Motors | Automation | Energy | Transmission & Distribution | Coatings

Electronic brake control system

EBC500

User Manual

Language: English

Information about this manual

General information

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.

Table of contents

1 - Safety instructions

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.

CAUTION!

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

ATTENTION!

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

NOTE!

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

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 and authorized to install, clear, ground and tag circuits and equipment in accordance with established safety procedures.

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

1.2 Safety precautions

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.

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.

1.3 General warning

WARNING!

Only duly qualified personnel are to work on this equipment, and only after they fully understand all information regarding safety, installation, operation and maintenance given in this manual. The safe, effective operation of this unit depends on proper installation, operation and maintenance.

Risk of electrical shocks

Some electronic components may remain powered at hazardous voltages for a brief period, even after the supply voltage has been cut off. Do not open the device while the drive is powered.

Risk of fire and electrical shocks

When using measuring devices (e.g., oscilloscopes) that operate on the unit while it is powered, the casing of the oscilloscope must be grounded and a differential probe used.

To obtain accurate readings, choose probes and terminals carefully and pay attention to oscilloscope adjustment. See the manufacturer's instruction manual for proper use and adjustment of the instrumentation.

Risk of fire and explosion

Installation in hazardous areas - where flammable substances or combustible vapours or dust are present - may cause fire or explosion. The EBC500 must be installed outside such hazardous areas, even when used with motors rated for operation under these conditions.

1.4 Disclaimer

Any remote connection functions should only be used when adequate safety conditions are in place, as outlined in the applicable regulations, and only by properly trained personnel. The user is responsible for evaluating the above requirements.

1.5 Product cleaning

Cleaning the EBC of any dust must be performed with natural or synthetic cloths that are dry or dampened with water and only when EBC and panel are off.
The use of solvents may affect the surfaces of the various dataplates.
If dampened cloths are used, pay particular attention to prevent moisture or liquids from entering the device; if this happens, the device should only be turned back on after you are sure that the liquids have evaporated. If the device is contaminated with conductive liquids, do not turn the power back on and send the device in for service to run any checks.

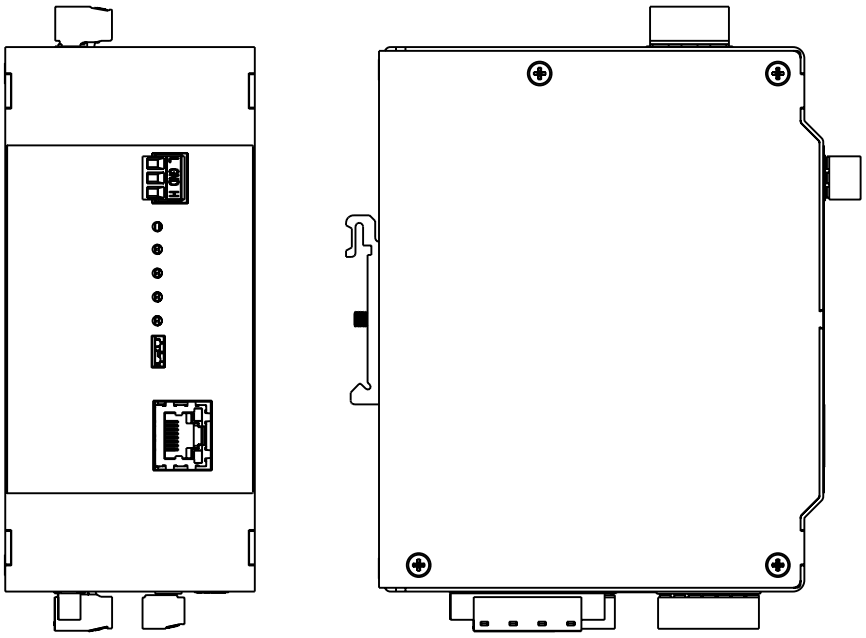
1.6 Disposal of the product

At the end of its life, the product should be disposed of according to specific local indications.
Alternatively, the customer may choose to send it back to the manufacturer (at their own expense) who will arrange for its disposal.

2 - Introduction to the product

The **EBC500** module is an electronic device used to power (open) and control the brake element; it can communicate and synchronize with ADL500 series drives.

The **EBC500** module simplifies the brake control system by eliminating rectifiers and contactors while maintaining the highest level of safety and improving brake system efficiency and overall maintenance.



Functions

The EBC500 module has two outputs for direct control of the two brake coils. Unlike normal electromechanical relays, the EBC500 controls the on/off current; it ensures that there is no overvoltage, arcing or overcurrent, thus bringing the module lifespan to over 10 years.

The EBC500 module also handles short circuits electronically, ensuring that, in the event of a brake short circuit, the output opens, thus preventing damage to the module itself or other components.

Electronic brake control ensures fast opening (Fast Off) under emergency conditions as outlined in EN 81-20/50. In addition to managing the brake electronically, which ensures longevity and safety, the EBC500 can measure the brake activation current by checking its real activation or deactivation.

Brake system operation can then be monitored by the module via brake feedback and by measuring the closing current.

The EBC500 supports the control of uncontrolled car movement as outlined in EN 81-20/50 and the new revamping requirements in UNI 10411-1.

When coupled with ADL500 series drives, the EBC500 replaces the rectifier, operating following the same logic but eliminating the contactors required to operate a conventionally powered brake.

Fully electronic and configurable, the module can be programmed either via its connected ADL500 device or independently through WEG Drivelabs configuration software. The operating voltage, current required by the brake and other parameters can be selected/configured.

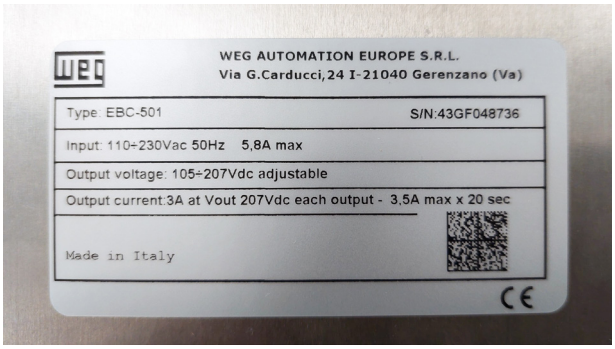
2.1 Product identification

The basic technical data for the EBC500 are documented in the code and on the dataplate.

Model designation (code)

EBC	5XX	01	
			01 = Rated Vdc Brake 207 Vdc with 2 channel brake
			Model name: **XX** = number for model identification
			Electronic brake control system, series EBC500

Dataplate



Model, serial number
Input voltage
Output voltage
Output current and maximum output current
Declaration of origin
Product QR-code
Certifications

All EBC5XX versions are featuring SBC (Safe Brake Control) safety function as defined and documented in Safety Manual.

3 - Transport and storage

CAUTION!

Proper transportation, storage, installation and assembly, as well as careful operation and maintenance are essential for correct, safe operation of the unit. During transportation and storage, protect the product from shocks and vibrations. Also ensure that it is protected from water (rain), moisture and excessive temperatures.

3.1 General information

EBC500s are carefully packaged for proper shipment.
Transportation should be made by appropriate means (see weight indications).
Pay attention to the indications printed on the packaging.

Upon delivery, immediately check that:
- the packaging shows no visible signs of damage,
- the details on the delivery note correspond to the order placed.

Open the packaging carefully and make certain that:
- no part of the unit has been damaged during transport,
- the unit corresponds to the type actually ordered.

If there are signs of damage or if the delivery is incomplete or incorrect, report the matter directly to the appropriate sales office.
The unit should be stored in a dry place and within the specified temperature limits.

NOTE!

Changes in temperature can cause moisture to condense inside the unit; this is acceptable under certain conditions but never during unit operation.

Therefore, in all cases, make absolutely certain that the unit to which voltage is applied presents no condensation!

3.2 Allowable ambient conditions

Temperature:

Storage	-25 … +55°C (-13 … +131°F) Class 1K4 according to EN 50718
Transport	-25 … +70°C (-13 … +158°F) Class 2K3 according to EN 50718

Humidity:

Storage	5 ... 95%, 1 ... 29 g/m^3 Class 1K3 according to EN 50718
Transport	95% (3), 60 g/m^3 (4)

Slight moisture (or condensation) may occasionally be generated for a brief period if the device is not in running (class 2K3 as per EN 50718).

Atmospheric pressure:

Storage	86 ... 106 [kPa] Class 1K4 according to EN 50718
Transport	[kPa] 70 to 106 (class 2K3 according to EN 50718)

(3) Higher relative air humidity values generated with the temperature at 40°C (104°F) or if the Drive is subject to an abrupt rise in temperature from -25 …+30°C (-13°…+86°F).

(4) Higher air humidity values if the Drive is subject to an abrupt drop in temperature from 70…15°C (158°…59°F).

4 - Specifications

4.1 Mechanical properties

The device has been developed to be as small as possible and as similar as possible to a contactor or DIN-rail switching power supply.

4.1.1 Dimensions and weight

MODEL	DIMENSIONS [Width x Height x Depth]		WEIGHT	
	[mm]	[inches]	[kg]	[lbs]
EBC501	66 x 144 x 116	2.59 x 5.66 x 4.56	0.68	1.5

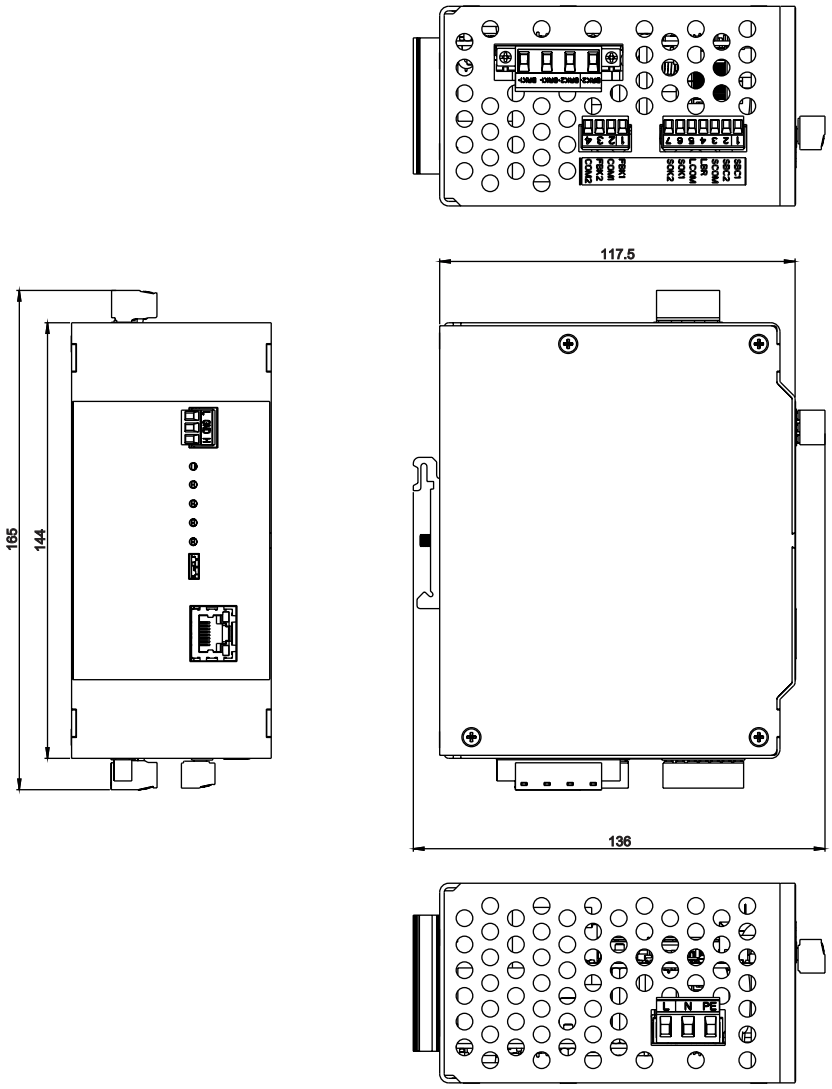


Figure 4.1.1: Dimensions

4.2 Electrical properties

The module supply voltage can range from 230 Vac to 115 Vac while the output voltage can be configured by parameters (it can never be higher than the input voltage). The boost voltage is related to the supply voltage.

The EBC has been designed to operate in various modes. In general, in the initial powering (brake opening) phase, an overvoltage, called boost, equal to the fully rectified line voltage (207 Vdc if powered at 230 Vac, 104 Vdc if powered at 110 Vac), is supplied. Following the boost, the EBC switches to supplying a voltage adjusted according to the brake characteristics and configuration.

Each channel can withstand a maximum current of 3.5 A for about 20 seconds.
The duty circle conceived for the EBC is 90% (i.e., the brake can remain powered for 90% of the time between runs).

4.2.1 Input power supply

Input voltage _____ 110 ÷ 230 Vac @50 Hz - Internal self-resetting fuse
Input current _____ 5.8 A max
Overvoltage _____ Category II

4.2.2 Output power supply

Output voltage _____ Regulated output 0 - 207 Vdc (typ. 105 Vdc, 207 Vdc)
Output current _____ 2 outputs x 3 Arms
Maximum output current
that can be handled for max 20 seconds _____ 2 outputs x 3.5 Arms

4.2.3 Protections

The EBC requires upstream protection against indirect contacts using type B RCDs which can be the same RCD used to protect the motor if the brake power supply is derived from the motor power supply line.
The EBC requires a fuse to protect the power supply line (6A gG).

Internally the EBC has:
- a short-circuit protection on the BRK1/2 outputs;
- an overvoltage protection on the input line;
- an overtemperature protection;
- an overload (current limitation) protection.

4.2.4 Power consumption

While in stand-by, to maintain communications, the ADL500 must be powered. Typical consumption in stand-by mode is about 10mA. EBC power consumption is generally insignificant when compared to that of conventional brake units. Indeed, the ability to partialize output makes it possible (if it does not cause brake function problems) to lower the brake power supply current so as to significantly lower brake system consumption.

4.2.5 Cable section

CLAMP		mm²	AWG
SUPPLY TB2	L1, N, PE	0.75 - 1.5	19 - 15
SAFETY TB9	7 ... 1	0.5 - 0.75	20 - 18
UCM TB1	4 ... 1	0.5 - 0.75	20 - 18
BRK1/2 TB3	B1+, B1-, B2+, B2-	0.5 - 0.75	20 - 18
CAN	H, L	0.2 ... 0.75	26 ... 12
ETH	1 ... 8	Ethernet Cable; category 5E shielded cable, maximum length 10 m.	

4.3 Environmental and operating conditions

Installation environment	Pollution rating of 2 (away from direct sunlight, vibrations, dust, corrosive or flammable gases, mists, vaporous oils and water drop lets; avoid high-saline environments).
Installation altitude	Max 2000 m above sea level. With a reduction in output current of 1.2% for every 100 m above 1000 m.
Mechanical installation conditions	Vibration stresses: EN 61800-2 Class 3M1.
Operating temperature	-10 … +50°C (32 … 122°F) without derating.
Humidity (operating)	max 85% rh without humidity (or condensation).
Air pressure (operating)	from 70 ... 106 kPa.
Storage	CEI EN 61800-2 Class 1K4. CEI EN 61800-2 Class 1K3.

5 - Standards references

5.1 Product standards

EN 50178

Electronic equipment for use in power installations.

EN 81-20

Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts.

EN 81-50

Safety rules for the construction and installation of lifts. Examinations and tests Design rules, calculations, examinations and tests of lift components.

5.2 Electromagnetic compatibility (EMC)

EN 12016

Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Immunity.

EN 12015

Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Emission.

5.3 Functions

IEC 61508-1

Functional safety of electrical/electronic/ programmable electronic safety-related systems - General requirements.

