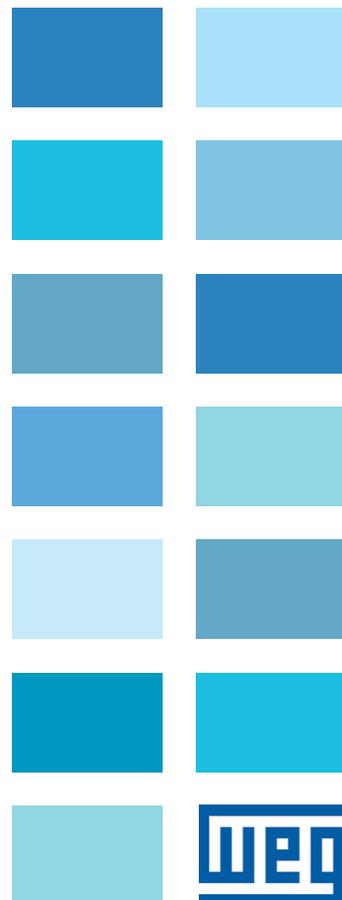# Vector inverter for lifts with synchronous/asynchronous motors

ADL500

Fast start up guide

Language: English

Information about this manual

The ADL500 FAST (Fast start up guide) is a handy-sized manual for mechanical installation, electrical connection and fast start-up.

Warning!

‖‖
Before installing, connecting and commissioning, carefully read the relevant Safety Instructions in the ADL500 HW + QS manual.
‖‖‖

The manuals ADL500 SW (functions and parameter descriptions) and ADL500 HW+QS (Hardware, Specification and Startup guide) can be found on the WEG website, DOWNLOAD CENTER section (https://www.weg.net/catalog/weg/IT/en/p/MKT_WDC_GLOBAL_PRODUCT_INVERTER_FOR_ELEVATOR_ADL500)

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 chapter 2 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 improvingthis manual. The e-mail address is the following: techdoc@weg.net.

Sommario

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 passtrictement 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 êtrerigoureusement 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 consigne 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 chapters.

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 "3.7 Voltage level of the inverter for safe operations" on page 11.

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 suns 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 "3.7 Voltage level of the inverter for safe operations" on page 11.

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 Èlectrique et Risque de Brúlure : Lors de l'utilisation d'instruments (par example oscilloscope) sur des systémes en marche, le chassis de l'oscilloscope doit être relié à la terre et une sonde différentiel devrait être utilisé en entrée. Les sondes et conducteurs doivent être choissis 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 zônes à risques (présence de vapeurs ou de poussières inflammables), peut provoquer des incendies ou des explosions. Les drives doivent être installés loin des zônes dangeureuses, 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 mast 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 "5.1.2 Cable cross-sections" on page 16.

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 - 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	220 = 22kW
055 = 5.5kW	300 = 30kW
075 = 7.5kW	370 = 37kW
110 = 11kW	450 = 45kW
150 = 15kW	550 = 55kW
185 = 18.5kW	750 = 75kW

Mechanical dimensions of the drive:

1 = size 1	3 = size 3
2 = size 2	4 = size 4
	5 = size 5

Inverter series:
ADL550
ADL530
ADL510

Data plate	Position on the drive
Serial number Drive model **Input** (mains supply, frequency, AC Input Current at constant torque) **Output** (Output voltage, frequency, power, current, overload) **Approvals** **WEG AUTOMATION EUROPE S.R.L.** Via G.Carducci,24 I-21040-Gerenzano (Va) Type : ADL550-2150-XBL-F-4-EMS S/N: 41GE038956 Inp: 230VAc-480VAc 50/60Hz 3Ph 40A@400VAc 37A@480VAc Out : 0-480VAc 300Hz 3Ph 15Kw@400VAc 20Hp@460VAc 32A@400V 28,8A@460V Ovld.183%-10s/200%-2s Made in Italy Factory ID:G c(UL)us LISTED IND.CONT.EQ.31KF EHC CE	
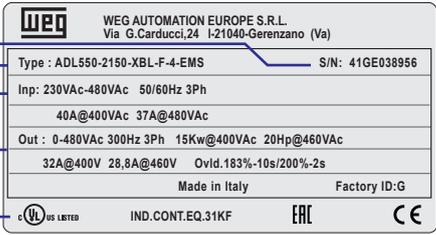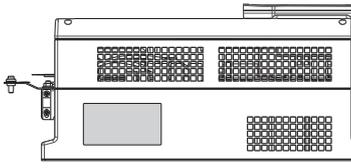
DataMatrix code

Two-dimensional matrix barcode, contains the following information:

- code
- type
- serial number
- versions of HMI firmware and DSP application firmware
- EFC application
- hardware revision

The code can be read by smartphones using dedicated applications or with specific industrial readers.

I.e.:
S9DL5565. ADL550-2150-XBL-F-4-EMS. 41GE038956 - Fw. 222 210 Appl. EFC 2.2.0 REV. HW A1
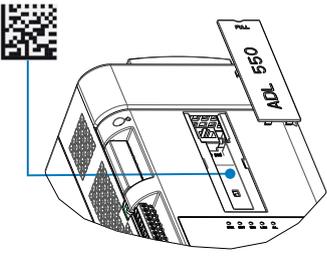
3 - Specification

3.1 Environmental Conditions

Installation location	Pollution degree 2 or lower (free from direct sunligth, vibration, dust, corrosive or inflammable gases, fog, vapour oil and dripped water, avoid saline environment)
Installation altitude	Max 2000m (6562 feet) above sea level. With 1.2% reduction in output current for every 100 m starting from 1000 m.
Mechanical conditions for installation	Vibrational stress: EN 61800-2 Class 3M1
Operating temperature	**ADL550:** -10…+50℃ (32°…122°F) without derating
	ADL530, ADL510: -10…+40℃ (+32…104°F) without derating
	ADL530, ADL510: +40 ... +50℃ (+104 … 122°F) with 1% derating every ℃ starting from 40℃ and up to 50℃. .
Air humidity (operating)	from 5 % to 85 % and from 1 g/m³ to 25 g/m³ with no humidity (or condensation)
Air pressure (operating)	from 70 to 106 kPa
Storage	CEI EN 61800-2 Class 1K4, CEI EN 61800-2 Class 1K3
Maximum period of inactivity	12 months

3.2 Standards

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

3.3 Control modes

Motor control modes	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)

3.4 Precision

3.4.1 Speed control

Speed control precision	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

3.4.2 Speed control limits

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

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

3.4.3 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

3.4.4 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.

3.5 Input electrical data

Input voltage U$_{LN}$ _____ **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 ADL500 HW+QS manual 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$_N$ (@ I$_N$ out)			DC-Link Capacity (μF)
				@ 230 Vac (A)	@ 400 Vac (A)	@ 480 Vac (A)	
ADL5..-...-4 , 3ph							
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 <u>devoid of any faults</u> (between active parts and PE) <u>or in the presence of temporary faults</u>.
Therefore an insulation monitor <u>MUST</u> 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 ADL500 is DC-powered).

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

Attention

3.6 Output electrical data

Maximum output voltage U2 _____ 0.98 x U_{LN} (U_{LN} = AC input voltage)
Maximum output frequency f2 _____ 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: Idrive = In x K_{ALT} x K_T x K_V.

Size	In Rated output current (fsw = default)			PN mot (Recommended motor power, fsw = default)			Reduction factor				IGBT braking unit
	@U_{LN} = 230V_{AC}	@U_{LN} = 400V_{AC}	@U_{LN} = 460V_{AC}	@U_{LN} = 230V_{AC}	@U_{LN} = 400V_{AC}	@U_{LN} = 460V_{AC}	K_V	K_T ADL550	K_T ADL510 ADL530	K_{ALT}	
	(A)	(A)	(A)	(kW)	(kW)	(Hp)	(1)	(2)	(3)	(4)	
ADL500-...-4, 3ph											
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_V : Derating factor for mains voltage at 460Vac and power supply from AFE200.

(2) K_T (ADL550): no derating.

(3) K_T (ADL510/ADL530): Derating factor for ambient temperature of 50°C (1% every °C above 40°C).

(4) K_{ALT} : Derating factor for installation at altitudes above 1000 meters a.s.l. Value to be applied = 1.2% each 100 m increase above 1000 m.
    E.g.: Altitude 2000 m, Kalt = 1.2% * 10 = 12% derating; In derated = (100 - 12) % = 88 % In

3.6.1 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 3.6.1: Ratio between overload/output frequency (ADL500-...-4)
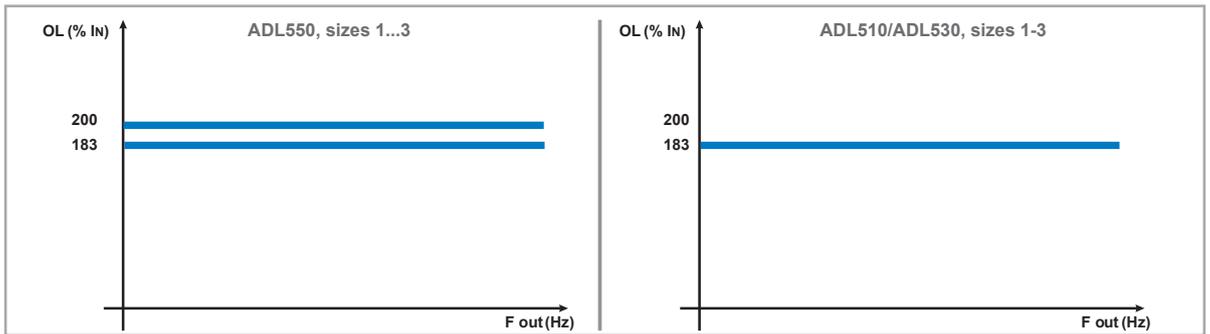
3.6.2 Derating values for switching frequency

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

Figure 3.6.2: Ratio between switching frequency/heat sink temperature
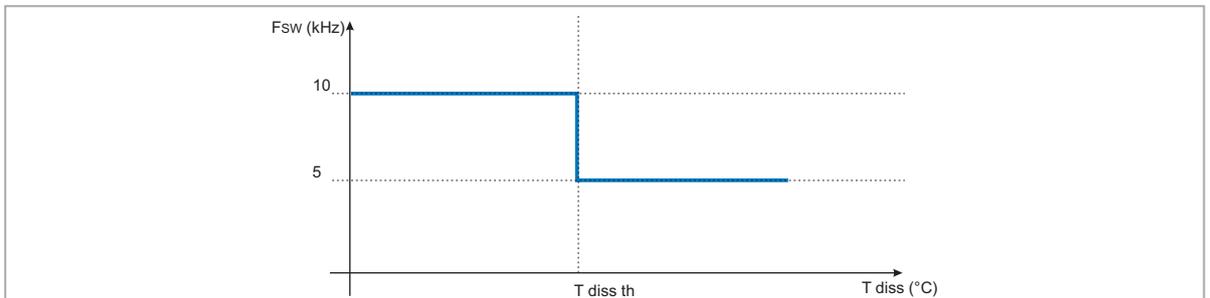
3.6.3 Kт: Ambient temperature reduction factor

Figure 3.6.3: Tamb reduction coefficient
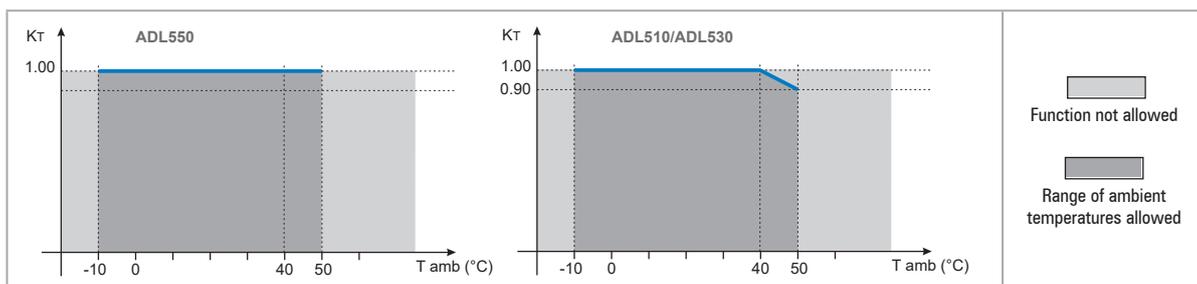
3.7 Voltage level of the inverter for safe operations

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).

3.8 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]
ADL5...-...-4, 3ph					
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.

3.9 Cooling

Size	Pv (Heat dissipation)	Fan capacity		Minimum cabinet opening for cooling
	@U_LN=230...460Vac (*)	Heat sink (m³/h)	Internal (m³/h)	(cm²)
ADL5...-...-4, 3ph				
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.

