follows:

- **Load language** See step 1
- **Load application (ADL550 and ADL530)** See step 2
- **Load parameters from USB (ADL550 and ADL530)** See step 3
- **Set encoder parameters** See step 4
- **Select Motor from USB (ADL550 and ADL530)** See step 5

When the drive is first switched on:

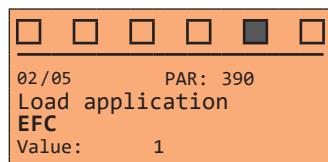


### Step 1 – Load language



Set the language to be used to program the drive (default English).  
Press ▼ to go to the next step or press E to change the selection.  
Options available: (0) English, (1) Italian, (2) French, (3) German, (4) Spanish, (8) Turkish.  
To set a language other than English or Italian, see section "8.2.8.1 Language selection" on page 57.

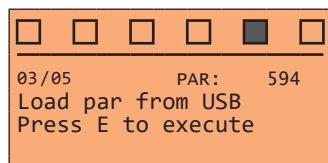
### Step 2 – Load application



Set the application to be used by the drive (default **EFC**).  
Press ▼ to go to the next step or press E to change the selection.  
Options available: (1) EFC, (2) EPC, (3) DCP, (4) CAN417.

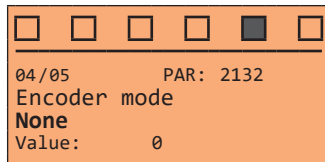
### Step 3 – Load parameters from USB

For ADL550 and ADL530 only.



Transfer the parameters from the memory connected to the drive's USB port.  
Press ▼ to go to the next step or press E to load the parameters from USB.

#### Step 4 – Set encoder parameters



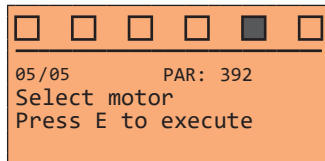
Select the type of encoder (default **None**).

Press ▼ to go to the next step or press E to change the selection.

Options available: (1) Digital, (2) Sinus, (3) Sinus SINCOS, (4) Sinus ENDAT, (5) Sinus BiSS, (6) ENDAT, (7) BiSS.

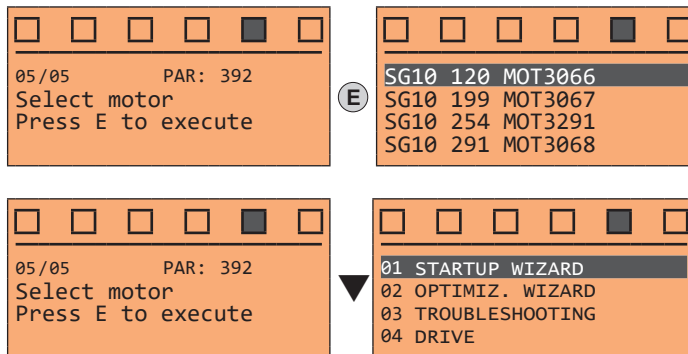
#### Step 5 – Select Motor from USB

For ADL550 and ADL530 only.



This parameter allows motor data to be loaded into the drive from a library (file extension .mot) saved on USB memory device (contact the technical service centre).. This is displayed only if the USB memory device contains the motor libraries in a folder named "ADL500MT".

Press ▼ to exit or press E to display the files with .mot extension saved on a USB memory.



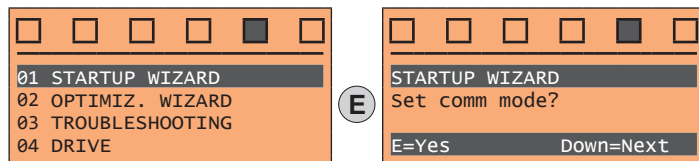
## 9.2 STARTUP WIZARD for Asynchronous motor

The STARTUP WIZARD is a guided procedure used for quick start-up of the drive that helps to set the main parameters.

It consists of a series of questions, relating to the various sequences for entering and calculating the parameters necessary for correct drive and lift application operation. The order of these sequences is as follows:

- **Setting communication** **See step 1**
- **Setting encoder parameters (Control type = ASY SSC or ASY FOC)** **See step 2**
- **Setting motor parameters** **See step 3**
- **Setting mechanical system data** **See step 4**
- **Setting the maximum speed reference and maximum system speed** **See step 5**
- **Autotune with motor at stand-still** **See step 6**
- **Saving parameters** **See step 7**

The format of the function selection page is as follows:



Pressing the **E** key, the function to be programmed is accessed.

Press the **▼** (Down) key to move to the next function skipping the current function.

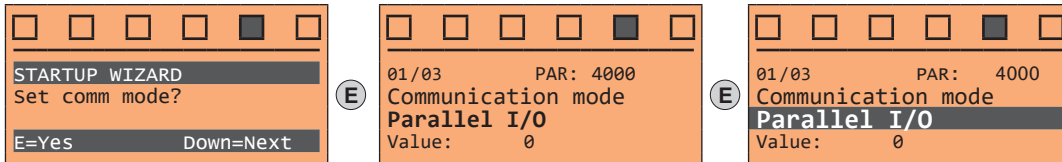
Press the **▲** (Up) key to return to the previous function.

To terminate the sequence of functions and return to the menu, press the **ESC** key.

At the end of the sequence, once the parameters have been saved, if commissioning is successful, the main menu will return.

### Step 1 – Setting communication

Set the type of communication to be used.



Available selections: (0) Parallel I/O, (1) CANopen

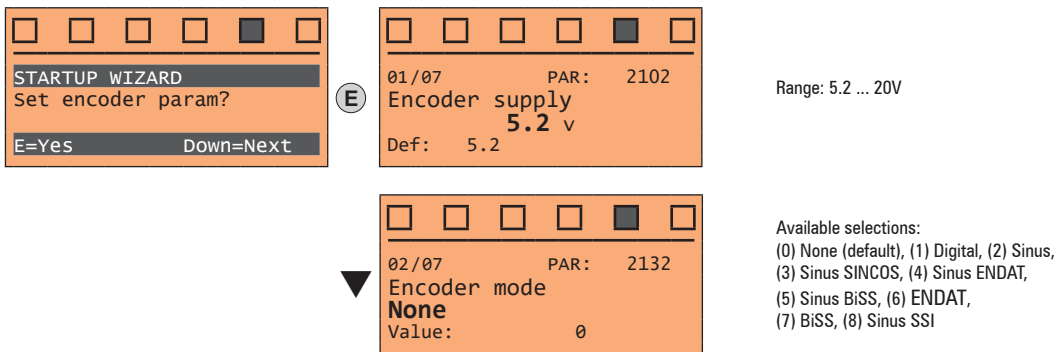
At the end of the procedure proceed to next step.

### Step 2 – Setting encoder parameters



The incorrect configuration of the encoder tension can permanently damage the device; therefore, it is advisable to check the values on the encoder's specification plate.

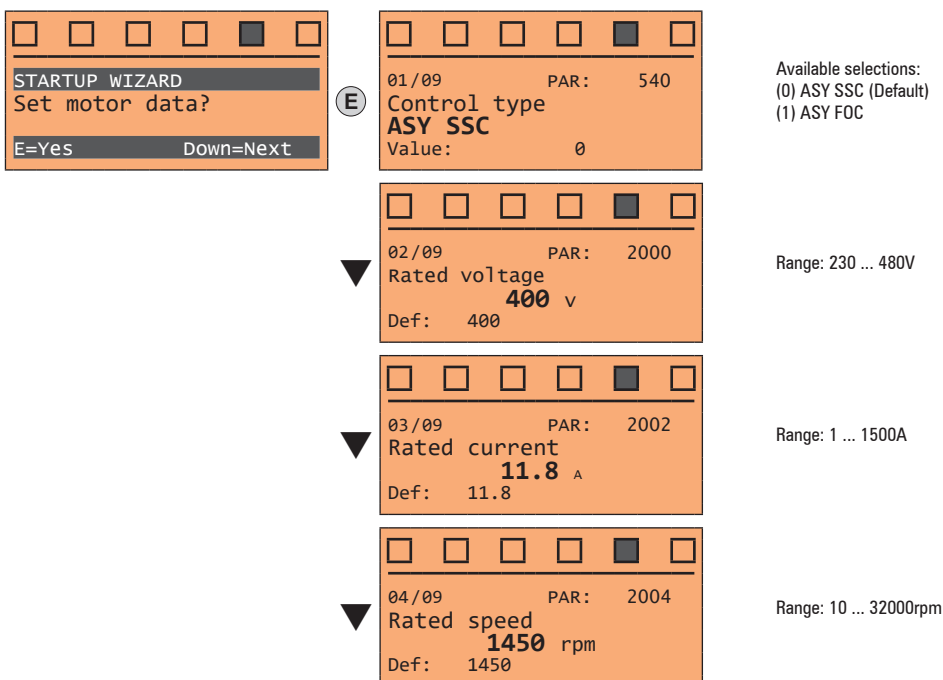
Set the following parameters for the encoder installed on the motor:



### Step 3 – Setting motor parameters

**Note !**

**Def:** The factory (default) setting depends on the size of the drive that is connected. These values refer to the ADL5.-1055



▼	<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>05/09</span> <span>PAR: 2006</span> </div> <p><b>Rated frequency</b></p> <p style="text-align: center; font-size: 1.2em;"><b>50.00</b> Hz</p> <p>Def: 50</p>	Range: 10 ... 1000Hz
▼	<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>06/09</span> <span>PAR: 2008</span> </div> <p><b>Pole pairs</b></p> <p style="text-align: center; font-size: 1.2em;"><b>2</b></p> <p>Def: 2</p>	Range: 1 ... 60
▼	<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>07/09</span> <span>PAR: 2010</span> </div> <p><b>Rated power</b></p> <p style="text-align: center; font-size: 1.2em;"><b>5.50</b> kW</p> <p>Def: 5.5</p>	Range: 0.1 ... 1500kW
▼	<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>08/09</span> <span>PAR: 2012</span> </div> <p><b>Rated power factor</b></p> <p style="text-align: center; font-size: 1.2em;"><b>0.83</b></p> <p>Def: 0.83</p>	Range: 0.6 ... 0.95

Set the plate data of the motor connected, according to the procedures described on the previous pages.

- Rated voltage [V]:** the rated voltage of the motor indicated on the data plate.
- Rated current [A]:** motor rated current; approximately, the value should not be less than 0.3 times the rated current of the drive, output current class 1 @ 400 V on the data plate of the drive.
- Rated speed [rpm]:** rated speed of the motor; this value must reflect the speed of the fully loaded motor at rated frequency. If slip is indicated on the motor data plate, set the Rated speed parameter as follows: Rated speed = Synchronous speed - Slip (e.g. for a 4-pole motor Rated speed = 1500 - 70 = 1430).
- Rated frequency [Hz]:** rated frequency of the motor, as shown on the data plate (asynchronous motors only).
- Pole pairs:** Number of motor pole pairs. The number of motor pole pairs is calculated using the plate data and the following formula:  

$$P = 60 [s] \times f [Hz] / nN [rpm]$$

Where: P = motor pole pairs, f = motor rated frequency (e.g. 50); nN = motor rated speed (e.g. 1450)
- Rated power [kW]:** Motor rated power; for a motor data plate with an HP power value, set the rated power kW = 0.736 x the motor power HP value.
- Rated power factor:** Leave the default rated power factor if the data are not available on the data plate.

**Note !**

When data entry is complete the **Take parameters** command is executed automatically (menu MOTOR DATA, PAR: 2020). The motor data entered during the STARTUP WIZARD procedure are saved in a RAM memory to enable the drive to perform the necessary calculations. These data are lost if the device is switched off. To save the motor data follow the procedure described in step 9.

At the end of the procedure proceed to next step.

## Step 4 – Setting mechanical system data

STARTUP WIZARD  
Set mechanical data?  
E=Yes Down=Next

01/09 PAR: 11002  
Travel unit sel  
Hz  
Value: 0

Available selections:  
0 Hz (output frequency)  
1 m/s (cabin speed, depends on the mechanical constant )  
2 Rpm (motor shaft speed )  
3 USCS (US unit of measure: fpm, ft/s<sup>2</sup>, ft/s<sup>3</sup>)

02/09 PAR: 11006  
Cabin speed  
1.00 m/s  
Def: 1.0

Range: 0 ... 10

03/09 PAR: 11010  
Gearbox ratio  
45.000  
Def: 45.000

Range: 1 ... 200

04/09 PAR: 11164  
Rope ratio  
1  
Def: 1

Range: 1 ... 40

05/09 PAR: 11012  
Pulley diameter  
0.600 m  
Def: 0.600

Range: 0 ... 5

06/09 PAR: 11150  
Car weight  
400 kg  
Def: 400

Range: 0 ... 10000

07/09 PAR: 11052  
Counter weight  
1000 kg  
Def: 1000

Range: 0 ... 10000

08/09 PAR: 11154  
Load weight  
450 kg  
Def: 450

Range: 0 ... 100,000

09/09 PAR: 11156  
Rope weight  
20 kg  
Def: 20

Range: 0 ... 10000

At the end of the procedure proceed to next step.



