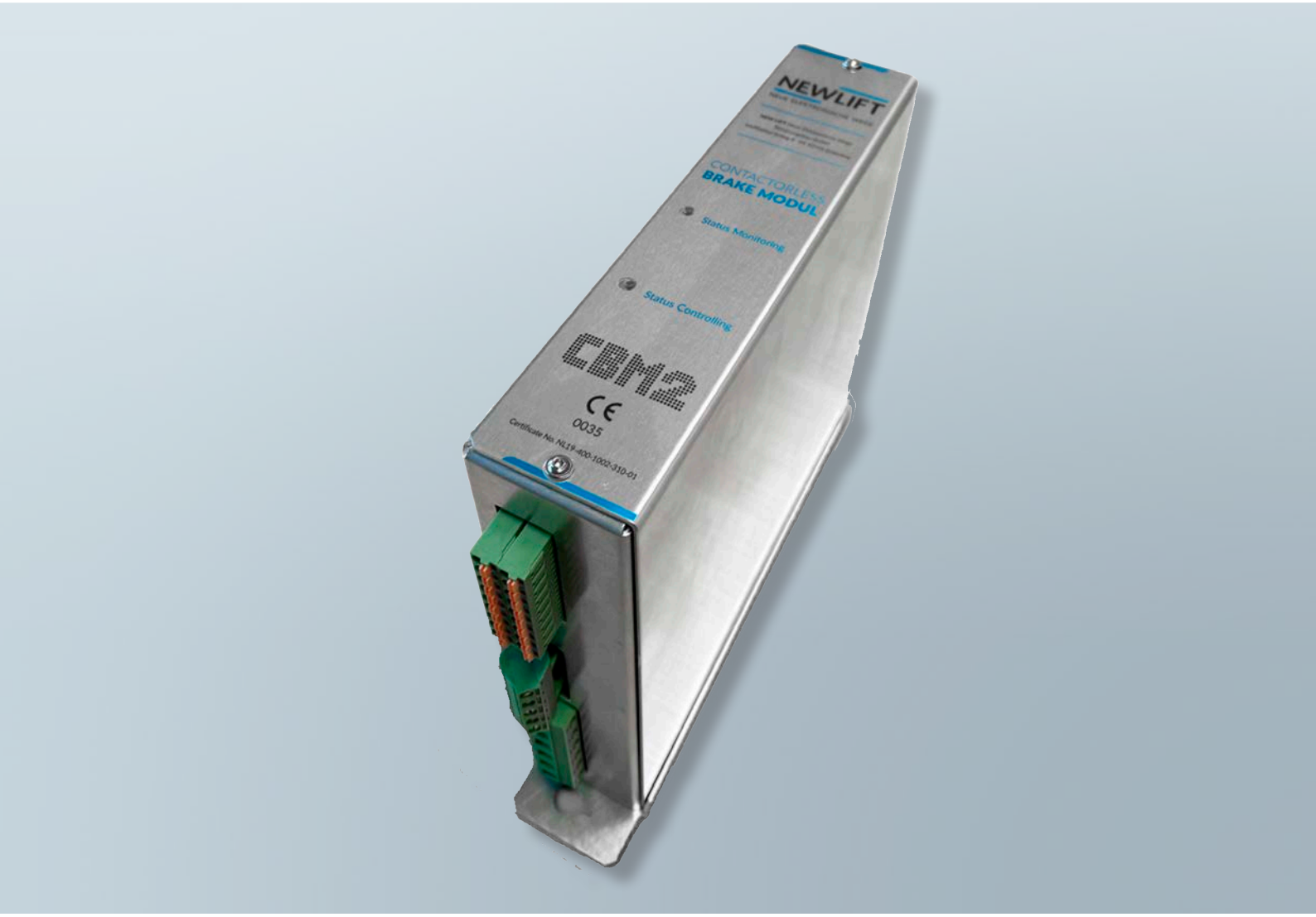
MANUAL

NEWLIFT
NEUE ELEKTRONISCHE WEGE

CBM2

CONTACTORLESS BRAKE MODULE



Hersteller
NEW *LIFT*
Neue elektronische Wege
Steuerungsbau GmbH
Lochhamer Schlag 8
82166 Gräfelfing
Tel +49 89 – 898 66 – 0
Fax +49 89 – 898 66 – 300
Mail info@newlift.de
www.newlift.de

Serviceline
Tel +49 89 – 898 66 – 110
Mail service@newlift.de

Erstausgabe 04.11.2021

Verfasser JW

Letzte Änderung 29.11.2023 / DOS

Freigabe AL

Hardwareversion CBM-5-89-21

Softwareversion V5.6.0.0

Dokumentnummer HB_CBM2_2023-11_v2.0_en

1 General

The CBM is a module that can control brake coils of all voltages (40-200VDC) and currents (up to 4A) up to a power of 240VA without protection. It is type-tested according to DIN EN81-20. In addition, it can perform brake test and evacuation (for machine roomless systems). In addition, other functions are available, such as the connection of a motor PTC or brake monitoring. The function of the brake circuits is monitored by a continuous current measurement.

1.1 Abbreviations, characters and symbols used

Abrreviation / Symbol	Meaning
CBM	Contactorless Brake Module for elevatior
DRIVE	Driving signal from the end of the safety chain
BRAKE	Brake signal to open the brake
EVAK	Evacuation signal for evacuation in the event of a fault in the system
TEST	Test signals for brake test
CANopen	CAN interface with CANopen protocol according to CiA Standard Draft 301
▶	**Activity symbol** Activities described after this symbol must be carried out in the given order.
•	Action step subordinate to the instruction
	***Safety-relevant information*** This symbol is located in front of safety-relevant information.
	***Information notice*** This symbol is located in front of relevant information.

1.2 Representations

Representation	Meaning
bold	› Terms of switches and control elements › Input values
italic	› Captions › References › Terms of functions and signals › Product names
bold italc	› Notes
Font LCD	› System messages of the controller

1.3 Further information

The following documents, among others, are available for the FST control system and its components.