3.10 Weights and dimensions

Figure 3.10.1: Size 1 dimensions
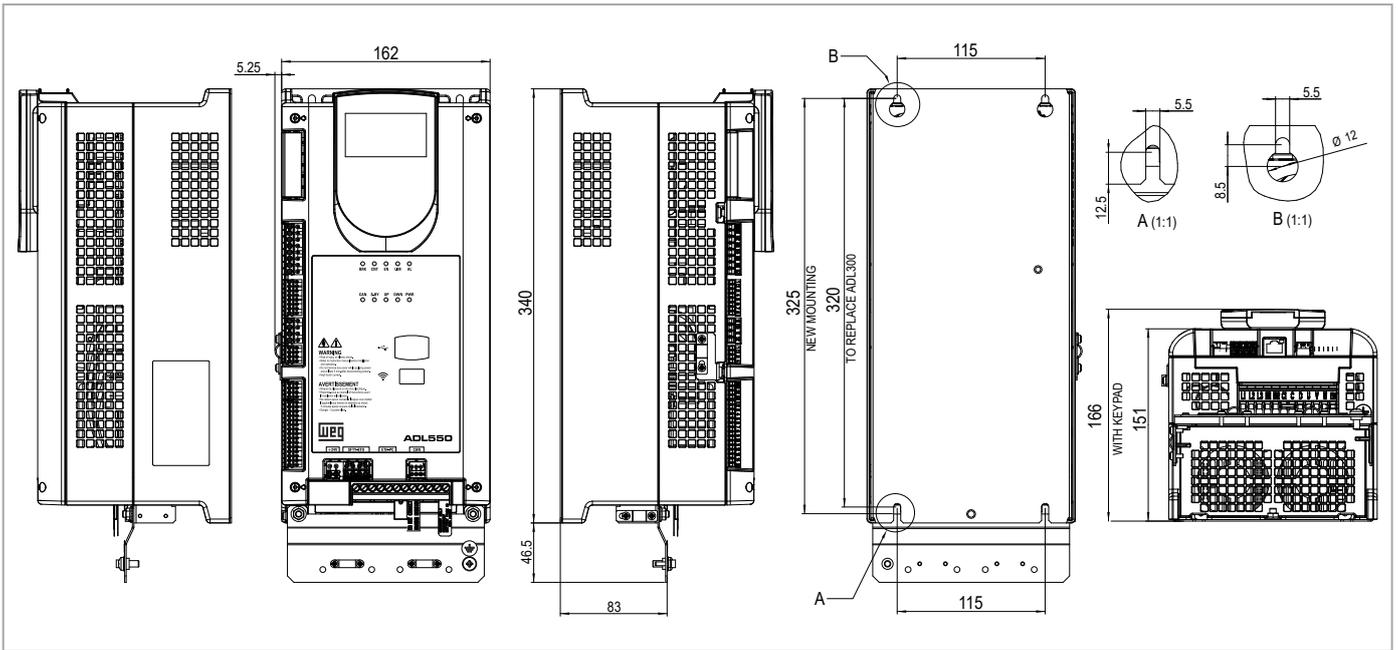
Sizes	Dimensions: Width x Height x Depth		Weight	
	(mm)	(inches)	(kg)	(lbs)
ADL510-1... ADL530-1... ADL550-1...	162 x 340 x 151	6.38 x 13.38 x 5.9	5.5	12.1

Figure 3.10.2:Size 2 dimensions
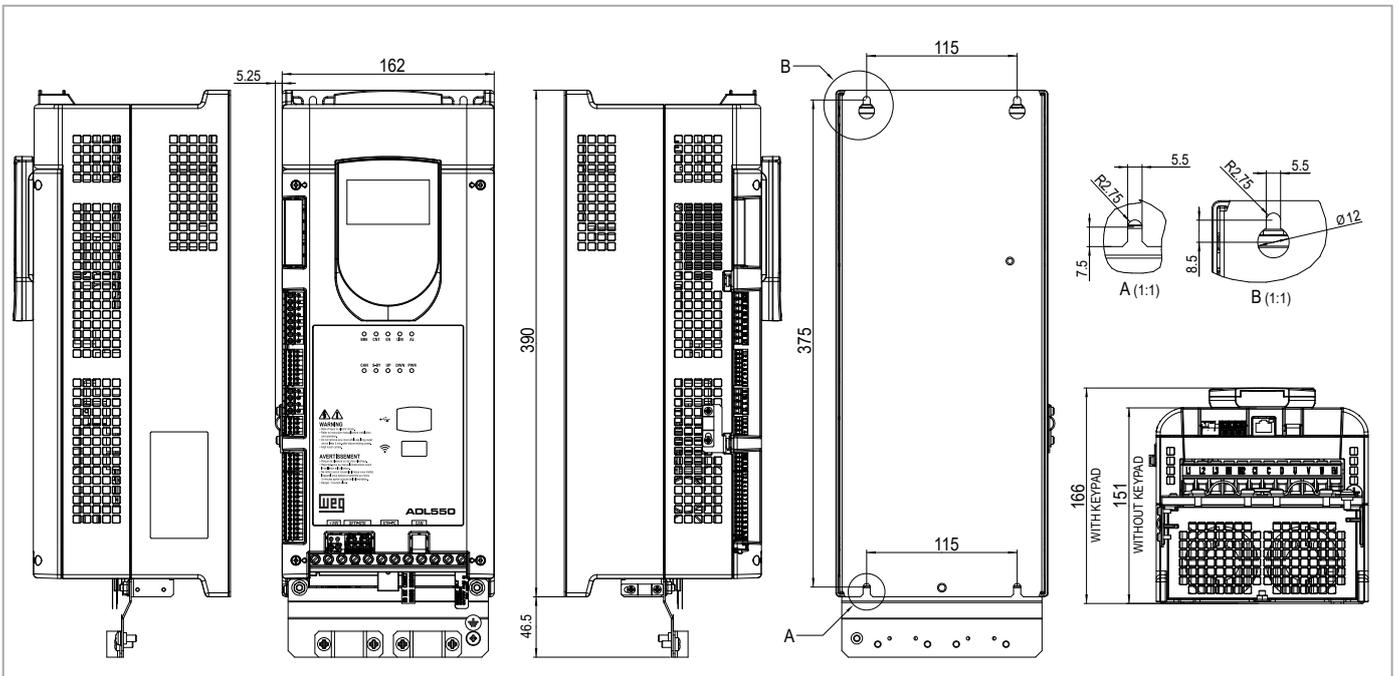
Sizes	Dimensions: Width x Height x Depth		Weight	
	(mm)	(inches)	(kg)	(lbs)
ADL510-2... ADL530-2... ADL550-2...	162 x 390 x 151	6.38 x 15.35 x 5.94	7.0	15.4

4 - Mechanical installation

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 pasinstaller le drive dans des places ou la temperature permise est dépassée.

Be sure to remove the desicant 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.).

4.1 Maximum inclination and assembly clearances

The inverters must be mounted in such a way that air can flow freely around them, **see paragraph 4.9 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

4.2 Fastening positions

Fissaggio a muro • Wall mounting • Fixation mural • Wandmontagee • Fijación en pared

Taglia 1
Size 1
Grandeur 1
Größe 1
Tamaño 1

Taglia 2
Size 2
Grandeur 2
Größe 2
Tamaño 2

Taglie • Sizes • Grandeurs • Größen • Tamaños :

1-2

5.5
12.5
(A)

5.5
8.5
Ø 12
(B)

3

4-5
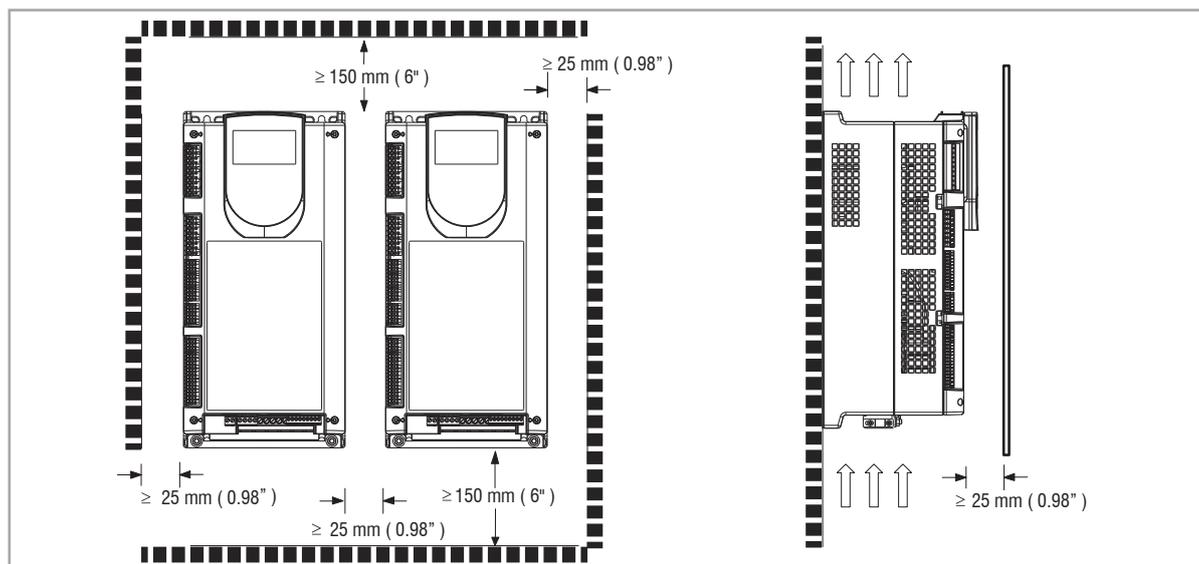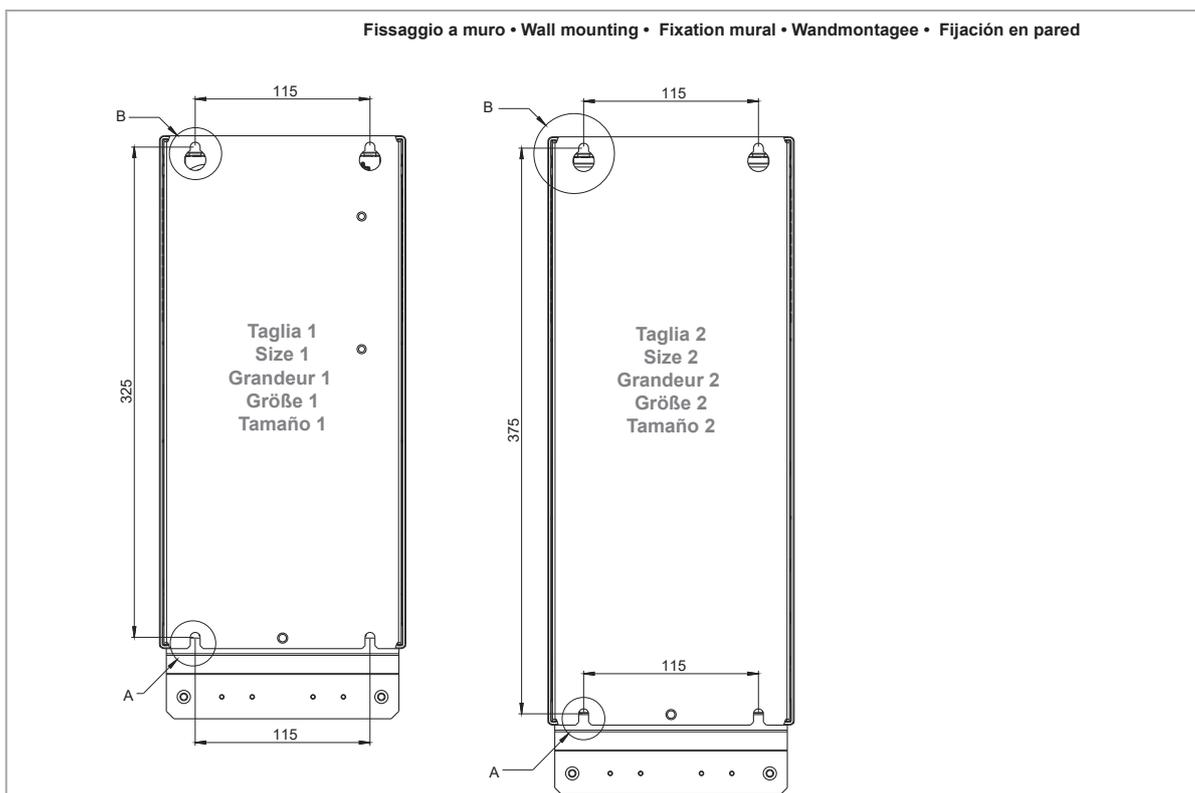
	Recommended screws for fastening
Size 1 (ADL5...-1...)	4 x M5 x 12 mm screws + Grover (spring-lock) washer + flat washer
Size 2 (ADL5...-2...)	4 x M5 x 12 mm screws + Grover (spring-lock) washer + flat washer