5.4 Certifications

CE

6 - Architecture

EBC is a brake control device specially designed for lifts.
EBC operation is based on two electronic safety switches controlled by safe inputs SBC1, SBC2.
Each of the two switches, R1 and R2, controls a power output just as contactors do in a conventional circuit.
The RECT switch controls activation of the rectifier bridge just as the brake contactor does in a conventional circuit.
When the electronic switches are enabled, the BRK1/2 outputs can generate power to open the connected brakes.
The required power is provided by a controlled rectifier, which can establish a predefined level of voltage at the outputs. An intelligent control part can best configure, adjust and measure the power output and brake operation.
The control part must communicate with the ADL500 series drive via a CAN channel.

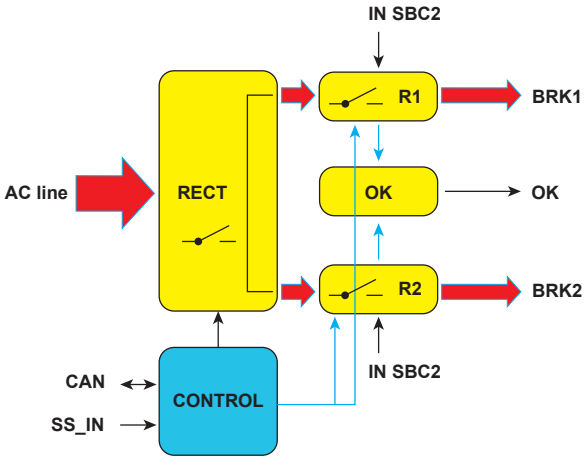


Figure 6.1: Diagram of EBC logic blocks

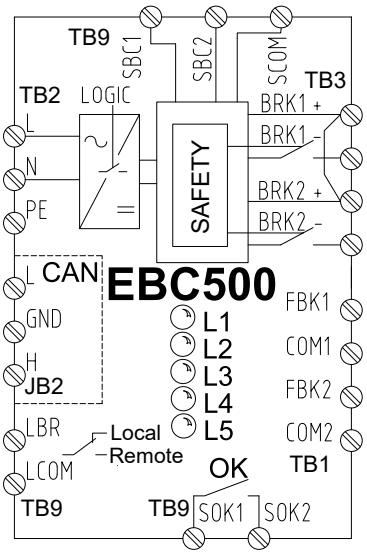


Figure 6.2: Electrical symbols associated with the EBC

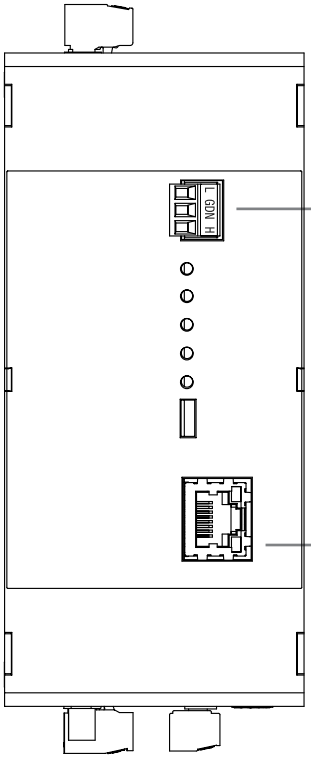
The EBC is capable of performing two types of braking:

- **Parking braking**: when parking braking is commanded, the EBC acts only on the rectifier, enabling a controlled brake cut-off without extra-voltage and limiting electromagnetic emissions.
- **Emergency braking**: in this situation, the EBC acts on electronic switches R1 and R2, thus rapidly shutting down the brakes.

7 - I/O and form factor

The EBC has a set of connectors used to connect the device power supply which, in turn, powers the brake coils, safety signals, monitoring and feedback signals required by the regulations. Below is a description of the ADL-EBC system IOs. The ADL-EBC module is designed for DIN-rail panel installation.

FRONT



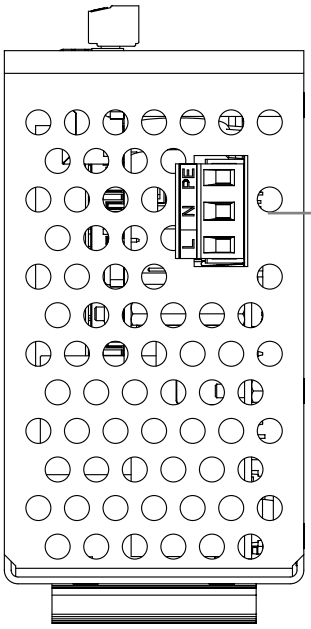
CAN
Green 3-pole terminal block. Step 3.81
CAN connector

PIN	CODE	USE
1	L	CAN L signal
2	GND	Common reference for CAN signals (referred to 0V)
3	H	CAN H signal

ETH-PC
RJ45 connector located on the front of the module.
Dedicated connection to the Service tool.

The Ethernet port is dedicated to the tool managed by the Service.

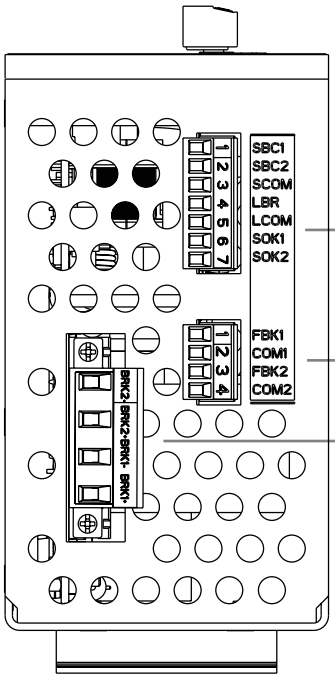
UPPER



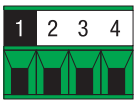
TB2
Green 3-pole terminal block. Step 7.62
Input 110-230 Vac located on top

PIN	CODE	USE
1	L	Mains phase
2	N	Mains neutral
3	PE	Mains PE

LOWER

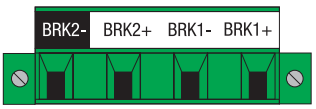


TB1
Green 4-pole terminal block. Step 3.81
Brake feedback input



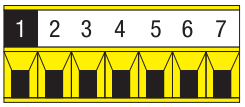
PIN	CODE	USE
1	FBK1	Brake shoe feedback - positive input 1
2	COM1	Brake shoe feedback - common input 1
3	FBK2	Brake shoe feedback - positive input 2
4	COM2	Brake shoe feedback - common input 2

TB3
Green 4-pole terminal block. Step 7.62
Brake coil output 1, Brake coil output 2



PIN	CODE	USE
1	BRK2-	Negative output to brake 2
2	BRK2+	Positive output to brake 2
3	BRK1-	Negative output to brake 1
4	BRK1+	Positive output to brake 1

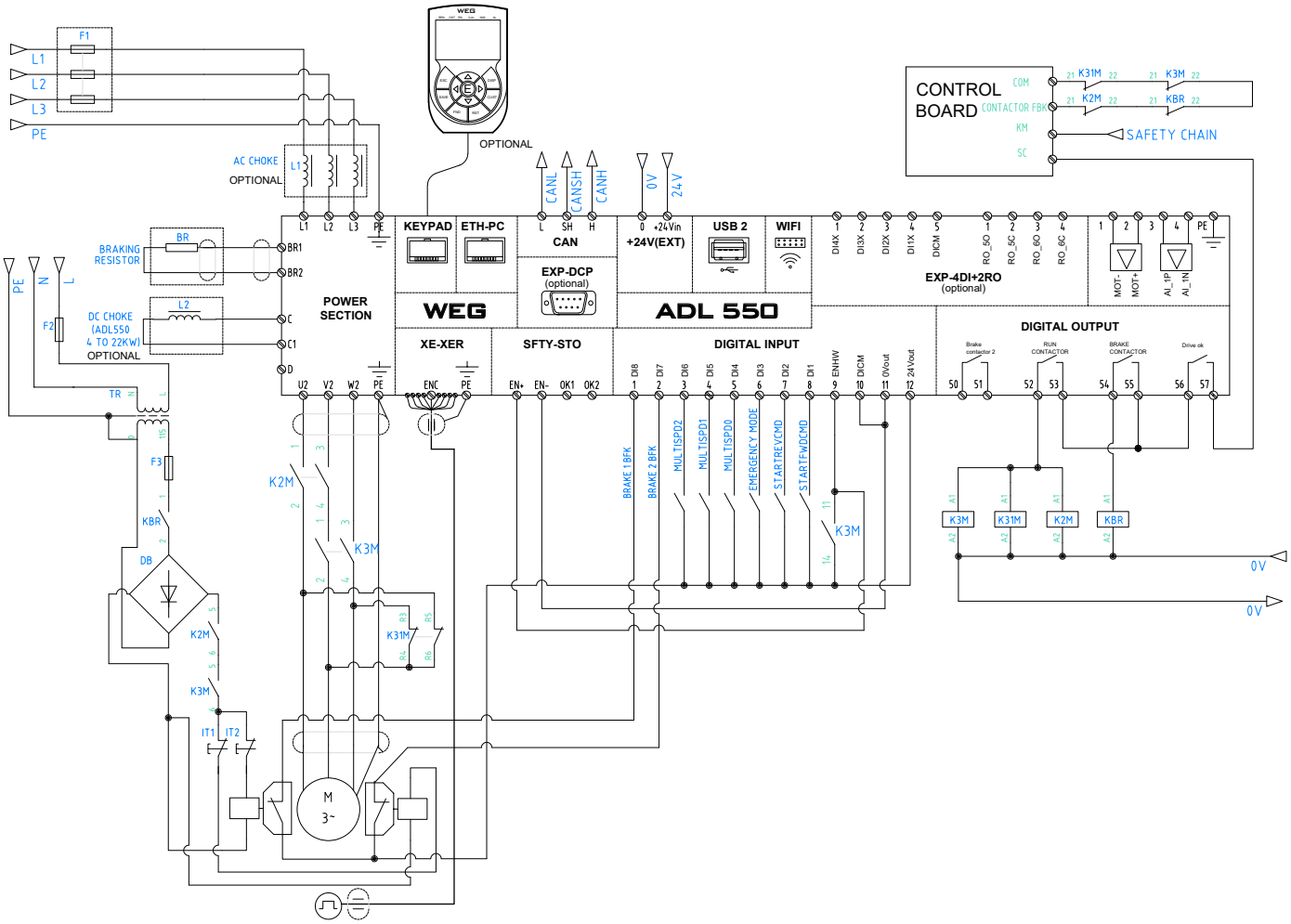
TB9
Yellow 4-pole terminal block. Step 3.81
Safety inputs, Local commands and Feedback



PIN	CODE	USE
1	SBC1	Channel 1 safety input (+24 Vdc)
2	SBC2	Channel 2 safety input (+24 Vdc)
3	SCOM	Common safety input (+0 Vdc)
4	LBR	Brake activation input in LOCAL mode
5	LCOM	Common brake activation input in LOCAL mode
6	SOK1	EBC OK status output active when brake is powered
7	SOK2	

8 - Connection diagrams

8.1 Actuation circuit for conventional brake: using only one power circuit shared by the two brake coils

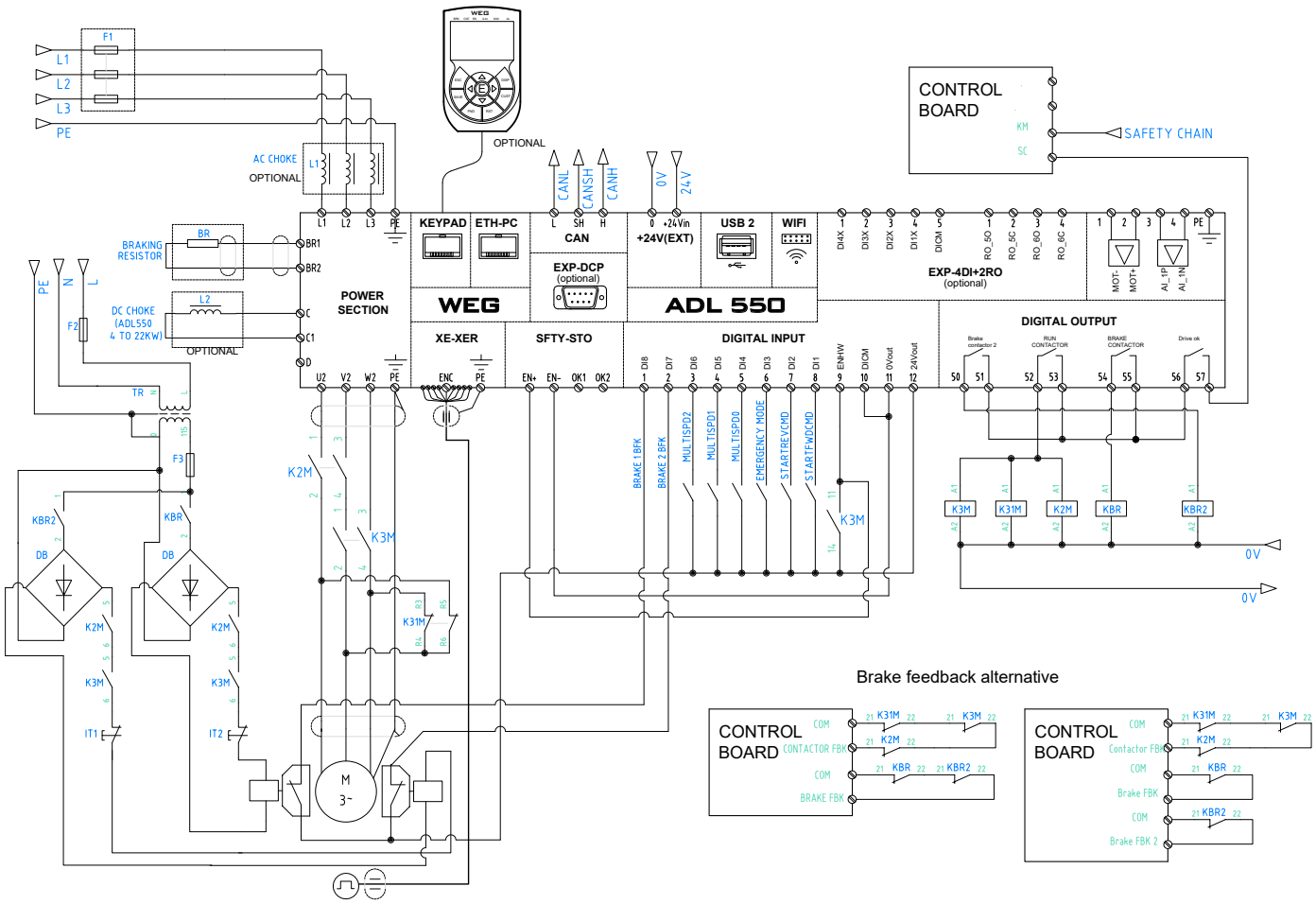


CODE	REFERENCE
K2M, K3M	Motor contactors
K31M	Motor short windings contactor
R4, K4	STO circuit safety relay, STO circuit mini contactor
KBR	Brake contactor
DB	Conventional diode bridge or power saver
TR	Transformer
IT1,IT2	Switch for brake tests

NOTE! R4 must either be a safety relay (safety-certified relay with opening and closing bonded contacts) or a mini-contactor (K4) with bonded contacts.

Figure 8.1.1: Diagram reporting a drive circuit for conventional brake using only one power circuit shared by the two brake coils.