## Step 5 – Setting the maximum speed reference and maximum system speed

- Select the unit of measurement for the speed references

STARTUP WIZARD  
Set speeds?  
E=Yes Down=Next

01/08 PAR: 11020  
Multi speed 0  
5.00 Hz  
Def: 5.00  
Range: -10000 ... 10000

- Set the multispeed values

02/08 PAR: 11022  
Multi speed 1  
47.73 Hz  
Def: 47.73 Hz  
Range: -10000 ... 10000

03/08 PAR: 11024  
Multi speed 2  
20.00 Hz  
Def: 20.00 Hz  
Range: -10000 ... 10000

04/08 PAR: 11026  
Multi speed 3  
0.00 Hz  
Def: 0.00 Hz  
Range: -10000 ... 10000

05/08 PAR: 11028  
Multi speed 4  
0.00 Hz  
Def: 0.00 Hz  
Range: -10000 ... 10000

06/08 PAR: 11030  
Multi speed 5  
0.00 Hz  
Def: 0.00 Hz  
Range: -10000 ... 10000

07/08 PAR: 11032  
Multi speed 6  
0.00 Hz  
Def: 0.00 Hz  
Range: -10000 ... 10000

08/08 PAR: 11034  
Multi speed 7  
0.00 Hz  
Def: 0.00 Hz  
Range: -10000 ... 10000



Multi speed configuration table:

Through the combination of “MtlSpd S0” (Digital input 4), “MtlSpd S1” (Digital input 5) and “MtlSpd S2” (Digital input 6) commands, is possible to select Multi speed desired, according to next table:

MtlSpd S2	MtlSpd S1	MtlSpd S0	ACTIVE SPEED
0	0	0	Multispeed 0, PAR 11020
0	0	1	Multispeed 1, PAR 11022
0	1	0	Multispeed 2, PAR 11024
0	1	1	Multispeed 3, PAR 11026
1	0	0	Multispeed 4, PAR 11028
1	0	1	Multispeed 5, PAR 11030
1	1	0	Multispeed 6, PAR 11032
1	1	1	Multispeed 7, PAR 11034

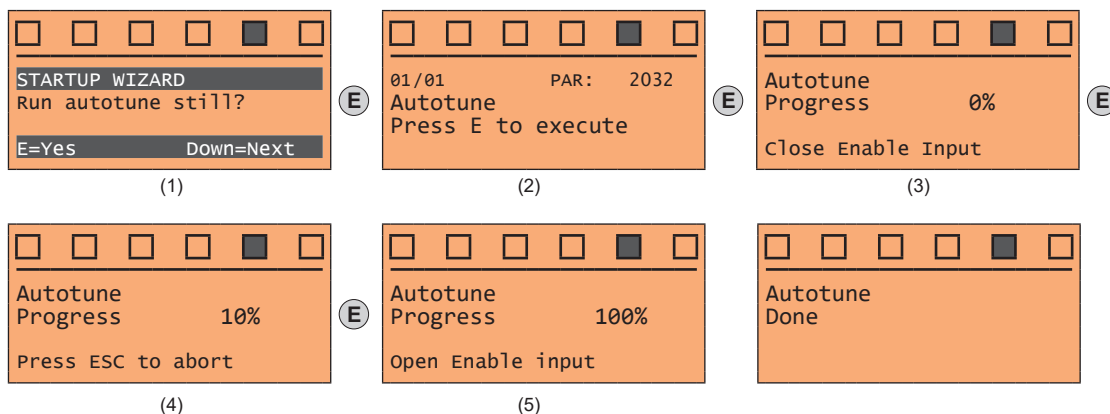
At the end of the procedure proceed to next step.

Step 6 – Autotune with motor at stand-still

The drive carries out the motor autotune procedure (real measurement of motor parameters). The procedure is fast and recommended in most cases

Note !

If this operation generates an error message, check the connections of the power and control circuits (see step 1 - Connections), check the motor data settings (see step 3 - Setting motor parameters) and then repeat the guided Autotune procedure.



- (1) Press the **E** key to proceed to the autotune procedure.
- (2) Press the **E** key to start the autotune procedure.
- (3) Enable the drive by connecting terminal 9 (Enable) to terminal 12 (+24 V). To abort this operation, press the **ESC** key.
- (4) Once the drive is enabled the autotune procedure starts. This may take a few minutes, depending on the type of motor being used.
- (5) At the end of the procedure the following screen is displayed. After opening the Enable contact, go to next step.

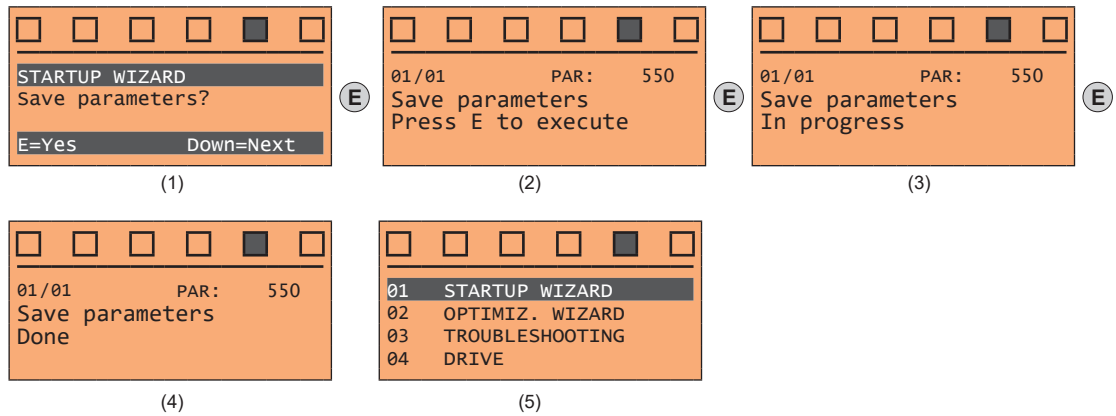
Note !

At the end of the autotune procedure there is a request to open the Enable contact (terminals 9 - 12); this results in the automatic execution of the **Take tune parameters** command (menu MOTOR DATA, PAR: 2078).

The calculated parameters are saved in a RAM memory to enable the drive to perform the necessary calculations. These data are lost if the device is switched off. To save the motor data follow the procedure described in step 7.

## Step 7 – Save parameters

To save the new parameter settings, so that they are maintained also after power-off, proceed as follows:



- (1) Press the **E** key to start the save parameters procedure.
- (2) Press **E to confirm**
- (3) End of procedure
- (4) When the parameters have been saved correctly the drive displays this screen to show that the startup wizard is complete.

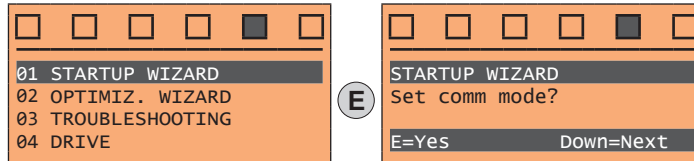
## 9.3 STARTUP WIZARD for brushless motors

The STARTUP WIZARD is a guided procedure used for quick start-up of the drive that helps to set the main parameters.

It consists of a series of questions, relating to the various sequences for entering and calculating the parameters necessary for correct drive and lift application operation. The order of these sequences is as follows:

- |   |                   |
|---|-------------------|
| • <b>Setting communication</b>  | <b>See step 1</b> |
| • <b>Setting encoder parameters (Control type = SYN FOC)</b>          | <b>See step 2</b> |
| • <b>Setting motor parameters</b>                                     | <b>See step 3</b> |
| • <b>Setting mechanical system data</b>                               | <b>See step 4</b> |
| • <b>Setting the maximum speed reference and maximum system speed</b> | <b>See step 5</b> |
| • <b>Autotune with motor at stand-still and encoder phasing</b>       | <b>See step 6</b> |
| • <b>Saving parameters</b>  | <b>See step 7</b> |

The format of the function selection page is as follows:

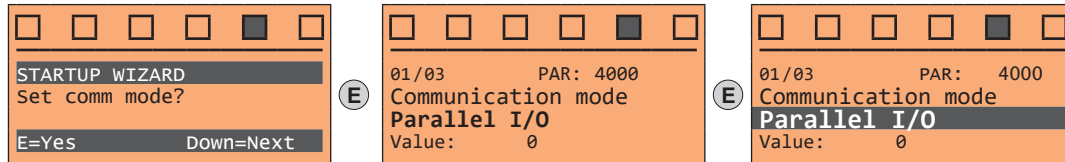


Pressing the **E** key, the function to be programmed is accessed.  
 Press the **▼** (Down) key to move to the next function skipping the current function.  
 Press the **▲** (Up) key to return to the previous function.

To terminate the sequence of functions and return to the menu, press the **ESC** key.  
 At the end of the sequence, once the parameters have been saved, if commissioning is successful, the main menu will return.

### Step 1 – Setting communication

Set the type of communication to be used.



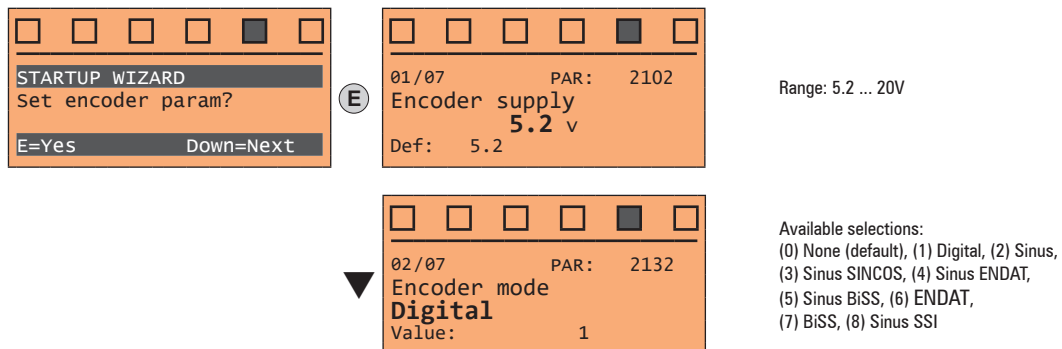
Available selections: (0) Parallel I/O, (1) CANopen  
 At the end of the procedure proceed to next step.

### Step 2 – Setting encoder parameters



.....  
**The incorrect configuration of the encoder tension can permanently damage the device; therefore, it is advisable to check the values on the encoder's specification plate.**  
 .....

Set the following parameters for the encoder installed on the motor:



<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	03/07      PAR: 2100 Encoder pulses <b>1024</b> ppr Def: 1024	Range: 4 ... 16384
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	04/07      PAR: 2110 Encoder signal check <b>Check A-B</b> Value: 1	Available selections: (1) Check A-B (2) Check A-B-Z

At the end of the procedure proceed to next step.

### Step 3 – Setting motor parameters

**Note !**

Def: The factory (default) setting depends on the size of the drive that is connected. These values refer to the size ADL5.-1055

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	STARTUP WIZARD Set motor data? E=Yes      Down=Next	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	01/09      PAR: 540 Control type <b>SYN FOC</b> Value: 2	Available selections: (2) SYN FOC
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	02/09      PAR: 2000 Rated voltage <b>340</b> V Def: 400	Range: 230 ... 480V		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	03/09      PAR: 2002 Rated current <b>17.5</b> A Def: 11.8	Range: 1 ... 1500A		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	04/09      PAR: 2004 Rated speed <b>144</b> rpm Def: 1450	Range: 10 ... 32000rpm		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	06/09      PAR: 2008 Pole pairs <b>12</b> Def: 2	Range: 1 ... 60		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	09/09      PAR: 2014 Torque constant <b>50.00</b> Nm/A Def: 50.00	Range: -		

Set the plate data of the motor connected, following the instructions given on the previous pages.

- Rated voltage [V]:** the rated voltage of the motor indicated on the data plate.
- Rated current [A]:** motor rated current; approximately, the value should not be less than 0.3 times the rated current of the drive, output current class 1 @ 400 V on the data plate of the drive.
- Rated speed [rpm]:** motor rated speed; see data plate.
- Pole pairs:** Number of motor pole pairs; see data plate.
- Torque constant [Nm/a] :** (KT) Ratio between the torque generated by the motor and the current required to supply it.

**Note !**

When data entry is complete the **Take parameters** command is executed automatically (menu MOTOR DATA, PAR: 2020). The motor data entered during the STARTUP WIZARD procedure are saved in a RAM memory to enable the drive to perform the necessary calculations.

These data are lost if the device is switched off. To save the motor data follow the procedure described in step 8.

At the end of the procedure proceed to next step.