5 - Location and identification of terminals and LEDs
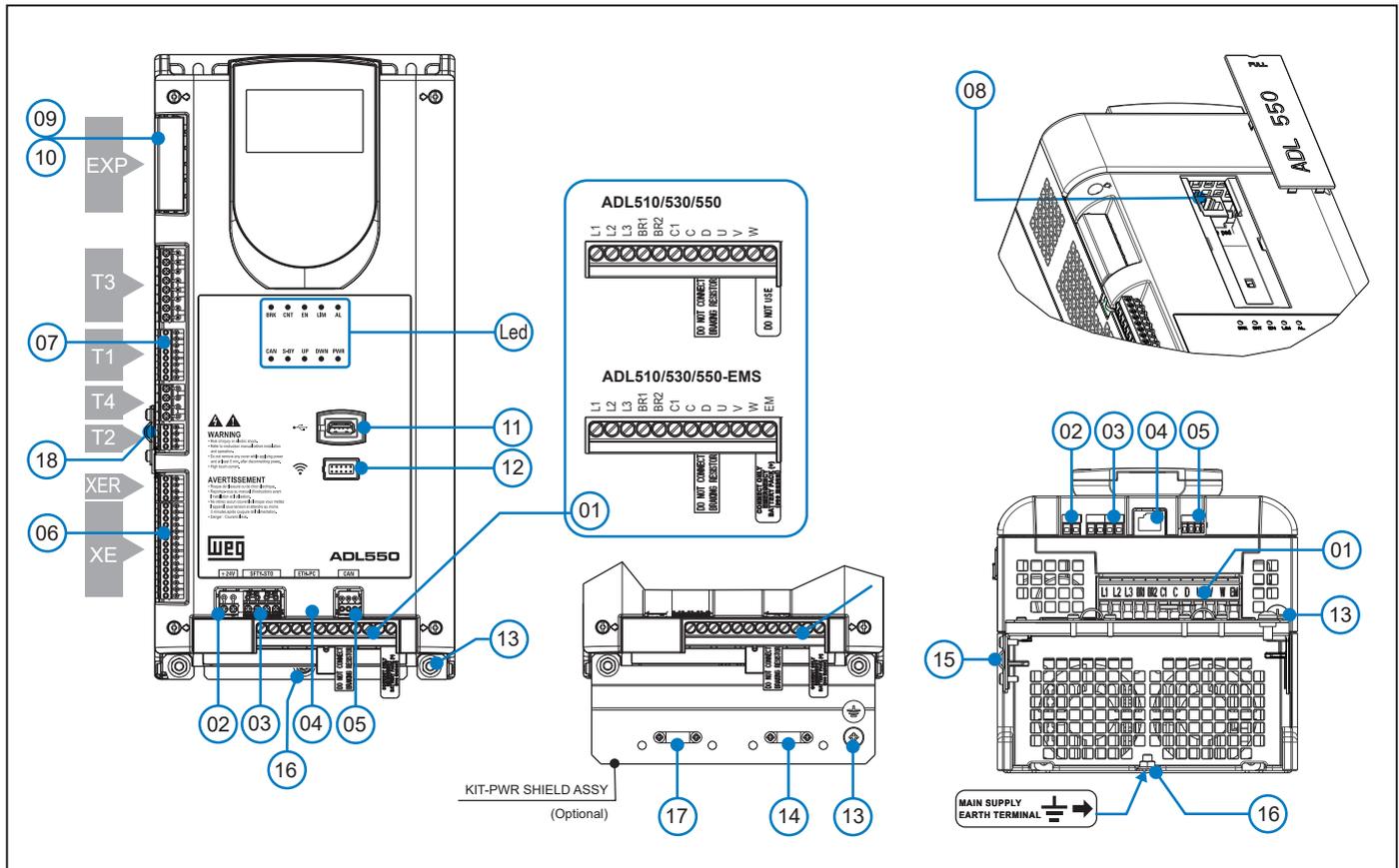
	Ref.		Description	Manual section	ADL510	ADL530	ADL550
(01)			Power terminals	"5.1 Power section" on page 16	Yes	Yes	Yes
(02)	+24V		Input + 24 Vdc external	"5.2.4 +24V supply connection" on page 18	-	-	Yes
(03)	SFTY-STO		STO Safety terminals	"5.2.5 Safety STO connection (SFTY-STO)" on page 19	-	-	Yes
(04)	ETH-PC		RJ45 terminal, Ethernet port (100 Mbit/s)	"7.4 ETH-PC Ethernet Interface (RJ45 connector)" on ADL500 HW+QS manual	Yes	Yes	Yes
(05)	CAN		CANopen 417 Lift terminals	"7.5 CAN interface" on ADL500 HW+QS manual	-	Yes	Yes
(06)	XE/XER		Encoder terminals	"5.2.3 Feedback Connection" on page 18	Yes	Yes	Yes
(07)		T1	Digital input terminal	"5.2.2 I/O and Relays connection" on page 17	Yes	Yes	Yes
		T2	Analogue input terminal				
		T3	Relay output terminal				
		T4	Digital and +24V input enable / reference terminal				
(08)			RJ45 terminal, KB-ADL500 optional keypad	"7.6 Optional Keypad interface (RJ45 connector)" on ADL500 HW+QS manual	Yes	Yes	Yes
(09)	EXP		Optional EXP-IO1-ADL500 card terminals	"A.1.2 - Optional card EXP-IO1-ADL500" on ADL500 HW+QS manual	-	-	Yes
(10)			Optional EXP-DCP-ADL500 card terminals	"A.1.3 - Optional card EXP-DCP-ADL500" on ADL500 HW+QS manual	-	-	Yes
(11)	⟜		USB 2.0 port	"7.7 USB port for data storage" on ADL500 HW+QS manual	-	Yes	Yes
(12)	⟨•⟩		Wi-Fi Port	"7.8 Wi-Fi module port" on ADL500 HW+QS manual	-	Yes	Yes
(13)	⏚		Motor Earth terminals	"5.1 Power section" on page 16	Yes	Yes	Yes
(14)			Omega motor cable shield connection	"5.1.3 Connection of shielding (recommended)" on page 16	Yes	Yes	Yes
(15)			Omega feedback cable shield connection	"5.2.3 Feedback Connection" on page 18	Yes	Yes	Yes
(16)			Mains supply earth terminals	"5.1 Power section" on page 16	Yes	Yes	Yes
(17)			Securing of Omega power cable		Yes	Yes	Yes
(18)			Omega connection for shielding of terminal T2	"5.2.2 I/O and Relays connection" on page 17	Yes	Yes	Yes
Led			Operation and diagnostics LEDs	"5.2.6 Led" on page 19	Yes	Yes	Yes

5.1 Power section

5.1.1 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 (+)

5.1.2 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	Recommended terminal	Tightening torque (min)
	(mm²)	AWG	(mm)	(mm)	(Nm)
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: ⏚ on structural work (see ref. (16) on previous page)				
	Cable cross-section		Lock screw diameter	Recommended terminal	Tightening torque (min)
	(mm²)	AWG	(mm)	(mm)	(Nm)
1040 ... 2150	Same as the maximum cross-section used for the power terminal strip		M5	Eyelet - Fork	6

5.1.3 Connection of shielding (recommended)

Optional KIT-PWR SHIELD ASSY:
- Cod. S72684S12 (size 1)
- Cod. S72684S13 (size 2)
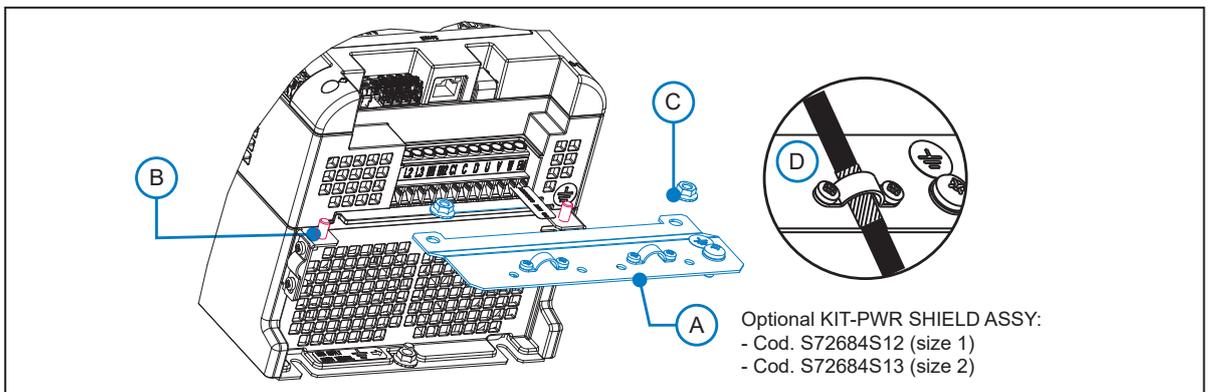
For compliance with EN 12016: put the optional metal support KIT-PWR SHIELD ASSY (A) on bolts (B) and tighten the two nuts fully (C).
Fasten the power cable shield to the omega sections (D).

5.2 Regulation section

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

5.2.1 Cable cross-sections

Terminals	Maximum cable cross-section		Recommended stripping	Tightening torque (min)
	(mm²)	(AWG)	(mm)	(Nm)
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

5.2.2 I/O and Relays connection

For terminal location see section "5 - Location and identification of terminals and LEDs" on page 15.

T3 terminal – Relays Output

Pin	Signal	Description	Command Associated parameter	ADL510	ADL530	ADL550
50	RO_4O	Relay 4 output (contact N.O., 24Vdc)	**1416, Dig output 4 src**	Yes	Yes	Yes
51	RO_4C	Common Relay 4	*DoopOpen*	Yes	Yes	Yes
52	RO_3O	Relay 3 output (contact N.O., 24Vdc)	**1414, Dig output 3 src**	Yes	Yes	Yes
53	RO_3C	Common Relay 3	*Run Contactor*	Yes	Yes	Yes
54	RO_2O	Relay 2 output (contact N.O., 24Vdc)	**1412, Dig output 2 src**	Yes	Yes	Yes
55	RO_2C	Common Relay 2	*Brake Contactor*	Yes	Yes	Yes
56	RO_1O	Relay 1 output (contact N.O., 24Vdc)	**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).
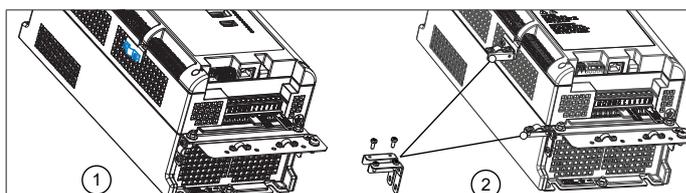
5.2.3 Feedback Connection

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 #1	Signal #2	Description	Digital Incremental	Sinusoidal Incremental	Sinusoidal Incremental + Sin/Cos	Sinusoidal Incremental + Absolute	Direction	ADL510	ADL530	ADL550
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	0VE		Encoder reference	x	x	x	x	OUT	Yes	Yes	Yes
15	+VE		Encoder supply	x	x	x	x	OUT	Yes	Yes	Yes

Figure 5.2.1: 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).
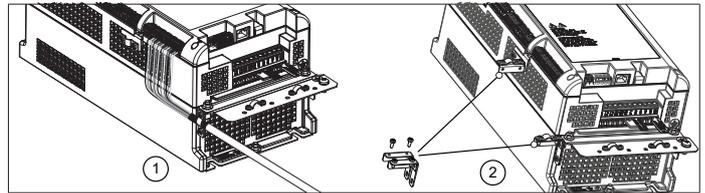
Encoders provide motor speed and position feedback.

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).

5.2.4 +24V supply connection

Terminal	Description	IN/OUT
1	+24 V_{DC} External power supply of the regulation board	IN
2	0 V_{DC} external power supply reference	IN

5.2.5 Safety STO connection (SFTY-STO)

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 "5.3 Typical connection diagram" on page 20.

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.

5.2.6 Led

Led	Colour	Meaning	ADL510	ADL530	ADL550
BRK	Yellow	Braking	Yes	Yes	Yes
CNT	Yellow	Contactor 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