› ADM Manual
› EAZ TFT.45.110.210 Manual
› EAZ-256 Manual
› EN81-20 Manual
› FPM Manual
› FST-2XT/s Manual
› FST-2XT MRL Manual
› FST Installation and Commissioning
› FST-3 MIPA
› GST-XT Manual
› LCS Manual
› RIO Manual
› SAM Manual
› UCM-A3 Manual
› Update-Backup-Analysis Manual

These and other current manuals can be found in the download area of our website under Service at https://www.newlift.de/downloads.html

1.4 How to contact us

If, after referring to this manual, you still require assistance, our service line is there for you

Tel +49 89 – 898 66 – 110
Mail service@newlift.de

Mon. - Thurs.: 8:00 a.m. – 12:00 p.m. and 1:00 p.m. – 5:00 p.m.

Fr: 8:00 a.m. – 3:00 p.m.

2 Safety

All modules of the system may only be operated in a technically faultless condition and in accordance with the intended use, safety and hazard awareness, observing the instructions, the applicable accident prevention regulations and the guidelines of the local power supply company.

The safety guidelines of the FST manual and the FST Installation, Commissioning & Ccheck manual apply to this product.

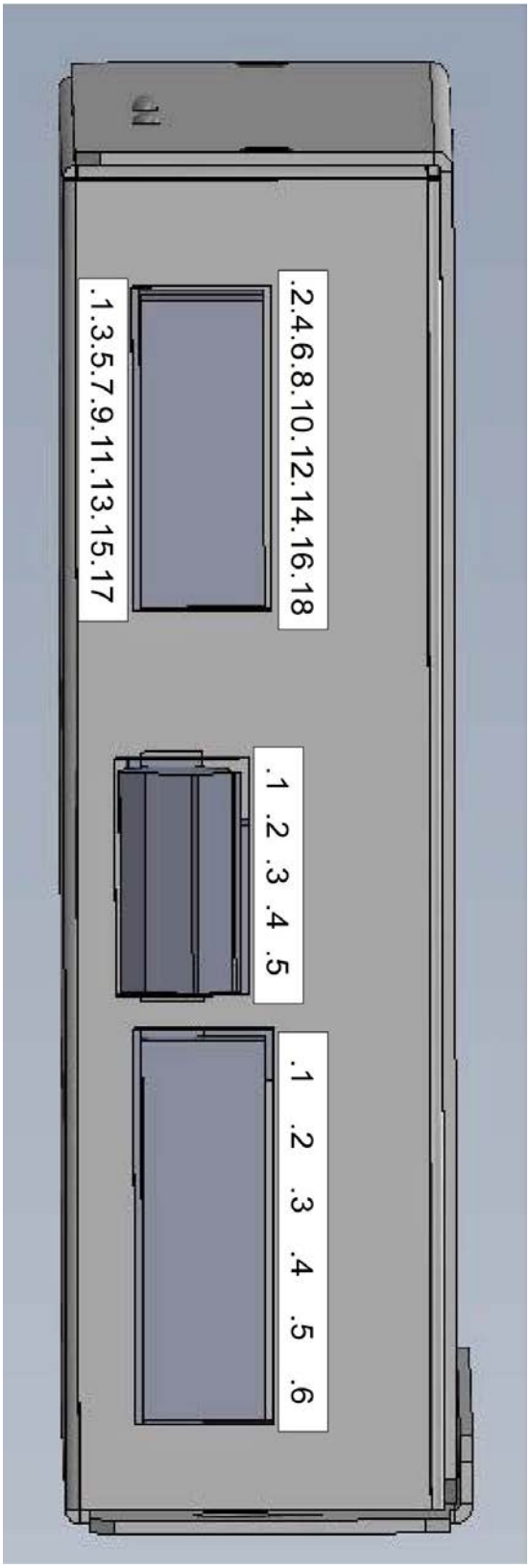
2.1 Handling of electronic modules

Electrostatic charge

- ► ***Leave the electronic module in its original packaging until installation to avoid damage.***
- ► ***Before opening the original packaging a static discharge must take place!***
  To do this, touch an earthed metal part.
- ► ***Repeat the discharging process regularly while working on electronic modules!***
- ► ***Provide all unused bus inputs/outputs with a terminator to prevent malfunctions.***

3 Terminals

3.1 Connection



←X3: IOs Connector PCB side: Phoenix Contact MCDN 1,5/ 9-G1-3,81 Mating Connector cable side: 2x Phoenix Contact FMC 1,5/ 9-ST-3,81

←X5: Power, Overvoltage-Test Connector PCB side: Phoenix Contact CCA 2,5/ 5-G-5,08 Mating Connector cable side: Phoenix Contact SMSTB 2,5/ 5-ST-5,08

←X4: DRIVE and Brake-Coils Connector PCB side: Phoenix Contact GMSTBA 2,5/ 6-G Mating Connector cable side: Phoenix Contact GMSTB 2,5/ 6-ST

3.2 Pin Table

Clip	Name	Description	Properties
X1.1	PE	Power Supply – 230VAC	
X1.2	L	Power Supply – 230VAC	10A Träge
X1.3	N	Power Supply – 230VAC	
X1.4	Test	Test Switch to simulate Overvoltage spark	
X1.5	Test	Test Switch to simulate Overvoltage spark	
X2.1	Drive	Drive-Signal – 48-230VUC	24-230VUC
X2.2	Drive	Drive-Signal – 48-230VUC	
X2.3	B1+	Brake 1 Coil +	40-200VDC
X2.4	B1-	Brake 1 Coil -	0V
X2.5	B2+	Brake 2 Coil +	40-200VDC
X2.6	B2-	Brake 2 Coil -	0V
X3.1	+24V DC	24V – Power Supply for In/Outputs	
X3.2	0V (GND)	0V – Power Supply for In/Outputs	
X3.3	Brake	Brake-Signal	Active High
X3.4	Evac	Evac-Signal	Active High
X3.5	T1	T1-Eingang	Active High
X3.6	T2	T2-Eingang	Active High
X3.7	BM1	BM1-Signal	Active High
X3.8	BM2	BM2-Signal	Active High
X3.9	CBM_OK	CBM OK Output (open collector)	Open Collector
X3.10	BRAKE_OPEN	Brake open Output (open collector)	Open Collector
X3.11	BRAKE_TEST	Test active Output (open collector)	Open Collector
X3.12	0V (GND)	Common pin for CAN-Interface	
X3.13	CAN-H	CAN-H (CANopen)	CANopen CiA 417
X3.14	CAN-L	CAN-L (CANopen)	
X3.15	CAN-H	CAN-H (CANopen)	
X3.16	CAN-L	CAN-L (CANopen)	
X3.17	PTC+	Motor PTC	PTC nach DIN 44081 und DIN 44082
X3.18	PTC-	Motor PTC	

4 Configuration

Unlike its predecessor, the CBM, the new CBM2 is configured exclusively via CANopen. It follows the CiA 417 standard. The exact description of the data transfer takes place in CANopen CiA 417,
see „5 CANopen“, page 14.