#### Step 4 – Setting mechanical system data

**STARTUP WIZARD**  
Set mechanical data?  
E=Yes Down=Next

Parameter ID	Parameter Name	Current Value	Default Value	Range
02/09	Cabin speed	1.00 m/s	1.0	0 ... 10
03/09	Gearbox ratio	45.000	45.000	1 ... 200
04/09	Rope ratio	1	1	1 ... 40
05/09	Pulley diameter	0.600 m	0.600	0 ... 5
06/09	Car weight	400 kg	400	0 ... 10000
07/09	Counter weight	1000 kg	1000	0 ... 10000
08/09	Load weight	450 kg	450	0 ... 100,000
09/09	Rope weight	20 kg	20	0 ... 10000

At the end of the procedure proceed to next step.

## Step 5 – Setting the maximum speed reference and maximum system speed

- Select the unit of measurement for the speed references

- Set the multispeed values



### Multi speed configuration table:

Through the combination of “MtlSpd S0” (Digital input 4), “MtlSpd S1” (Digital input 5) and “MtlSpd S2” (Digital input 6) commands, is possible to select Multi speed desired, according to next table:

MtlSpd S2	MtlSpd S1	MtlSpd S0	ACTIVE SPEED
0	0	0	Multispeed 0, PAR 11020
0	0	1	Multispeed 1, PAR 11022
0	1	0	Multispeed 2, PAR 11024
0	1	1	Multispeed 3, PAR 11026
1	0	0	Multispeed 4, PAR 11028
1	0	1	Multispeed 5, PAR 11030
1	1	0	Multispeed 6, PAR 11032
1	1	1	Multispeed 7, PAR 11034

At the end of the procedure proceed to next step.

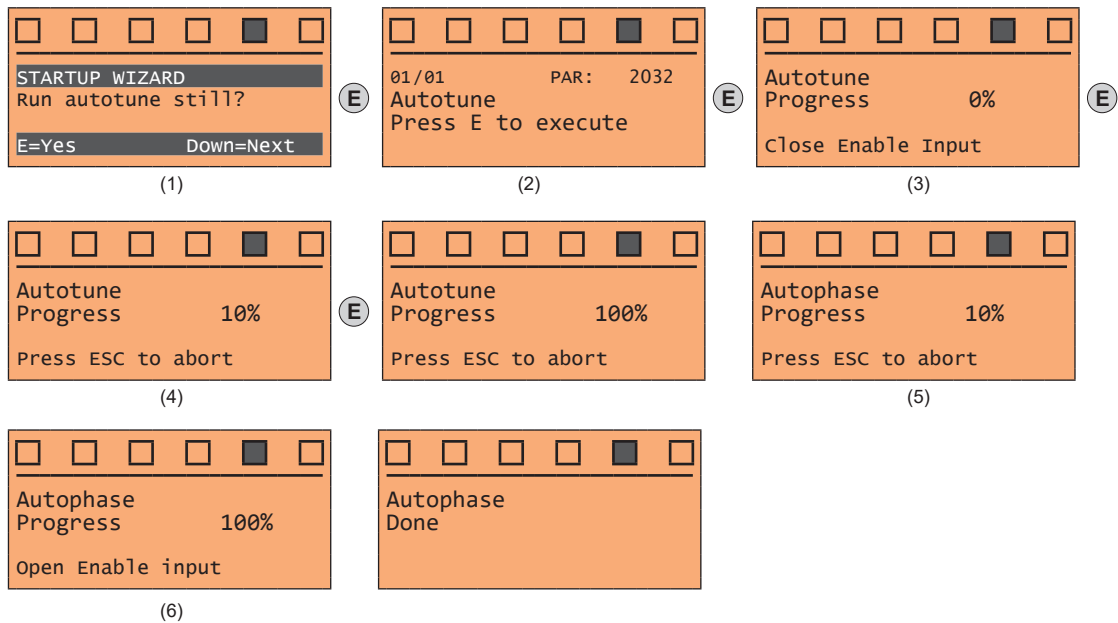
### Step 6 – Autotune with motor at stand-still and encoder phasing

The drive carries out the motor autotune procedure (real measurement of motor parameters) and the automatic phasing of the absolute encoder (**the brake must be blocked**).

Autotuning may take a few minutes.

**Note!**

If this operation generates an error message, check the connections of the power and control circuits (see **step 1** - Connections), check the motor data settings (see **step 3** - Setting motor parameters) and then repeat the guided Autotune procedure.



- (1) Press the **E** key to proceed to the autotune procedure.
- (2) Press the **E** key to start the autotune procedure.
- (3) Enable the drive by connecting terminal 9 (Enable) to terminal 12 (+24 V). To abort this operation, press the **ESC** key.
- (4) Once the drive is enabled the autotune procedure starts.  
This may take a few minutes, depending on the type of motor being used.
- (5) The drive now proceed automatically to the absolute encoder phasing. This may take a few minutes, depending on the type of motor being used.
- (6) At the end of the procedure the following screen is displayed.  
After opening the Enable contact, proceed to next step.

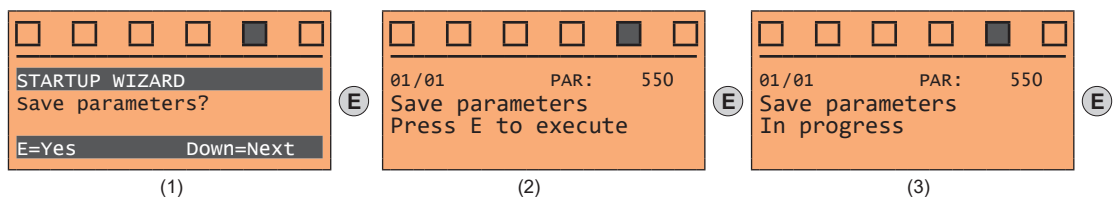
**Note!**

At the end of the autotune procedure there is a request to open the Enable contact (terminals 9 - 12); this results in the automatic execution of the **Take tune parameters** command (menu MOTOR DATA, PAR: 2078).

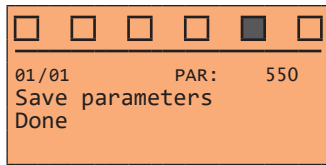
The calculated parameters are saved in a RAM memory to enable the drive to perform the necessary calculations. These data are lost if the device is switched off. To save the motor data follow the procedure described in step 7.

### Step 7 – Save parameters

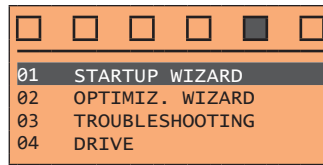
To save the new parameter settings, so that they are maintained also after power-off, proceed as follows:







(4)



(5)

- (1) Press the **E** key to start the save parameters procedure.
- (2) Press "E" to confirm
- (3) End of procedure
- (4) When the parameters have been saved correctly the drive displays this screen to show that the startup wizard is complete.

## 9.4 OPTIMIZATION WIZARD

The OPTIMIZ. WIZARD is a guided procedure used for immediately optimize the control response in order to maximise cabin comfort.

In addition to the automatic procedure (Learning Trip function), three or five levels of optimization are available for each of the Rollback, Comfort low speed, Comfort high speed parameters.

To avoid possible vibrations, the optimization level should not be increased if not necessary.



Attention

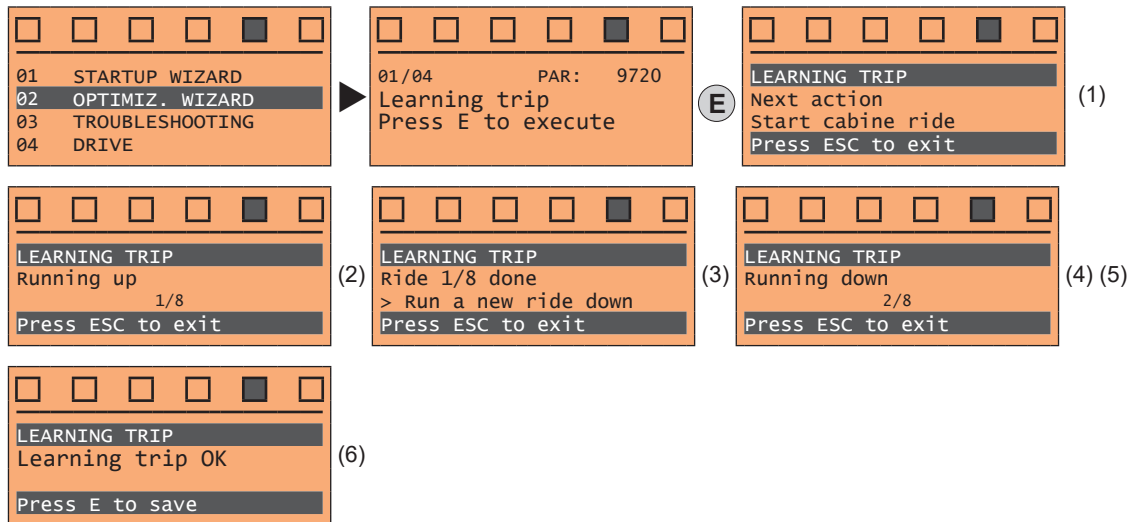
Before enabling the function:

- run the **Startup wizard**,
- check cabin movement in inspection mode to rule out any macroscopic data entry errors.

The function can be performed from the keypad and via the WEG\_DriveLabs configurator (Wizard menu / Optimization Wizard).

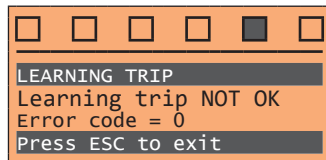
To facilitate operations, the configurator/keypad suggests what actions are to be performed (e.g. up one floor, down one floor, etc.), intercepting any incorrect actions and communicating them (e.g. call to floor short, calls always in the same direction, etc.) so as to recommend the corrective action.

Once the sequences envisaged by the function have been completed, the basic speed regulator gains are automatically recalculated. Therefore the user can run a test travel to evaluate the improvement in performance obtained and, if still not satisfied, the Learning Trip procedure can be repeated or the deficient aspects improved using the appropriate sections of the optimisation wizard (Rollback, Comfort low speed, Comfort high speed).

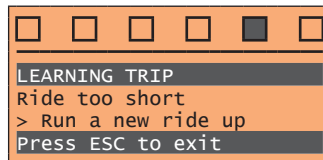


- (1) You are prompted to perform the first run (up or down).
- (2) Perform the up run.
- (3) You are prompted to perform a down run.
- (4) Perform the down run.
- (5) Repeat the operations (1) (2) (3) (4) several times.
- (6) Procedure successfully completed.

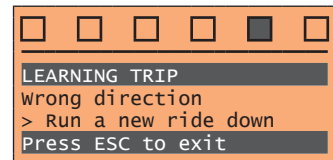
Other possible messages:



Procedure not successfully completed.



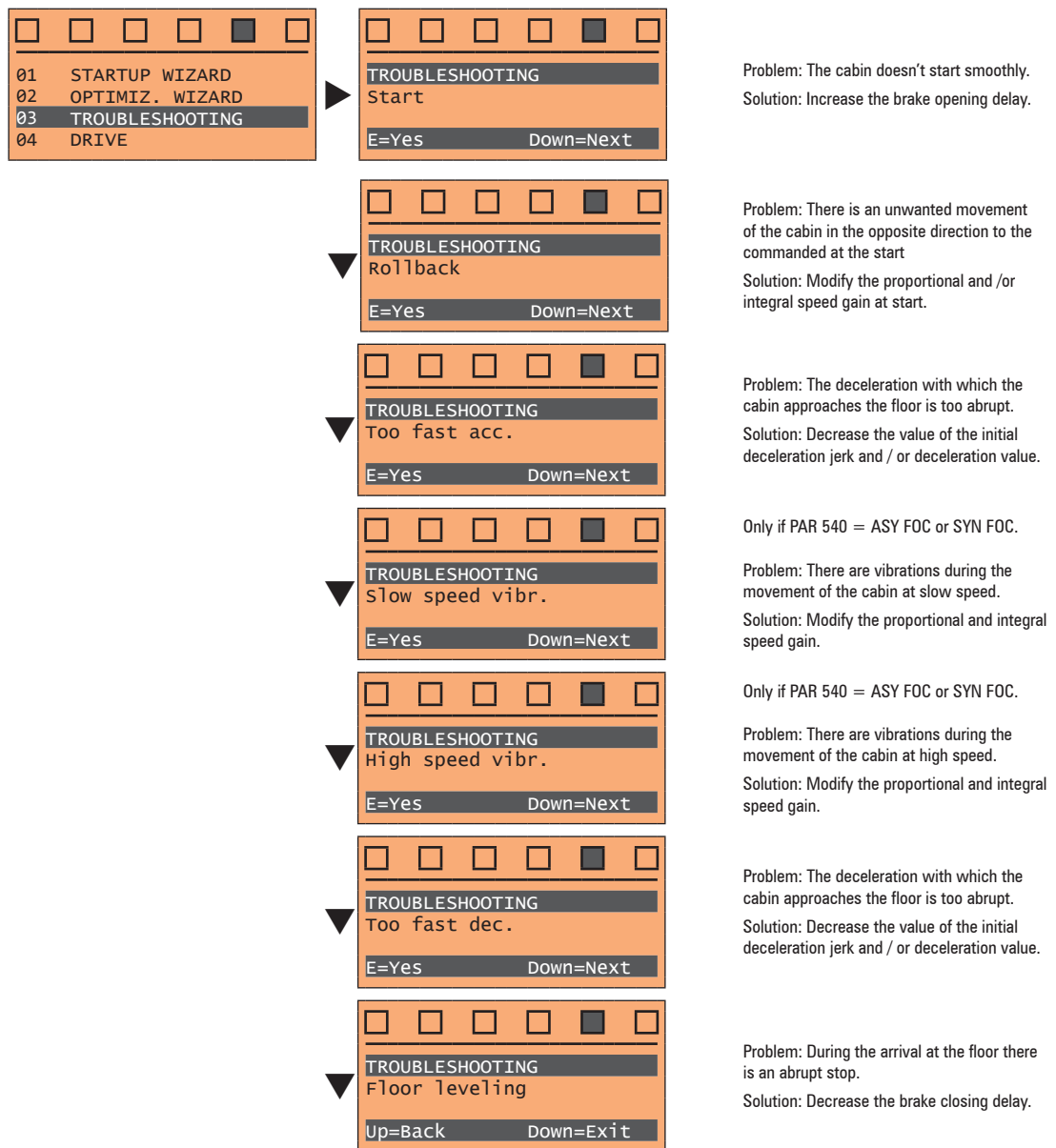
Short run error.