5.3 Typical connection diagram

Figure 5.3.1: Typical connection diagram (Sizes ADL550-1040 ...2150)
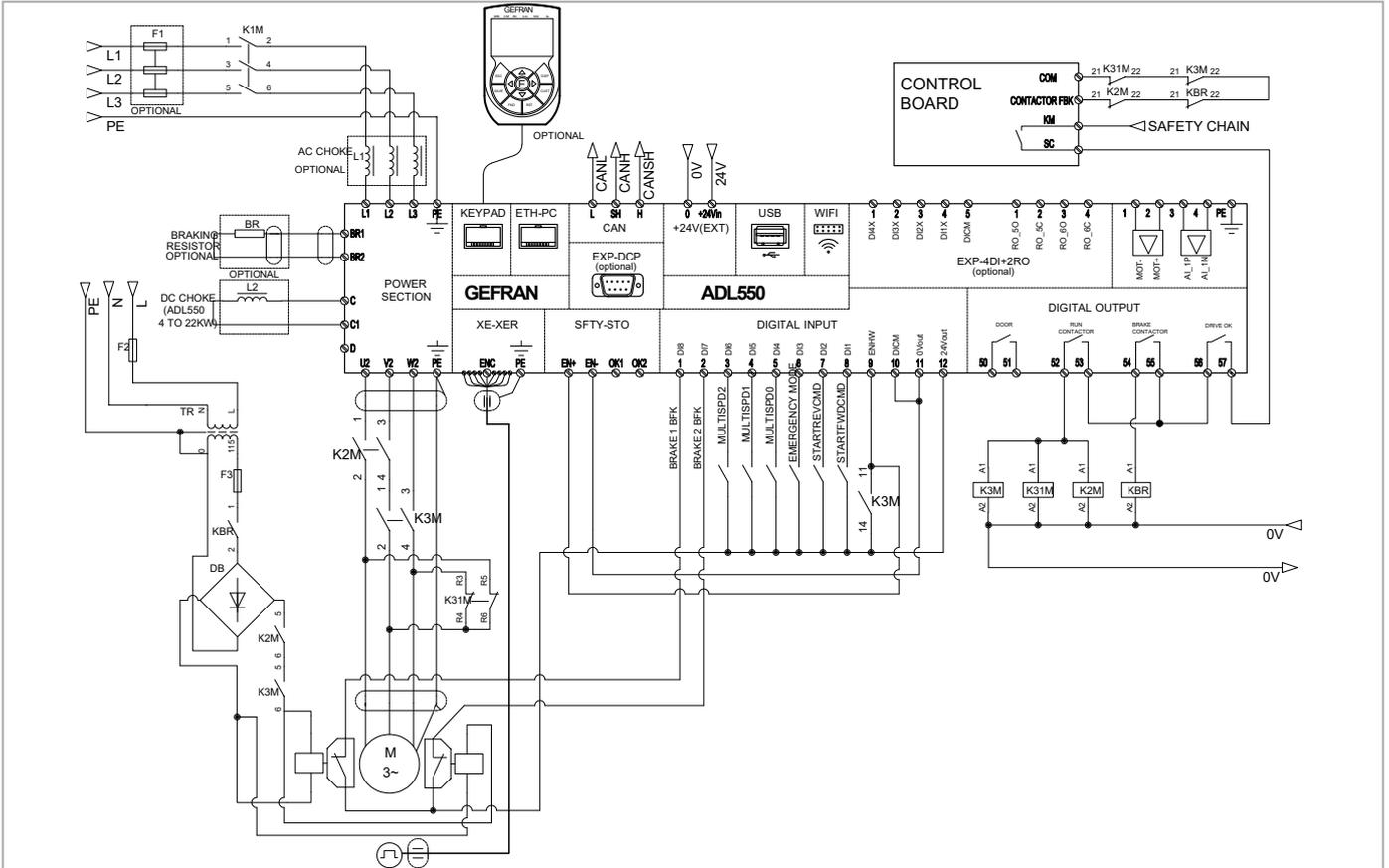
Figure 5.3.2: Typical connection diagram (Sizes ADL530-1040 ...2150)
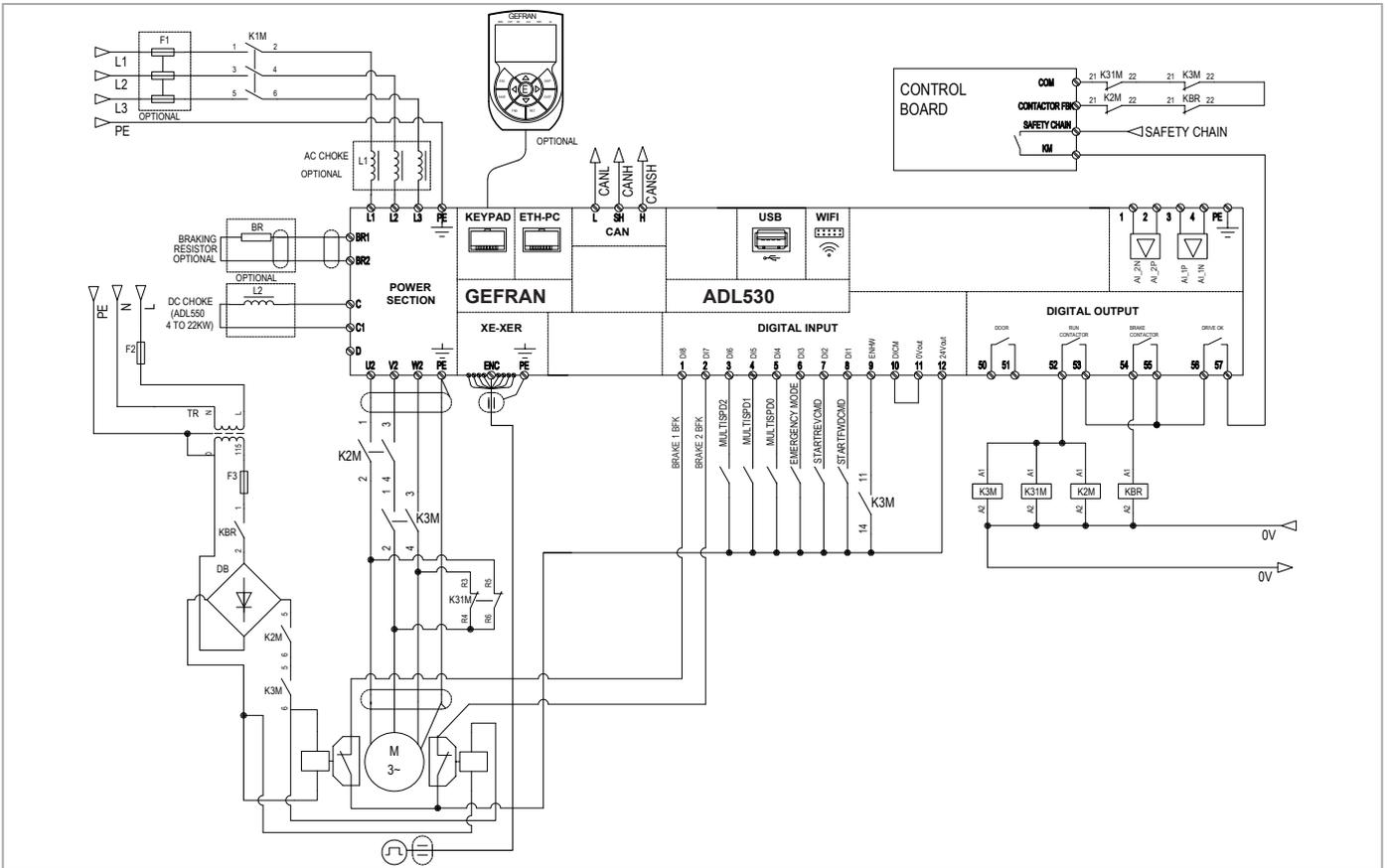
6 - Use of the optional keypad (KB-ADL500)

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

6.1 Description

Drive status indicator LEDs →

← 128 x 64 dot liquid crystal graphic display, with amber backlighting.
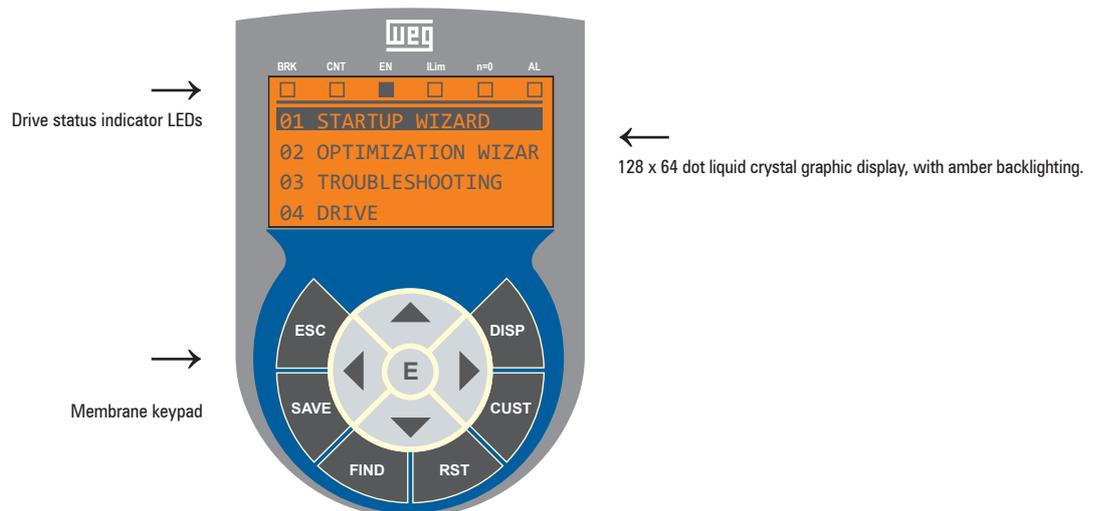
Membrane keypad →

6.1.1 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 **Save parameters**
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.

6.1.2 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

6.2 Navigating with the optional keypad

6.2.1 Scanning of the first and second level menu

First level

```
01   STARTUP WIZARD
02   OPTIMIZ. WIZARD
03   TROUBLESHOOTING
04   DRIVE
```
▲
```
13   FUNCTIONS
01   STARTUP WIZARD
02   OPTIMIZ. WIZARD
03   TROUBLESHOOTING
```

▼
```
01   STARTUP WIZARD
02   OPTIMIZ. WIZARD
03   TROUBLESHOOTING
04   DRIVE
```

First level

```
01   STARTUP WIZARD
02   OPTIMIZ. WIZARD
03   TROUBLESHOOTING
04   DRIVE
```
▶

Second level

```
04.01   DRIVE MONITOR
04.02   DRIVE INFO
04.03   DRIVE CONFIG
04.04   ALARM CONFIG
```
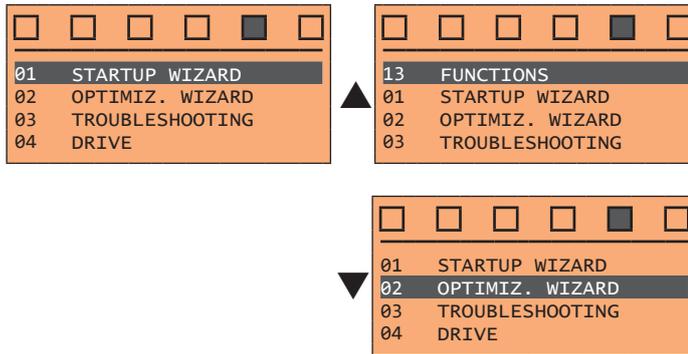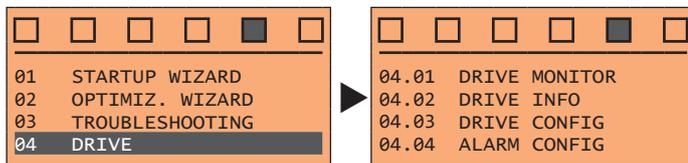
6.2.2 Display of a parameter

```
04   DRIVE
05   LIFT
07   COMMUNICATION
08   MOTOR DATA
```
▶
```
①  02/30          PAR:   2000  ④
②  Rated voltage
                  400 V       ⑤
③  Def:    400
```
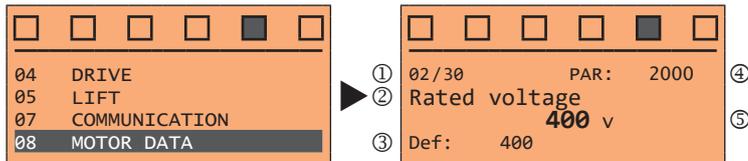
(1) Reference to the menu where the parameter is to be found, in this case menu MOTOR DATA (02/30)

(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:

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

6.3 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.

```
☐ ☐ ☐ ☐ ■ ☐          ☐ ☐ ☐ ☐ ■ ☐

04.01  DRIVE MONITOR         01/18        PAR:    550      Ⓔ
04.02  DRIVE INFO            Save parameters
04.03  DRIVE CONFIG          Press E to execute
04.04  ALARM CONFIG
```

```
☐ ☐ ☐ ☐ ■ ☐          ☐ ☐ ☐ ☐ ■ ☐

01/18        PAR:    550     01/18        PAR:    550
Save parameters              Save parameters
In Progress                  Done
```
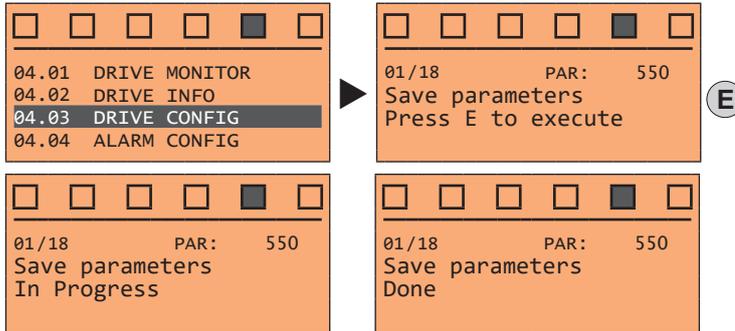
To exit, press the ◄ key.

6.4 Alarms

The alarms page is displayed automatically when an alarm occurs.

```
       ☐ ☐ ☐ ☐ ■ ■
①   Alarm              1/1  ②
③   External fault
④
⑤   Time:      3:44
```
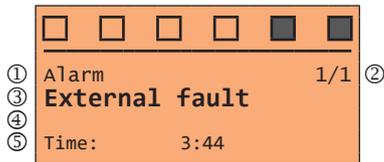
(1) **Alarm**: identifies the alarm page.

   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

6.4.1 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.

6.5 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.