4.1 Brake monitoring

The brakes are monitored via the brake monitoring contacts of the brakes.

4.1.1 Contact-based monitoring

Here contacts (NO or NC) must be connected to the inputs BM1 and / or BM2. These contacts must also switch when the brake is activated. Otherwise, the error 0x19 (brake monitoring faulty) is triggered.

4.2 Motor-PTC

The function of the motor PTC is automatically recognized the first time it is switched on after restoring the factory settings. If a PTC is then connected, it is activated. In that case, however, the PTC must not have responded. If no PTC is connected, the function is deactivated. If the function is to be activated or deactivated during operation, the factory settings must first be restored!

4.3 Rectifier mode

If a voltage of 50V, 100V, 150V or 200V is set, the CBM2 operates in rectifier mode. In this case, the voltage is no longer generated via phase control, but the thyristors are permanently controlled over the entire half-wave and only operate as a diode. With an input voltage of 230VAC, this results in an output voltage of 51.75V, 103.5V, 155.25V or 207V. This mode can have a positive effect on the noise development of the brake and also the CBMaus. If this function is not desired, a voltage increased or decreased by 1V can be set.

4.4 Explanation of Inputs

4.4.1 DRIVE-Signal

The DRIVE input can process voltages from 48-230VUC. This means that all common safety circuits can be connected here. This signal opens two safety contacts in front of and behind the brake coil and thus prepares the voltage supply for the brakes. If a gear brake is connected and configured, it is directly energized with the DRIVE signal, since the brake on the gear must first open.

4.4.2 BRAKE-Signal

The BRAKE signal opens a brake configured as a motor brake. A motor brake is usually mounted directly on the motor shaft.

4.4.3 EVAC-Signal

The EVAK signal is used for evacuation in the event of a fault. It activates a different measurement of the input voltage, as the evacuation can also be carried out with a UPS (VI-SY-333 or better) as the power supply.

Normal travel is not possible when the EVAK signal is activated!

4.4.4 T-Signals

Either the brake test or the evacuation can be carried out with the signals T1 and T2.

In addition, the EEPROM can be re-initialized with the standard values by pressing T1 and T2 during the boot process

See for details:
see „4.7.1 Restore factory settings“, page 13 .

If only T1 is activated during the boot process, the CBM2 enters the bootloader and can receive new firmware via CANopen.
If only T2 is activated during the boot process, stored errors are deleted.

Detailed description of the signal sequences can be found in:
see „4.6 Control process“, page 12.

4.5 Explanation of Outputs

4.5.1 OK-Signal

The OK output signals that the CBM is active and has no error. This output is only active when both processors (control and monitor CPU) give their release.

4.5.2 Open-Signal

The open output signals an open brake.

4.5.3 Test-Signal

The test output signals an active brake test.

4.6 Control process

4.6.1 Normal ride

› During normal driving, only the DRIVE and the BRAKE input are activated.

› DRIVE must be applied first. In this case, if connected, the brake 3 is opened.

› Then BRAKE is applied (there must be no test signal). This opens brake 1 and 2.

› After the ride BRAKE is deactivated again.

› Then first brake 1 and 2 close. Thereafter, brake 3 is closed.

› Now DRIVE must be deactivated again. The inputs DRIVE and BRAKE are checked with an ABC circuit.

This means that DRIVE must be activated before BRAKE and both signals must be deactivated before reactivation!

4.6.2 Emergency Stop

In the event of an emergency stop, the DRIVE signal is deactivated first. This means that all brakes are applied immediately!

4.6.3 Brake Test

During the brake test, normal travel is first initiated. If a test signal is already present during this (button has got stuck), error „0x1A - error inputs“ is set and normal travel is prevented. However, if a test signal is applied after normal travel has been initiated, the associated brake is applied immediately. The other brakes remain open.

The brake test is signaled directly to the elevator control via the test output. This must now ensure that the torque is removed from the frequency converter. As a result, it will deactivate the BRAKE signal. That is allowed for the brake test. The other brakes remain open anyway. The other brakes only apply when the DRIVE signal is deactivated.

4.6.4 Evacuation

In order to carry out an evacuation, the EVAC signal must first be activated. This changes the internal control of the brakes, since the evacuation can also be carried out with a UPS. Since UPSs that do not generate a pure sinusoidal voltage (VI-SY-333 or better) are also permitted, the phase control must be adapted. The brakes are now controlled based on the previously saved operating current.

The DRIVE signal can now be activated. This already opens a transmission brake. The evacuation can be activated by activating the test 1 and test 2 signals. This is carried out via the configured mode. If the signals are deactivated again, the brakes are applied again..

4.7 EEPROM

The EEPROM mainly stores data that is required for the CANopen functionality.

In addition, the operating currents of the individual brake coils are stored here. These are necessary to carry out an evacuation. The default value for all brakes is the equivalent of 0.4A. If this value is still in the EEPROM and normal travel is triggered, the current values of this normal travel are saved and used in the following. An evacuation with a CBM in the factory setting without prior normal travel would result in a current control to 0.4A per brake.

Correct evacuation is possible after a single normal trip.

4.7.1 Restore factory settings

► Switch **ON** CBM.

► During the start up

- Press buttons **T1** and **T2**
  or (if they are not present)
- set a jumper between X2.1 and X2.4 and X2.5.

Since an error occurs in the case at the same time:

► Turn **OFF** CBM.

► Release the buttons **T1** and **T2** or remove the jumper.

► Switch **ON** CBM.

After switching on again, the module is in the factory state.

4.8 Surge device Test

Either a button as a break contact or a wire bridge is connected to terminals X1.4 and X1.5. To test the triggering of the overvoltage protection device at the voltage input of the CBM2, the connected button can be pressed or the connected wire bridge can be removed. This causes an internal relay to drop out at the input of the CBM2 and the output stage that generates the voltage for the brakes. This causes the brakes to close and the CBM2 detects an undercurrent fault on the brakes. It is therefore no longer possible to continue your journey.