Wrong direction error.

## 9.5 TROUBLESHOOTING

For each typical problem of a Lift System, the parameter of the drive on which to act to solve the problem, are displayed by selecting the relative action.



# 10 - Troubleshooting

## 10.1 Alarms

When an Alarm is tripped, the Alarm LED lights up and Alarm appears on the display.

**Note !**

To reset alarms, see paragraph "8.2.11.1 Alarm reset" on page 59.

In the following table, the Code is visible only from WEG\_DriveLabs configurator.

Index	Error message shown on the display	Sub-code	Description
0	No alarm	Condition: No alarm present	
1	Overvoltage	Condition: DC link overvoltage alarm due to energy recovered from the motor. The voltage arriving at the drive power section is too high compared to the maximum threshold relating to the PAR 560 Mains voltage parameter setting. Solution: - Extend the deceleration ramp. - Use a braking resistor to dissipate the energy recuperation, to be connected to the specific terminals. See section "7.2.1 Power terminals and connection" on page 28.	
2	Undervoltage	Condition: DC link undervoltage alarm. The voltage arriving at the drive power section is too low compared to the minimum threshold relating to the 560 Mains voltage parameter setting due to: - the mains voltage being too low or overextended voltage drops. - poor cable connections (e.g. loose contactor terminals, inductance, filter, etc. ). Solution: Check the connections and mains voltage	
3	Ground fault	Condition: Ground short circuit alarm Solution: - Check drive and motor wiring. - Check that the motor is not grounded.	
4	Overcurrent	Condition: Instantaneous overcurrent protection intervention alarm. This may be due to the incorrect setting of current regulator parameters or a short circuit between phases or ground fault on the drive output. Solution: - Check the current regulator parameters - Check wiring towards the motor	
5	Desaturation	Condition: Instantaneous overcurrent in the IGBT bridge alarm. Solution: - Switch the drive off and then switch it on again. - Check the condition of the braking resistor isolation. Make sure there are no earth leakages. - If the alarm persists, contact the technical service centre.	
6	MultiUndervolt	Condition: The number of attempted automatic restarts after the Undervoltage alarm has exceeded the set PAR 4650 UVRep attempts value in the PAR 4652 UVRep delay time. Solution: Too many Undervoltage alarms. Adopt the proposed solutions for the Undervoltage alarm.	
7	MultiOvercurr	Condition: 2 attempted automatic restarts after the Overcurrent alarm within 30 seconds. If more than 30 seconds pass after the Overcurrent alarm was generated, the attempt counter is reset. Solution: Too many Overcurrent alarms. Adopt the proposed solutions for the Overcurrent alarm.	
8	MultiDesat	Condition: 2 attempted at automatic restarts after the Desaturation alarm within 30 seconds. If more than 30 seconds pass after the Desaturation alarm was generated, the attempt counter is reset. Solution: Too many Desaturation alarms. Adopt the proposed solutions for the Desaturation alarm.	
9	Heatsink OT	Condition: Heatsink temperature too high alarm Solution: - Verify the correct operation of the cooling fan. - Check that the heatsinks are not clogged - Check that the openings for the cabinet cooling air are not blocked.	
10	Heatsinks OTUT	Condition: IGBT module temperature too high or too low alarm Solution: - Verify the correct operation of the cooling fan. - Check that the heatsinks are not clogged - Check that the openings for the cabinet cooling air are not blocked.	
11	PTC failure	Condition: PTC sensor break alarm. Solution: Verificare il collegamento e l'integrità della sonda PTC.	
12	Motor OT	Condition: Motor overtemperature alarm. Possible causes: - Load cycle too heavy - The motor is installed in a place where the ambient temperature is too high - If the motor is provided with a blower: the fan is not working - If the motor is not provided with a blower: the load is too high at slow speeds. Cooling the fan on the motor shaft is not sufficient for this load cycle. - The motor is used at less than the rated frequency, causing additional magnetic losses. Solution: - Change the processing cycle. - Use a cooling fan to cool the motor.	

Index	Error message shown on the display	Sub-code	Description
13	Drive overload	<b>Condition:</b> Drive overload alarm. - The inverter output current has exceeded the allowed overload value. - The overload cycle has exceeded the allowed values.	
		<b>Solution:</b> - Check that the load is not excessive. - Check that accelerations are not excessive. - Check that the overload cycle is within allowed limits.	
14	Motor overload	<b>Condition:</b> Motor overload alarm. The current absorbed during operation is greater than that specified on the motor data plate.	
		<b>Solution:</b> - Reduce the motor load. - Increase the size of the motor.	
15	Bres overload	<b>Condition:</b> Braking resistor overload alarm. The current absorbed by the resistor is greater than the rated current.	
		<b>Solution:</b> - Check the size of the braking resistor. - Check the condition of the braking resistor.	
16	Phase loss	<b>Condition:</b> Power phase loss alarm.	
		<b>Solution:</b> Check the mains voltage and whether any protections upstream of the drive have been tripped.	
17	Opt Bus fault	<b>Condition:</b> Error in the configuration stage or communication error.	
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is equal to 0, the error relates to a communication problem.
		XXXXH-X	If the first digit to the left of "H" in the alarm sub-code is other than 0, the error relates to a configuration problem.
		<b>Solution:</b> For configuration errors, check the configuration of the Bus communication, Bus type, Baudrate, address, parameter setting For communication errors verify wiring, resistance of terminations, interference immunity, timeout settings. For more details reference should be made to the datasheet of the bus being used.	
18	Opt 1 IO fault	<b>Condition:</b> Error in the communication between Regulation and I/O expansion card.	
		<b>Solution:</b> Check that it has been inserted correctly, see section "A.1 - Optional cards" on page 90.	
19	Precharge fault	<b>Condition:</b> Failed precharge relay: the precharge relay contacts are stuck open.	
		<b>Solution:</b> Reset the alarm and try to resume normal operation. If the alarm persists, contact technical support.	
20	Opt enc fault	<b>Condition:</b>	
		<b>Solution:</b>	
21	External fault	<b>Condition:</b> External alarm present. A digital input has been programmed as an external alarm, but the +24V voltage is not available on the terminal.	
		<b>Solution:</b> Check that the terminal screws are tight	
22	Speed fbk loss	<b>Condition:</b> Speed feedback loss alarm. The encoder is not connected, not connected properly or not powered: verify encoder operation by selecting the <b>PAR 260 Motor speed</b> parameter in the MONITOR menu.	
		<b>Solution:</b> See parameter 2172 <b>SpdFbkLoss code</b> for information about the cause of the alarm and chapter 10.2 <b>Speed fbk loss [22]</b> alarm	
23	Overspeed	<b>Condition:</b> Motor overspeed alarm. The motor speed exceeds the limits set in the <b>PAR 4540</b> parameter.	
		<b>Solution:</b> - Limit the speed reference. - Check that the motor is not driven in overspeed during rotation.	
24	Speed ref loss	<b>Condition:</b> <b>Speed reference loss alarm;</b> occurs if the difference between the speed regulator reference and the actual motor speed is more than 100 rpm. This condition occurs because the drive is in the current limit condition. It is only available in the Flux Vect OL and Flux Vect CL mode (see PAR 4550).	
		<b>Solution:</b> Check that the load is not excessive.	
25	Emg stop alarm	<b>Condition:</b>	
		<b>Solution:</b>	
26	Power down	<b>Condition:</b> The drive was enabled with no supply voltage at the power section.	
		<b>Solution:</b> Check drive power supply.	
27	Phaseloss out	<b>Condition:</b> Before each start, a test is performed by injecting a small DC current into the motor output phases: if one or more phases are not connected, an alarm is tripped, preventing any movement and opening the brake.	
		<b>Solution:</b> Check Drive/motor connection.	
28	OV safety	<b>Condition:</b> Safety status alarm caused by Overvoltage situations.	
		<b>Solution:</b> the firmware attempts to reset the card automatically. If the condition is removed (the alarm cleared message is displayed) the alarm can be reset and the drive restarted by deactivating and reactivating Enable and Start.	
29	Safety failure	<b>Condition:</b> The state of the "safety function" is communicated to the regulation card via 2 digital inputs: SAFETY_ON (pin P1.8) and SAFETY_EN (pin P1.9)	
		<b>Solution:</b> Switch the drive off and then back on. If the error persists, contact the technical service centre.	
30	Mot phase loss	<b>Condition:</b> One or more motor output power phases missing while motor is turning.	
		<b>Solution:</b> Check Drive/motor connection.	
31	Ropes change	<b>This may occur in two conditions:</b> <ul style="list-style-type: none"> <li>the drive continues to run but the rope usage threshold set in parameter 3404 <b>Ropes change thr</b> has been reached;</li> <li>the drive finishes the current travel and then locks because parameter 3414 Direction counter has reached 0 (corresponding to parameter 3412 <b>Ropes usage</b> = 100%).</li> </ul>	
		<b>Solution:</b> replace the ropes. By switching the drive off and back on you can run a single travel to bring the car to a better position for the procedure. After you have changed the ropes, reset the direction change counter to eliminate the lock condition.	