6.6 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:

```
┌─ □ □ □ □ ■ □ ─┐          ┌─ □ □ □ □ ■ □ ─┐          ┌─ □ □ □ □ ■ □ ─┐
│ 04.01  DRIVE MONITOR │    │16/18        PAR:    596│   │ Save to USB         │
│ 04.02  DRIVE INFO    │ ▶▲x2│Save to USB         │ E │ADL_0000.DAT        │ E
│ 04.03  DRIVE CONFIG  │    │Press E to execute  │          │                    │
│ 04.04  ALARM CONFIG  │    └───────────────────────┘          └────────────────────┘
└──────────────────────┘

┌─ □ □ □ □ ■ □ ─┐
│ Save to USB       OK │
│ ADL_0000.DAT        │
│ ADL_0001.DAT        │
│                      │
└──────────────────────┘
```
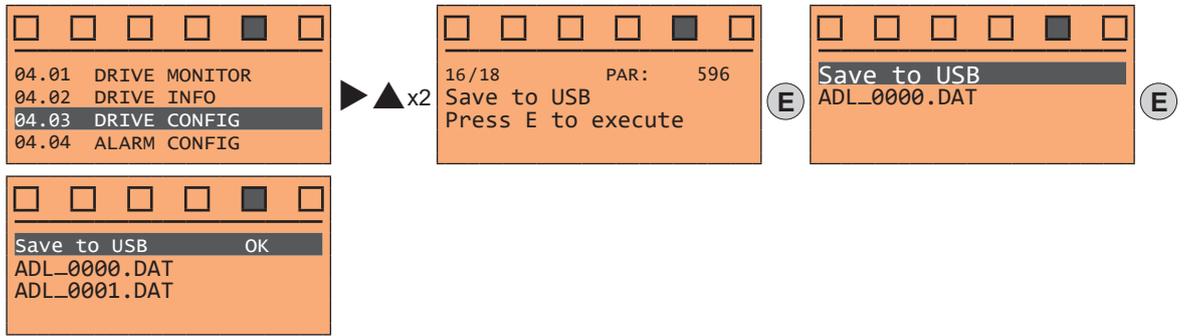
(ADL550 and ADL530 only). To transfer (recover) parameters from the memory USB to the drive: Menu CONFIG DRIVE, parameter **Load from USB**, PAR 598 :

```
┌─ □ □ □ □ ■ □ ─┐          ┌─ □ □ □ □ ■ □ ─┐          ┌─ □ □ □ □ ■ □ ─┐
│ 04.01  DRIVE MONITOR │    │17/18        PAR:    598│   │ ADL_0000.DAT        │
│ 04.02  DRIVE INFO    │ ▶▲ │Load from USB       │ E │ADL_0001.DAT        │ E
│ 04.03  DRIVE CONFIG  │    │Press E to execute  │          │                    │
│ 04.04  ALARM CONFIG  │    └───────────────────────┘          └────────────────────┘
└──────────────────────┘

┌─ □ □ □ □ ■ □ ─┐          ┌─ □ □ □ □ ■ □ ─┐
│ ADL_0000.DAT        │    │ Load from USB    Done │
│ ADL_0001.DAT        │    │ ADL_0000.DAT        │
│                      │    │ ADL_0001.DAT        │
│                      │    │                      │
└──────────────────────┘    └──────────────────────┘
```
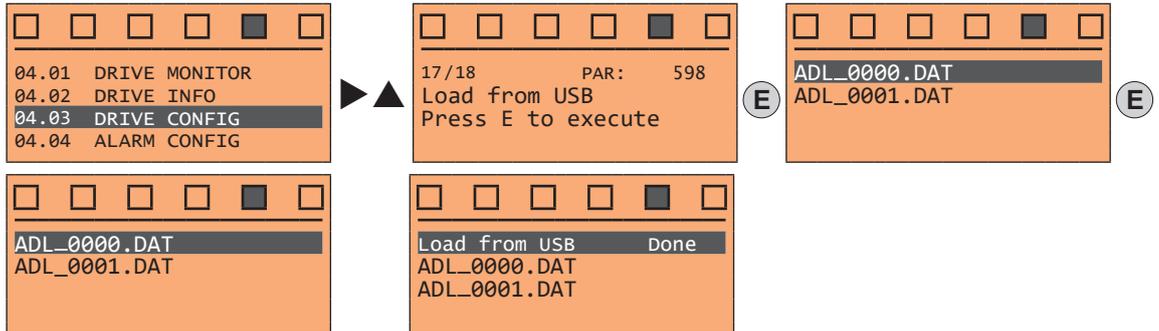
7 - Startup wizard for Asynchronous motor

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:

```
□  □  □  □  ■  □              □  □  □  □  ■  □
01 STARTUP WIZARD              STARTUP WIZARD
02 OPTIMIZ. WIZARD      Ⓔ      Set comm mode?
03 TROUBLESHOOTING
04 DRIVE                       E=Yes       Down=Next
```

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.

```
┌─ ┌─ ┌─ ┌─ ■ ┌─
STARTUP WIZARD
Set comm mode?

E=Yes        Down=Next
```
(E)
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
01/03      PAR:  4000
Communication mode
Parallel I/O
Value:       0
```
(E)
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
01/03      PAR:  4000
Communication mode
Parallel I/O
Value:       0
```

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

At the end of the procedure proceed to next step.

Step 2 – Setting encoder parameters

Caution

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:

```
┌─ ┌─ ┌─ ┌─ ■ ┌─
STARTUP WIZARD
Set encoder param?

E=Yes        Down=Next
```
(E)
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
01/07      PAR:  2102
Encoder supply
        5.2 v
Def:  5.2
```
Range: 5.2 ... 20V

▼
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
02/07      PAR:  2132
Encoder mode
None
Value:        0
```
Available selections:
(0) None (default), (1) Digital, (2) Sinus,
(3) Sinus SINCOS, (4) Sinus ENDAT,
(5) Sinus BiSS, (6) ENDAT,
(7) BiSS, (8) Sinus SSI

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

```
┌─ ┌─ ┌─ ┌─ ■ ┌─
STARTUP WIZARD
Set motor data?

E=Yes        Down=Next
```
(E)
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
01/09      PAR:   540
Control type
ASY SSC
Value:        0
```
Available selections:
(0) ASY SSC (Default)
(1) ASY FOC

▼
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
02/09      PAR:  2000
Rated voltage
        400 v
Def:  400
```
Range: 230 ... 480V

▼
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
03/09      PAR:  2002
Rated current
        11.8 A
Def:  11.8
```
Range: 1 ... 1500A

▼
```
┌─ ┌─ ┌─ ┌─ ■ ┌─
04/09      PAR:  2004
Rated speed
        1450 rpm
Def:  1450
```
Range: 10 ... 32000rpm

```
┌─────────────────────────────┐
│ □  □  □  □  ■  □             │
│                             │
│ 05/09          PAR:    2006 │
│ Rated frequency             │
│          50.00 Hz           │
│ Def:   50                   │
└─────────────────────────────┘     Range: 10 ... 1000Hz

┌─────────────────────────────┐
│ □  □  □  □  ■  □             │
│                             │
│ 06/09          PAR:    2008 │
│ Pole pairs                  │
│               2             │
│ Def:    2                   │
└─────────────────────────────┘     Range: 1 ... 60

┌─────────────────────────────┐
│ □  □  □  □  ■  □             │
│                             │
│ 07/09          PAR:    2010 │
│ Rated power                 │
│          5.50 kW            │
│ Def:    5.5                 │
└─────────────────────────────┘     Range: 0.1 ... 1500kW

┌─────────────────────────────┐
│ □  □  □  □  ■  □             │
│                             │
│ 08/09          PAR:    2012 │
│ Rated power factor          │
│          0.83               │
│ Def:    0.83                │
└─────────────────────────────┘     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] x 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 !

ıı

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.

ıı

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
```

(E)

```
□ □ □ □ ■ □
─────────────────
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^2, ft/s^3)

▼

```
□ □ □ □ ■ □
─────────────────
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
```

(E)

```
□ □ □ □ ■ □

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 o 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.
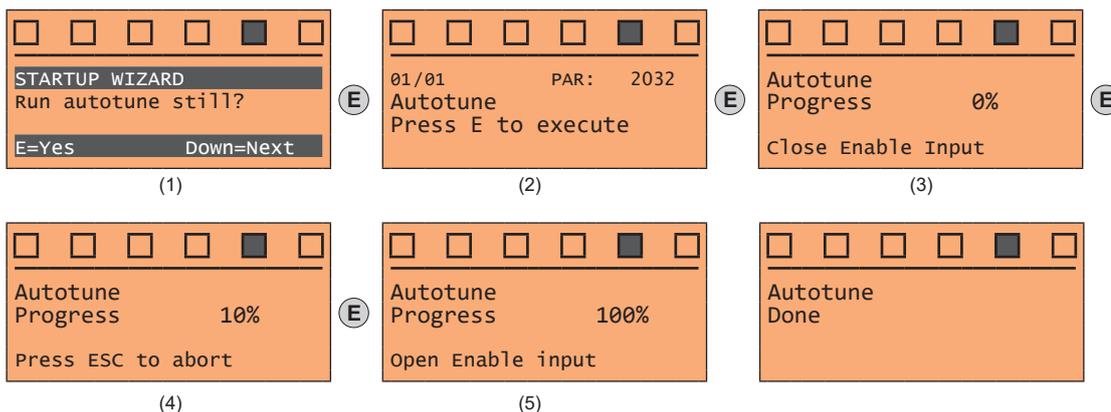
(1)

(2)

(3)

(4)

(5)

(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:

```
┌─□──□──□──□──■──□─┐        ┌─□──□──□──□──■──□─┐        ┌─□──□──□──□──■──□─┐
│ STARTUP WIZARD   │   E    │ 01/01      PAR:   550 │   E    │ 01/01      PAR:   550 │   E
│ Save parameters? │        │ Save parameters  │        │ Save parameters  │
│                  │        │ Press E to execute│       │ In progress      │
│ E=Yes    Down=Next│       │                  │        │                  │
└──────────────────┘        └──────────────────┘        └──────────────────┘
        (1)                         (2)                         (3)
```

```
┌─□──□──□──□──■──□─┐        ┌─□──□──□──□──■──□─┐
│ 01/01      PAR:   550 │   │ 01   STARTUP WIZARD │
│ Save parameters  │        │ 02   OPTIMIZ. WIZARD│
│ Done             │        │ 03   TROUBLESHOOTING│
│                  │        │ 04   DRIVE          │
└──────────────────┘        └──────────────────┘
        (4)                         (5)
```
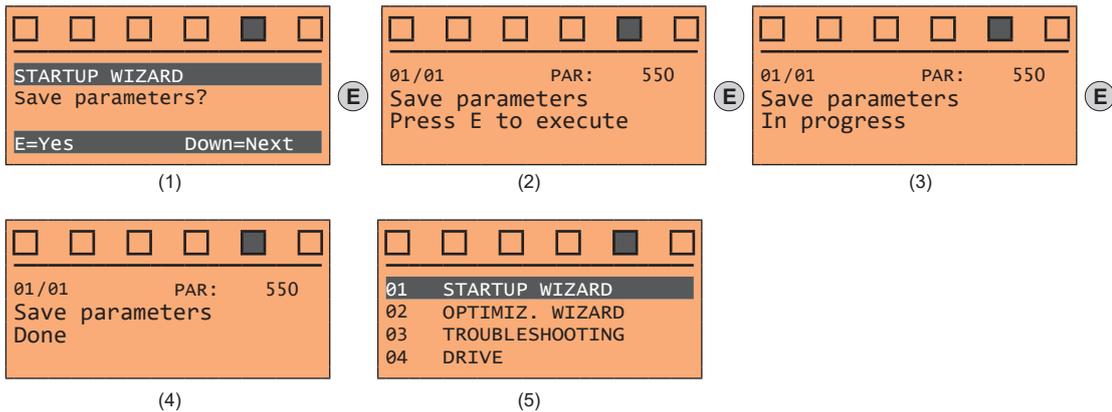
(1) Press the **E** key to start the save parameters procedure.

(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.

8 - 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:

- Setting communication   See step 1
- Setting encoder parameters (Control type = SYN 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 and encoder phasing   See step 6
- Saving parameters   See step 7

The format of the function selection page is as follows:

```
□ □ □ □ ■ □                          □ □ □ □ ■ □

01 STARTUP WIZARD                    STARTUP WIZARD
02 OPTIMIZ. WIZARD        (E)        Set comm mode?
03 TROUBLESHOOTING
04 DRIVE                             E=Yes        Down=Next
```

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.

```
□ □ □ □ ■ □              □ □ □ □ ■ □              □ □ □ □ ■ □

STARTUP WIZARD           01/03      PAR: 4000     01/03      PAR:   4000
Set comm mode?    (E)    Communication mode  (E) Communication mode
                         Parallel I/O              Parallel I/O
E=Yes      Down=Next     Value:    0               Value:      0
```

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

Step 2 – Setting encoder parameters

⚠️ *Caution*

||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
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:

```
□ □ □ □ ■ □              □ □ □ □ ■ □

STARTUP WIZARD           01/07      PAR:   2102        Range: 5.2 ... 20V
Set encoder param?  (E)  Encoder supply
                              5.2 v
E=Yes      Down=Next     Def:   5.2
```

```
       □ □ □ □ ■ □

 ▼     02/07      PAR:   2132        Available selections:
       Encoder mode                 (0) None (default), (1) Digital, (2) Sinus,
       Digital                      (3) Sinus SINCOS, (4) Sinus ENDAT,
       Value:         1             (5) Sinus BiSS, (6) ENDAT,
                                    (7) BiSS, (8) Sinus SSI
```

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 03/07      PAR:    2100    │
│ Encoder pulses            │
│      1024 ppr             │
│ Def:   1024               │
└───────────────────────────┘
```
▼   Range: 4 ... 16384

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 04/07      PAR:    2110    │
│ Encoder signal check      │
│ Check A-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

```
┌───────────────────────────┐       ┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │       │ ☐  ☐  ☐  ☐  ◼  ☐           │
│ STARTUP WIZARD            │       │ 01/09      PAR:     540    │
│ Set motor data?        (E)│       │ Control type              │
│                           │       │ SYN FOC                   │
│ E=Yes        Down=Next    │       │ Value:           2        │
└───────────────────────────┘       └───────────────────────────┘
```
Available selections:
(2) SYN FOC

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 02/09      PAR:    2000    │
│ Rated voltage             │
│      340 v                │
│ Def:   400                │
└───────────────────────────┘
```
▼   Range: 230 ... 480V

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 03/09      PAR:    2002    │
│ Rated current             │
│      17.5 A               │
│ Def:   11.8               │
└───────────────────────────┘
```
▼   Range: 1 ... 1500A