4.9 CANopen Bootloader

The CBM2 is equipped with a CANopen bootloader that can perform firmware updates as described in CiA 417. This means that, unlike the CBM1, firmware updates can now be carried out easily in the field. When using the CBM2 with the NEWLIFT FST2 lift controller, the firmware can be uploaded via the FST2 using a USB stick. In addition, you can switch directly to the bootloader by pressing T1 during the boot process of the CBM2. The CBM2 would then wait for firmware data via CANopen. However, a specific protocol must be run for this, which is described in a separate manual.

5 CANopen

With the integrated, isolated high-speed CAN ISO-11898 interface, a CANopen protocol according to CiA 417 is integrated.

5.1 Network Management

The CBM is an NMT slave. An NMT master must make settings on the CBM in accordance with the NMT protocol.

5.1.1 Node-ID

In the delivery state, the node ID is 125, which corresponds to a non-configured device according to CiA 417. If an NMT master detects this, it must change the ID to 85-101, which are reserved for manufacturer-specific IDs. The Node-ID can be changed in Object 0x2001.

5.1.2 Bit Rate

The bit rate is set to 250kbit / s in the delivery state.

5.1.3 NMT-RX-Events

The following NMT-RX events are implemented:

› 1/0x01 – Start Node: sets the operational mode

› 2/0x02 – Stop Node: sets the stop mode

› 128/0x80 – Pre-Operational: sets the pre-operational mode

› 129/0x81 – Reset: triggers a reset of the CBM

› 130/0x82 – Reset Communication: triggers a reset of the CAN routines

By default, the CBM starts up in pre-operational mode. An NMT master must switch the CBM to operational mode.

5.2 Sync

The CBM is a SYNC consumer and can receive SYNC objects that were sent via the COB ID 0x080. This mechanism is used for sending the TPDOs.

5.3 Emergency

In the event of a faulty SDO transfer or another error, an emergency message is sent. This is structured as follows:

› Byte 0-1: CANopen Error Code

› Byte 2: CANopen Error Register

› Byte 3: -

› Byte 4: Manufacturer-specific error

› Byte 5: Manufacturer-specific error Detail

› Byte 6: Error generated during internal VCC not OK

› Byte 7: Error generated during emergency stop

5.4 Heartbeat Producer

The CBM has a heartbeat endpoint that sends a heartbeat message. In the delivery state the interval is 3000ms, but can be changed in the range of 500-20000ms. A heartbeat message can contain the following information:

› 0/0x00 - Bootup: CBM is booting

› 4/0x04 - Stopped: CBM in Stop Mode

› 5/0x05 - Operational: CBM in Operational Mode

› 127/0x7F - Pre-Operational: CBM in Pre-Operational Mode

5.5 Object Dictionary

5.5.1 Daten-Types

› 0x0001 – boolean

› 0x0002 – integer8

› 0x0003 – integer16

› 0x0004 – integer32

› 0x0005 – unsigned8

› 0x0006 – unsigned16

› 0x0007 – unsigned32

5.5.2 Device Info

› 0x1000 – device type; unsigned32;

» constant = 0x414D4243 („CBMA“) if application is running

» constant = 0x424D4243 („CBMB“) if bootloader is running

› 0x1001 – error register; unsigned8; read only

› 0x1002 – manufacturer status register; unsigned32; read only

› 0x1003 – error code register; unsigned32; read only

› 0x1009 – manufacturer hardware version; char[4](Ascii); constant

› 0x100A – manufacturer software version; char[4](Ascii); constant

» Subindex 0 – Software version

» Subindex 1 – 0x07 GIT version string

› 0x1017 – producer heartbeat time; unsigned16; read/write

» Values from 500-20000ms are accepted

* Demand from Master:
  COB-ID: 0x600 + NodeID
  cs: read=2, write=1
  n: read=0, write=2
  e: read=0, write=1
  s: read=0, write=1
  Index: 0x1017
  Subindex: 0x0
  Data: read=0, write=desired value

* Answer from CBM:
  COB-ID: 0x580 + Node-ID
  cs: read=2, write=3
  n: read=2, write=0
  e: read=1, write=0
  s: read=1, write=0
  Index: 0x1017
  Subindex: 0x0
  Data: read=actual value, write=0

› 0x1018 – identity object

»Subindex 0 – Identity Index; unsigned8; constant = 4

»Subindex 1 – Vendor ID; unsigned32; constant = 0x0057454E

»Subindex 2 – Product Code; unsigned32; constant = 0x324D4243 (“CBM2“)

»Subindex 3 – Revision Number; unsigned32; constant = 0x000000xx where “xx” corresponds to Revision number in SDO 0x3006 as integer

»Subindex 4 – Serial Number; unsigned32

5.5.3 RPDOs

› 0x1400 – RPDO1 Parameter (Controlling)

» Subindex 0 – number of supported entries in this record (here 2); unsigned8; read only

» Subindex 1 – COB-ID used by PDO; unsigned32; read only

» Subindex 2 – transmission type; unsigned8; read only; default=255

RPDO1 is statically mapped to object 0x3016 which is the controlling via CANopen

5.5.4 TPDOs

› 0x1800 – TPDO1 Parameter (Errors)
» Subindex 0 – number of supported entries in this record (here 2); unsigned8; read only
» Subindex 1 – COB-ID used by PDO; unsigned32; read only
» Subindex 2 – transmission type; unsigned8; read/write; default=2 (1-240)
»TPDO1 is statically mapped to object 0x301F which is the status of the Errors
› 0x1801 – TPDO2 Parameter (Outputs)
» Subindex 0 – number of supported entries in this record (here 2); unsigned8; read only
» Subindex 1 – COB-ID used by PDO; unsigned32; read only
» Subindex 2 – transmission type; unsigned8; read/write; default=1 (1-240)
»TPDO2 is statically mapped:
* Byte 0: Object 0x3014 which is the status of the Outputs
* Byte 1: Object 0x3017 which is the status of the Brake-Coils
› 0x1802 – TPDO3 Parameter (Currents)
» Subindex 0 – number of supported entries in this record (here 2); unsigned8; read only
» Subindex 1 – COB-ID used by PDO; unsigned32; read only
» Subindex 2 – transmission type; unsigned8; read/write; default=1 (1-240)
»TPDO3 is statically mapped:
* Byte 0,1: Object 0x3001 which is current of Brake 1
* Byte 2,3: Object 0x3002 which is current of Brake 2
* Byte 4,5: 0 – Compatibility to CBM1
› 0x1803 – TPDO4 Parameter (Currents of Brake fallback)
»Subindex 0 – number of supported entries in this record (here 2); unsigned8; read only
»Subindex 1 – COB-ID used by PDO; unsigned32; read only; 0x480 + Node
»Subindex 2 – transmission type; uint8; read only; default=0
»TPDO4 is statically mapped:
* Byte 0,1: Object 0x3001 which is current of Brake 1
* Byte 2,3: Object 0x3002 which is current of Brake 2
»TPDO4 is only transmitted if it is enabled in
* Object 0x2016 Subindex 10
* Object 0x2016 Subindex 1 = 3 and between brake switch off and safety chain opening!