Index	Error message shown on the display	Sub-code	Description
32	Enable missing		<p><b>Condition:</b> (for ADL550 only) occurs if, after <b>Safety Enable</b> signal, <b>Enable</b> is not activated within 4 seconds.</p> <p><b>Solution:</b></p> <ul style="list-style-type: none"> <li>• Check <b>Enable</b> signal.</li> <li>• Check SAFETY connector, contacts 1 and 2.</li> <li>• Check electrical level and current capability of <b>Safety Enable</b> signal.</li> </ul>
33 ... 48	Plc1 fault ... Plc16 fault		<p><b>Condition:</b> Enabled application developed in the IEC 61131-3 environment has found the conditions for generating this specific alarm to be true. The meaning of the alarm depends on the type of application. For more information, refer to the documentation concerning the specific application.</p> <p><b>XXXXH-X</b>   The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> Refer to the documentation concerning the enabled application. With regards to the standard application EFC refer to Functional Parameter Manual section 5.10 LIFT ALARMS. For the applications DCP3/DCP4, EPC and CiA 417 refer to the application manual section ALARMS.</p>
49	Watchdog		<p><b>Condition:</b> this condition can occur during operation when the watchdog micro protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm:</p> <ul style="list-style-type: none"> <li>- the drive automatically runs a reset</li> <li>- motor control is not available.</li> </ul> <p><b>XXXXH-X</b>   The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> If the alarm is the consequence of a change in the drive configuration (parameter setting, option installation, PLC application download) remove it. Turn the drive off and then on again.</p>
50	Trap error		<p><b>Condition:</b> this condition can occur during operation when the trap micro protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm:</p> <ul style="list-style-type: none"> <li>- the drive automatically runs a reset</li> <li>- motor control is not available.</li> </ul> <p><b>XXXXH-X</b>   The XXXXH-X (SubHandler-Class) code indicates the reason for the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.</p>
51	System error		<p><b>Condition:</b> this condition can occur during operation when the operating system protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm:</p> <ul style="list-style-type: none"> <li>- the drive automatically runs a reset</li> <li>- motor control is not available.</li> </ul> <p><b>XXXXH-X</b>   The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.</p>
52	User error		<p><b>Condition:</b> this condition can occur during operation when the software protection is enabled; the alarm is included in the list of alarms and alarm log. After this alarm:</p> <ul style="list-style-type: none"> <li>- the drive automatically runs a reset</li> <li>- motor control is not available.</li> </ul> <p><b>XXXXH-X</b>   The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> If the alarm was a consequence of a variation to the drive configuration (parameter setting, installation of an option, downloading of a PLC application), remove it. Switch the drive off and then switch it on again.</p>
53	Param error		<p><b>Condition:</b> if an error occurs during the enabling of the parameter database saved in the Flash memory; the alarm is included in the list of alarms and alarm log.</p> <p><b>XXXXH-X</b>   Code XXXXH-X indicates the number of the parameter (Hex-Dec) that has caused the error: make a note of this to discuss it with the service centre.</p> <p><b>Solution:</b> Set the parameter causing the error to the correct value and run <b>Save parameter</b>. Switch the drive off and then switch it back on again.</p>
54	Load default		<p><b>Condition:</b> this can occur during loading of the parameter database saved in the Flash memory it is normal if it appears in the following conditions: the first time the drive is switched on, when a new version of the firmware is downloaded, when the regulation is installed on a new size, when a new region is entered. If this message appears when the drive is already in use it means there has been a problem in the parameter database saved in the Flash memory. If this message is displayed the drive restores the default database, i.e. the one downloaded during production.</p> <p><b>0001H-1</b>   The database saved is not valid</p> <p><b>0002H-2</b>   The database saved is not compatible</p> <p><b>0003H-3</b>   The saved database refers to a different size and not to the current size</p> <p><b>0004H-4</b>   The saved database refers to a different region and not to the current region</p> <p><b>Solution:</b> Set the parameters to the desired value and execute <b>Save parameters</b></p>
55	Plc cfg error		<p><b>Condition:</b> this can occur during loading of the MDPLC application The Mdplc application present on the drive is not run.</p> <p><b>0004H-4</b>   The application that has been downloaded has a different Crc on the DataBlock and Function table.</p> <p><b>0065H-101</b>   The application that has been downloaded has an invalid identification code (Info).</p> <p><b>0066H-102</b>   The application that has been downloaded uses an incorrect task number (Info).</p> <p><b>0067H-103</b>   The application that has been downloaded has an incorrect software configuration.</p> <p><b>0068H-104</b>   The application that has been downloaded has a different Crc on the DataBlock and Function table.</p> <p><b>0069H-105</b>   A Trap error or System error has occurred. The drive has automatically executed a Power-up operation. Application not executed. See the Alarm List for more information about an error that has occurred.</p> <p><b>006AH-106</b>   The application that has been downloaded has an invalid identification code (Task).</p> <p><b>006BH-107</b>   The application that has been downloaded uses an incorrect task number (Task).</p> <p><b>006CH-108</b>   The application that has been downloaded has an incorrect Crc (Tables + Code)</p> <p><b>Solution:</b> Remove the MDPLC application or download a correct MDPLC application.</p>

Index	Error message shown on the display	Sub-code	Description
56	Load par def plc		<b>Condition:</b> this can occur during loading of the parameter database saved in the Flash memory of the MDPLC application it is normal if it appears the first time the drive is switched on, after downloading a new application. If this message appears when the drive is already in use it means there has been a problem in the parameter database saved in the Flash memory. If this message appears the drive automatically runs the Load default command.
		0001H-1	The database saved is not valid
			<b>Solution:</b> Set the parameters to the desired value and run Save parameter.
57	Key failed		<b>Condition:</b> this can occur at drive power-on if the wrong enabling key is entered for a given firmware function
		0001H-1	Incorrect PLC key. PLC application not available.
			<b>Solution:</b> Contact WEG to request the key to enable the desired firmware function.
58	Encoder error		<b>Condition:</b> this condition may occur when the drive is powered during encoder setup each time parameter 552 <b>Regulation mode</b> is set.
		100H-256	<b>Cause:</b> An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the <b>Speed fbk loss</b> alarm is also generated.
			<b>Solution:</b> Take the recommended action for the <b>Speed fbk loss</b> alarm.
		200H-512	<b>Cause:</b> The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
			<b>Solution:</b> Contact WEG in order to update the firmware on the optional encoder card.
59	Recovery mode		<b>Condition:</b>
			<b>Solution:</b>

### 10.1.1 EFC application alarms

Index	Error message shown on the display	Description
33	Cont feedback	<b>Condition:</b> The contactor feedback signal does not match its command.
		<b>Solution:</b> Check contactor feedback wiring, check logic status of feedback input to drive, increase hold off time (PAR 11202).
34	Brake Feedback	<b>Condition:</b> The brake feedback signal does not match its command.
		<b>Solution:</b> Check brake feedback wiring, check logic status of feedback input to drive, increase hold off time (PAR 11206).
35	Door Feedback	<b>Condition:</b> The door feedback signal does not match its command.
		<b>Solution:</b> Check door feedback wiring, check logic status of feedback input to drive, increase hold off time (PAR 11212).
36	Brake Failure	<b>Condition:</b> Exceeding the Threshold A3 (PAR 11270).
		<b>Solution:</b> Reset alarm using the reset parameter (PAR 11268), check that brake is intact, increase threshold (PAR 11270).
37	Safe Brake Test	<b>Condition:</b> Brake force test failed.
		<b>Solution:</b> Check that brake is intact, increase the maximum deviation threshold (PAR 11840).
38	Speed limit	<b>Condition:</b> Speed limitation warning to ensure stopping, enabling the DISTANCE function.
		<b>Solution:</b> Check multi-speed selected for current distance.
39	Up/low limit	<b>Condition:</b> Speed threshold exceeded in limit switches zone (sensors installed at the top and bottom of the lift/elevator shaft).
		<b>Solution:</b> Check speed set in limit switches zone, change speed limit (PAR 11216).
40	Lift ext fault	<b>Condition:</b> External alarm signal triggered (PAR 11258).
		<b>Solution:</b> Check causes enabling external alarm signal, increase hold off time (PAR 11266).
41	No battery	<b>Condition:</b> Battery monitoring alarm triggered.
		<b>Solution:</b> Check whether battery is properly connected to drive.

## 10.2 Speed fbk loss alarm according to the type of feedback

### Note !

For the correct interpretation of the cause of the alarm trigger, it is necessary to transform the hex code indicated in parameter 15.13 **SpdFbkLoss code**, PAR 2172 , in the corresponding binary and verify in the encoder table that the active bits and related description are used.

Example with encoder Endat:

PAR 2172 = A0H (hex value)

In the table "Speed fbk loss [22] alarm with absolute encoder EnDat" A0 is not indicated in the value column.

A0 should be contemplated as a bitword with meaning A0 -> 10100000 -> bit 5 and bit 7 . The following causes simultaneously intervene:

- Bit 5 = 20H Cause: the SSI signal interferences cause an error in the CKS or parity.

- Bit 7 = 80H Cause: The encoder has detected an incorrect operation and communicates it to the converter through the Error bit. Bits 16..31 present the type of incorrect encoder operation detected.

The value is displayed in hexadecimal format on the optional and standard keypad.

### • Speed fbk loss [22] alarm with digital incremental encoder

Bit	Value	Name	Description
0	0x01	CHA	<b>Cause:</b> no impulses or disturbance on incremental channel A.
			<b>Solution:</b> Check the connection of the encoder-drive channel A, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2104 <b>Encoder input config</b> .
1	0x02	CHB	<b>Cause:</b> no impulses or disturbance on incremental channel B.
			<b>Solution:</b> Check the connection of the encoder-drive channel B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2104 <b>Encoder input config</b> .
2	0x04	CHZ	<b>Cause:</b> no impulses or disturbance on incremental channel Z.
			<b>Solution:</b> Check the connection of the encoder-drive channel Z, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2104 <b>Encoder input config</b> , check parameter 2110 <b>Encoder signal check</b>

### • Speed fbk loss [22] alarm with sinusoidal incremental encoder

Bit	Value	Name	Description
3	0x08	MOD_INCR	<b>Cause:</b> voltage level not correct or disturbance on signals of incremental channels A-B.
			<b>Solution:</b> Check the connection of the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2108 <b>Encoder signal Vpp</b> .

### • Speed fbk loss [22] alarm with SinCos encoder

Bit	Value	Name	Description
3	0x08	MOD_INCR	<b>Cause:</b> voltage level not correct or disturbance on signals of incremental channels A-B.
			<b>Solution:</b> Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2108 <b>Encoder signal Vpp</b> .
4	0x10	MOD_ABS	<b>Cause:</b> voltage level not correct or disturbance on signals of absolute SinCos channels.
			<b>Solution:</b> Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2108 <b>Encoder signal Vpp</b> .

### • Speed fbk loss [22] alarm with SSI absolute encoder

Bit	Value	Name	Description
3	0x08	MOD_INCR	<b>Cause:</b> voltage level not correct or disturbance on signals of incremental channels A-B.
			<b>Solution:</b> Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2108 <b>Encoder signal Vpp</b> .
5	0x20	CRC_CKS_P	<b>Cause:</b> SSI signals not present or disturbed.
			<b>Solution:</b> Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameters 7106 <b>BiSS N bit ST</b> and 7108 <b>BiSS N bit MT</b> .
8	0x100	Setup error	<b>Cause:</b> An error occurred during setup.
			<b>Solution:</b> Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameters 7106 <b>BiSS N bit ST</b> and 7108 <b>BiSS N bit MT</b> .



- Speed fbk loss [22] alarm with EnDat absolute encoder

Bit	Value	Name	Description
3	0x08	MOD_INCR	<b>Cause:</b> voltage level not correct or disturbance on signals of incremental channels A-B.
			<b>Solution:</b> Check the connection of the the encoder-drive channels A-B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> , check parameter 2108 <b>Encoder signal Vpp</b> .
5	0x20	CRC_CKS_P	<b>Cause:</b> SSI signals not present or disturbed cause an error on CRC
			<b>Solution:</b> Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> .
8	0x100	Setup error	<b>Cause:</b> An error occurred during setup.
			<b>Solution:</b> Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> .

The following conditions occur while resetting the encoder following **Speed fbk loss [22]** activation

Bit	Value	Name	Description																																				
6	0x40	ACK_TMO	<b>Cause:</b> SSI signals not present or disturbed cause an error on CRC																																				
			<b>Solution:</b> Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 <b>Encoder supply</b> .																																				
7	0x80	DT1_ERR	<b>Cause:</b> Encoder has detected malfunction and signals this to the drive via bit DT1. Bits 16..31 contain the type of malfunction detected by the encoder.																																				
			<b>Solution:</b> See the encoder manufacturer's technical guide.																																				
16.31			<table border="1"> <thead> <tr> <th>Bit</th> <th></th> <th>=0</th> <th>=1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Light source</td> <td>OK</td> <td>Failure (1)</td> </tr> <tr> <td>1</td> <td>Signal amplitude</td> <td>OK</td> <td>Erroneous (1)</td> </tr> <tr> <td>2</td> <td>Position value</td> <td>OK</td> <td>Erroneous (1)</td> </tr> <tr> <td>3</td> <td>Over voltage</td> <td>NO</td> <td>Yes (1)</td> </tr> <tr> <td>4</td> <td>Under voltage</td> <td>NO</td> <td>Under voltage supply (1)</td> </tr> <tr> <td>5</td> <td>Over current</td> <td>NO</td> <td>Yes (1)</td> </tr> <tr> <td>6</td> <td>Battery</td> <td>OK</td> <td>Change the battery (2)</td> </tr> <tr> <td>7..15</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Bit		=0	=1	0	Light source	OK	Failure (1)	1	Signal amplitude	OK	Erroneous (1)	2	Position value	OK	Erroneous (1)	3	Over voltage	NO	Yes (1)	4	Under voltage	NO	Under voltage supply (1)	5	Over current	NO	Yes (1)	6	Battery	OK	Change the battery (2)	7..15			
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Bit	Value	Name	Description																																																									
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16.31			<table border="1"> <thead> <tr> <th>Type</th> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Transmission</td> <td>09h</td> <td>Transmitted parity bit is incorrect</td> </tr> <tr> <td></td> <td>0AH</td> <td>Checksum of transmitted data is wrong</td> </tr> <tr> <td></td> <td>0BH</td> <td>Incorrect command code</td> </tr> <tr> <td></td> <td>0CH</td> <td>Wrong number of transmitted data</td> </tr> <tr> <td></td> <td>0DH</td> <td>Illegal transmitted command argument</td> </tr> <tr> <td></td> <td>0FH</td> <td>Wrong access authorization specified</td> </tr> <tr> <td></td> <td>0EH</td> <td>Selected field has READ ONLY status</td> </tr> <tr> <td></td> <td>10H</td> <td>Data field (re) definition not executable due to field size</td> </tr> <tr> <td></td> <td>11H</td> <td>Specified address is not available in selected field</td> </tr> <tr> <td></td> <td>12H</td> <td>Selected field does not yet exist</td> </tr> <tr> <td></td> <td>00H</td> <td>No encoder error, no error message</td> </tr> <tr> <td></td> <td>03H</td> <td>Data field operations disabled</td> </tr> <tr> <td></td> <td>04H</td> <td>Analog monitoring inoperative</td> </tr> <tr> <td></td> <td>08H</td> <td>Counting register overflow</td> </tr> <tr> <td></td> <td>01H</td> <td>Encoder analog signals are unreliable</td> </tr> <tr> <td></td> <td>02H</td> <td>Wrong synchronisation or offset</td> </tr> <tr> <td></td> <td>05H-07H</td> <td>Encoder-internal hardware fault, no operation possible</td> </tr> <tr> <td></td> <td>1CH-1DH</td> <td>Error in sampling, no operation possible</td> </tr> </tbody> </table>	Type	Code	Description	Transmission	09h	Transmitted parity bit is incorrect		0AH	Checksum of transmitted data is wrong		0BH	Incorrect command code		0CH	Wrong number of transmitted data		0DH	Illegal transmitted command argument		0FH	Wrong access authorization specified		0EH	Selected field has READ ONLY status		10H	Data field (re) definition not executable due to field size		11H	Specified address is not available in selected field		12H	Selected field does not yet exist		00H	No encoder error, no error message		03H	Data field operations disabled		04H	Analog monitoring inoperative		08H	Counting register overflow		01H	Encoder analog signals are unreliable		02H	Wrong synchronisation or offset		05H-07H	Encoder-internal hardware fault, no operation possible		1CH-1DH	Error in sampling, no operation possible
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Bit	Value	Name	Description
			1EH Permissible operation temperature is exceeded
			(1) Can also be set after the power supply is switched off or on. (2) Only for battery-buffered encoders

### 10.2.1 Reset Speed fbk loss alarm

The reasons for activating the **Speed fbk loss** alarm and the information acquired by the encoder are shown in parameter 2172 **SpdFbkLoss code**.