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 04/09      PAR:    2004    │
│ Rated speed               │
│      144 rpm              │
│ Def:   1450               │
└───────────────────────────┘
```
▼   Range: 10 ... 32000rpm

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 06/09      PAR:    2008    │
│ Pole pairs                │
│              12           │
│ Def:   2                  │
└───────────────────────────┘
```
▼   Range: 1 ... 60

```
┌───────────────────────────┐
│ ☐  ☐  ☐  ☐  ◼  ☐           │
│                           │
│ 09/09      PAR:    2014    │
│ Torque constant           │
│      50.00 Nm/A           │
│ Def:   50.00              │
└───────────────────────────┘
```
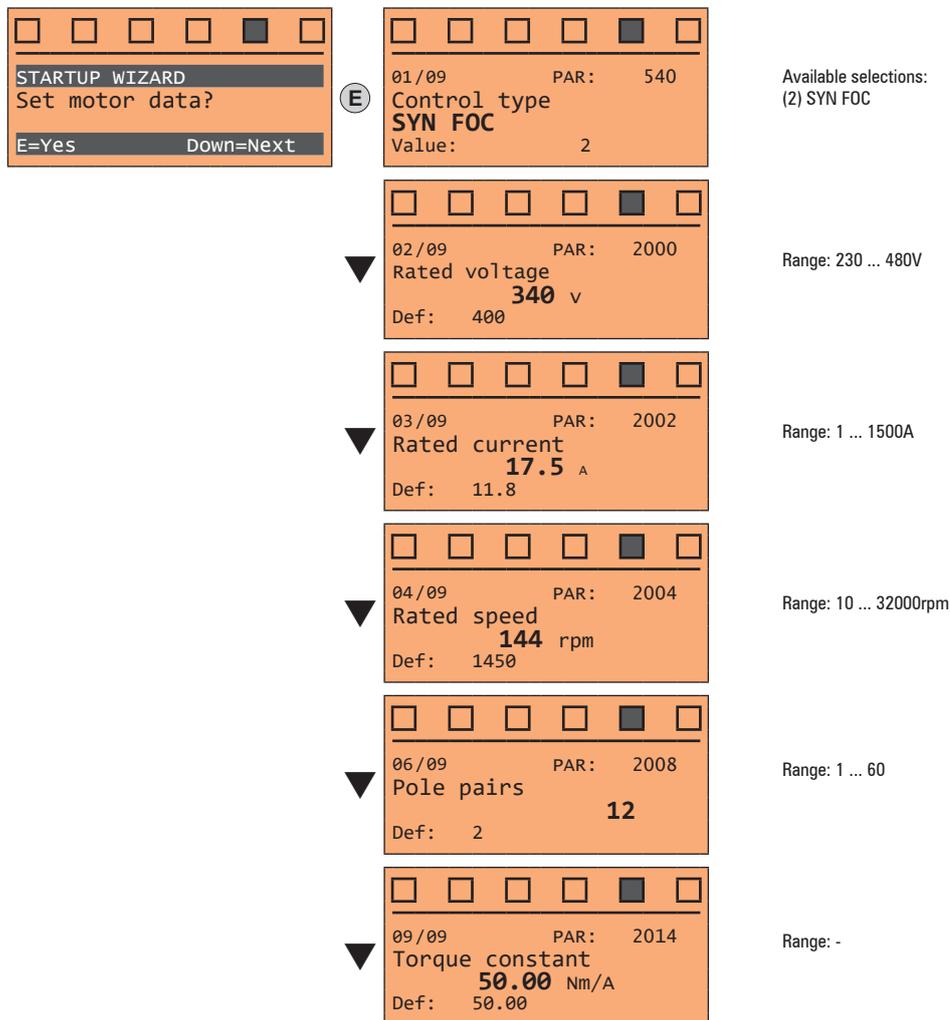▼   Range: -

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.

```
┌─┬─┬─┬─┬─┬─┐
│□│□│□│□│■│□│
└─┴─┴─┴─┴─┴─┘
STARTUP WIZARD
Set mechanical data?

E=Yes         Down=Next
```

(E)

```
┌─┬─┬─┬─┬─┬─┐
│□│□│□│□│■│□│
└─┴─┴─┴─┴─┴─┘
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        │
└─────────────────────────────────┘
```

(E)

```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 01/08         PAR:   11020      │
│ Multi speed 0                   │
│           0.10 m/s              │
│ Def:    0.10                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

● **Set the multispeed values**

▼
```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 02/08         PAR:   11022      │
│ Multi speed 1                   │
│           1.00 m/s              │
│ Def:    1.00                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

▼
```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 03/08         PAR:   11024      │
│ Multi speed 2                   │
│           0.40 m/s              │
│ Def:    0.40                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

▼
```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 04/08         PAR:   11026      │
│ Multi speed 3                   │
│           0.00 m/s              │
│ Def:    0.00                    │
└─────────────────────────────────┘
```
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 m/s              │
│ Def:    0.00                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

▼
```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 07/08         PAR:   11032      │
│ Multi speed 6                   │
│           0.00 m/s              │
│ Def:    0.00                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

▼
```
┌─────────────────────────────────┐
│ □  □  □  □  ■  □                 │
│                                 │
│ 08/08         PAR:   11034      │
│ Multi speed 7                   │
│           0.00 m/s              │
│ Def:    0.00                    │
└─────────────────────────────────┘
```
Range: -10000 ... 10000

⚠ **Attention**

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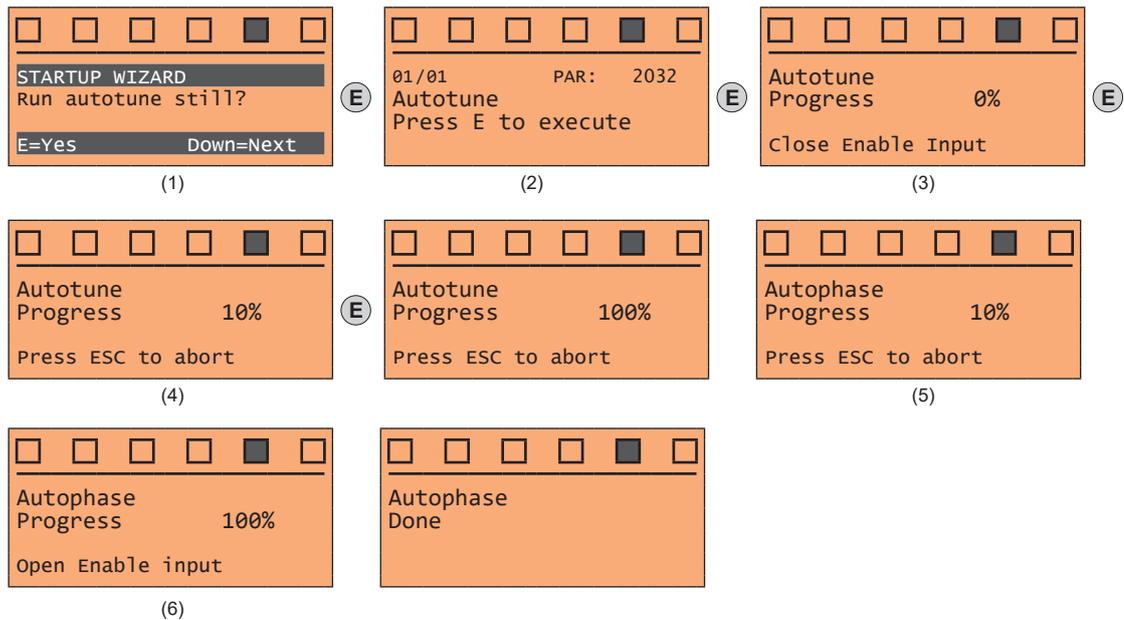
Step 6 – Autotune with motor at stand-still and encoder phasing

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.

```
STARTUP WIZARD
Run autotune still?

E=Yes        Down=Next
```
(1)

```
01/01          PAR:  2032
Autotune
Press E to execute
```
(2)

```
Autotune
Progress        0%

Close Enable Input
```
(3)

```
Autotune
Progress       10%

Press ESC to abort
```
(4)

```
Autotune
Progress      100%

Press ESC to abort
```

```
Autophase
Progress       10%

Press ESC to abort
```
(5)

```
Autophase
Progress      100%

Open Enable input
```
(6)

```
Autophase
Done
```

(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 <u>absolute encoder phasing</u>.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.

Step 7 – Save parameters

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

```
STARTUP WIZARD
Save parameters?

E=Yes        Down=Next
```
(1)

```
01/01          PAR:   550
Save parameters
Press E to execute
```
(2)

```
01/01          PAR:   550
Save parameters
In progress
```
(3)

```
┌─┬─┬─┬─┬─┬─┐          ┌─┬─┬─┬─┬─┬─┐
│□│□│□│□│■│□│          │□│□│□│□│■│□│
└─┴─┴─┴─┴─┴─┘          └─┴─┴─┴─┴─┴─┘
01/01      PAR:   550   01    STARTUP WIZARD
Save parameters         02    OPTIMIZ. WIZARD
Done                    03    TROUBLESHOOTING
                        04    DRIVE
```

           (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 - 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 fives 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**).

```
01   STARTUP WIZARD
02   OPTIMIZ. WIZARD
03   TROUBLESHOOTING
04   DRIVE
```

```
01/04       PAR:   9720
Learning trip
Press E to execute
```
(E)

```
LEARNING TRIP
Next action
Start cabine ride
Press ESC to exit
```
(1)

```
LEARNING TRIP
Running up
        1/8
Press ESC to exit
```
(2)

```
LEARNING TRIP
Ride 1/8 done
> Run a new ride down
Press ESC to exit
```
(3)

```
LEARNING TRIP
Running down
        2/8
Press ESC to exit
```
(4) (5)

```
LEARNING TRIP
Learning trip OK

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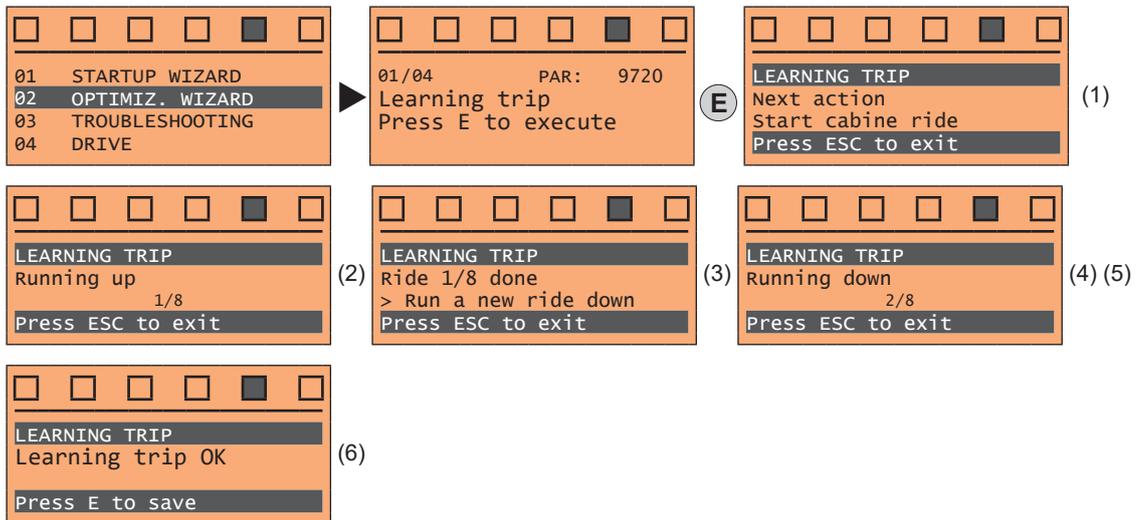
(1)   You are prompted to perform the first run (up or down).
(2)   Perform the up run.
(3)   You are prompted to perform a down run.
(4)   Perform the down run.
(5)   Repeat the operations (1) (2) (3) (4) several times.
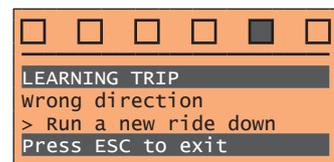(6)   Procedure successfully completed.

Other possible messages:
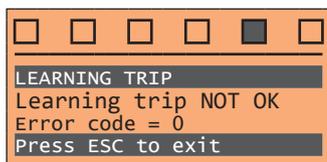
```
LEARNING TRIP
Learning trip NOT OK
Error code = 0
Press ESC to exit
```
Procedure not successfully completed.

```
LEARNING TRIP
Ride too short
> Run a new ride up
Press ESC to exit
```
Short run error.