5.5.4 Firmware Update

Firmware update processing; see CiA 302 Part 3: Configuration and program download
› 0x1F50 – Program data
› 0x1F51 – Program control
› 0x1F56 – Program software identification current firmware version; same as 0x100A
› 0x1F57 – Flash status identification
› 0x6005 – Lock unlock parameters

5.5.5 Herstellerspezifische SDOs

Bei allen SDO-Write-Transfers muss ein Reset durchgeführt werden, bevor die Änderung übernommen wird!

› 0x2001 – Node-ID; unsigned8; read/write
Can be set from 85 to 101. A new unconfigured Device is set to 125.

› 0x2002 – Bitrate; unsigned8; read/write

» Bitrates implemented:

* 0 = 20kbit/s
* 1 = 50kbit/s
* 2 = 125kbit/s
* 3 = 250kbit/s (default)
* 4 = 500kbit/s
* 5 = 800kbit/s

› 0x2003 – Lift-ID; unsigned8; read/write
Can be set from 0 (default) to 7

› 0x2004 – Controlling Mode; unsigned8, read/write

» Read: 0x0X

» Write: 0x7300000X (the Ascii-Values of the character “s” need to be appended)

* Modes implemented:
0x0 = Controlling with IO (Configuration-Values extracted from DIP-Switches)
0x1 = Controlling with CANopen (Configuration-Values extracted from internal EEPROM)

› 0x2011 – Voltages of the brakes; uint8; read/write

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Voltage Brake 1

»Subindex 2: Voltage Brake 2
Voltages can be set from 40 to 200. A new unconfigured Device is set to 0.

› 0x2012 – Brake Modes; char[4]; read/write

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Mode Brake 1

»Subindex 2: Mode Brake 2 Mode can be set to 0 (gear brake) or 1 (motor brake).

»Subindex 3: Connection Brake 1

»Subindex 4: Connection Brake 2
Connection can be set to 0 (only one coil) or 1 (two coils in series)

› 0x2013 – Power reduction level of the brakes; char[4]; read/write

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Reduction Level Brake 1

»Subindex 2: Reduction Level Brake 2
Reduction Level can be set from 50 to 100%. A new unconfigured Device is set to 0.

› 0x2014 – Power reduction time of the brakes; char[4]; read/write

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Reduction Level Brake 1

»Subindex 2: Reduction Level Brake 2 Reduction Time can be set to 0, 3-10 or 255.0 means direct Power Reduction, 255 means never reduce Power. A new unconfigured Device is set to 0.

› 0x2015 – Power Stage; char[4]; read/write

» Values implemented: 0 = Off 1 = On (default)
0x0 = OFF
0x1 = ON

› 0x2016 – Brake monitoring; read/write

»Subindex 0: Number of entries = 11 (read only)

»Subindex 1: uint8

* 0 = Off
* 1 = On, Contact-Type NO
* 2 = On, Contact-Type NC
* 3 = On, contactless

»Subindex 2: Counter Brake 1; uint16; Default: 100; Range: 20-1000

»Subindex 3: Current Offset Brake 1; uint16; Default: 50mA; Range: 5-500mA

»Subindex 4: Delay Monitoring after switch off; uint16; Default: 50ms; Range: 50-500ms

»Subindex 5: Counter Brake 2; uint16; Default: 100; Range: 20-1000

»Subindex 6: Current Offset Brake 2; uint16; Default: 50mA; Range: 5-500mA

»Subindex 7: Delay Monitoring after switch off; uint16; Default: 50ms; Range: 50-500ms

»Subindex 8: Start Tests; uint8; write only;

* 11 = leave brake 1 open after ride
* 12 = leave brake 2 open after ride
* 31 = leave Brake 1 closed
* 32 = leave Brake 2 closed

»Subindex 9: enables self-teach mode; writing a '1' enables the self-teach mode; this measures the counter values and adjusts the current offset for best results; as long as you read the value "1" here, the self-teach mode is active; after self-teach mode has finished, the controller needs to read the values to overtake them in the parameters! If counter values are 0 after self-teach Mode, self-teaching was not possible! In that case parameters need to be adjusted manually or contactless monitoring is not possible with these brakes. Contactless brake monitoring is switched off then automatically; uint8

»Subindex 10: enables/disables sending of TPDO4 between brake switch off and safety chain opening; uint8

»Subindex 11: changes the interval of the sending of TPDO4 between 5 and 20ms; Default=10ms; uint8

› 0x2017 – Evacuation times; unsigned16; read/write

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Evacuation pulse duration

»Subindex 2: Evacuation period duration

»Values can be set from 50-10000ms; Default: Pulse=200ms, Period=2000ms
When setting Strobe and Period to the same value, brakes are always open till evacuation is active!

› 0x2019 – One Halfwave Mode; uint8; read/write

» Values implemented:
0x0 = Off
0x1 = On

› 0x2020 – Delay switch off Gear-Brake; unsigned16; read/write
Can be set from 100 to 1000ms. Default is 1000ms

› 0x2021 – Load-Check Pulse; uint16, read/write
Can be set from 50 to 1000ms. Default is 200ms. 0 switches off this function.

› 0x2022 – CANopen Errors; uint8; read/write

» Values implemented:
0 = only Errors are transmitted which lead to shutoff (default)
1 = all Errors are transmitted

› 0x2023 – Delay Periods for MosFET-Tests; uint8; read/write

» Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Delay periods HS-MF-Test, Number of periods for delaying the HS-MF-Test after Switchoff and EEPROM-Write-Cycles

»Subindex 2: Delay periods HS-MF-Test, Number of periods for delaying the LS-MF-Test after the HS-MF-Test
Can be set from 5 to 200. Default is 5(100ms).