If no card has been installed the **Speed fbk loss** [22] alarm is generated and no cause is displayed in parameter 2172 **SpdFbkLoss code**. Several causes may be present at the same time.

If no card is recognised, the system runs a routine that always returns **Speed fbk loss** [22] active without specifying a cause.

### 10.2.2 Encoder error alarm

Setup is performed each time the drive is turned on, regardless of the regulation mode that has been selected. If an error is detected during setup the **Encoder error** alarm is generated with the following codes:

Bit	Value	Name	Description
8	0x100	Setup error	<b>Cause:</b> An error occurred during setup. When this has been signalled the information obtained from the encoder is not reliable. <b>Solution:</b> Take the action recommended for <b>Speed fbk loss</b> [22] alarm according to the type of encoder.
9	0x200	Compatibility error	<b>Cause:</b> Firmware on option card incompatible with firmware on regulation card. When this has been signalled the information obtained from the encoder is not reliable. <b>Solution:</b> Contact WEG in order to update the firmware on the optional card.

## 10.3 Messages

**Note !**

For more information see chapter "8.2.12 Messages" on page 59.

Index	Error message shown on the display	Sub-code	Description		
1	Load default param		<b>Condition:</b> may occur during loading of the parameter database saved in flash normally appears in the following conditions: at initial power-on when a new firmware version is downloaded, when the regulation is installed on a new size, when the region is changed. If this message is displayed when the drive is already operating, this means that a problem has occurred in the parameter database saved in Flash. If this message is displayed, the drive automatically performs the <b>Load default</b> command.		
		0001H-1	The database saved is not valid		
		0002H-2	The database saved is not compatible		
		0003H-3	The database saved refers to a different size from the current size		
		0004H-4	The database saved refers to a different region from the current region		
			<b>Solution:</b> Set the parameters to the value required and perform <b>Save parameter</b>		
2...4	Not used				
5	Autotune (motor)		<b>Condition:</b> this may occur during the self-tuning procedure		
		0	No error		
		1	N.A.		
		2	N.A.		
		3	The motor plate data parameters have changed but the <b>Take parameters</b> command, PAR 2020, has not been executed <b>Solution:</b> Execute the <b>Take parameters</b> command.		
		4	The motor is not connected <b>Solution:</b> Connect the motor		
		5	While running self-tuning the ESC key was pressed or the enable contact was opened or an alarm occurred. The self-tuning command was sent with the drive in the alarm condition <b>Solution:</b> Eliminate the reason for the alarm, remove the reason for the opening of the enable contact, reset alarms.		
		6	A self-tuning measurement is beyond the drive limits. <b>Solution:</b> Check the motor plate data or drive and motor sizes have been combined incorrectly.		
		7	The self-tuning command was sent without being enabled. <b>Solution:</b> Close the enable contact before sending the self-tuning command		
		8 ... 21	A self-tuning measurement has reached a drive limit. <b>Solution:</b> Check the motor plate data or the drive and motor sizes have been combined incorrectly.		
		22	The Enable was not given or removed in time during the phasing procedure. <b>Solution:</b> Repeat the phasing procedure and check the connection of the enable signals.		
		29	Incorrect incremental encoder impulse count probably caused by the incorrect value of the encoder impulse parameter. <b>Solution:</b> Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter.		
		30	Incorrect absolute encoder impulse count <b>Solution:</b> Check the electric signals of the absolute encoder. Check the configuration of the absolute encoder.		
		31	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count. <b>Solution:</b> Invert the A+ and A- signal of the incremental encoder.		
		32	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count. <b>Solution:</b> Invert the A+ and A- signal of the absolute encoder.		
		33	Incorrect phase sequence. (Message not signalled) <b>Solution:</b> The automatic procedure has modified the setting of the Encoder direction parameter. No other action is required		
		34	During automatic phasing a communication channel is activated between the drive and encoder. An error has occurred on this communication channel. <b>Solution:</b> Repeat the procedure.		
		<b>Solution:</b> If the message appears with a value other than 0, follow the instructions supplied for each particular case and repeat self-tuning. This should be performed using the wizard function available from the keypad (STARTUP WIZARD) and the Tool software on the PC.			
		Pay attention to all motor plate data parameters, especially: - <b>Rated speed, Motor rated speed</b> in rpm. • (ADL500 for Asynchronous motor) Take care not to set the <b>Rated speed</b> parameter to the synchronous speed. The value of the <b>Rated speed</b> parameter must be less than: $[(\text{Rated frequency} * 60) / \text{Pole pairs}]$ . • (ADL500 for Synchronous motor) Take care to set the <b>Rated speed</b> parameter to the synchronous speed. - <b>Rated frequency, Motor rated frequency</b> in Hz - <b>Pole pairs, Motor pole pairs</b>			
		If the problem persists even after following the instructions supplied, confirm the values of the motor plate data parameters, execute the <b>Take parameters</b> command but not self-tuning.			
		5	Autotune (phasing) (Only Synchronous)	0	No error
				1	N.A.
				2	N.A.
				3	The motor plate data parameters have changed but the <b>Take parameters</b> command, PAR 2020, has not been executed <b>Solution:</b> Execute the <b>Take parameters</b> command.

Index	Error message shown on the display	Sub-code	Description	
		4	The motor is not connected <b>Solution:</b> Connect the motor	
		5	While running self-tuning the ESC key was pressed or the enable contact was opened or an alarm occurred. The self-tuning command was sent with the drive in the alarm condition <b>Solution:</b> Eliminate the reason for the alarm, remove the reason for the opening of the enable contact, reset alarms.	
		6	A self-tuning measurement is beyond the drive limits. <b>Solution:</b> Check the motor plate data or drive and motor sizes have been combined incorrectly.	
		7	The self-tuning command was sent without being enabled. <b>Solution:</b> Close the enable contact before sending the self-tuning command	
		8 ... 21	A self-tuning measurement has reached a drive limit. <b>Solution:</b> Check the motor plate data or the drive and motor sizes have been combined incorrectly.	
		22	The Enable was not given or removed in time during the phasing procedure. <b>Solution:</b> Repeat the phasing procedure and check the connection of the enable signals.	
		29	Incorrect incremental encoder impulse count probably caused by the incorrect value of the encoder impulse parameter. <b>Solution:</b> Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter.	
		30	Incorrect absolute encoder impulse count <b>Solution:</b> Check the electric signals of the absolute encoder. Check the configuration of the absolute encoder.	
		31	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count. <b>Solution:</b> Invert the A+ and A- signal of the incremental encoder.	
		32	Incremental encoder impulse count sign inverted with respect to the absolute encoder impulse count. <b>Solution:</b> Invert the A+ and A- signal of the absolute encoder.	
		33	Incorrect phase sequence. (Message not signalled) <b>Solution:</b> The automatic procedure has modified the setting of the Encoder direction parameter. No other action is required	
		34	During automatic phasing a communication channel is activated between the drive and encoder. An error has occurred on this communication channel. <b>Solution:</b> Repeat the procedure.	
		<b>Solution:</b> If the message has a value other than 0 follow the instructions provided for each case and repeat automatic phasing.		
		6	<b>Power config</b>	<b>Condition:</b> may occur during recognition of power cards. If this message is displayed, it is not possible to drive the motor.
			0020H-32	The power card is configured for a drive that is incompatible with the regulation card
	0021H-33	The configuration of the power card is not compatible with the regulation card		
	0017H-23	The configuration required is not available on the power card		
<b>Solution:</b> Download the correct configuration on the power card				
7	<b>Save par failed</b>	<b>Condition:</b> during transfer of the parameters from the drive to the memory of the keypad		
	0H-0	Communication error		
	0023H-35	Communication error		
	0023H-36	Communication error		
	0025H-37	The data saved on the keypad are not valid		
<b>Solution:</b>				
8	<b>Load par failed</b>	<b>Condition:</b> during transfer of the parameters from the memory of the keypad to the drive		
9	<b>Load par incomplete</b>	0H-0 Communication error		
	0023H-35	Communication error		
	0023H-36	Communication error		
	0025H-37	The data saved on the keypad are not valid. No parameter is transferred from the keypad to the drive		
	0026H-38	Incompatible drive series. No parameter is transferred from the keypad to the drive		
	0027H-39	Incompatible software version. All the parameters present in the memory of the keypad have been transferred to the drive. The set of parameters transferred refers to a drive with a different firmware version; therefore, certain parameters may not be updated.		
	0028H-40	Incompatible drive size. All the parameters present in the memory of the keypad (excluding those that depend on the size of the drive), have been transferred to the drive. The parameters that depend on size maintain their original value.		
	0029H-41	Error during saving of parameters on the drive. All the parameters present in the memory of the keypad have been transferred to the drive. The transfer of one or more parameters has caused an "out of range" error, or one or more parameters does not exist. At the end of transfer, one or more parameters may not have been updated.		
	002AH-42	PLC application release and version not compatible. All parameters in the keypad memory have been transferred to the drive. The transferred set of parameters relates to a drive with a PLC application in which the version and release of the application are different. As a result some of the PLC application parameters may not be updated.		
	002BH-43	PLC application not compatible. All the parameters in the keypad memory except those relating to the PLC application have been transferred to the drive. The transferred set of parameters relates to a drive with a different PLC application. As a result none of the PLC application parameters are updated.		
<b>Solution:</b> Recover a set of parameters from a compatible drive (model and size)				
10	<b>Not used</b>			
11	<b>Load def plc</b>	<b>Condition:</b> may occur during loading of the parameter database saved in the Flash of the Mdpplc application Normally appears at initial power-on after downloading a new application. If this message is displayed when the drive is already operating, this means that a problem has occurred in the parameter database saved in Flash. If this message appears the drive restores the default database, i.e. the one that was downloaded.		
	0001H-1	The database saved is not valid		
<b>Solution:</b> Set the parameters to the value required and perform <b>Save parameter</b>				