```
LEARNING TRIP
Wrong direction
> Run a new ride down
Press ESC to exit
```
Wrong direction error.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
2.1	9720	**Learning trip**		BIT		0	0	1	RWZ	INT	VSY

Launch the "Learning Trip" function, an automatic procedure to simplify commissioning and optimise the drive according to the system's mechanical parameters.
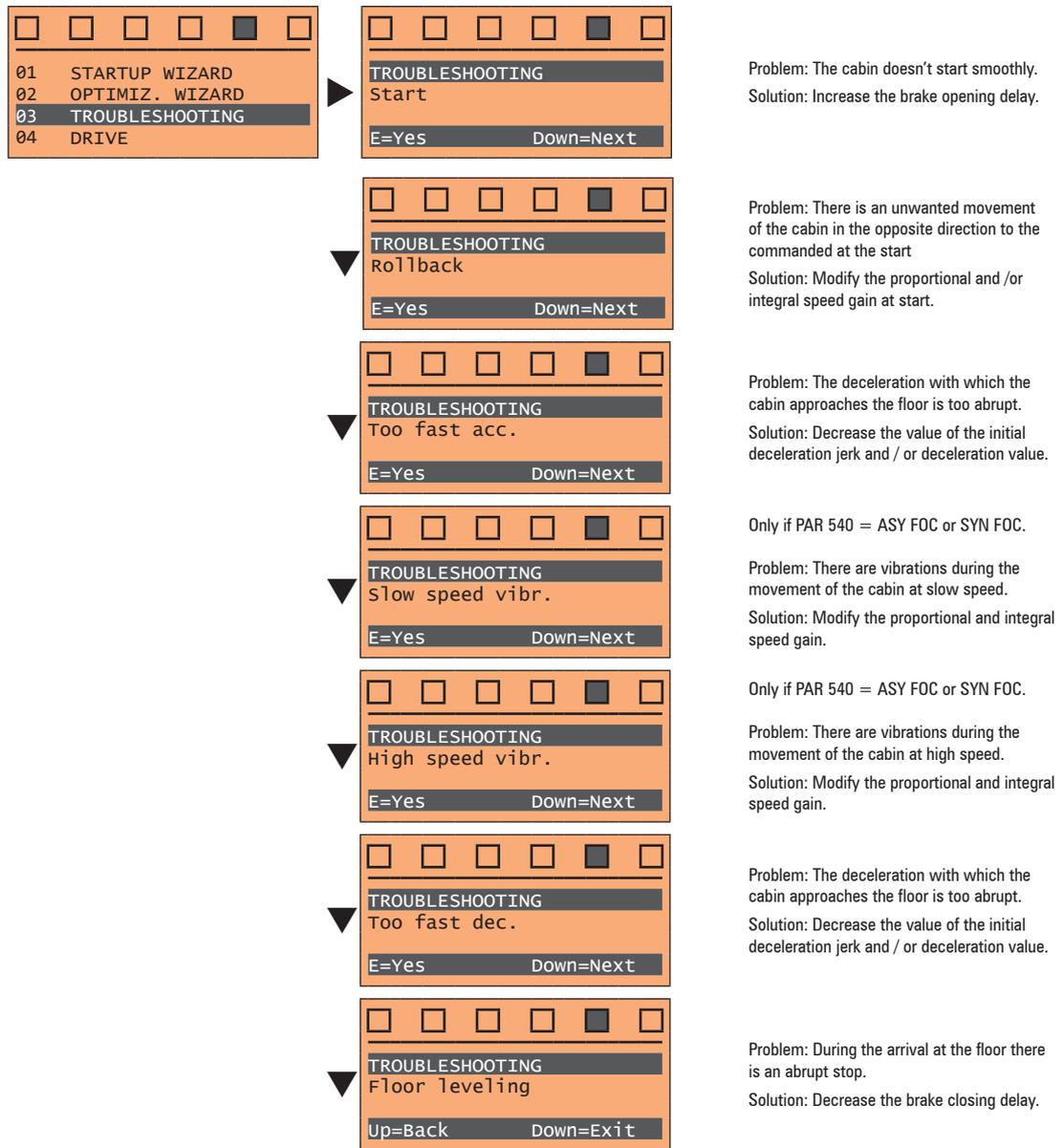
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
2.2	12000	**RollBack**		UINT32		1	1	5	RW	INT	FVY

In some applications an undesirable movement of the cabin in the opposite direction to the one commanded may occur for a short moment at the beginning of the travel when the locking brake is lifted.
By selecting one of the five levels the disturbance can be reduced or eliminated.

1 Basic level pre-selected as default level
2 Intermediate optimization level 2
3 Intermediate optimization level 3
4 Intermediate optimization level 4
5 High optimization level

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

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
2.3	12002	**Comfort high spd**		UINT32		1	1	3	RW	INT	FVY

During the high speed section there may be oscillations in the cabin or abrupt and sudden movements.
By selecting one of the five levels the disturbance can be reduced or eliminated.

1 Basic level pre-selected as default level
2 Intermediate optimization level 2
3 High optimization level

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

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
2.4	12004	**Comfort low spd**		UINT32		1	1	3	RW	INT	FVY

During the low speed section there may be oscillations in the cabin or abrupt and sudden movements.
By selecting one of the five levels the disturbance can be reduced or eliminated.

1 Basic level pre-selected as default level
2 Intermediate optimization level 2
3 High optimization level

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

10 - 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.

□ □ □ □ ■ □ 01 STARTUP WIZARD 02 OPTIMIZ. WIZARD **03 TROUBLESHOOTING** 04 DRIVE ▶	□ □ □ □ ■ □ TROUBLESHOOTING Start E=Yes Down=Next

Problem: The cabin doesn't start smoothly.

Solution: Increase the brake opening delay.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
Rollback

E=Yes   Down=Next

Problem: There is an unwanted movement of the cabin in the opposite direction to the commanded at the start

Solution: Modify the proportional and /or integral speed gain at start.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
Too fast acc.

E=Yes   Down=Next

Problem: The deceleration with which the cabin approaches the floor is too abrupt.

Solution: Decrease the value of the initial deceleration jerk and / or deceleration value.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
Slow speed vibr.

E=Yes   Down=Next

Only if PAR 540 = ASY FOC or SYN FOC.

Problem: There are vibrations during the movement of the cabin at slow speed.

Solution: Modify the proportional and integral speed gain.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
High speed vibr.

E=Yes   Down=Next

Only if PAR 540 = ASY FOC or SYN FOC.

Problem: There are vibrations during the movement of the cabin at high speed.

Solution: Modify the proportional and integral speed gain.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
Too fast dec.

E=Yes   Down=Next

Problem: The deceleration with which the cabin approaches the floor is too abrupt.

Solution: Decrease the value of the initial deceleration jerk and / or deceleration value.

▼ □ □ □ □ ■ □

TROUBLESHOOTING
Floor leveling

Up=Back   Down=Exit

Problem: During the arrival at the floor there is an abrupt stop.

Solution: Decrease the brake closing delay.

3.1 Start

Problem	Solution
The cabin doesn't start smoothly.	Increase the brake opening delay.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.1.1	11064	Brake open delay	ms	INT16/32		500	0	10000	RW	ESY	FVY

Setting of the brake opening delay time.

3.2 Rollback

Problem	Solution
There is an unwanted movement of the cabin in the opposite direction to the commanded at the start	Modify the proportional and /or integral speed gain at start.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.2.1	2200	Boost voltage	perc	FLOAT		3	0	20.0	RW	INT	F

Specifies the value of the additional voltage applied to the motor terminals at low speeds to increase the delivered torque. Excessive values produce an increase of current draw and motor heating due to the resistive losses in stator winding. Possible range of values: 0…20% of motor rated voltage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.2.2	2212	V/Hz Boost mode		ENUM		Fixed			RW	INT	F

This parameter can be used to select one of the following two boost voltage generation modes:

0 Fixed
1 Auto

In the "Fixed" mode, the boost voltage is defined by the user through parameter PAR 2200 **Boost voltage.**
At zero speed, the drive applies a voltage to the motor terminals equal to the value defined in parameter PAR 2200.
This additional voltage is gradually reduced for speeds higher than zero until it is eliminated for output frequencies above the threshold equal to half the rated frequency defined in parameter PAR 2204 **Base frequency** (see figure).
In "Auto" mode the boost voltage is dynamically adjusted by the drive.
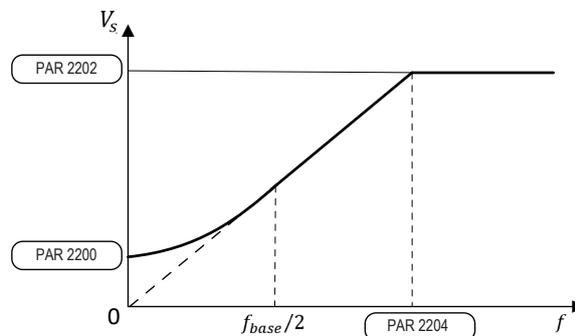
Figure 10.1: V/f characteristic curve profile

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.2.3	2794	SR-P gain at start	perc	FLOAT		150.0 [*]	0.0	400.0	RW	INT	VY

Defines the level of proportional control exercised by the PI regulator during the start phase.
In this initial phase the motor speed control loop must be sufficiently responsive to compensate for any load imbalance and thus counteract the roll-back effect.
An excessive increase of this parameter may generate system vibrations or unstable behaviour.
(*) Def: 150 = ASY FOC, 110 = SYN FOC

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.2.4	2796	SR-I gain at start	perc	FLOAT		110.0 [*]	0.0	400.0	RW	INT	VY

Defines the level of integral control exercised by the PI regulator during the start phase.
Increasing the value of this parameter improves the speed control response in compensating for any load imbalance when the brake is opened.
(*) Def: 110 = ASY FOC, 130 = SYN FOC

3.3 Too fast acceleration (Too fast accel.)

Problem	Solution
The acceleration is too abrupt.	Decrease the value of the initial acceleration jerk and / or acceleration value

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.3.1	11040	**Accel initial jerk**	m/s^3	FLOAT		0.2	0.001	20	RW	ESY	FVY

Setting of the jerk value for the first part of the acceleration.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.3.2	11042	**Acceleration**	m/s^2	FLOAT		0.600	0.001	10	RW	ESY	FVY

Setting of the maximum acceleration value.

3.4 Slow speed vibrations (Slow speed vibr.)

Problem	Solution
There are vibrations during the movement of the cabin at slow speed	Modify the proportional and integral speed gain.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.4.1	2752	**SR-P gain low speed**	perc	FLOAT		100.0	0.0	400.0	RW	INT	VY

Defines the level of the proportional control action exercised by the PI regulator for operating speeds below the minimum threshold defined in parameter PAR 2760 **SR-low speed thrsd**.
For operating speeds above this threshold, the actual level of proportional action becomes a linear combination between the value defined in this parameter and the value defined in parameter PAR 2756 **SR-P gain high speed**.
In the speed range between the thresholds defined in PAR 2760 SR-low speed thrsd and PAR 2762 **SR-high speed thrsd** parameters, the weight of the proportional action varies linearly with the speed.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.4.2	2754	**SR-I gain low speed**	perc	FLOAT		100.0	0.0	400.0	RW	INT	VY

Defines the level of the integral control action exercised by the PI regulator for operating speeds below the minimum threshold defined in parameter PAR 2760 **SR-low speed thrsd**.
For operating speeds above this threshold, the actual level of integral action becomes a linear combination between the value defined in this parameter and the value defined in parameter PAR 2758 **SR-I gain high speed**.
In the speed range between the thresholds defined in PAR 2760 **SR-low speed thrsd** and PAR 2762 **SR-high speed thrsd** parameters, the weight of the proportional action varies linearly with the speed.

3.5 High speed vibrations (High speed vibr.)

Problem	Solution
There are vibrations during the movement of the cabin at high speed	Modify the proportional and integral speed gain.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.5.1	2756	**SR-P gain high speed**	perc	FLOAT		80.0	0.0	400.0	RW	INT	VY

Defines the level of the proportional control action exercised by the PI regulator for operating speeds above the maximum threshold defined in parameter PAR 2762 **SR-high speed thrsd**.
For operating speeds lower than this threshold, the actual level of proportional action becomes a linear combination between the value defined in this parameter and the value defined in parameter PAR 2752 **SR-P gain low speed**.
In the speed range between the minimum and maximum thresholds defined in PAR 2760 **SR-low speed thrsd** and PAR 2762 **SR-high speed thrsd** parameters, the weight of the proportional action varies linearly with the speed.

ùMenu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.5.2	2758	**SR-I gain high speed**	perc	FLOAT		100.0	0.0	400.0	RW	INT	VY

Defines the level of the integral control action exercised by the PI regulator for operating speeds above the maximum threshold defined in parameter PAR 2760 **SR-low speed thrsd**.
For operating speeds lower than this threshold, the actual level of integral action becomes a linear combination between the value defined in this parameter and the value defined in parameter PAR 2754 **SR-I gain low speed.**
In the speed range between the thresholds defined in PAR 2760 **SR-low speed thrsd** and PAR 2762 **SR-high speed thrsd** parameters, the weight of the integral action varies linearly with the speed.

3.6 Too fast deceleration (Too fast dec.)

Problem	Solution
The deceleration with which the cabin approaches the floor is too abrupt.	Decrease the value of the initial deceleration jerk and / or deceleration value

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.6.1	**11046**	**Decel initial jerk**	m/s^3	FLOAT		0.6	0.001	20	RW	ESY	FVY

Setting of the jerk value for the first part of the deceleration.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.6.1	**11048**	**Deceleration**	m/s^2	FLOAT		0.600	0.001	10	RW	ESY	FVY

Setting of the maximum deceleration value.

3.7 Floor leveling

Problem	Solution
During the arrival at the floor there is an abrupt stop.	Decrease the brake closing delay.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
3.7.1	**11068**	**Brake close delay**	ms	INT16/32		500	0	10000	RW	ESY	FVY

Setting of the delay time after closing the brake.

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 **"6.4.1 Alarm reset" on page 24.**

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 "5.1.1 Power terminals and connection" on page 16.
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.
13	Drive overload		**Condition:** Drive overload alarm. - The inverter output current has exceeded the allowed overload value. - The overload cycle has exceeded the allowed values.
			Solution: - Check that the load is not excessive. - Check that accelerations are not excessive. - Check that the overload cycle is within allowed limits.

Index	Error message shown on the display	Sub-code	Description
14	Motor overload		**Condition:** Motor overload alarm. The current absorbed during operation is greater than that specified on the motor data plate.
			Solution: - Reduce the motor load. - Increase the size of the motor.
15	Bres overload		**Condition:** Braking resistor overload alarm. The current absorbed by the resistor is greater than the rated current.
			Solution: - Check the size of the braking resistor. - Check the condition of the braking resistor.
16	Phase loss		**Condition:** Power phase loss alarm.
			Solution: Check the mains voltage and whether any protections upstream of the drive have been tripped.
17	Opt Bus fault		**Condition:** 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.
			Solution: 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.
18	Opt 1 IO fault		**Condition: Error in the communication between Regulation and I/O expansion card.**
			Solution: Check that it has been inserted correctly, see section "A.1 - Optional cards" on ADL500 HW+QS manual.
19	Precharge fault		**Condition:** Failed precharge relay: the precharge relay contacts are stuck open.
			Solution: Reset the alarm and try to resume normal operation. If the alarm persists, contact technical support.
20	Opt enc fault		**Condition:**
			Solution:
21	External fault		**Condition:** External alarm present. A digital input has been programmed as an external alarm, but the +24V voltage is not available on the terminal.
			Solution: Check that the terminal screws are tight
22	Speed fbk loss		**Condition:** Speed feedback loss alarm. The encoder is not connected, not connected properly or not powered: verify encoder operation by selecting the **PAR 260 Motor speed** parameter in the MONITOR menu.
			Solution: See parameter 2172 **SpdFbkLoss code** for information about the cause of the alarm and chapter 10.2 **Speed fbk loss** [22] alarm
23	Overspeed		**Condition:** Motor overspeed alarm. The motor speed exceeds the limits set in the **PAR 4540** parameter.
			Solution: - Limit the speed reference. - Check that the motor is not driven in overspeed during rotation.
24	Speed ref loss		**Condition: Speed reference loss alarm;** 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).
			Solution: Check that the load is not excessive.
25	Emg stop alarm		**Condition:**
			Solution:
26	Power down		**Condition:** The drive was enabled with no supply voltage at the power section.
			Solution: Check drive power supply.
27	Phaseloss out		**Condition:** 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.
			Solution: Check Drive/motor connection.
28	OV safety		**Condition:** Safety status alarm caused by Overvoltage situations.
			Solution: the firmware attemps 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		**Condition:** 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)
			Solution: Switch the drive off and then back on. If the error persists, contact the technical service centre.
30	Mot phase loss		**Condition:** One or more motor output power phases missing while motor is turning.
			Solution: Check Drive/motor connection.
31	Ropes change		**This may occur in two conditions:** • the drive continues to run but the rope usage threshold set in parameter 3404 **Ropes change thr** has been reached; • the drive finishes the current travel and then locks because parameter 3414 Direction counter has reached 0 (corresponding to parameter 3412 **Ropes usage** = 100%).
			Solution: 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.