8.2 Drive circuit for conventional brake: using an independent power circuit for each of the two brake coils

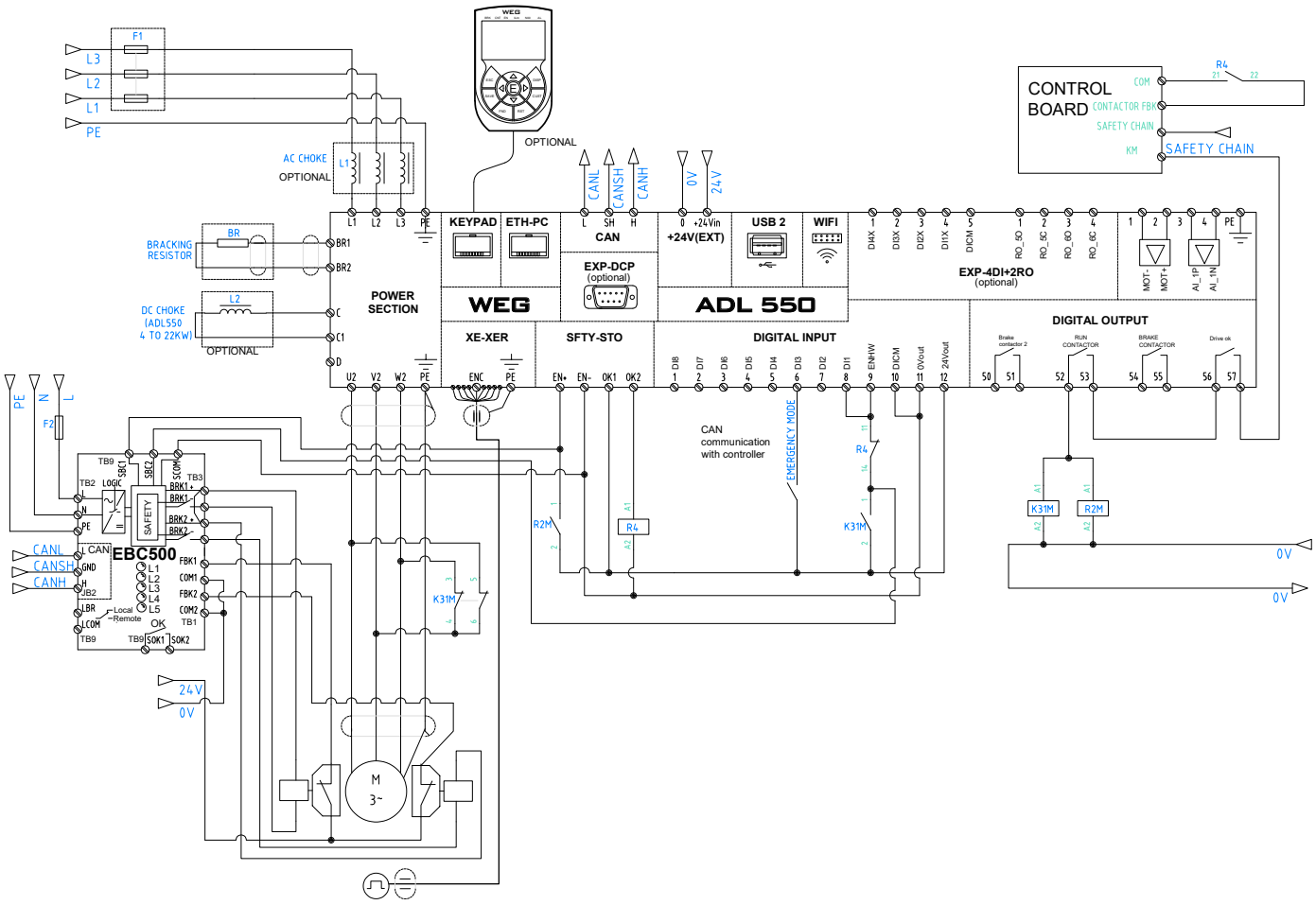


CODE	REFERENCE
K2M, K3M	Motor contactors
K31M	Motor short windings contactor
R4, K4	STO circuit safety relay, STO circuit mini contactor
KBR	Brake contactor
DB	Conventional diode bridge or power saver
TR	Transformer
IT1,IT2	Switch for brake tests

NOTE! R4 must either be a safety relay (safety-certified relay with opening and closing bonded contacts) or a mini-contactor (K4) with bonded contacts.

Figure 8.2.1: Diagram reporting a drive circuit for conventional brake using an independent power circuit for each of the two brake coils.

8.3 Typical connection of a brake drive circuit using the EBC



CODE	REFERENCE
K2M, K3M, R2M	Motor contactors
K31M	Motor short windings contactor
R4, K4	STO circuit safety relay, STO circuit mini contactor
KBR	Brake contactor
DB	Conventional diode bridge or power saver
TR	Transformer
IT1,IT2	Switch for brake tests

NOTE!

R4 must either be a safety relay (safety-certified relay with opening and closing bonded contacts) or a mini-contactor (K4) with bonded contacts. R2M in this case, using a single signal contact, can be a simple relay.

Figure 8.3.1: Diagram reporting typical connection of a brake drive circuit using the EBC and CAN communication with the control board.

8.4 Connection of the brake coils

The two EBC outputs that feed the brake coils have an internal configuration that puts in common the positive power supply of the same.

In the case where the two brake coils have, on board the motor, an independent connection in the terminal block, it is necessary to follow the connection diagram, as shown in the drawing following on the left side.

If, on the other hand, the two brake coils have a common connection that it is not possible to divide, then the connection diagram of the drawing following on the right side must be used. In any case, if there are filters between the two poles of the coils (for example PTC or diodes) it is advisable to remove them because they are already present in the EBC and because they could interfere with the brake actuation times that are managed by the EBC.

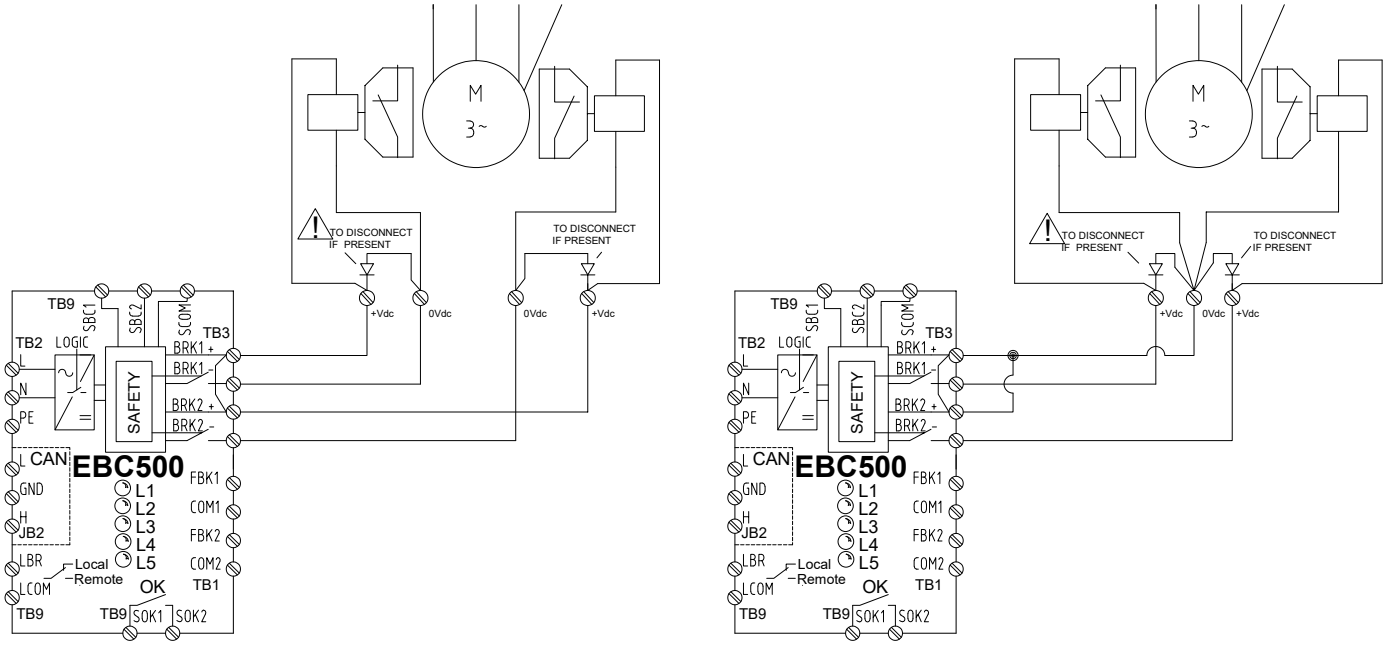


Figure 8.4.1: Connecting Brake Coils.

8.5 Connecting the feedback contacts for brake contactors

The possible configurations of contactor feedback connections are:

1. Controller has a single feedback control input.
In this case, SOK (a normally open transistor-type output) can control a dedicated input on the control board programmed as a normally open input or it can control a support relay that drives a normally closed contact.

2. Controller has two or more contactor feedback control inputs.
In this case, SOK is brought to the input normally dedicated to the KBR brake contactor. The run contactor feedback is always linked to the run drive and can be wired to the conventional K3M or to the directly driven R4 relay, how indicated in the reference diagram 8.5.1.

3. Controller has two or more brake feedback control inputs and the brake controls are split (see Figure 8.5.2).
In this case the SOK signal is carried on both KBR monitor inputs or alternatively, SOK in connected to one KBR monitor input and other input is connected to one AD550 output relay programmed how Brake feedback 2. The run contactor feedback is always linked to run drive and can be wired to the conventional K3M or to the directly driven R4 relay, how indicated in the reference diagram 8.5.2.

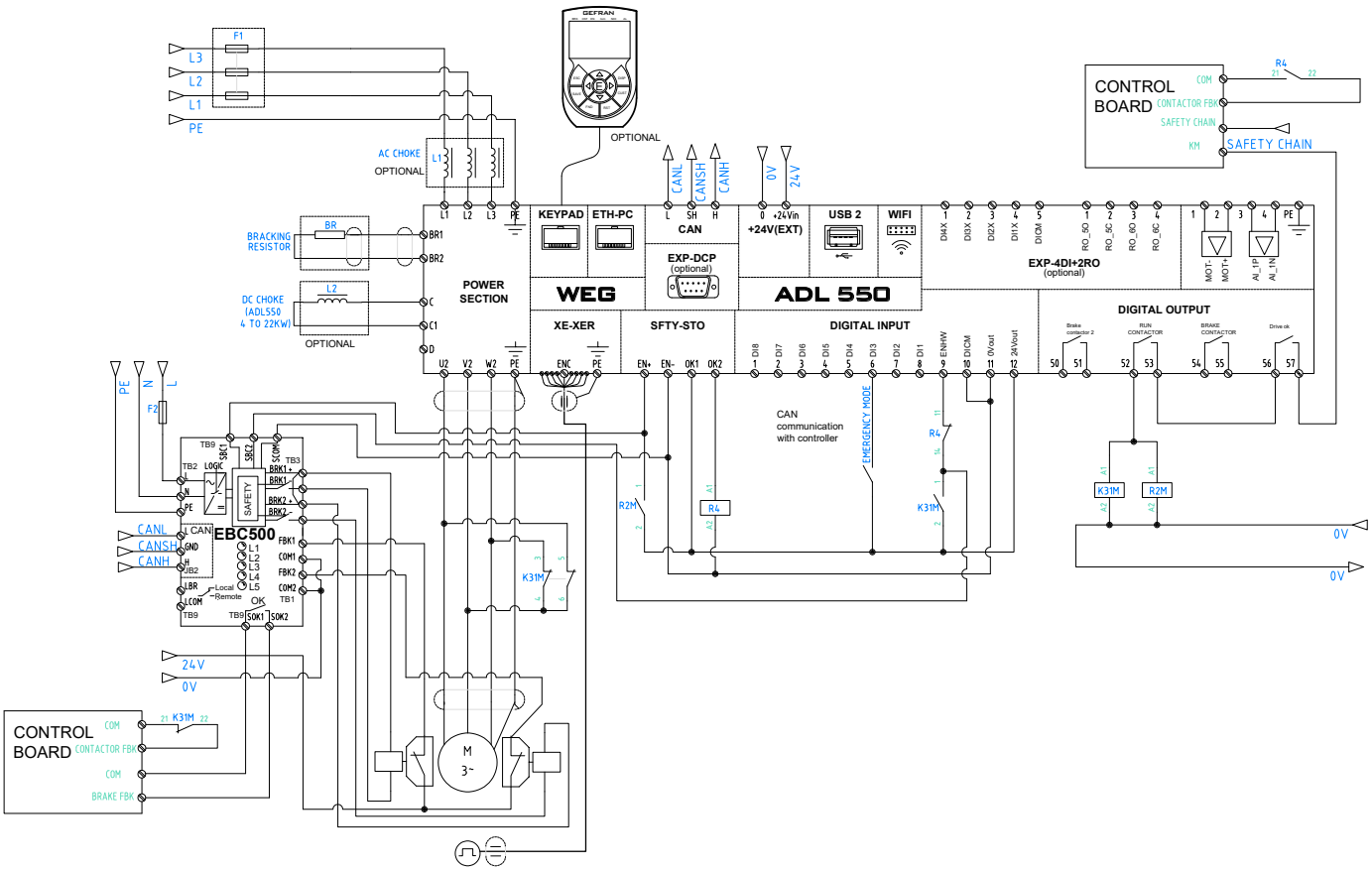
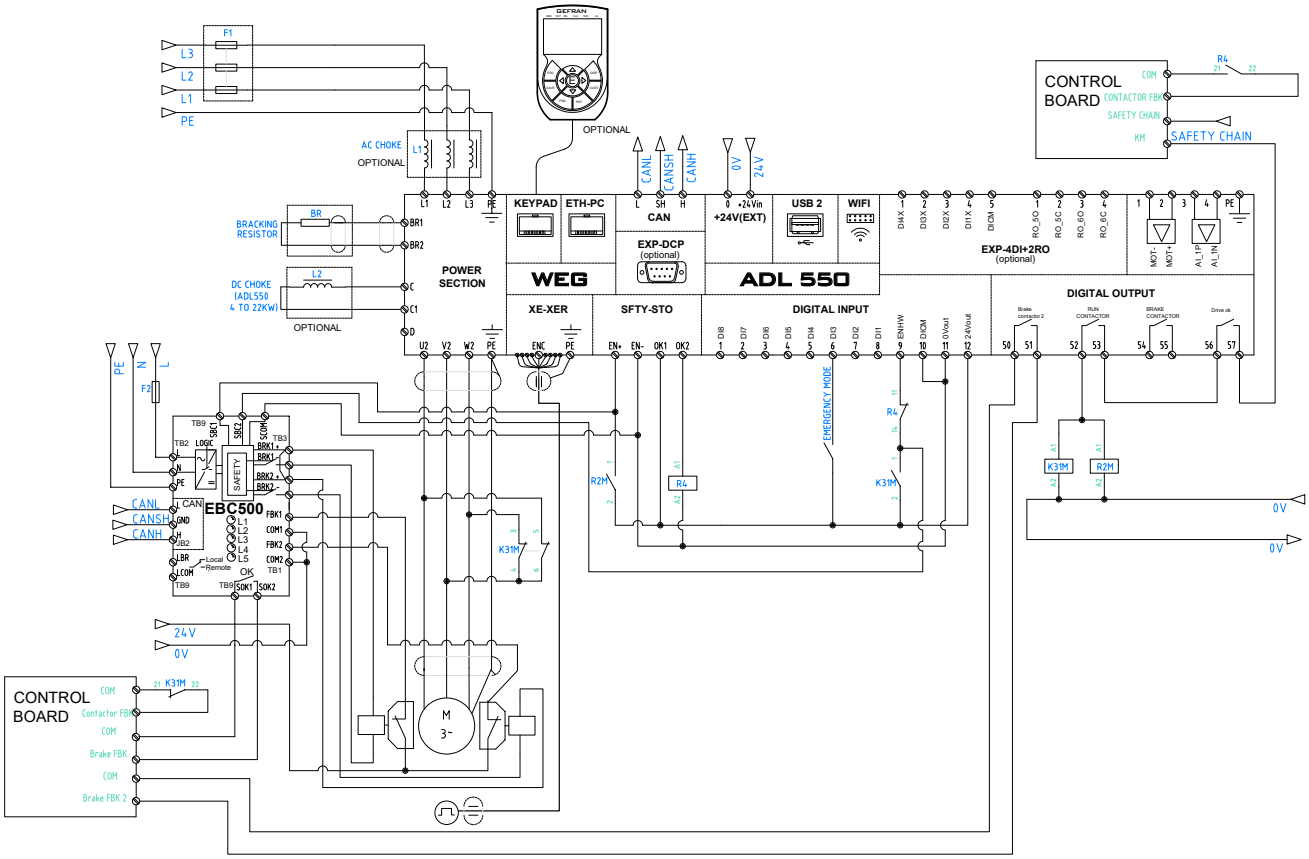


Figure 8.5.1: Connecting the 2 feedback inputs in parallel on the EBC SOK output.