› 0x2024 – continuous contactless Brake monitoring; uint16, read/write

»Subindex 0: Number of entries = 8 (read only)

»Subindex 1: Counter Brake 1; Default: 0; Range: 20-1000; 0= continuous monitoring Off

»Subindex 2: Current Offset Brake 1; Default: 50mA; Range: 20-500mA

»Subindex 3: Delay Monitoring after switch on; Default: 2000ms; Range: 1000-5000ms

»Subindex 4: Counter Brake 2; Default: 0; Range: 20-1000; 0= continuous monitoring Off

»Subindex 5: Current Offset Brake 2; Default: 50mA; Range: 20-500mA

»Subindex 6: Delay Monitoring after switch on; Default: 2000ms; Range: 1000-5000ms

»Subindex 7: Delay for start Test after switch on; Default: 5000ms; Range: 2000-10000m

»Subindex 8: Start Tests; uint8; write only;

* 21 = close Brake 1 after delay

* 22 = close Brake 2 after delay

› 0x2025 – IIR-Filter 2nd Order for Currents; Default: Butterworth with f_g= 100 Hz and A= 1, 0

»Subindex 0: Number of entries = 6 (read only

»Subindex 1: Power of 2; uint8; Default: 10; Range: 6-12

»Subindex 2: alpha[0]; int16; Default: 47; Range: -32768 - +32767

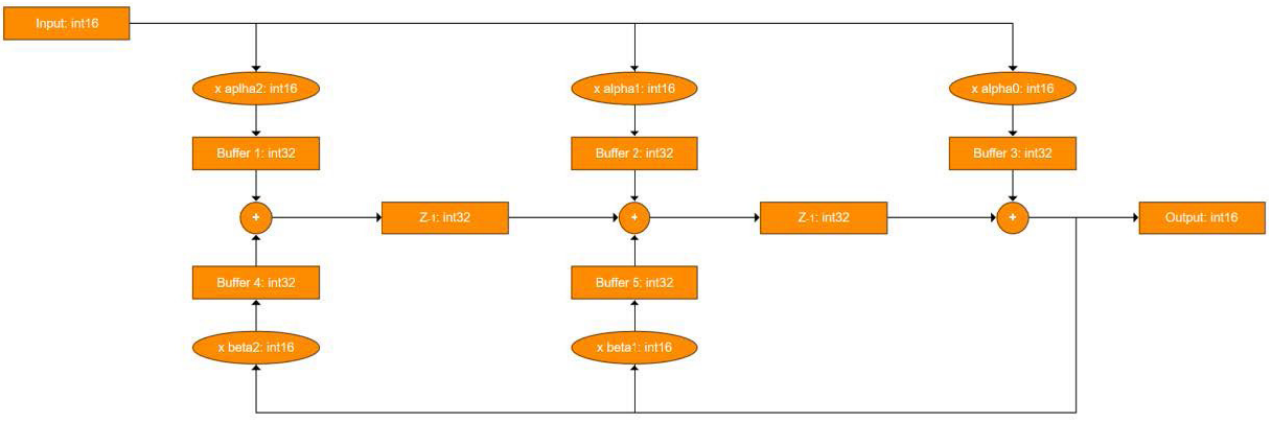
»Subindex 3: alpha[1]; int16; Default: 94; Range: -32768 - +32767

»Subindex 4: alpha[2]; int16; Default: 47; Range: -32768 - +32767

»Subindex 5: beta[1]; int16; Default: 1339; Range: -32768 - +32767

»Subindex 6: beta[2]; int16; Default: -504; Range: -32768 - +32767

»Filter structure



› Calculation of the coefficients

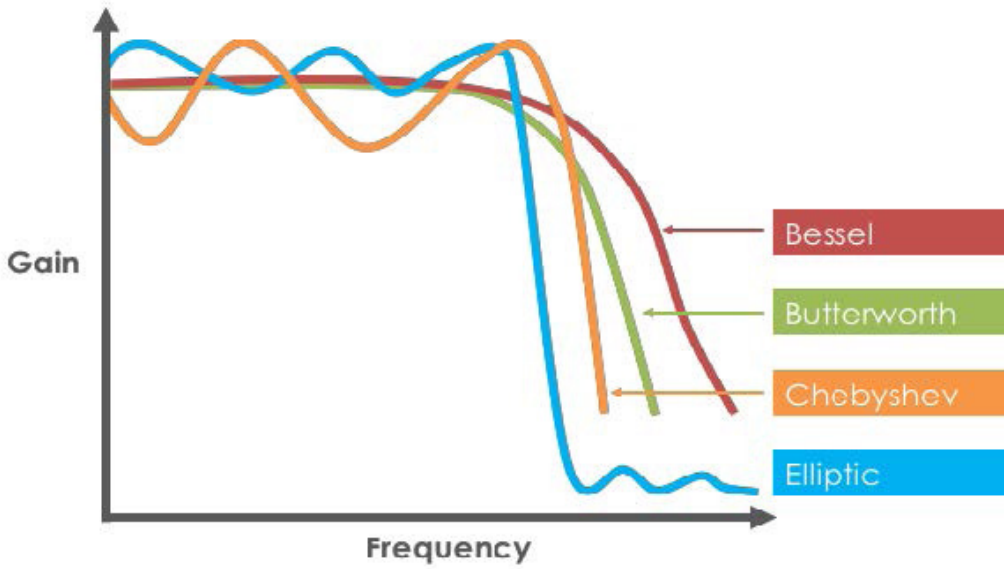
- $\alpha_0 = \frac{A}{(1+(a_1 l)+(b_1 l^2))}$
- $\alpha_1 = \frac{2A}{(1+(a_1 l)+(b_1 l^2))} = 2\alpha_0$
- $\alpha_2 = \frac{A}{(1+(a_1 l)+(b_1 l^2))} = \alpha_0$
- $\beta_1 = \frac{2(l-(b_1 l^2))}{(1+(a_1 l)+(b_1 l^2))}$
- $\beta_2 = \frac{(1-(a_1 l)+(b_1 l^2))}{(1+(a_1 l)+(b_1 l^2))}$
- With $l = \cot\pi * F_g = \cot\pi * \frac{f_g}{f_a}$

  a_1, b_1: Coefficients of the factored transfer function
  A: Amplification
  F_g: standardized cut-off frequency
  f_g: cutoff frequency of the filter
  f_a: sampling frequency = 1250Hz

› Filter types

»critical damping: a_1= 1,2875; b_1 = 0,4142
»Bessel: a_1= 1,3671; b_1= 0,6180
»Butterworth: a_1= 1,4142; b_1= 1
»Chebyshev 0,5dB ripple: a_1= 3614; b_1= 1,3827
»Chebyshev 1dB ripple: a_1= 1,3022; b_1= 1,5515
»Chebyshev 2dB ripple: a_1= 1,1813; b_1= 1,7775
»Chebyshev 3dB ripple: a_1= 1,0650; b_1= 1,9305

› Filter responses:



Prevent overflowing buffers!