32	Enable missing		**Condition:** (for ADL550 only) occurs if, after **Safety Enable** signal, **Enable** is not activated within 4 seconds.
			Solution: • Check **Enable** signal. • Check SAFETY connector, contacts 1 and 2. • Check electrical level and current capability of **Safety Enable** signal.

Index	Error message shown on the display	Sub-code	Description
33 ... 48	**Plc1 fault** ... **Plc16 fault**		**Condition:** 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.
		XXXXH-X	The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.
			Solution: 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 refert to the application manual section ALARMS.
49	**Watchdog**		**Condition:** 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: - the drive automatically runs a reset - motor control is not available.
		XXXXH-X	The XXXXH-X code indicates the reason for the error: make a note of this to discuss it with the service centre.
			Solution: 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.
50	**Trap error**		**Condition:** 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: - the drive automatically runs a reset - motor control is not available.
		XXXXH-X	The XXXXH-X (SubHandler-Class) code indicates the reason for the error: make a note of this to discuss it with the service centre.
			Solution: 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.
51	**System error**		**Condition:** 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: - the drive automatically runs a reset - motor control is not available.
		XXXXH-X	The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.
			Solution: 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.
52	**User error**		**Condition:** 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: - the drive automatically runs a reset - motor control is not available.
		XXXXH-X	The XXXXH-X (Error-Pid) code indicates the reason for the error: make a note of this to discuss it with the service centre.
			Solution: 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.
53	**Param error**		**Condition:** 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.
		XXXH-X	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.
			Solution: Set the parameter causing the error to the correct value and run **Save parameter**. Switch the drive off and then switch it back on again.
54	**Load default**		**Condition:** 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.
		0001H-1	The database saved is not valid
		0002H-2	The database saved is not compatible
		0003H-3	The saved database refers to a different size and not to the current size
		0004H-4	The saved database refers to a different region and not to the current region
			Solution: Set the parameters to the desired value and execute **Save parameters**
55	**Plc cfg error**		**Condition:** this can occur during loading of the MDPLC application The Mdplc application present on the drive is not run.
		0004H-4	The application that has been downloaded has a different Crc on the DataBlock and Function table.
		0065H-101	The application that has been downloaded has an invalid identification code (Info).
		0066H-102	The applciation that has been downloaded uses an incorrect task number (Info).
		0067H-103	The application that has been downloaded has an incorrect software configuration.
		0068H-104	The application that has been downloaded has a different Crc on the DataBlock and Function table.
		0069H-105	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.
		006AH-106	The application that has been downloaded has an invalid identification code (Task).
		006BH-107	The application that has been downloaded uses an incorrect task number (Task).
		006CH-108	The application that has been downloaded has an incorrect Crc (Tables + Code)
			Solution: Remove the MDPLC application or download a correct MDPLC application.
56	**Load par def plc**		**Condition:** 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
			Solution: Set the parameters to the desired value and run Save parameter.

Index	Error message shown on the display	Sub-code	Description
57	Key failed		**Condition:** 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.
			Solution: Contact WEG to request the key to enable the desired firmware function.
58	Encoder error		**Condition:** this condition may occur when the drive is powered during encoder setup each time parameter 552 **Regulation mode** is set.
		100H-256	**Cause**: An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the **Speed fbk loss** alarm is also generated.
			Solution: Take the recommended action for the **Speed fbk loss** alarm.
		200H-512	**Cause**: The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
			Solution: Contact WEG in order to update the firmware on the optional encoder card.
59	Recovery mode		**Condition:**
			Solution:

10.1.1 EFC application alarms

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

10.2 Speed fbk loss alarm according to the type of feedback

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	**Cause:** no impulses or disturbance on incremental channel A.
			Solution: Check the connection of the encoder-drive channel A, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder supply**, check parameter 2104 **Encoder input config**.
1	0x02	CHB	**Cause:** no impulses or disturbance on incremental channel B.
			Solution: Check the connection of the encoder-drive channel B, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder supply**, check parameter 2104 **Encoder input config**.
2	0x04	CHZ	**Cause:** no impulses or disturbance on incremental channel Z.
			Solution: Check the connection of the encoder-drive channel Z, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder supply**, check parameter 2104 **Encoder input config**, check parameter 2110 **Encoder signal check**

● **Speed fbk loss [22] alarm with sinusoidal incremental encoder**

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

● **Speed fbk loss [22] alarm with SinCos encoder**

Bit	Value	Name	Description
3	0x08	MOD_INCR	**Cause:** voltage level not correct or disturbance on signals of incremental channels A-B.
			Solution: 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 **Encoder supply,** check parameter 2108 **Encoder signal Vpp**.
4	0x10	MOD_ABS	**Cause:** voltage level not correct or disturbance on signals of absolute SinCos channels.
			Solution: 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 **Encoder supply,** check parameter 2108 **Encoder signal Vpp**.

● **Speed fbk loss [22] alarm with SSI absolute encoder**

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

● **Speed fbk loss [22] alarm with EnDat absolute encoder**

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

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

Bit	Value	Name	Description			
6	0x40	ACK_TMO	**Cause:** SSI signals not present or disturbed cause an error on CRC			
			Solution: Check the connection of the clock and encoder-drive data, check the connection of the screen, check the encoder supply voltage, check parameter 2102 **Encoder supply**.			
7	0x80	DT1_ERR	**Cause:** 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.			
			Solution: See the encoder manufacturer's technical guide.			
16.31			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			
			(1) Can also be set after the power supply is switched off or on. (2) Only for battery-buffered encoders			

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

Bit	Value	Name	Description		
7	0x80	DT1_ERR	**Cause:** Encoder has detected malfunction and signals this to the drive via Error bit. Bits 16..31 contain the type of malfunction detected by the encoder.		
			Solution: See the encoder manufacturer's technical guide.		
16.31			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

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

10.3 Messages

Index	Error message shown on the display	Sub-code	Description
1	**Load default param**		**Condition:** 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 **Load default** 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
			Solution: Set the parameters to the value required and perform **Save parameter**
2...4	**Not used**		
5	**Autotune (motor)**		**Condition:** 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 **Take parameters** command, PAR 2020, has not been executed
			Solution: Execute the **Take parameters** command.
		4	The motor is not connected
			Solution: 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
			Solution: 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.
			Solution: Check the motor plate data or drive and motor sizes have been combined incorrectly.
		7	The self-tuning command was sent without being enabled.
			Solution: Close the enable contact before sending the self-tuning command
		8 ... 21	A self-tuning measurement has reached a drive limit.
			Solution: 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.
			Solution: 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.
			Solution: Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter.
		30	Incorrect absolute encoder impulse count
			Solution: 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.
			Solution: 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.
			Solution: Invert the A+ and A- signal of the absolute encoder.
		33	Incorrect phase sequence. (Message not signalled)
			Solution: 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.
			Solution: Repeat the procedure.
			Solution: 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: - **Rated speed**, **Motor rated speed** in rpm. • (ADL500 for Asynchronous motor) Take care not to set the **Rated speed** parameter to the synchronous speed. The value of the **Rated speed** parameter must be less than: [(**Rated frequency** * 60) / **Pole pairs**]. • (ADL500 for Synchronous motor) Take care to set the **Rated speed** parameter to the synchronous speed. - **Rated frequency**, **Motor rated frequency** in Hz - **Pole pairs**, **Motor pole pairs** If the problem persists even after following the instructions supplied, confirm the values of the motor plate data parameters, execute the **Take parameters** 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 **Take parameters** command, PAR 2020, has not been executed
			Solution: Execute the **Take parameters** command.
		4	The motor is not connected
			Solution: Connect the motor

Index	Error message shown on the display	Sub-code	Description
		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
			Solution: 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.
			Solution: Check the motor plate data or drive and motor sizes have been combined incorrectly.
		7	The self-tuning command was sent without being enabled.
			Solution: Close the enable contact before sending the self-tuning command
		8 ... 21	A self-tuning measurement has reached a drive limit.
			Solution: 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.
			Solution: 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.
			Solution: Check the electric signals of the incremental encoder. Check the value of the encoder impulse parameter.
		30	Incorrect absolute encoder impulse count
			Solution: 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.
			Solution: 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.
			Solution: Invert the A+ and A- signal of the absolute encoder.
		33	Incorrect phase sequence. (Message not signalled)
			Solution: 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.
			Solution: Repeat the procedure.
			Solution: If the message has a value other than 0 follow the instructions provided for each case and repeat automatic phasing.
6	Power config		**Condition:** 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
			Solution: Download the correct configuration on the power card
7	Save par failed		**Condition:** during transfer of the parameters from the drive to the memory of the keypado
		0H-0	Communication error
		0023H-35	Communication error
		0023H-36	Communication error
		0025H-37	The data saved on the keypad are not valid
			Solution:
8	Load par failed		**Condition:** during transfer of the parameters from the memory of the keypad to the drive
9	Load par incomplete	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 applciation 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.
			Solution: Recover a set of parameters from a compatible drive (model and size)
10	Not used		
11	Load def plc		**Condition:** may occur during loading of the parameter database saved in the Flash of the Mdplc 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
			Solution: Set the parameters to the value required and perform **Save parameter**
12	Plc cfg error		**Condition:** 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

Index	Error message shown on the display	Sub-code	Description
		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)
		Solution: Remove the Mdplc application or download a correct Mdplc application	
13 14 15 16	Plc 1 Plc 2 Plc 3 Plc 4		Reserved messages and dedicated to the PLC application. See the application manual.
17	Opt bus fault		**Condition:** 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.
		Solution: 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		**Condition**: this may occur when powering the drive, if the incorrect enable key is inserted for a given firmware function.
		xxxxH-x	
		Solution: Ask WEG to supply the correct key to enable the desired firmware function.	
19	Key expiring		**Condition:** 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.
		Solution: Ask WEG for the correct key to enable the desired firmware function.	
20	Not used		
21	Parameter error		**Condition:** 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 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.
		Solution: Set the parameter that has caused the error to the correct value and execute **Save parameters**, switch the drive off and then back on.	
22	Encoder error		**Condition:** this condition may occur when the drive is powered during encoder setup each time parameter 552 **Regulation mode** is set.
		100H-256	**Cause**: An error occurred during setup; the information received from the encoder is not reliable. If the encoder is used for feedback the **Speed fbk loss** alarm is also generated.
			Solution: Take the recommended action for the **Speed fbk loss** alarm.
		200H-512	**Cause**: The firmware on the optional encoder card is incompatible with that on the regulation card. The information received from the encoder is not reliable
			Solution: Contact WEG in order to update the firmware on the optional encoder card.
23	Not used		
24	Fw update failed		**Condition:** When updating the firmware, check whether the file is in the wrong format or corrupt.
		Solution: try again with a correct file.	
25	USB Error		**Condition:** A parameter (*) requiring insertion of a USB flash drive has been run, but the drive has not been inserted. (*): PAR 392 **Select motor,** PAR 596 **Save to USB,** PAR 598 **Load from USB,** PAR 1560 **WebApp Update,** PAR 3434 **Save rope to USB,** PAR 3436 **Load rope from USB**.
		Solution: Insert a USB flash drive containing any files required by the parameter for its execution.	

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