QS_EBC500 figura 8.4.1b old
QS_EBC500 figura 8.5.2

Figure 8.5.2: Connecting one feedback input to the SOK output and the other feedback input to the ADL output left free by the KBR contactor, which is no longer present and is reprogrammed as brake feedback 2.

8.6 Connecting the brake self-monitoring contacts (contacts already introduced in EN81.1 amendment A3)

The brake shoe self-monitoring function can be achieved by activating the certified function on the ADL550; this is done by directly connecting two inputs to the two brake contacts or by connecting the two brake contacts to inputs FBK1 and FBK2. In the latter case, useful for saving inputs on ADL500, the EBC reports the status of the brake contacts to ADL via the fieldbus. This leaves two ADL inputs available to cover other functions.

Given the flexibility provided by the ADL500-EBC solution, it is up to the installer to decide how best to implement monitoring of brake closing:

- by managing feedback directly on the system control card;
- by managing feedback on the ADL500 inputs;
- by wiring feedback on the EBC FBK inputs.

Setting the ADL500 parameters makes it possible to handle all cases as deemed fitting.

8.7 Emergency drive circuit in Local mode

The EBC supports an operating mode called local, activated via a selector switch on the front. The local mode of operation enables the installer to manage brakes directly via physical contacts: when the EBC is in local mode, the outputs can be activated (and the brakes opened) by powering the safety inputs (SBC1, SBC2) and the local LBR control. Local mode is designed only to handle particular cases such as emergencies. The EBC cannot operate continuously in local mode.

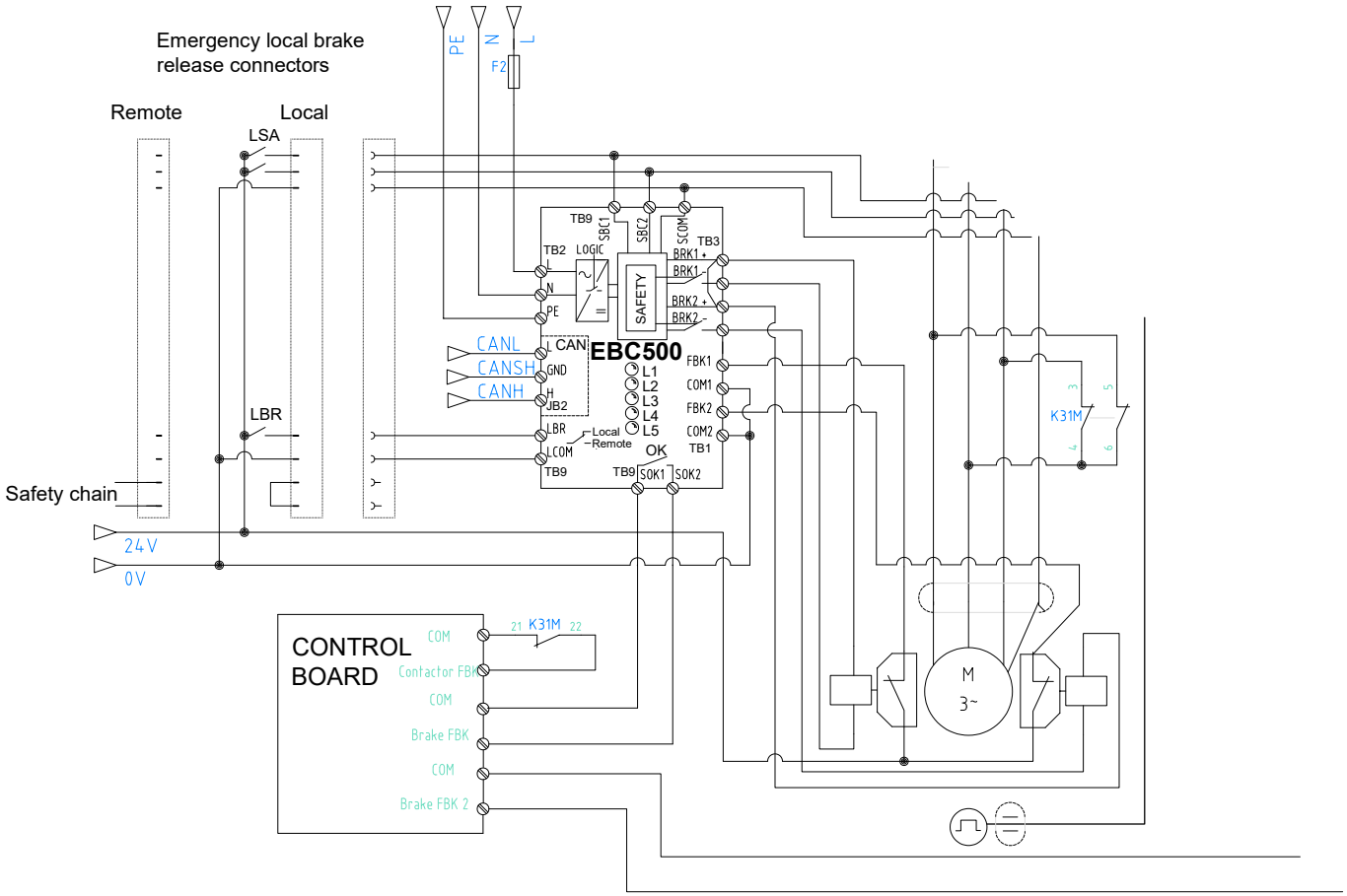


Figure 8.7.1: Diagram of a possible auxiliary circuit for local brake activation.

Predisposition for engine auto-tuning procedure in rotation with EBC.

In order to proceed with motor auto-tuning with the motor in motion, the following procedure must be followed:

1 - Disable EBC on the drive; if left active when I move the EBC microswitch from remote to local, a non resettable alarm is generated.
2 - Save and restart the drive to disable the communication changes.
3 - Put the EBC local.
4 - Set the emergency brake opening circuit in local.
5 - At the same time as the auto-tuning start command, keep the LBR input of the EBC closed to allow the brake to open.
6 - Wait for the tuning procedure to finish, taking care that the motor does not run; if in doubt, open the LBR input to allow the brake to close again.

9 - Test

With a conventional brake power system, to test brake operation with one or both shoes open and with machine running or starting from a standstill, the wiring must be physically adjusted by removing wires from the connectors or, better, by acting on the switches.

With the EBC, no manipulation of the wiring is needed because all tests are performed automatically by the ADL, with the support of the EBC which opens or closes just one of the brakes on command.
The EBC makes it possible to test brake operation and former A3 feedback contacts.

There are several of these types of tests:
- tests with stationary start with one or both brake shoes unopened;
- tests starting with car moving with one or both brake shoes being closed by depowering the motor.

Currently, these tests are performed acting directly on the terminal block connections and, when all goes well, by acting on the switches.

These tests are made possible through the EBC and ADL, operating directly from the keypad, selecting the function and keeping the key (CUST) pressed on the keypad for as long as we want to keep one or both brakes closed or open.

9.1 Test starting from car in motion

NOTE!

For both types of tests — starting from a standstill or with the car in motion and where a coil is to be powered later — it is best to set parameter 8258 to Full Voltage mode; this ensures that, after starting the run, the brake to be opened does actually open (the EBC can only handle power-saving ramps during the first brake opening, which means that subsequent powering of a coil - by pressing CUST - would occur directly in power-saving mode, hence the ensuing risk that the peak required for proper opening may not be obtained).

With the EBC, tests can be run starting with the car moving; it is achieved **by opening both brakes or opening only one**, without opening the safety chain but always performing an emergency stop.
In the latter case, the drive must manage a new emergency stop sequence by keeping the running contactors closed so that the safety inputs to the EBC remain closed until the end of the test.

9.1.1 Brake operation test starting with car moving with 125% load capacity and simultaneously closing both brakes

CASE STUDY:

Securing the system.
By calling the car down to the lowest floor and reaching the rated speed, the maintenance technician creates a situation in which power is cut off to the motor and the brakes are reclosed by simply opening the automatic safety chain valve.
The loaded car must stop with deceleration that is less than that expected for parachute deceleration (depending on the type of parachute, this ranges from 1g to 2g max).
If stopped too abruptly or for too long, the brakes must be adjusted accordingly. When the safety chains open, at most the system enters an open overtravel error which can be reset upon restarting.

When starting from a moving car, where both brakes are actually opened at the EBC level, the operation test does not require any special function: an emergency stop simply occurs when the safety chain is opened. For the EBC, this test is a normal emergency stop.

9.1.2 Brake operation test starting with car moving with 100% load capacity and closing only one of the brakes

CASE STUDY:

Securing the system.
From the ADL500 keypad, enter LIFT TEST menu \ EBC test type: Upon arrival (Par 10138).
Select the brake to be kept open during LIFT TEST \ EBC sel brake movement (Par 10140).
From the control card, start an inspection run; once the car has reached the desired speed, press CUST on the

keypad while maintaining inspection run values at all times.

When CUST is pressed, the ADL disables the drive without releasing the run contactor output and short circuit contactor output (otherwise the EBC would close the brakes); at the same time, while at the brake level, the ADL sends the EBC the command to close only that brake which, according to the selection made in parameter 10140, is not to remain open.
The manoeuvre can be completed at any time by removing the inspection run and drive, and the EBC will return to normal operating conditions by closing brakes and contactors.

9.2 Test starting with car at a standstill

Starting with car at a standstill, the test can be performed freely or it can be performed by activating the SBT test mode already present in the ADL550.

9.2.1 Free test

This test involves the manual or periodic machine torque test, achieved by applying increasing torques up to a max value; if the machine moves, an error signal is given requesting brake assembly maintenance.

The free test can be preliminary, to find out what current is able to move the motor with one or both brake shoes closed; later, this information is used as maximum current during the periodic SBT test.

CASE STUDY:

The system is secured by moving to the intermediate floor. From the ADL500 keypad, enter LIFT TEST menu \ EBC test type: At start (Par 10138).
Select the brake to be kept open during LIFT TEST \ EBC sel brake movement (Par 10140).

With the car stopped, press CUST on the keypad to initiate an inspection run from the control card.
The system will attempt to move, with one or both shoes closed; depending on how parameter 10140 is set and depending on the purpose of the test, the maintenance technician will decide when to release the CUST button to stop the test.

During the test, the keypad displays the instantaneous current value, providing the maintenance technician with a reference of the current in play; this also helps in calibrating the maximum drive current and currents used in any SBT tests.
Once the CUST drive button has been released and the EBC returned to normal conditions, the manoeuvre stops by interrupting the inspection run.

9.2.2 Test with simultaneous SBT function on both brakes

CASE STUDY:

The car must be at an intermediate stop.
Selecting “test with SBT function” calls up the menu where the test may be activated (in practice, a virtual input is activated enabling IPA11832 Set SBT while the IPA10092 SBt 2nd brake is left disabled).
A call is made to a floor near the intermediate floor.
Within the parameters given in the SBT function, the motor receives an increasing current.
The test is performed automatically in both directions (this is why the car should be brought to an intermediate floor).

If, during the test, the motor moves beyond the setting, parameter IPA14286 SBT mon alarm indicates that the test has failed. The value for this parameter is displayed on the keypad. At the same time, the IPA11840 SBT Alarm is also activated with the activity set in IPA11842.
When the test is finished, the ADL releases the run contactor output and the manoeuvre is aborted.

For systems without EBC and for systems with EBC, the SBT function is practically the same since it is the drive that, during the test, ensures that the brake is not enabled.
During the SBT test, the EBC only runs the orders issued automatically by the ADL550; indeed, it is not even necessary to enter the EBC test menu, however, the SBT test input on the ADL550 must be activated.
Automation of the SBT test - along the lines of the periodic tests required for hydraulic lifts - is being studied.

With the EBC, to perform the SBT test with both brakes closed, the virtual input assignment for the second brake must be disabled. This ensures that the ADL understands that it must run the test on both brakes and perform the test without sending the brake open command to the EBC.

9.2.3 Test SBT function on a single, alternating brake

CASE STUDY:

The car must be at an intermediate stop.
Selecting “test with SBT function” calls up the menu where the test may be activated (in practice, a virtual input is activated enabling IPA11832 Set SBT while the IPA10092 SBt 2nd brake is set to Enable).
A call is made to a floor near the intermediate floor.
Within the parameters given in the SBT function, the motor receives an increasing current.

The test is performed automatically in both directions (this is why the car should be brought to an intermediate floor), first by keeping the first brake closed and then by keeping the second brake closed.
If, during the test, the motor moves beyond the setting, parameter IPA14286 SBT mon alarm indicates that the test has failed. The value for this parameter is displayed on the keypad. At the same time, the IPA11840 SBT Alarm is also activated with the activity set in IPA11842. When the test is finished, the ADL releases the run contactor output and the manoeuvre is aborted.

9.3 Operation in case of emergency blackout

In the event of a blackout, the ALD envisages the following automatic manoeuvres to return to the floor:

1. Re-powering the motor via UPS or battery pack and re-powering of the brake circuit via UPS;
2. Imbalance manoeuvre via controlled reactivation of the brake contactor + run contactor option;
3. Battery saving manoeuvre which first intervenes through an imbalancing manoeuvre and then, in the case of a balanced car, by activating the motor.

In all these manoeuvres, the emergency activation sequence starts from the control panel phase relay which activates the control card emergency input as well as the drive emergency input. Activation of the drive emergency input prepares the drive to manage the preset emergency modes.

The presence of the EBC does not change drive behaviour.

9.4 Operation in case of ADL blocked emergency

Emergency operation is an operation by which the car is released away from floor if something breaks on the safety chain or in case of drive or control card failure.

Current regulations only cover the case of a safety chain remaining open and envisages bypass by an on-site operator with a dead man command or with an operating command equal to the one applied in case of blackout.

On the other hand, if the drive or control card presents a problem, the panel operator must set up an alternative circuit that can only be activated by dual control or with safety switches that reactivate the brake in an attempt to move the car via imbalance.

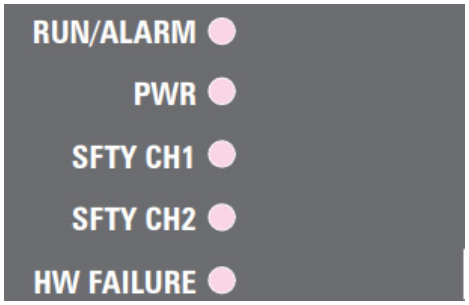
If an EBC is present, the control panel costructor must set up a circuit that, for example, via key-interlocked double push-button,
reactivates the EBC’s STO inputs and then also activates the local SS_IN activation input.