› 0x2026 – Cut-Edge-Oscillation

»Subindex 0: Number of entries = 2 (read only)

»Subindex 1: Mode

* 0 – Off

* 1 – Sequence: 2 – 4 ….

* 2 – Sequence: 2 – 3 – 4 …

* 3 – Sequence: 1 – 4 – 2 – 5 – 3 …

»Subindex 2: Offset
Time between two edges: uint8; Value * 50µs

»| | | | | |
1 2 3 4 5
Edge 3 is the original calculated edge of the configured voltage. With the mode you can choose the sequence of the edges. Offset sets the space between two following edges.

› 0x2027 – extended Halfwave-Mode

»Subindex 0: Number of entries = 4 (read only)

»Subindex 1: Bitmask for B1 Start; uint8

»Subindex 2: Bitmask for B1 Reduction; uint8

»Subindex 3: Bitmask for B1 Start; uint8

»Subindex 4: Bitmask for B2 Reduction; uint8

»Sets which of 8 consecutive half cycles are active. This sequence then repeats itself indefinitely.
Examples:
0b11111111 (0xFF) - 200 VDC
0b11101110 (0xEE) - 150 VDC
0b10101010 (0xAA) - 100 VDC
0b00010001 (0x11) - 50 VDC

› 0x3001 – Current Brake 1; unsigned16; read only

» 0xXXXX
where ‘XXXX’ is the 16-Bit-Current-Value in mA

› 0x3002 – Current Brake 2; unsigned16; read only

» 0xXXXX
where ‘XXXX’ is the 16-Bit-Current-Value in mA

› 0x3003 – 12VDC; unsigned16; read only

» 0xXXXX
where ‘XXXX’ is the Value in mV

› 0x3004 – PCB Board Temperature; unsigned 16; read only

»0x0XXX where ‘XXX’ is the 12-Bit-ADC-Value of an 3900K NTC with a 10k Pullup on a 5VDC Signal

$$T[°C] = \left(\frac{-3900}{\ln\left(\frac{-(ADC-4096)}{ADC}\right)-13{,}08}\right) - 273{,}15$$

»

› 0x3005 – Motor Temperature; unsigned 16; read only

» 0x0XXX
where ‘XXX’ is the 12-Bit-ADC-Value of PTC with a 620R Pullup to 5VDC and a amplification of 0,52075.

› 0x3006 – Hardware Revision; uint16; read only

»0x0XXX where 'XXX' is the 12-Bit-ADC-Value of a resistor network that defines the Hardware Revision

* 0 – Rev.0 (5-89-20)
* 222 – Rev.1 (5-89-21)
* 369 – Rev.2
* 530 – Rev.3
* 678 – Rev.4
* 847 – Rev.5
* 1062 – Rev.6
* 1233 – Rev.7
* 1415 – Rev.8
* 1657 – Rev.9
* 1812 – Rev.10
* 1998 – Rev.11
* 2184 – Rev.12
* 2340 – Rev.13
* 2585 – Rev.14
* 2769 – Rev.15
* 2943 – Rev.16
* 3162 – Rev.17
* 3336 – Rev.18
* 3487 – Rev.19
* 3653 – Rev.20
* 3805 – Rev.21
* 4066 – Rev.22

› 0x3011 – Status of Dip-Switches; unsigned16; read only

» 0xS2S1
where 'S2' is the second Dip-Switch and 'S1' is the first Dip-Switch

› 0x3012 – Status of the Inputs; unsigned8; read only

» 0xXX
where the bits meaning is as follows:
Bit 0: Evacuation (active low)
Bit 1: Test Brake 1 (active low)
Bit 2: Test Brake 2 (active low)
Bit 4: Brake (active low)
Bit 5: Brake 1 Monitor (configurable to NC or NO)
Bit 6: Brake 2 Monitor (configurable to NC or NO)

› 0x3013 – Status of the two internal Drive signals; unsigned8; read only

» 0x0X
Bit 0: Drive signal for High-Side-MosFET
Bit 1: Drive signal for Low-Side-MosFET

› 0x3014 – Status of the Outputs; unsigned8; read only

» 0x0X Bit 0: Brake open
Bit 1: Control-CPU OK
Bit 2: Braketest active

› 0x3016 – Controlling via CANopen; unsigned8; read/write

» 0x0X
Bit 0: Evacuation via CANopen (active high)
Bit 1: Test Brake 1 via CANopen (active high)
Bit 2: Test Brake 2 via CANopen (active high)
Bit 4: open Brake via CANopen (active high)

› 0x3017 – Status Brake-Coils; unsigned8; read/write

» 0xXX Bit 0: Brake-Coil 1 Control OFF / ON
Bit 1: Brake-Coil 2 Control OFF / ON
Bit 3: Brake-Coil 1 Monitor CLOSED / OPEN
Bit 4: Brake-Coil 2 Monitor CLOSED / OPEN
Bit 3-4 are real in case of Monitoring is enabled, otherwise depending on current is on.