Index	Error message shown on the display	Sub-code	Description
12	Plc cfg error	<b>Condition:</b> may occur during loading of the Mdplc application The Mdplc application present on the drive is not run.	
		0004H-4	The application downloaded has a different Crc on DataBlock and Function table
		0065H-101	The application downloaded has an invalid identifier (Info)
		0066H-102	The application downloaded has an incorrect task number (Info)
		0067H-103	The application downloaded has an incorrect software configuration
		0068H-104	The application downloaded has a different Crc on DataBlock and Function table
		0069H-105	A Trap error or System error has occurred. The drive automatically performs a Power-up operation. The application is not run. See in Alarm List for further information regarding the error occurred
		006AH-106	The application downloaded has an incorrect identifier (Task)
		006BH-107	The application downloaded has an incorrect task number (Task)
		006CH-108	The application downloaded has an incorrect Crc (Tables + Code)
			<b>Solution:</b> Remove the Mdplc application or download a correct Mdplc application
13	Plc 1	Reserved messages and dedicated to the PLC application. See the application manual.	
14	Plc 2		
15	Plc 3		
16	Plc 4		
17	Opt bus fault	<b>Condition:</b> this may occur when the drive is turned on, during fieldbus card setup. Error during configuration or communication error.	
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is 0, the error regards a communication problem.
		XXX0H-X	If the first digit to the left of "H" in the alarm sub-code is other than 0, the error regards a configuration problem.
			<b>Solution:</b> For configuration errors, check the configuration of the bus communication, type of bus, baudrate, address, parameter setting For communication errors, check wiring, termination resistors, disturbance immunity, timeout settings. For further details, please refer to the user guide for the specific bus.
18	Wrong key	<b>Condition:</b> this may occur when powering the drive, if the incorrect enable key is inserted for a given firmware function.	
		xxxxH-x	
			<b>Solution:</b> Ask WEG to supply the correct key to enable the desired firmware function.
19	Key expiring	<b>Condition:</b> this may occur at drive power-on if the incorrect enabling key was inserted for a given firmware function. At this stage the firmware function can still be used freely, but this time limit is about to expire	
		xxxxH-x	Number of hours for which the function can still be used freely.
		<b>Solution:</b> Ask WEG for the correct key to enable the desired firmware function.	
20	Not used		
21	Parameter error	<b>Condition:</b> if an error occurs during activation of the parameter database saved in flash; the alarm is inserted in the alarm list and alarm log.	
		XXX0H-X	Code XXXX-H indicates the number of the parameter (Hex-Dec) that has caused the error: make a note of this to discuss it with the service centre.
			<b>Solution:</b> Set the parameter that has caused the error to the correct value and execute <b>Save parameters</b> , switch the drive off and then back on.
22	Encoder error	<b>Condition:</b> this condition may occur when the drive is powered during encoder setup each time parameter 552 <b>Regulation mode</b> is set.	
		100H-256	<b>Cause:</b> An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the <b>Speed fbk loss</b> alarm is also generated. <b>Solution:</b> Take the recommended action for the <b>Speed fbk loss</b> alarm.
		200H-512	<b>Cause:</b> The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable <b>Solution:</b> Contact WEG in order to update the firmware on the optional encoder card.
23	Not used		
24	Fw update failed	<b>Condition:</b> When updating the firmware, check whether the file is in the wrong format or corrupt.	
		<b>Solution:</b> try again with a correct file.	
25	USB Error	<b>Condition:</b> A parameter (*) requiring insertion of a USB flash drive has been run, but the drive has not been inserted. (*): PAR 392 <b>Select motor</b> , PAR 596 <b>Save to USB</b> , PAR 598 <b>Load from USB</b> , PAR 1560 <b>WebApp Update</b> , PAR 3434 <b>Save rope to USB</b> , PAR 3436 <b>Load rope from USB</b> .	
		<b>Solution:</b> Insert a USB flash drive containing any files required by the parameter for its execution.	

## A.1 - Optional cards

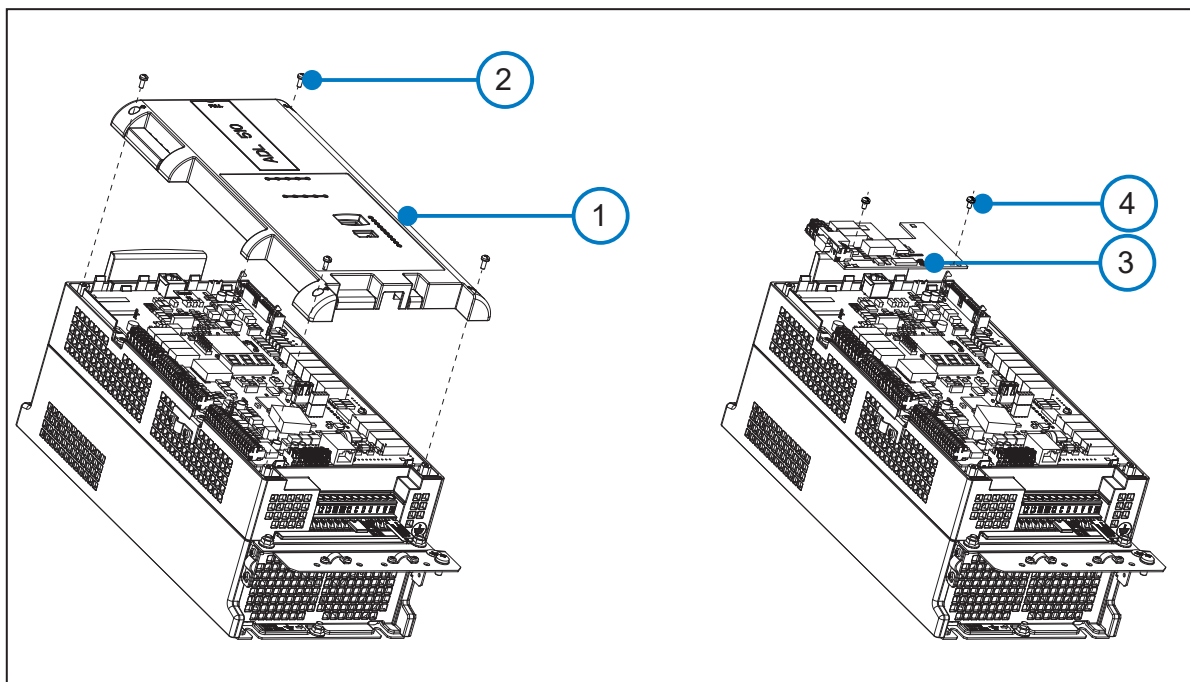
### A.1.1 - Installation

Only one option card can be installed, either an **EXP-IO1-ADL500** or an **EXP-DCP-ADL500**.



**Caution**

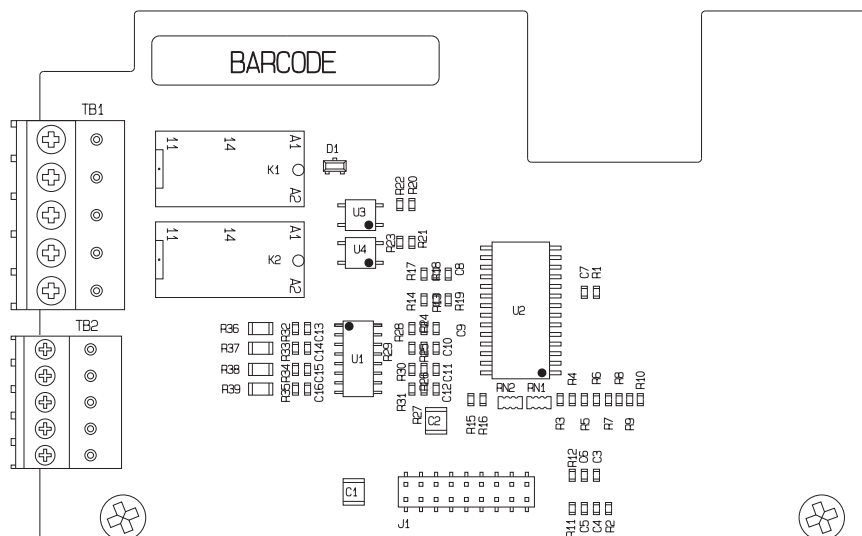
Use only the screws supplied with the option card.



1. Use a Phillips screwdriver (Ph2) to loosen the 4 M3 screws (2) and then remove the top cover (1);
2. Secure the optional board (3) by inserting the option board's J1 female connector onto the control board's J1 male connector;
3. Tighten down the 2 M3 screws supplied with the option board (4);
4. Replace the upper cover (1) and tighten down the 4 M3 screws (2).

## A.1.2 - Optional card EXP-IO1-ADL500

Optional expansion card (code S5DL408, for ADL550 only), adds 4 digital inputs (DI) and 2 relays outputs (RO) to the basic configuration.



### TB1 terminal – Digital Relays Output

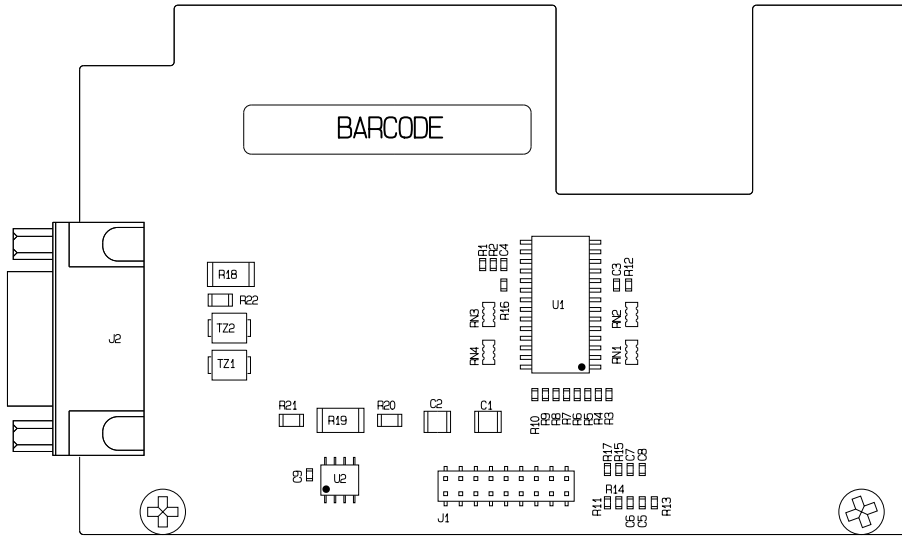
Pin	Signal	Description	Command Associated parameter
1	RO_60	Output Relay 6 (N.O. contact, 24Vdc)	1412, Dig output 2 src
2	RO_6C	Common Relay 6	Brake Contactor
3	RO_50	Output Relay 5 (N.O. contact, 24Vdc)	1410, Dig output 1 src
4	RO_5C	Common Relay 5	Drive OK
5	-	Not connected	

### TB2 terminal – Digital inputs

Pin	Signal	Description	Command Associated parameter
1	DI_4X	Digital input 4X	-
2	DI_3X	Digital input 3X	-
3	DI_2X	Digital input 2X	-
4	DI_1X	Digital input 1X	-
5	DI_CM	Digital input common reference	-

### A.1.3 - Optional card EXP-DCP-ADL500

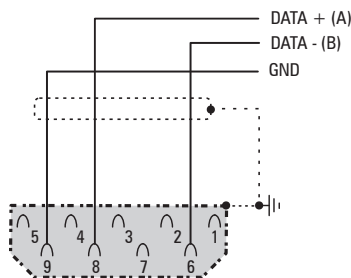
Optional expansion card (cod. S5DL434, for ADL550 only) for remote control through the DCP3 protocol for use in EFC (Elevator Floor Control) mode or through the DCP4 protocol for use in EPC (Elevator Positioning Control) mode (in preparation).



#### J2 DSUB 9-pin female cup connector

Pin	Signal
1	n.c.
2	n.c.
3	n.c.
4	n.c.
5	n.c.
6	DATA - (B)
7	n.c.
8	DATA + (A)
9	REF (GROUND)

For the connection reference should be made to the DCP specifications (see next screen).



.....  
**The connection have no galvanic isolation!**  
 .....



## A.2 - Input/Output features

External supply	
Voltage	+24Vdc
Tolerance	± 10%
Maximum current	300 mA

- **Digital inputs (DI) and enable hardware inputs (EN-HW)**

Description	Features
Type	24 V PNP / NPN
Operating voltage	0 V to + 24 V (+ 30 V max)
Load	5 mA @ +24 V - R <sub>L</sub> = 4.7 kΩ
Thresholds	V <sub>ic</sub> < 5 V - V <sub>ih</sub> > 15 V
Isolation	Yes – Functional (> 1 kV)

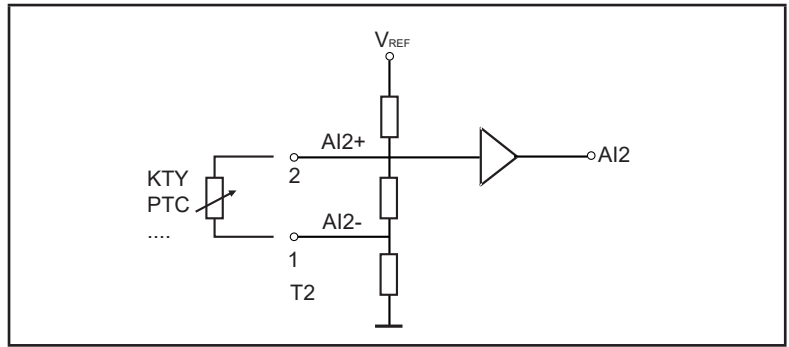
- **Relay outputs (RO)**

Description	Features
Type	NO Relay (single contact)
Operating voltage	250 V <sub>AC</sub> / - 30 V <sub>DC</sub> / 2 A
Load	50 mA @ + 10 V
Isolation	Yes – 4 kV

- **Analog input AI1**

Description	Features
Type	Voltage differential
Input voltage	± 10V <sub>DC</sub> (± 12,5V <sub>DC</sub> full scale)
Input R	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 20 mA
Input R	500 Ω
Resolution	12 Bits (11 + sign)
Precision	1% of full scale
Isolation	NO
(*) Select input V/I (V=OFF, I=ON)	