To manage emergency brake opening manoeuvres with the ADL550 locked, a double terminal block and a connector must be arranged in the operating panel; depending on the normal or emergency or local/ remote operating mode, this enables local powering of the EBC by pressing a button that activates the safety inputs and a button that activates the Local input (SS_IN) - see fig 8.7.1.

10 - Signals

The EBC front panel has a connector for CAN connection with the ADL and an Ethernet dedicated to Service for programming using WEG_Drivelabs.
A series of LEDs indicate the EBC operating status.
There is also a selector switch on the front panel that, in case of an emergency such as ADL failure, enables the EBC to also operate in local mode; this is achieved by activating a physical input in addition to the safety inputs.

10.1 Diagnostic LEDs



LED	NAME	COLOUR	FUNCTION
1	**RUN / ALARM**	Green (flashing)	CAN pre-operational
		Green (on steady)	CAN operating
		Red (flashing)	Non-blocking software error
2	**PWR**	Green (on steady)	Power supply OK
3	**SFTY CH1**	Off Yellow (flashing slowly) Yellow (on steady)	Safety input SBC1 not powered Safety input SBC1 powered Safety input SBC1 and brake 1 output powered Safety channel SBC1 in alarm
4	**SFTY CH2**	Off Yellow (flashing slowly) Yellow (on steady)	Safety input SBC2 not powered Safety input SBC2 powered Safety input SBC2 and brake 2 output powered SBC2 safety channel in alarm
5	**HW FAILURE**	Yellow (fast flashing)	Hardware error

11 - ADL / EBC Communications

Communication between the EBC and ADL550 takes place through the CANOpen connection, a connection that can be shared with the control card and its peripherals.

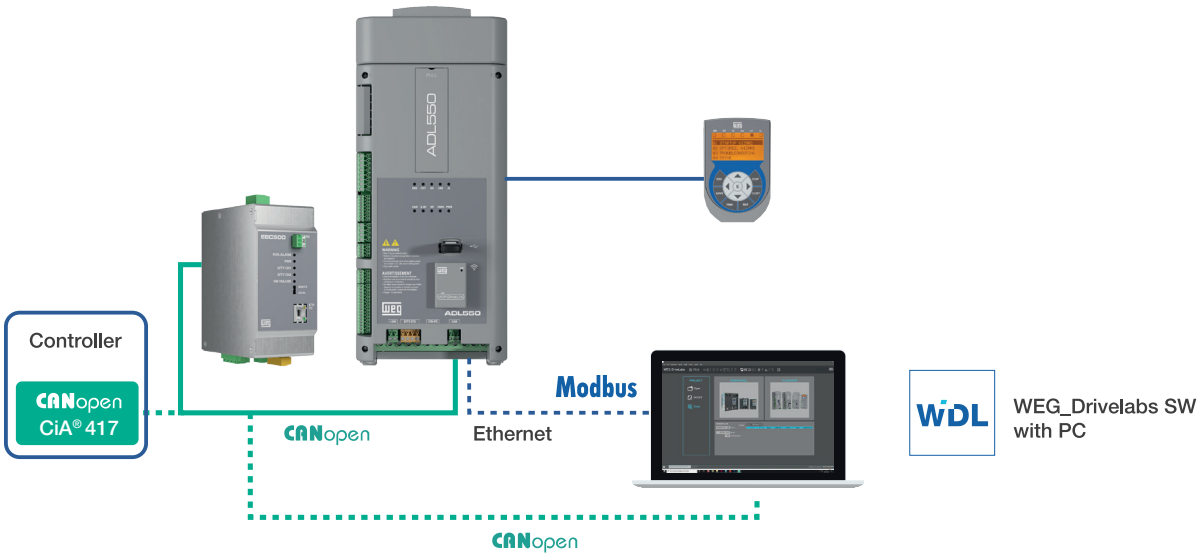
CAN communication between EBC and ADL works automatically without having to activate parameter 4000 communication mode which only refers to the communication mode between the drive and the elevator control board.
For the same reason, the CAN LED on the drive does not respond to the status of the CAN communication between ADL550 and EBC. To monitor the status of CAN communication between EBC and ADL550, refer to the CAN LED on the EBC.

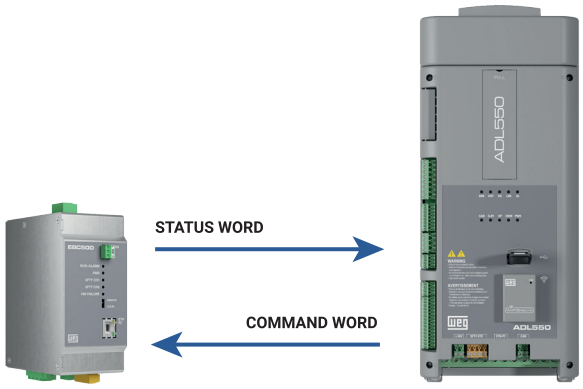
EBC programming can be achieved via:

- ADL550 keypad;
- WEG_DriveLabs from the ADL550 through the ADL550's EBC-dedicated menus;
- WEG_DriveLabs by connecting directly to the EBC Ethernet port;
- App Liftouch via Wi-Fi or EtherNet port connecting directly to ADL550.

Essentially, communication between the EBC and the ADL550 takes place by exchanging **strings called status word and control word**. The EBC uses the status word to send the ADL information regarding its status; instead, with the control word, the ADL550 sends commands to the EBC.

The EBC firmware is designed to defer decisions on its operation to the ADL.

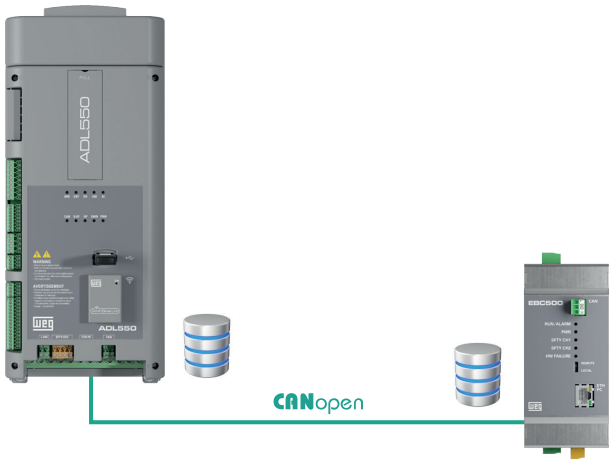




11.1 Management of stored information

The EBC is a stand-alone device with its own parameters database. The installer can configure the parameters at the bench, using the Drivelabs configuration software.

However, when the EBC is connected to the ADL500, the ADL500 becomes the system master and dominates system configuration. The installer should pay attention to the ADL500 - EBC system configuration; when the ADL500 is connected to the EBC via CAN and communication is enabled, the ADL500 parameter configuration is copied to the EBC.



12 - Programming

The EBC is delivered already preprogrammed. With EBC the brake state can be monitored in 2 manner:

- Brake feedback;
- Power managment.

Power management

If we use power management for brake feedback monitoring only the following two parameters are essential for proper operation:

- rated power if not using the brake in power saving mode;
- holding power if the brake is used in power saving mode.

If only the brake's rated power and rated voltage are given in non power-saving mode and you wish to use one of the power-saving modes, the voltage values reaching the brake in power-saving mode must be entered while the following formula must be used to enter the holding power:

$$\frac{V\ holding^2 \times P\ rated}{V\ rated^2}$$

For example, for a brake with a rated voltage of 207 Vdc and rated power of 100W, if you wish to use the brake in power-saving mode at 103.5 Vdc (the value indicated by the manufacturer), the power value to be entered is 103.52 x 100 / 2072 = 25 W

Brake feedback monitoring (only available with ADL550 fw 3.1.7 or upper)

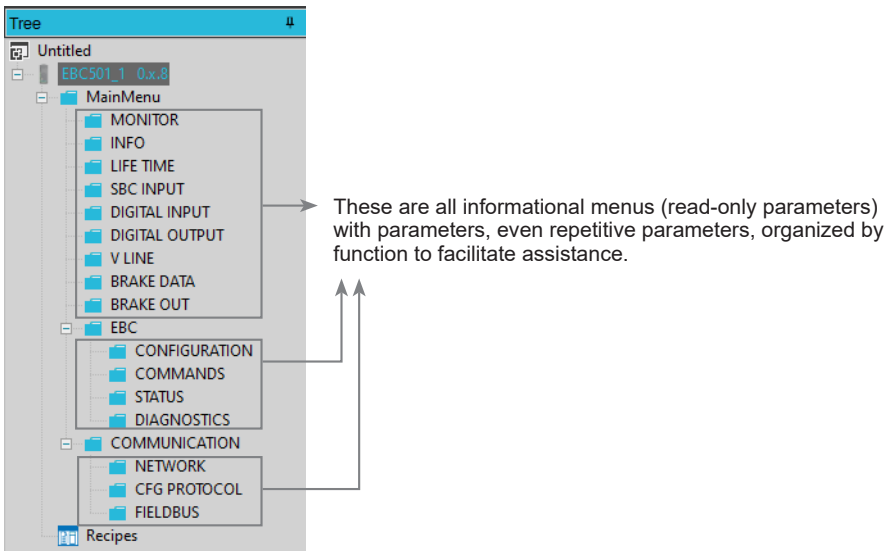
If we use this type of monitoring brake shoe feedback contact (activated by PAR 2003 Use Brake Feedbacks) are used also from EBC for monitor the brake state. Respect Power mode is not necessary to calculate the holding power but EBC need to know only at with holding voltage we want that brake will work in power saving mode.
Below is a description of the menus built into the ADL and created in the EBC to manage its operation and programming, both locally and remotely via the ADL, its menus visible from both keypad and WEG_Drivelabs via the Ethernet port dedicated exclusively to the Service it is then possible to programme the EBC directly via WEG_Drivelabs without going through the ADL.
Since the database is unique, the parameters displayed in the EBC and ADL will also be the same.
(Note: the EBC and ADL have different IPAs for the same parameters).

The only differences are:

- more parameters are displayed in the EBC than are present in the ADL (e.g., those dedicated to the EBC network address configuration);
- the EBC operation monitoring data. In the EBC, the same data are present in different menus, each optimized to manage a different aspect of the device.

Let us therefore begin by describing the parameters with reference to their organisation within the EBC; thereafter we will see how they are displayed within the ADL550, pointing out any differences when present.
In the ADL550, the various menus dedicated to the EBC will only be displayed if the EBC is activated in the ADL550 through the only configuration menu always visible.

12.1 Dedicated EBC menus



12.2 List of EBC parameters and features dedicated to the service tool

Legend

NB: Parameter numbering is related to the EBC connecting to it directy by service tool and WEG_DriveLabs.

1.1 MAIN MENU (Level 1 menu)

1.1.1 MONITOR (Level 2 sub-menu)

0	1	2	3	4	5	6	7	8	9	10	11
Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev.	Vis.
1.1.1	**316**	**STO IN 1 mon**							R		ALL
		Monitor of safety input status SBC1									
		Active	the input is powered								
		Not Active	the input is disabled								

0	Indexing of the menu and parameter		
1	Parameter identifier		
2	Parameter description		
3	UM: unit of measure		
4	Type of parameter	BIT	Boolean, from modbus seen as 16 bits
		ENUM	Selection list, from modbus seen as 16 bits
		FLOAT	Real, from modbus seen as 32 bits
		INT16	Integer with sign 16 bits, from modbus seen as 16 bits
		INT32	Integer with sign 32 bits, from modbus seen as 32 bits
		ILINK	Selection list, from modbus seen as 16 bits
		LINK	Selection list, from modbus seen as 16 bits
		UINT16	Integer without sign 16 bits, from modbus seen as 16 bits
		UINT32	Integer without sign 32 bits, from modbus seen as 32 bits
		STRING16	16 character string
		FBM2SIPA	IPA of the parameter received from the CAN master
		FBF2MIPA	IPA of the parameter sent to the CAN master
5	Format of data exchanged on Fieldbus		16=16BIT, 32=32BIT, 16/32= 16/32BIT
6	Default value (1)	CALCF CALCI SIZE	Value calculated as a number with floating point Value calculated as a whole number Value depending on the size of the drive
7	Minimum value		
8	Maximum value		
9	Accessibility	R	Read
		W	Write
		Z	Parameters that can be modified ONLY with the drive disabled
10	Level	RO	Read Only
		INT	Intermediate
		EXP	Expert
		SRV	Service
		ESY	Easy
11	Visibility	F	Open loop V/f mode control, asynchronous motor (PAR 540 = ASY SSC, Default).
		V	Field oriented vector mode control, asynchronous motor (PAR 540 = ASY FOC).
		Y	Field oriented vector mode control for permanent magnet synchronous motor (PAR 540 = SYN FOC).
[*]	Selection lists: The "Source.../Src..." format parameters are linked to a selection list. The source of the signal that will control the parameter can be selected from the list indicated. The lists are indicated in paragraph D of this manual.		

(1) The default value is usually common for Synchronous and Asynchronous versions. When it is different, the value of the synchronous version is indicated into brackets.

e.g.: PAR 11012 Pulley diameter, Def= 0.6 (0.32), 0.6 = default ver. asynchronous, (0.32)= default ver. synchronous.

1.1 MAIN MENÙ

1.1.1 MONITOR

The monitor menu contains all the monitoring parameters.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.1	**316**	**IN SBC1 mon**		ENUM					R		ALL
		Monitor of safety input status SBC1.									
		Active	the input is powered								
		Not active	the input is disabled								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.2	**317**	**IN SBC2 mon**		ENUM					R		ALL
		Monitor of safety input status SBC2.									
		Active	the input is powered								
		Not active	the input is disabled								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.3	**320**	**SOK out mon**		ENUM					R		ALL
		Output status monitor SOK.									
		Active	The parameter is active, and the corresponding pure relay contact closes when both SBCx safety inputs are powered, the ADL brake close command has been issued (or the LBK input has been powered), and the EBC outputs are powered. The SOK output remains powered if the EBC detects that the current passing through the brake coils is consistent with the rated current.								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.4	**402**	**V Line rms mon**	Vrms	FLOAT					R		ALL
		Monitor reporting the rms voltage input to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.5	**404**	**V Line Frequency mon**	Hz	FLOAT					R		ALL
		Monitor reporting the voltage frequency input to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.6	**506**	**BRK 1 Current avg mon**	A	FLOAT					R		ALL
		Monitor reporting the average current present at the brake coil 1 output.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.7	**556**	**BRK 2 Current avg mon**	A	FLOAT					R		ALL
		Monitor reporting the average current present at the brake coil 2 output.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.8	**2000**	**EBC Configuration**		ENUM					R		ALL
		Monitor indicating the type of output configuration.									
		Brake 1-2	currently the only type envisaged								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.9	**2001**	**EBC Mode**		ENUM					R		ALL
		Parameter indicating the command source configuration status.									
		Remote	the commands are sent to the EBC via the CANOPEN fieldbus								
		Local	the commands are sent via digital signals on the EBC's LBR input								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.10	**1062**	**EBC Brake 1 Out mon**		ENUM					R		ALL
		Monitor indicating the output status.									
		1	output current present								
		0	output not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.11	**1067**	**EBC Brake 2 Out mon**		ENUM					R		ALL
		Monitor indicating the output status.									
		1	output current present								
		0	output not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.12	**1060**	**EBC Brake 1 state mon**		ENUM					R		ALL
		Brake 1 feed circuit status monitor.									
		Brake ON	the brake is powered								
		Brake OFF Safe	the brake is safely closed because the safety inputs are not powered								
		Brake OFF	the brake is closed but the safety inputs are still powered								
		Brake STS Fail	the EBC is blocked with an active alarm								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.13	**1065**	**EBC Brake 2 state mon**		ENUM					R		ALL
		Brake 2 feed circuit status monitor.									
		Brake ON	the brake is powered								
		Brake OFF Safe	the brake is safely closed because the safety inputs are not powered								
		Brake OFF	the brake is closed but the safety inputs are still powered								
		Brake STS Fail	the EBC is blocked with an active alarm								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.14	**1055**	**EBC Alarm mon**		ENUM					R		ALL
		EBC Alarms Status Monitor.									
		Active	alarms are active on the EBC								
		Not active	there are no alarms on the EBC								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.15	**1054**	**EBC Warning mon**		ENUM					R		ALL
		EBC Warning Status Monitor.									
		Active	warnings are active on the EBC								
		Not active	there are no warnings on the EBC								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.16	**900**	**PWR Bridge Temperature mon**	°C	FLOAT					R		ALL
		Monitor reporting the temperature of the controlled rectifier bridge.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.1.17	**902**	**PWR Bridge Temperature Sensor Alarm**		ENUM					R		ALL
		Monitor reporting the temperature alarm status of the controlled rectifier bridge.									
		Active	the alarm is in progress								
		Not active	the alarm is not in progress								

1.1.2 INFO

Under the INFO menu, even more detail is given regarding parameter operation and may also be useful during any support. The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.1	**170**	**Product ID**		unsigned Int					R		ALL
		Parameter indicating the EBC identifier.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.2	**172**	**Product Type**		ENUM					R		ALL
		Parameter indicating the EBC model.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.3	**174**	**Product Version**		unsigned Int					R		ALL
		Parameter indicating the firmware version.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.4	**176**	**Product SN**		unsigned Int					R		ALL
		Parameter indicating the EBC serial number.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.5	**178**	**Boot Version**		unsigned Int					R		ALL
		Parameter indicating in Boot version for the EBC operating system.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.6	**180**	**OP Version**		unsigned Int					R		ALL
		Parameter indicating the operating system version.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.2.7	**9600**	**MAC address**		String					R		ALL
		Parameter indicating EBC MAC address.									

1.1.3 LIFETIME

Under the LIFETIME menu, even more detail is given regarding parameter operation and may also be useful during any support. The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.3.1	**200**	**Time power On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.3.2	**202**	**Time SCR power On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC controlled bridge has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.3.3	**206**	**Time Break 1 On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC brake 1 output has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.3.4	**210**	**Time Break 2 On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC brake 2 output has been on.									

1.1.4 SBC INPUT

Under the SBC INPUT menu, even more detail is given regarding parameter operation and may also be useful during any support. The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.4.1	**316**	**IN SBC1 mon**		ENUM					R		ALL
		Monitor indicating the input status for safety SBC1.									
		Active	the safety input is powered correctly								
		Not active	safety input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.4.2	**317**	**IN SBC2 mon**		ENUM					R		ALL
		Monitor indicating the input status for safety SBC2.									
		Active	the safety input is powered correctly								
		Not active	safety input not powered								

1.1.5 DIGITAL INPUT

The Digital input menu monitoring parameters refer to 3 digital inputs.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.5.1	**302**	**LBR mon**		ENUM					R		ALL
		Monitoring of LBR input status.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.5.2	**303**	**IN FBK1 mon**		ENUM					R		ALL
		Monitoring of FBK1 input status.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.5.3	**304**	**IN FBK2 mon**		ENUM					R		ALL
		Monitoring of FBK2 input status.									

1.1.6 DIGITAL OUTPUT

The monitoring parameters for the Digital Output menu refer to the EBC digital outputs.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.6.1	**320**	**SOK out mon**		ENUM					R		ALL
		Output status monitor SOK.									

1.1.7 V LINE

The parameters in this menu monitor the power supply to the EBC.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.1	**402**	**V Line rms mon**	Vrms	FLOAT					R		ALL
		Monitor reporting the rms voltage input to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.2	**404**	**V Line Frequency mon**	Hz	FLOAT					R		ALL
		Monitor reporting the input voltage frequency to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.3	**400**	**V Line mon**	V	FLOAT					R		ALL
		Monitoring the instantaneous voltage present at the EBC input.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.4	**406**	**V Line Theta mon**	rad	FLOAT					R		ALL
		Monitor reporting the instantaneous value of the input voltage angle.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.5	**321**	**Overvoltage Pwr Safe mon**		ENUM					R		ALL
		Monitoring the presence of a safety input overvoltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.7.6	**322**	**Pwr Safe Fail mon**		ENUM					R		ALL
		Monitoring the failure situation on the internal power circuit for the safety part.									

1.1.8 BRAKE DATA

The Brake data menu parameters can be modified by the user to configure the EBC according to the electrical properties of the connected brake.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.1	**3000**	**Brake Holding Voltage**	V	FLOAT		103.5	1.0	207	RW		ALL
		Holding voltage value. If parameter 3008 is set to holding voltage mode, then the internal bridge output voltage is adjusted to provide the set brake output holding voltage. Some manufacturers indicate this voltage on the brake dataplates along with the brake rated power and voltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.2	**3002**	**Brake Holding Power**	W	FLOAT		76	1.0	350	RW		ALL

Rated brake power in holding mode indicated by the manufacturer on the brake dataplate.

If only the brake's rated power and rated voltage are given in non power-saving mode and one of the power-saving modes is to be used, the voltage values reaching the brake in power-saving mode need to be entered while the following formula must be used to enter the holding power: $V\ holding^2 \times Prated / Vrated^2$.
For example, for a brake with a rated voltage of 207 Vdc and rated power of 100W, if you wish to use the brake in power-saving mode at 103.5 Vdc (the value indicated by the manufacturer), the power value to be entered is $103.5^2 \times 100 / 207^2 = 25$ W

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.3	**3004**	**Brake ON Holding Current Thr Perc**	%	FLOAT		80	0.0	200	RW		ALL
		Value in a percentage of the rated current. Threshold current below which the EBC considers the brake to be properly powered (thus open).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.4	**3006**	**Brake OFF Holding Current Thr Perc**	%	FLOAT		20	0.0	200	RW		ALL
		Value in a percentage of the rated current. Threshold current above which the EBC considers the brake as not powered (thus closed).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.5	**3008**	**Brake Power ON Mode**		ENUM		Boost / Half voltage			RW		ALL
		Brake start up and holding modes. **Full voltage** — the brake is activated with the input voltage rectified for both initial and holding phases **Boost/Half voltage** — the brake is activated with the input voltage rectified for the first milliseconds indicated by parameter 3009 and then the output voltage is halved within the EBC by cutting a half-wave output from the bridge **Boost/Holding voltage** — the brake is activated with the input voltage rectified for the first milliseconds indicated by parameter 3009 and then the output voltage is modulated to keep it equal to the voltage set by parameter 3000, Holding voltage									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.6	**3009**	**Brake Power Boost Time**	Ms	unsigned Short		1000	0	5000	W		ALL
		Time for which the output voltage is held, equal to the value of the rectified input voltage (Boost time).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.7	**3010**	**Brake Holding Current**	A	FLOAT					R		ALL
		Rated Brake Current = Rated Power / Holding Voltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.8	**3012**	**Brake ON Holding Current Thr**	A	FLOAT					R		ALL
		Indication of the current calculated by the EBC as the value corresponding to the threshold, in %, given by parameter 3004.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.9	**3014**	**Brake OFF Holding Current Thr**	A	FLOAT					R		ALL
		Indication of the current calculated by the EBC as the value corresponding to the threshold, in %, given by parameter 3006.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.10	**3016**	**Brake Holding Theta angle**	rad	FLOAT					R		ALL
		Value of the leading angle for the voltage modulation present on the EBC brake outputs during the holding time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.11	**3100**	**Brake Output Voltage Equivalent**		FLOAT					R		ALL
		This value is the equivalent medium Brake out voltage that EBC can output in low noise mode nearest to PAR 3000 Brake Holding voltage. If Low noise par is deactivated this value correspond to Brake holding voltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.8.12	**2500**	**Low Noise**		BOOLEAN		ON			RW		ALL
		Activation of low noise function.									
		0 OFF	parameter is teactivated and Holding voltage, nomina power and holding power are necessary								
		1 ON	brake autoconfiguration si activated								

1.1.9 BRAKE OUT

The monitoring parameters in the Brake out menu make it possible to monitor the status of the outputs powering the brake coils.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.1	**506**	**BRK 1 Current avg mon**		ENUM					R		ALL
		Monitoring of average output current to brake 1.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.2	**556**	**BRK 2 Current avg mon**		ENUM					R		ALL
		Monitoring of average output current to brake 2.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.3	**502**	**BRK 1 Current mon**		ENUM					R		ALL
		Monitoring of instantaneous output current to brake 1.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.4	**552**	**BRK 2 Current mon**		ENUM					R		ALL
		Monitoring of instantaneous output current to brake 2.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.1	**323**	**BRK 1 CC mon**		ENUM					R		ALL
		Monitoring the status of alarm BRK1.									
		Active	brake 1 output is short-circuited								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.2	**324**	**BRK 2 CC mon**		ENUM					R		ALL
		Monitoring the status of alarm BRK2.									
		Active	brake 2 output is short-circuited								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.3	**347**	**BRK 1 CTRL mon**		ENUM					R		ALL
		Monitoring of command to start BRK1.									
		SBC1 present									
		Active	brake 1 open command is active (command sent by ADL in remote mode or from LBR input when in local mode)								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.1.9.4	**348**	**BRK 2 CTRL mon**		ENUM					R		ALL
		Monitoring of command to start BRK2.									
		SBC2 present									
		Active	brake 2 open command is active (command sent by ADL in remote mode or from LBR input when in local mode)								

1.2 EBC

1.2.1 CONFIGURATION

The parameters in the Configuration menu are used to define how the EBC is configured in terms of operating mode. The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.1	**2000**	**EBC Configuration**		ENUM					R		ALL
		Monitor indicating the type of output configuration.									
		Brake 1-2	currently the only type envisaged								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.2	**2001**	**EBC Mode**		ENUM					R		ALL
		Parameter indicating the command source configuration status.									
		Remote	the commands are sent to the EBC via the CANOPEN fieldbus								
		Local	the commands are sent via digital signals on the EBC's LBR input								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.3	**2500**	**Low Noise**		BOOLEAN		ON			RW		ALL
		Activation of low noise function.									
		0 OFF	low noise function deactivated and output voltage setted by PAR 3000 Brake Holding Voltage								
		1 ON	low noise function activated and output voltage setted nearest PAR 3000 value allowed by function								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.4	**2002**	**EBC Local Mode**		ENUM					R		ALL
		Parameter defining how brake reopening is to take place in Local mode.									
		Emergency stop	stopping occurs by simultaneously opening the bridge and the outputs which immediately stop the brake								
		Smooth stop	the stop occurs via opening of the controlled bridge and brake current recirculation which causes a gradual release								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.5	**2003**	**Use Brake Feedbacks**		BOOLEAN		ON			RW		ALL
		Activating this parameter Brake power and current value are evaluated automatically by EBC and only Holding voltage is necessary for configure EBC powering parameters.									
		0 OFF	parameter is teactivated and Holding voltage, nomina power and holding power are necessary								
		1 ON	brake autoconfiguration si activated								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.6	**2004**	**Brake Feedback Inv**		BOOLEAN		OFF			RW		ALL
		This parameter permit to EBC to couples to brake feedback contacts that are normaly closed or normaly opened.									
		0 OFF	to be setted if brake feedback contact is normaly open (contact is opened if brake is closed with coils not energized)								
		1 ON	to be setted if brake feedback contact is normaly closed (contact is closed if is closed with coils not energized)								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.1.7	**2006**	**Brake Feedback Swap**		BOOLEAN		OFF			RW		ALL
		This parameter permit to EBC to swap input feedback contacts.									
		0 OFF	feedback brake 1 contact is associated to EBC output brake 1 and feedback brake 2								
		1 ON	feedback brake 1 contact is associated to EBC output brake 2 and feedback brake 2 contact is associated to EBC output brake 1								

1.2.2 COMMANDS

The Commands menu contains parameters related to the command word.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.2.1	**1001**	**EBC Command word mon**	Hex	unsigned Short					R		ALL
		Hexadecimal value indicating the status of the command word.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.2.2	**1002**	**EBC Brake Close mon**		ENUM					R		ALL
		Monitoring the state of the EBC rectifier bridge output.									
		Active	the bridge is activated								
		Not Active	the bridge is deactivated and brake outputs are off								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.2.3	**1003**	**EBC Brake 1 Close mon**		ENUM					R		ALL
		Monitoring the status of brake 1 output.									
		Active	BRK1 is closed								
		0	BRK1 is open, not active								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.2.4	**1004**	**EBC Brake 2 Close mon**		ENUM					R		ALL
		Monitoring the status of brake 2 output.									
		Active	BRK2 is closed								
		0	BRK2 is open, not active								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.2.5	**1005**	**EBC Alarm Reset mon**		ENUM					R		ALL
		Monitoring the alarm status of the remotely launched alarm reset command.									

1.2.3 STATUS

The Status menu contains parameters related to the status word.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.1	**1062**	**EBC Brake 1 Out mon**		ENUM					R		ALL
		Monitor indicating the output status.									
		1	current present on output								
		0	output not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.2	**1067**	**EBC Brake 2 Out mon**		ENUM					R		ALL
		Monitor indicating the output status.									
		1	current present on output								
		0	output not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.3	**1060**	**EBC Brake 1 state mon**		ENUM					R		ALL

Brake 1 feed circuit status monitor.

Brake ON	the brake is powered
Brake OFF Safe	the brake is safely closed because the safety inputs are not powered
Brake OFF	the brake is closed but the safety inputs are still powered
Brake STS Fail	the EBC is blocked with an active alarm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.4	**1065**	**EBC Brake 2 state mon**		ENUM					R		ALL

Brake 2 feed circuit status monitor.

Brake ON	the brake is powered
Brake OFF Safe	the brake is safely closed because the safety inputs are not powered
Brake OFF	the brake is closed but the safety inputs are still powered
Brake STS Fail	the EBC is blocked with an active alarm

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.5	**1055**	**EBC Alarm mon**		ENUM					R		ALL

EBC Alarms Status Monitor.

Active	alarms are active on the EBC
Not active	there are no alarms on the EBC

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.6	**1054**	**EBC Warning mon**		ENUM					R		ALL

EBC Warning Status Monitor.

Active	warnings are active on the EBC
Not Active	there are no warnings on the EBC

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.7	**1050**	**EBC Status word mon**	Hex	unsigned Int					R		ALL

Hexadecimal indication of the status word value.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.8	**1051**	**EBC Local mon**		ENUM					R		ALL

Monitoring the position of the EBC Local/Remote switch.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.9	**1052**	**EBC Locked mon**		ENUM					R		ALL

Monitoring the status of the EBC connection with the ADL.

Active	the logic connection with the ADL500 is active
Not Active	the logic connection is not active

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.10	**1053**	**EBC SOK mon**		ENUM					R		ALL

Monitoring the SOK output status.