- Analog input AI2 (External PTC or KTY sensor)



- Fast Input Inputs (Freeze)

Description	Features
Type	24Vdc PNP Input
Input voltage	0 to + 24 Vdc (+30 Vdc max)
Load	8mA @ 24Vdc, RL = 2.7kΩ
Thresholds	V <sub>IL</sub> < 2V, V <sub>IH</sub> > 19V
Isolation	Yes, functional (>1kV)

- STO Input signal (Safe Torque Off)

Description	Features
Type	24Vdc
Operating voltage	0 to + 24Vdc (+ 36Vdc max)
Load	20mA @ +24Vdc - RL = 1.32 kΩ
Thresholds	V <sub>IC</sub> < 5Vdc - V <sub>IH</sub> > 18Vdc
Isolation	Yes, functional (>1kV)

- STO Output signal (Safe Torque Off)

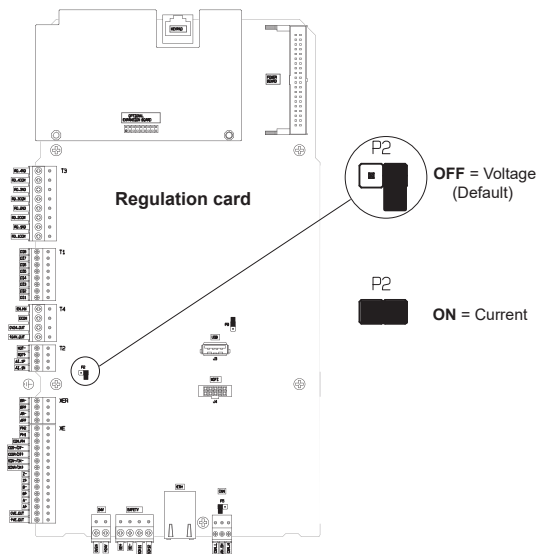
Description	Features
Type	24Vdc or 110 VAc
Operating voltage	0 to + 24Vdc (+ 36Vdc max) or 0 to + 110VAc (+ 125VAc max)
Load	200mA @ +24Vdc (250 max) or 200 mArms @ 110VAc (250 max)
Thresholds	V <sub>IC</sub> < 5Vdc - V <sub>IH</sub> > 18Vdc
Max blocking voltage	400V

### A.2.1 Selection of Voltage/Current at analog input AI1

Analogue input 1 is factory set for differential voltage signals (-10V..+10V).

To change the input type (0.20mA, 0.10V or 4.20 mA) it is necessary to change the (PAR 1602 **Analog inp 1 type**, menu ANALOG INPUTS) parameter setting and the position of P2 Jumper as shown in the figure.

To access the Regulation card, remove the top cover, see section "A.1 - Optional cards" on page 90.



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## A.3 Windows PC Network Configuration

PC's Ethernet configuration must be set consistently with ADL500 Ethernet configuration, so that the PC and ADL500 can communicate.

Usually PC's are set in DHCP mode, so they request the network for an IP address. In case no DHCP server is available in the network, in most cases PC's autonomously acquire an IP address belonging to "link local" family: 169.254.x.y. If the PC's Ethernet configuration has to be modified, for example in case of ADL500 static IP configuration, here are the operations to do:

For Windows XP under Control Panel -> Network Connections

For Windows 7 under Control Panel -> Network and Sharing Center -> Change adapter settings

For Windows 10 under Control Panel -> Network & Internet -> Change your network settings -> Change adapter options

Then right click on the network adapter to be configured, select "Properties", double click on "Internet Protocol TCP/IP" (for Windows XP) or "Internet Protocol Version 4 (TCP/IPv4)" (for Windows 7 or Windows 10).

By default, under "General" Tab, the radio button "Obtain an IP address automatically" should be selected. With this selection, the PC requests the IP address from the DHCP network.

If under "Alternate Configuration" the "Automatic private IP address" is selected, PC will acquire a link local address (169.254.x.y), if no DHCP server is available in the network.

Changing the selection of the radio button to "Use the following IP address" the PC will be configured with a static network configuration. Value of fields:

- IP address
- Subnet Mask
- Default Gateway

must be set to be compatible with ADL500 network configuration and thus enable communication.

## A.4 - Brake monitoring system

### A.4.1 Introduction

The brake monitoring function in the ADL500 series of products enables implementation of the automatic brake monitoring function as required by EN 81-20:2020 section 5.6.7.3.

Two functional elements are required to implement the brake monitoring function:

1. Management of the **Brake fault** alarm;
2. Resetting of the **Brake fault** alarm.

The basic wiring diagram for implementing this function is shown in Figure 5.1.

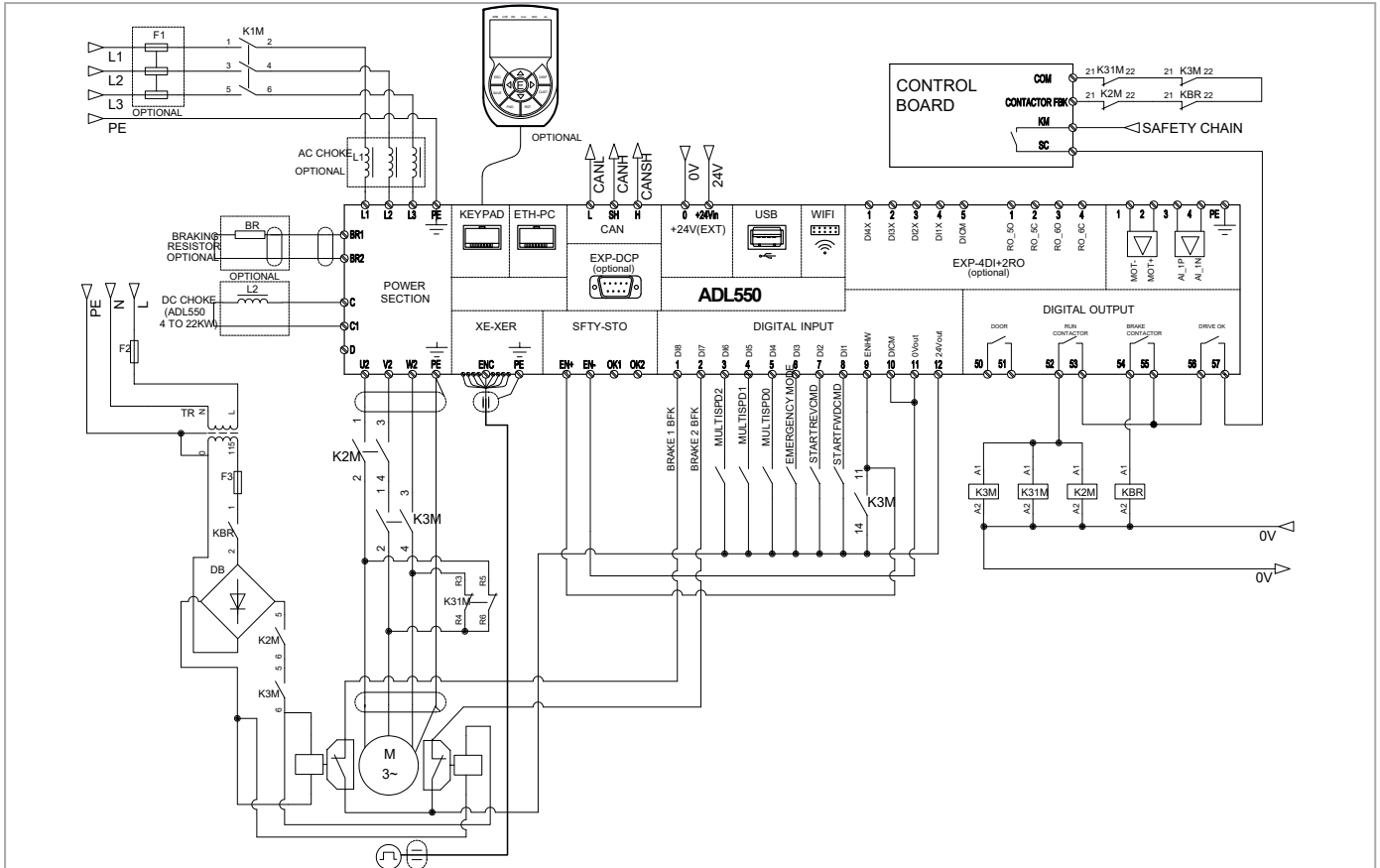


Figure 5.1: ADL500 connection diagram for brake monitoring

This shows that :

- A) The ADL500 controls brake activation/deactivation via relay BR
- B) Both brake feedback signals are sent to the ADL500 inputs
- C) The ADL500 signals any malfunctions (including brake malfunctions) to the system control unit via internal relay DRIVE OK.
- D) The system control unit blocks the system brake in safety by deactivating contactors K2M and K3M.

According to an alternative arrangement, the ADL500 closes/opens contactors K2M and K3M but the power supply to the coils and to the ADL500 commands comes from the external, i.e. a control unit.

The purpose of the brake fault alarm is to check whether the states of the two feedback signals from the brake are consistent and, in case of doubt, to include a function whereby the ADL500 drive stops the system. The procedure for including the alarm is described below.

### A.4.2 Configuration of the brake fault alarm

#### • Activation of the brake fault alarm function.

The installer must have previously located the necessary digital inputs of the ADL500 drive and connected the corresponding wires to the feedback signals on these inputs. Note that depending on the type of wiring arrangement, the brake feedback signals are normally asserted (brake closed – digital input to 1) or normally not asserted (brake closed – digital input to 0).

The brake fault alarm envisages signals that are normally asserted. If the wiring is functionally inverted, simply negate the corresponding digital inputs in the ADL500 configuration.

To configure the brake fault alarm function, proceed as follows:

1. In the SAFETY menu , change the setting of parameter 11252 **Brake Fbk A3 Sel** (default **Null**) and select the digital input corresponding to the second brake feedback signal. If **Brake Fbk A3 Sel** is set to a value other than **Null**, the brake fault alarm function is automatically enabled.
2. Next select the digital input corresponding to the first brake feedback signal in parameter 11236 **Brake fbk src** (menu LIFT IN).

The brake fault function is enabled. The installer in charge of the system must test the function each time it is activated or modified, following the brake fault test procedure.

- **Resetting the brake fault alarm**

1. Open the LIFT ALARM menu and check the setting of parameter 11204 **Brake activity** = Disable.
2. In the SAFETY menu, select parameter 11268 **Reset Brake Alarm** (default 0).
3. The system asks for a code, enter release code 5313.
4. Check again to see whether the **Brake Alarm** has been reset.

- **Disabling the brake fault alarm**

1. In the SAFETY menu, change the setting of parameter 11252 **Brake Fbk A3 Sel** to **Null**. The brake fault alarm function is disabled.
2. If the new configuration does not manage any brake feedback signals, change the setting of parameter 11236 **Brake Fbk Sel** (menu LIFT IN) to [3708] **Brake cont mon**.

- **Brake fault alarm test procedure**

Proceed as follows:

1. Disconnect the wire connecting the first brake feedback signal to the relative digital input.
2. Try re-starting from the floor with the feedback signal disconnected. If the lift car does not move (correct behaviour), proceed to step 3. If the lift car moves, the alarm is not working properly. Check the various parts of the system.
3. If the brake fault alarm is connected, reset it and proceed to step 4. If the alarm is not connection, re-check the various parts of the system.
4. Repeat steps 1, 2 and 3, disconnecting the second brake feedback signal from the corresponding input.

If the procedure is successful, the brake fault alarm will function properly.

#### A.4.3 Maintenance of the brake fault alarm function

The installer must repeat the brake fault alarm test procedure during periodical inspections and whenever messages concerning the brake unit are displayed.

The installer must check the alarm log each time for any faults

#### A.4.4 Troubleshooting

Fault	Possible cause	Solution
<b>Motor does not run, the brake fault alarm is triggered continuously</b>	Feedback signals disconnected/incorrectly connected	Re-check brake feedback signal wiring and electric levels
	Brake feedback not configured correctly	Check PAR 11236 <b>Brake fbk src</b> , PAR 11252 <b>Brake fbk A3 sel</b> configuration. Check correct signal operation (electric levels) and invert digital inputs if necessary
	Monitoring time too short in relation to system response times	Set a longer PAR 11206 <b>Brake Hold Off time</b>
<b>The motor runs even with the feedback signals disconnected</b>	The brake fault alarm is not connected.	Check the setting of PAR 11252 <b>Brake Fbk Sel A3</b> .
	Incorrect PAR 11252 <b>Brake fbk A3 sel</b> / PAR 11236 <b>Brake fbk src</b> setting.	PAR 11252 <b>Brake fbk A3 sel</b> and PAR 11236 <b>Brake fbk src</b> must not be set to <b>Null</b> or <b>Brake Cont Mon</b> .



## HW and start up User Manual

Series: ADL500

Revision: 0.7

Date: 25-11-2022

Code: 1S95QSEN

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