Active	the output is closed and indicates that both safety inputs are active and that the brake open command is also active without any alarms indicating a non-congruent current running through the brake
Not Active	the brake output is not active and the SOK contact is not closed

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.11	**1056**	**EBC Local In mon**		ENUM					R		ALL
		Monitoring of LBR input status.									
		Active	the input is powered								
		Not Active	input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.12	**1061**	**EBC Brake 1 SBC mon**		ENUM					R		ALL
		Monitoring of safety input SBC1.									
		Active	the input is powered								
		Not Active	input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.13	**1063**	**EBC Brake 1 Fbk mon**		ENUM					R		ALL
		Monitoring the self-monitoring feedback input for contacts set on brake shoes.									
		Active	the input is powered								
		Not Active	input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.14	**1064**	**EBC Brake 1 Alarm mon**		ENUM					R		ALL
		Monitoring brake 1 circuit alarm status.									
		Active	the EBC circuit powering brake 1 is in alarm.								
		Not Active	there are no alarms active on the EBC circuit powering brake 1								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.15	**1066**	**EBC Brake 2 SBC mon**		ENUM					R		ALL
		Monitoring of safety input SBC2.									
		Active	the input is powered								
		Not Active	input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.15	**1068**	**EBC Brake 2 Fbk mon**		ENUM					R		ALL
		Monitoring the self-monitoring feedback input for contacts set on brake shoes.									
		Active	the input is powered								
		Not Active	input not powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.3.16	**1069**	**EBC Brake 2 Alarm mon**		ENUM					R		ALL
		Monitoring brake 2 circuit alarm status.									
		Active	the EBC circuit powering brake 2 is in alarm								
		Not Active	there are no alarms active on the EBC circuit powering brake 2								

1.2.4 DIAGNOSTICS

The Diagnostics menu contains parameters useful for possible diagnostics. The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.1	**200**	**Time power On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.2	**202**	**Time SCR power On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC controlled bridge has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.3	**206**	**Time Break 1 On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC brake 1 output has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.4	**210**	**Time Break 2 On**	hh.mm.ss	unsigned Int					R		ALL
		Parameter indicating how long the EBC brake 2 output has been on.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.5	**204**	**SCR Off On Counter**		unsigned Int					R		ALL
		Number of times the controlled rectifier bridge is activated.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.6	**208**	**Brake 1 Off On Counter**		unsigned Int					R		ALL
		Number of times brake 1 output is activated.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.7	**212**	**Brake 2 Off On Counter**		unsigned Int					R		ALL
		Number of times brake 2 output is activated.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.8	**214**	**Pwr Bridge Temperature max**	°C	FLOAT					R		ALL
		Value indicating the maximum temperature reached by the controlled bridge.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.4.9	**216**	**Pwr Bridge Temperature min**	°C	FLOAT					R		ALL
		Value indicating the minimum temperature reached by the controlled bridge.									

1.2.5 MEASURES

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.1	**4000**	**BRK 1 Fast Close Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 fast close time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.2	**4002**	**BRK 2 Fast Close Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 fast close time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.3	**4004**	**BRK 1 Slow Close Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 Slow close time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.4	**4006**	**BRK 2 Slow Close Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 Slow close time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.5	**4008**	**BRK 1 Open Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 open time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.6	**4010**	**BRK 2 Open Time**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 open time.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.7	**4012**	**BRK 1 Open Energy**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 energy necessary to maintain open brake 1 shoe.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.8	**4014**	**BRK 2 Open Energy**	ms	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 energy necessary to maintain open brake 2 shoe.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.9	**4016**	**BRK 1 Resistance**	ohm	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 coil resistance.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.10	**4018**	**BRK 2 Resistance**	ohm	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 coil resistance.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.11	**4020**	**BRK 1 Min Hold Current**	A	FLOAT					R		ALL
		This parameter permits to visualize Brake 1 minimum current necessary to maintain opened brake 1 shoe.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.2.5.12	**4022**	**BRK 2 Min Hold Current**	A	FLOAT					R		ALL
		This parameter permits to visualize Brake 2 minimum current necessary to maintain opened brake 2 shoe.									

1.3 COMMUNICATION

1.3.1 NETWORK

The Network menu contains the parameters related to EBC IP communication.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.1	**9600**	**MAC address**		String					R		ALL
		Parameter indicating EBC MAC Address									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.2	**22**	**Network configuration**		ENUM		DHCP			RW		ALL
		Parameter indicating the type of line configuration chosen.									
		Static	the network address is set statically								
		DHCP	the EBC network address is assigned by a DHCP server								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.3	**33**	**IPv4 Address**		unsigned Int		169.254.10.11			W		ALL
		Value indicating the Ipv4 network address assigned to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.4	**35**	**IPv4 Netmask**		unsigned Int		255.255.0.0			W		ALL
		Value indicating the Netmask Ipv4 assigned to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.5	**37**	**IPv4 Gateway**		unsigned Int		0.0.0.0			W		ALL
		Value indicating the Gateway IP address.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.6	**39**	**IPv4 DNS 1**		unsigned Int		0.0.0.0			W		ALL
		Value indicating the DNS 1 assigned to the EBC.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.7	**23**	**IPv4 Address assigned**		unsigned Int		0.0.0.0			R		ALL
		Value of the address currently assigned to the EBC which, in case of DHCP configuration, may differ from the address assigned statically.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.8	**25**	**IPv4 Netmask assigned**		unsigned Int		0.0.0.0			R		ALL
		Value of the netmask currently assigned to the EBC which, in case of DHCP configuration, may differ from the address assigned statically.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.9	**27**	**IPv4 Gateway assigned**		unsigned Int		0.0.0.0			R		ALL
		Value of the Gateway currently assigned to the EBC which, in case of DHCP configuration, may differ from the address assigned statically.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.10	**29**	**IPv4 DNS 1 assigned**		unsigned Int		0.0.0.0			R		ALL
		Value of DNS 1 currently assigned to the EBC which, in case of DHCP configuration, may differ from the address assigned statically.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.1.11	**7**	**Network Take configuration**		Boolean		OFF			W		ALL
		Command to launch the setting of a new configuration.									

1.3.2 CFG PROTOCOL

The CFG Protocol menu contains data for configuring the Modbus protocol.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.2.1	**20**	**Modbus TCP Type**		ENUM		Modbus			W		ALL
		Parameter used to import the TCP communication type.									
		Modbus									
		Jbus									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.2.2	**21**	**Modbus TCP Port**		Unsigned Short		502			W		ALL
		Parameter used to set the Modbus port.									

1.3.3 FIELDBUS

The Fieldbus menu contains the parameters for configuring the CANopen fieldbus.
The data are all read only; programmable IPAs can be found in dedicated menus.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.1	**800**	**Fb Type**		ENUM					W		ALL
		Parameter used to set the fieldbus communication type.									
		CANopen									
		OFF									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.2	**801**	**Fb Address**		Unsigned Char		119	1	127	W		ALL
		Parameter used to assign the EBC node ID address.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.3	**802**	**Fb CAN Baud**	Kbit/s	ENUM	250				W		ALL
		Parameter used to assign the fieldbus baudrate.									
		125									
		250									
		500									
		1000									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.4	**803**	**Fb CAN Msg Format**		ENUM		29 bit ID			W		ALL
		Parameter reporting the CAN message format.									
		11 bit ID									
		29 bit ID									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.5	**804**	**Fb State**		ENUM					R		ALL
		Fieldbus status monitor.									
		Boot-up									
		Reset-appl									
		Reset-comm									
		Init									
		Stop									
		Operational									
		Pre-operational									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.6	**805**	**Fb Life time in use**	ms	Unsigned Int					R		ALL
		Fieldbus utilization time monitor.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.3.3.7	**8**	**Fb Take configuration**		Boolean		OFF			W		ALL
		Command to launch the setting of a new configuration.									

12.3 Menus present in the ADL550

Below is a description of the menus built into the ADL and created in the EBC to manage operation and programming.

As previously described, the EBC500 is an autonomous system with its own set of parameters determining its exact operation (EBC parameter database).

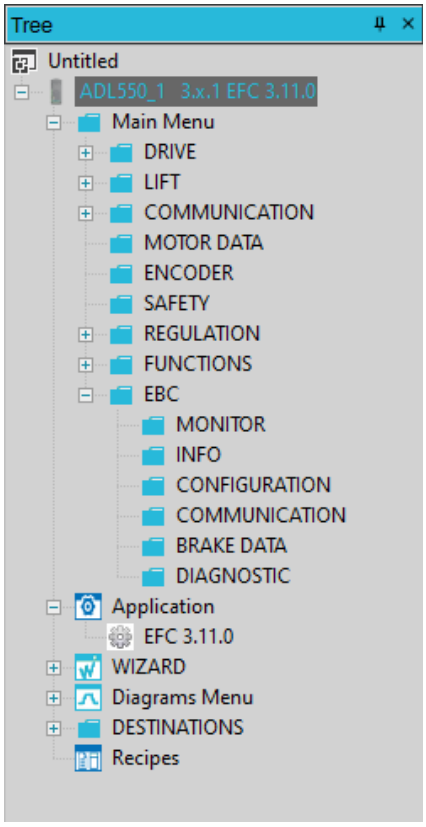
The parameter database is shared with ADL500 when the two devices are connected via CAN; in these cases, ADL500 is the system master and copies its configuration to the EBC500.
EBC500 internal parameter database appears when the installer certifies this database via the configuration tool: WEG Drivelabs.

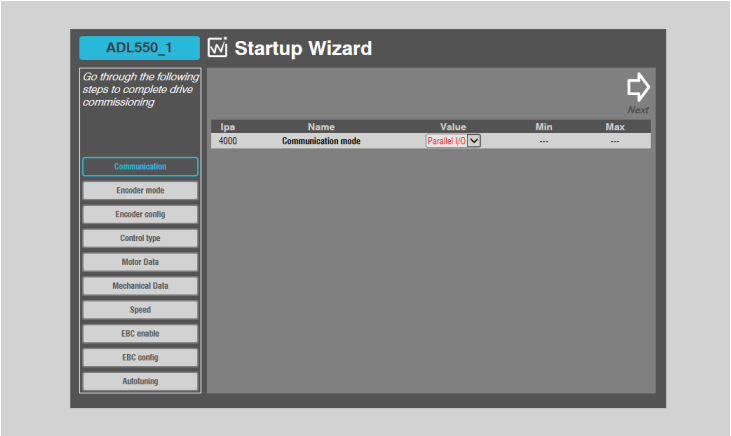
The EBC500 parameter set is also displayed and can be configured from the ADL500, under the specific EBC menu. The EBC menu parameters enable full configuration of the brake device, even by the ADL500.

For reasons regarding usability and applicability (e.g., EBC configuration addresses on Can and network are managed in a direct link with EBC), the ADL550 EBC menu has some limitations compared to the EBC direct link.

Let us therefore begin by describing the parameters with reference to their organisation within the ADL550, and then later we will see how they are displayed within the EBC, pointing out the differences when present.

In the ADL550, the various menus dedicated to the EBC will only be displayed if the EBC is activated in the ADL550 through the only configuration menu always visible.





12.3.1 Programming during plant installation: WIZARD menu

The EBC can work with any application installed in the ADL550 (EFC, DS417 and EPC) since the ADL550 has a dedicated set of menus regardless of the application installed.

The EBC is easily configured via a special submenu in the drive Setup wizard, however, we will first take a closer look at the brake information on the dataplate and the required configuration parameters.

The characteristics reported change depending on the brake manufacturer but the brake's rated voltage and power rating are always present. Some manufacturers indicate the reduced voltage at which the brake can be kept open (holding voltage).

To program the brake correctly, you need to know the rated voltage and rated power. If the Holding voltage is also available, enter it into the ADL, confident of its effectiveness.
Alternatively, if the holding voltage is not available, subsequent tests must be made to determine the minimum voltage at which the brake remains open.
As a rule of thumb, brakes are designed to reliably open when supplied at full rectified voltage and maintain their state at single half-wave rectified voltage (half the DC voltage).

The only parameters that are mandatory and which must be entered in the ADL550 to operate the EBC properly are:
- PAR 8150 EBC Enable which must be set to 1;
- PAR 8250 Holding voltage;
- PAR 8252 rated power.

For ADL550 FW version from 3.1.7 or upper is available also a Loy noise function associated with Brake feedback monitoring for autimatically tune brake corrent setted holding voltage witout necessity to manage power holding value or brake currents.
All other parameters are already preset to run the brake run with an initial boost of n milliseconds - time being imported in parameter 8260 - then it switches to the half-wave power-saving mode (IPA 8258).
If you wish to achieve modulation with the set holding voltage, the value for parameter 8258 must be changed from 1 to 2.

The procedure is very simple and integrated into the startup wizard, between definition of the multispeed and autotuning parameters.
All parameters in the following menus are in read-only mode; they are used to run malfunction diagnostics or to change secondary settings.

1.6 WIZARD

1.6 Set EBC param

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.1	**8150**	**EBC enable**		Bit		False			W	Int	ADL550 Any motor

If the brake is active, the parameter must be saved to render it effective. If it is deactivated, it is saved automatically upon deactivation.

On	detects and requests the presence of the EBC
Off	does not detect the presence of the EBC and brake management is performed in the conventional manner

NOTE! Follow parameters are visible only if EBC enable is setted ON.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.2	**8250**	**Brake Holding Voltage**	V	Float		103.5	1	207	W	Int	ADL550 Any motor

Holding voltage value. If parameter 3008 is set to holding voltage mode, then the internal bridge output voltage is adjusted to provide the set brake output holding voltage. Some manufacturers indicate this voltage on the brake dataplates, along with the brake rated power and rated voltage.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.3	**8252**	**Brake Holding Power**	W	Float		76	1	350	W	Int	ADL550 Any motor

Rated brake power in holding mode indicated by the manufacturer on the brake dataplate.

If only the brake rated power and rated voltage are given and the brake is to be used in power-saving mode, then, once the holding voltage is identified, the following equation must be used to calculate the holding power: $V\ holding^2 \times Prated / Vrated^2$.
For example, for a brake with a rated voltage of 207 Vdc and rated power of 100W, if you wish to use the brake in power-saving mode at 103.5 Vdc (the value indicated by the manufacturer), the power value to be entered is $103{,}5^2 \times 100 / 207^2 = 25$ W

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.4	**8258**	**Brake Power ON mode**		U8		1			W	Int	ADL550 Any motor
		Brake start up and holding modes.									
		Full voltage	the brake is activated with the input voltage rectified for both initial and holding phases								
		Boost/Half voltage	the brake is activated with the input voltage rectified for the first milliseconds indicated by parameter 3009 and then the output voltage is halved within the EBC by cutting a half-wave output from the bridge								
		Boost/Holding voltage	the brake is activated with the input voltage rectified for the first milliseconds indicated by parameter 3009 and then the output voltage is modulated to keep it equal to the voltage set by parameter 3000, Holding voltage								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.5	**8260**	**Brake Power ON Boost Time**	ms	U16		1000	0	5000	W		ADL550 Any motor
		Time for which the output voltage is held, equal to the value of the rectified input voltage (Boost time).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
1.6.6	**4008**	**BRK 1 Open Time**	ms	FLOAT					R		ADL550 Any motor
		This parameter permits to visualize Brake 1 open time.									

12.3.2 List of ADL550 parameters and features: MAIN menu

5. LIFT

5.13 LIFT TEST

The LIFT Test menu is used during some tests. We have seen in chapter 9 details how toperform test.

The parameters concerned are 3:

- the type of particular test selected starting from standstill or with the engine running;
- the parameter asking whether to exclude any feedback errors that may arise during the tests;
- the parameter identifying which brake shoe to test.

When tests are run to test the feedback we leave the parameter set to 0 and when we do tests that we do not want to be interrupted by feedback errors then we put the parameter at 1.

NOTE! The cust button of the keypad, by default, recalls a list of the last parameters displayed. If we press the cust key of the keypad with the function EBC_ Test_Type off the Cust key returns to the list of the last parameters among which there may also be those of the menu Lift test.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
5.13.1	**10138**	**EBC_Test_Type**		ENUM		0			W	EXP	ADL550 Any motor
		Parameter to select the type of test to run.									
		0	off								
		1	at start								
		2	upon arrival								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
5.13.2	**10140**	**EBC Sel brake**		ENUM		Brake1			W	EXP	ADL550 Any motor
		Parameter to select on which/the brake shoes to simulate the failure.									
		0	Brake1 (+ Brake2) This functionality, for security reasons, is disabled with parameter 10138 EBC_Test_Type= 2.								
		1	Brake1								
		2	Brake2								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
5.13.3	**10142**	**EBC_TEST_FBK**		ENUM		Enable			W	EXP	ADL550 Any motor
		Parameter that disables the alarm of "Brake fbk" during the test maneuvers.									
		Disable	do not disable brake feedback control during testing								
		Enable	disable brake feedback control during testing								

12. EBC

12.1 MONITOR

The EBC-dedicated monitoring menu presents all the parameters needed to perform an initial rough monitoring, as for the ADL550 monitoring menu.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.1	**8000**	**EBC SOK mon**		Bit					R	ESY	ALL
		Status word image bit 3. Indicates the status of the SOK output.									
		Bit = 0 (OFF)	open								
		Bit = 1 (ON)	closed								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.2	**8002**	**EBC Warning mon**		Bit					R	ESY	ALL
		Status word image bit 6 (Pwr Bridge temperature over 85°C).									
		Bit = 1 (ON)	EBC in overtemperature								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.3	**8004**	**EBC Alarm mon**		Bit					R	ESY	ALL
		Status word image bit 7.									
		Bit = 1 (ON)	EBC blocked in alarm mode.								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.4	**8006**	**Brake 1 state mon**		U8					R	ESY	ALL
		Status word i mage bit 16-19.									
		0	Brake OFF safe								
		1	Brake OFF								
		2	Brake ON								
		3	Fail								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.5	**8008**	**Brake 2 state mon**		U8					R	ESY	ALL
		Status word image bit 24-27.									
		0	Brake OFF safe								
		1	Brake OFF								

2	Brake ON	
3	Fail	

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.6	**8010**	**Brake 1 out mon**		Bit					R	ESY	ALL
		Status word image bit 21.									
		Bit = 1 (ON)	brake 1 output powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.7	**8012**	**Brake 2 out mon**		Bit					R	ESY	ALL
		Status word image bit 29.									
		Bit = 1 (ON)	brake 2 output powered								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.8	**8014**	**Brake 1 Fbk mon**		Bit					R	ESY	ALL
		Status word image bit 22.									
		Bit = 1 (ON)	former brake 1 A3 input active								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.9	**8016**	**Brake 2 Fbk mon**		Bit					R	ESY	ALL
		Status word image bit 30.									
		Bit = 1 (ON)	former brake 2 A3 input active								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.10	**8018**	**Brake 1 Current avg mon**	A	Float					R	ESY	ALL
		Current delivered to the brake 1 output.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.11	**8020**	**Brake 2 Current avg mon**	A	Float					R	ESY	ALL
		Current delivered to the brake 2 output.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.12	**8022**	**Vline rms mon**	V	Float					R	ESY	ALL
		Supply voltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.13	**8024**	**Vline frequency mon**	Hz	Float					R	ESY	ALL
		Supply frequency.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.1.14	**8026**	**Pwr Bridge Temperature mon**	°C	Float					R	ESY	ALL
		Rectifier bridge temperature.									

12.2 INFO

The info menu provides the identification parameters for the connected EBC; these are also read-only parameters.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.2.1	**8100**	**Product type**		U16					R	ESY	ALL
		Product type.									
		1	EBC501								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.2.2	**8102**	**Product version**		U32					R	ESY	ALL
		Product version.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.2.3	**8104**	**Product conf**		U8					R	ESY	ALL
		Monitor indicating the type of output configuration.									
		Brake 1-2	currently the only type envisaged								

12.3 CONFIGURATION

The EBC Configuration menu presents the EBC activation parameter present in the wizard menu and the parameter describing EBC performance under local operating mode. In practice, when in local mode, a decision must be made as to whether the brake should act instantaneously - by directly opening the “run-mossfet contactors” - or whether a few millisecond delay is allowed with a soft opening, achieved by open the “Kbr contactor-controlled bridge”.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.3.1	**8150**	**EBC enable**		Bit		False			W	ESY	ALL
		If the brake is active, the parameter must be saved to render it effective. If it is deactivated, it is saved automatically upon deactivation.									
		On	detects and requests the presence of the EBC								
		Off	does not detect the presence of the EBC and brake management is performed in the con-ventional manner								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.3.2	**8152**	**EBC Local mode**		U8		0			W	ESY	ALL
		Defines how the brake should behave in local mode: soft braking or emergency braking.									
		0	emergency stop								
		1	smooth stop								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.3.3	**8154**	**EBC Local mon**		Bit					R	ESY	ALL
		Indicates whether the switch on the EBC is set to Local mode.									

12.4 COMMUNICATION

The Communication menu includes parameters essential for reprogramming the EBC CAN port with a different ID number or baud rate; moreover, there are also parameters that display the status and control words.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.4.1	**8200**	**EBC Communication Address**		U8		119	1	127	W	ESY	ALL
		CAN port ID address.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.4.2	**8202**	**EBC Communication Format**		U8		1	0	1	W	ESY	ALL
		Communication format.									
		0	11 bit ID								
		1	29 bit ID								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.4.3	**4004**	**Field baudrate**							W	ESY	ALL
		Baudrate, default is 250kb/s Canopen standard. Visible only when IPA 4000 is set as CANopen.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.4.4	**8204**	**EBC Command word mon**		U16					R	ESY	ALL
		Command word monitor.									
		1	125 K								
		2	250 K								
		3	500 K								
		4	1 M								

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.4.5	**8206**	**EBC Status word mon**		U32					R	ESY	ALL
		Status word monitor.									

12.5 BRAKE DATA

The Brake menu shows the necessary configuration parameters already present in the startup wizard menu.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.1	**8250**	**Brake Holding Voltage**	V	Float		103.5	1	207	W	ESY	ALL
		Holding voltage value. If parameter 3008 is set to holding voltage mode, then the internal bridge output voltage is adjusted to provide the set brake output holding voltage. Some manufacturers indicate this voltage on the brake dataplates along with the brake rated power and voltage.									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.2	**8252**	**Brake Holding Power**	W	Float		76	1	350	W	ESY	ALL
		Rated brake power in holding mode indicated by the manufacturer on the brake dataplate. If only the brake's rated power and rated voltage are given in non power-saving mode and one of the power-saving modes is to be used, the voltage values reaching the brake in power-saving mode need to be entered while the following formula must be used to enter the holding power: $V\ holding^2 \times P\ rated / V\ rated^2$. For example, for a brake with a rated voltage of 207 Vdc and rated power of 100W, if you wish to use the brake in power-saving mode at 103.5 Vdc (the value indicated by the manufacturer), the power value to be entered is $103.5^2 \times 100 / 207^2 = 25$ W									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.3	**8254**	**Brake ON Holding I**	%	Float		80	0	200	W	ESY	ALL
		Value in a percentage of the rated current. Threshold current below which the EBC considers the brake to be properly powered (thus open).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.4	**8256**	**Brake OFF Holding I**	%	Float		20	0	200	W	ESY	ALL
		Value in a percentage of the rated current. Threshold current above which the EBC considers the brake as not powered (thus closed).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.5	**8258**	**Brake Power ON Mode**		U8		1			W	ESY	ALL
		Brake start up and holding modes.									
		Full voltage	the brake is activated with the input voltage rectified for both initial and holding phases								

Boost/Half voltage	the brake is activated with the input voltage rectified for the first milli-seconds indicated by parameter 3009 and then the output voltage is halved within the EBC by cutting a half-wave output from the bridge
Boost/Holding voltage	the brake is activated with the input voltage rectified for the first milli-seconds indicated by parameter 3009 and then the output voltage is modulated to keep it equal to the voltage set by parameter 3000, Holding voltage

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.6	**8260**	**Brake Power ON Boost**	ms	U16		1000	0	5000	W	ESY	ALL
		Time for which the output voltage is held, equal to the value of the rectified input voltage (Boost time).									

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.5.7	**8262**	**Brake Holding I mon**	A						R	ESY	ALL
		Indication of the current calculated by the EBC as the value corresponding to the threshold, in %, given by parameter 8254.									

12.6 DIAGNOSTIC

The Diagnostics menu presents the few parameters needed to diagnose the CAN port status: effectively the EBC communication status. These are read-only parameters.

Menu	PAR	Description	UM	Type	FB BIT	Def	Min	Max	Acc	Lev	Vis
12.6.1	**8300**	**Time SCR power on**	h:min						R	ESY	ALL
		Indicates the SCR start-up time.									

Alarm Management

Alarm management is crucial to understanding system status and how to deal with emergency or recovery situations. Alarms are reported on both EBC/ADL parameters and EBC signal LEDs.
The basic concept behind communication between the EBC and ADL550, also as regards alarm management, is as follows: in the event of an alarm, every effort must be made to prevent the risk of leaving anyone trapped in the car.
If a blocking alarm occurs when the lift has not started or has not left the door area, the alarm will block the system.

If, on the other hand, the alarm occurs when the car is already traversing the shaft, an attempt is made to move the alarm lock to the end of the stop sequence, when the car has reached the floor.
Then, if the magnitude of the alarm truly requires blocking - such as a brake reopening - other ADL alarms such as overcurrent or speed ref loss will block the car.

If, on the other hand, the alarm stems from a lack of CAN communication between the EBC and ADL550, the car can arrive at the floor and, in this case, the drive shutdown procedure is speeded up by cutting off power to the run contactors as soon as the “conventional” brake contact opening command is issued.
More specifically, the main name of all EBC-related alarms is EBC FAULT followed by a subcode and a specific EBC LED signal, as outlined in the table below:

- **CAN communication failure**

If a CANopen communication failure occurs, the ADL550 behaves differently depending on when the communication failure occurs (the communication failure is also indicated by LED 1 which flashes red):

- if the communication failure occurs before the car has left or after the car has left but while it is still in the door area, the ADL550 performs an immediate stop;
- if the communication failure occurs when the car is already moving outside the door area, then the drive continues running transit and issues the open brakes command as soon as it arrives; it also simultaneously issues the command to open the running contactors so the EBC immediately cuts off power to the brakes, causing them to close again quickly. When the manoeuvre has been completed, the drive stops with EBC failure alarm which can be reset from the keypad.

- **HW alarm sent by the EBC**

Hardware alarms on EBC power (e.g., short circuiting of brake outputs) cause the EBC to stop immediately, closing the brakes.

- **Mutually incongruent SBC inputs**

This alarm occurs when the SBC safety inputs remain inconsistent (one high, the other low) for more than 2 seconds. Under such conditions, an alarm occurs and the OK signal remains low until both SBC signals are brought low. The alarm persists even if the second input is enabled after the 2 seconds. For this alarm to automatically reset, power must be cut off to both EBC SBC inputs.

- **EBC alarm activated by ADL500 because selector switch is in Local mode.**

If the EBC selector switch is set to Local mode and, at the same time, the EBC function is activated on the ADL550, the ADL550 presents a Local Alarm error due to command incongruity.

Follow detailed EBC alarms subcodes:

CODE	LABEL	DESCRIPTION
0x0000	ALM_no_alarms	No communication alarm
0x0001	ALM_ng_err_timeout	NodeGuarding time expired (canopen line interrupted)
0x0002	ALM_ng_err_generic	Unexpected error in NG management
0x0003	ALM_ng_err_toggle	NG toggle bit misaligned (serious problems on canopen communication line)
0x0004	ALM_fail_reset_node	NMT command to reset communication to EBC failed
0x0005	ALM_ebc_missing	“Device-type” request to EBC failed too many times. EBC NOT PRESENT on canopen line
0x0006	ALM_badline_ebc	“Device-type” request to EBC failed. Recovery test in progress
0x0007	ALM_ebc_preop_missing	EBC node in timeout when NG and PLC started
0x0008	ALM_ebc_product_error	EBC product information reading by SDO failed or EBC PRODUCT_TYPE and PROD-UCT_CONFIG are inconsistent
0x0009	ALM_ebc_config_error	Parameters were not transferred correctly from the ADL to the EBC
0x000a	ALM_ebc_initpdo1	PDO initialization failed
0x000b	ALM_ebc_initpdo2	PDO like SDO initialization failed
0x000c	ALM_ebc_startnode	Start remote node failed
0x000d	ALM_ebc_pdoNo_operative	EBC OPERATION did not cut in
0x000e	ALM_ebc_pdos_missing	No PDOs received from the EBC
0x000f	ALM_ebc_sys_fault	EBC node restart. Deleting old PDOs failed
0x0010	ALM_fail_stop_node	Stop mode command was sent to EBC, but transmission failed
0x0011	ALM_ebc_local_ON	EBC local switch set to local
0x0012	ALM_ebc_crypt_error	CRYPT sequence failed
0x0013	ALM_ebc_relocked_error	EBC passed the CRYPT phase but, during resetting or with EBC ready, it repeats the request for CRYPT sequence
0x0014	ALM_ebc_pdoReset_error	EBC final reset command failed.
0x0015	ALM_ebc_NowRemote	EBC with switch in local mode... If it is set to remote, it issues an alarm and stops the EBC

12.4 EBC / ADL550 parameter matching

IPA EBC	IPA ADL	NAME	ADL MENU
1053	**8000**	EBC sok MON	EBC monitor
1054	**8002**	EBC Warning mon	EBC monitor
1055	**8004**	EBC Alarm mon	EBC monitor
1060	**8006**	Brake 1 state mon	EBC monitor
1065	**8008**	Brake 2 state mon	EBC monitor
1062	**8010**	Brake 1 out mon	EBC monitor
1067	**8012**	Brake 2 out mon	EBC monitor
1063	**8014**	Brake 1 Fbk mon	EBC monitor
1068	**8016**	Brake 2 Fbk mon	EBC monitor
506	**8018**	Brake 1 Current avg mon	EBC monitor
556	**8020**	Brake 2 Current avg mon	EBC monitor

IPA EBC	IPA ADL	NAME	ADL MENU
402	**8022**	Vline rms mon	EBC monitor
404	**8024**	Vline frequency mon	EBC monitor
900	**8026**	Pwr bridge temperature mon	EBC monitor
202	**8300**	Time SCR power on	EBC Diagnostics
3000	**8250**	Brake Holding Voltage	EBC Brake
3002	**8252**	Brake Holding Power	EBC Brake
3004	**8254**	Brake ON Holding Current Thr perc	EBC Brake
3006	**8256**	Brake OFF Holding Current Thr Perc	EBC Brake
3008	**8258**	Brake Power On mode	EBC Brake
3009	**8260**	Brake Power On Boost Time	EBC Brake
3010	**8262**	Brake Holding Current	EBC Brake
172	**8100**	Product type	EBC info
174	**8102**	Product version	EBC info
176	**NA**	Product SN	EBC info
NA	**8104**	Product configuration	EBC info
3000	**8150**	EBC Enable	EBC Configuration
2002	**8152**	EBC Local mode	EBC Configuration
1051	**8154**	EBC local mon	EBC Configuration
801	**8200**	EBC Communication Address	EBC Communication
803	**8202**	EBC Communication format	EBC Communication
802	**4004**	Field baudrate	EBC Communication
1001	**8204**	EBC Command word mon	EBC Communication
1050	**8206**	EBC Status word mon	EBC Communication

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WEG Automation Europe S.r.l.
Via Giosuè Carducci, 24
21040 Gerenzano (VA) · Italy
info.motion@weg.net

Technical Assistance: technohelp@weg.net
Customer Service: salesmotion@weg.net

www.weg.net

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