› 0x301E – Reset critical errors; char; write only

» 0x0X
Bit 0: resets critical Errors in EEPROM

› 0x301F – Status of Errors; char[2]; read only

» 0xDDEE
where 'EE' is the Error number and 'DD' is
see „6.1.1 Status Monitoring“, page 26

› 0x3020 – Brake Counters; 32Bit Value; read only

»0: Number of entries = 2

»1: Counter Brake 1

»2: Counter Brake 2

› 0x3021 – Brake Average Currents (100%) [mA]; 32Bit Value; read only

» 0: Number of entries = 2

»1: Brake 1 Average Current

»2: Brake 2 Average Current

› 0x3022 – Brake Average Currents (Reduction) [mA]; 32Bit Value; read only

» 0: Number of entries = 2

»1: Brake 1 Average Reduction Current

»2: Brake 2 Average Reduction Current

› 0x3023 – Brake Last Time Currents (100%) [mA]; 32Bit Value; read only

» 0: Number of entries = 2

»1: Brake 1 Last Time Current

»2: Brake 2 Last Time Current

› 0x3024 – Brake Last Time Currents (Reduction) [mA]; 32Bit Value; read only

» 0: Number of entries = 2

»1: Brake 1 Last Time Reduction Current

»2: Brake 2 Last Time Reduction Current

› 0x3025 – Operating Minutes; 32Bit Value; read only

» 0: Number of entries = 5

»1: Brake 1 100%

»2: Brake 2 100%

»3: Brake 1 Reduction

»4: Brake 2 Reduction

»5: CBM

› 0x3026 – Total Power [wh]; 32Bit Value; read only
» 0: Number of entries = 4
»1: Brake 1 100%
»2: Brake 2 100%
»3: Brake 1 Reduction
»4: Brake 2 Reduction
› 0x027 – Energy Savings through lowering [wh]; 32Bit Value; read only
» 0: Number of entries = 2
»1: Brake 1
»2: Brake 2
› 0x3028 – Brake opening times [ms]; 16Bit Value; read only
» 0: Number of entries = 4
»1: Brake 1 (first opening)
»2: Brake 2 (first opening)
»3: Brake 1 (last opening)
»4: Brake 2 (last opening)
› 0x3029 – Brake closing times [ms]; 16Bit Value; read only
» 0: Number of entries = 4
»1: Brake 1 (first closing)
»2: Brake 2 (first closing)
»3: Brake 1 (last closing)
»4: Brake 2 (last closing)

6 Indicatior LEDs

6.1 Status LEDs

JEach of the two integrated controllers has a 3-color LED (red / green / blue). The meaning of the states is different.

6.1.1 Status Monitoring

blue

› On: Monitoring OK

› Off: Monitoring faulty

red

› The red LED indicates an error condition. It can show a 5-digit error code by flashing. The duration of a position is 500ms. A logical 1 has an on-time of 250ms, while a logical 0 only has an on-time of 25ms. In order to find the beginning of the 5-digit code, there is a pause of 1000ms between the end and the beginning.

Error	B0	B1	B2	B3	B4	Description
0x00	0	0	0	0	0	No Error
0x01	1	0	0	0	0	Inputs not in initial position during booting
0x02	0	1	0	0	0	ABC error at the inputs DRIVE and BRAKE
0x03	1	1	0	0	0	Internal DRIVE signals are not the same
0x04	0	0	1	0	0	BRAKE signal active before DRIVE signal
0x05	1	0	1	0	0	Trigger signal from Control CPU not detected
0x06	0	1	1	0	0	Short-circuit tests of the MosFETs in the MAIN-CPU unsuccessful

6.1.2 Status Controlling

blue

› On: Controlling OK

› blinking with 400ms/1000ms: Brake open

› blinking with 100ms/1000ms: Evacuation active

› Off: Controlling faulty

green

Blinkt die LED grün im Sekundentakt, befindet sich die Main-CPU im Bootloader-Modus. Blinkt sie schneller, findet gerade ein Update statt.

red

The red LED indicates an error condition. It can show a 5-digit error code by flashing. The duration of a position is 500ms. A logical 1 has an on-time of 250ms, while a logical 0 only has an on-time of 25ms. In order to find the beginning of the 5-digit code, there is a pause of 1000ms between the end and the beginning.

Error	B0	B1	B2	B3	B4	Description	CANopen Error Register	CANopen Error Code
0x00	0	0	0	0	0	No Error	0x00	0x0000
0x01	1	0	0	0	0	Inputs on Bootup not OK Detail 1: Control-Inputs not OK Detail 2: Brakemonitoring configured as NO not OK Detail 3: Brakemonitoring configured as NC not OK	 0x80 0x01 0x01	 0xFF01 0x8000 0x8000
0x02	0	1	0	0	0	ABC Error Detail 1: DRIVE-Signal was already active Detail 2: Brake-Signal was already active	0x80	 0xFF02 0xFF07
0x03	1	1	0	0	0	internal Drive-Signals not equal	0x80	0xFF03
0x04	0	0	1	0	0	Brake-Drive-Sequence Detail 1:Brake-Signal rises before Drive-Signal Detail 2: Drive-Signal falls before Brake-Signal (Emergencystop)	0x80	 0xFF04 0xFF06
0x05	1	0	1	0	0	Trigger-Signal from Monitor-CPU not detected	0x80	0xFF05
0x06	0	1	1	0	0	Overtemperature on PCB	0x08	0x4200
0x07	1	1	1	0	0	Overtemperature in Motor	0x08	0x4000
0x08	0	0	0	1	0	Overcurrent in Brake 1 Detail 1: Overcurrent Detail 2: Short Circuit	0x80	 0xFF08 0xFF48
0x09	1	0	0	1	0	Overcurrent in Brake 2 Detail 1: Overcurrent Detail 2: Short Circuit	0x80	 0xFF09 0xFF49
0x0B	1	1	0	1	0	Undercurrent in Brake 1	0x80	0xFF0B
0x0C	0	0	1	1	0	Undercurrent in Brake 2	0x80	0xFF0C
0x0E	0	1	1	1	0	Thyristor in Brake 1 circuit Detail 1: SCR of positive half wave is short circuit Detail 2: SCR of negative half wave is short circuit Detail 3: SCR of positive half wave is open circuit Detail 4: SCR of negative half wave is open circuit	0x80	 0xFF11 0xFF12 0xFF13 0xFF14
0x0F	1	1	1	1	0	High-Side-MosFET in Brake 1 circuit Detail 1: open circuit on positive half wave Detail 2: open circuit on negative half wave Detail 3: short circuit	0x80	 0xFF15 0xFF16 0xFF17

Error	B0	B1	B2	B3	B4	Description	CANopen Error Register	CANopen Error Code
0x10	0	0	0	0	1	Low-Side-MosFET in Brake 1 Detail 1: open circuit Detail 2: short circuit	0x80	 0xFF18 0xFF19
0x11	1	0	0	0	1	Thyristor in Brake 2 circuit Detail 1: SCR of positive half wave is short circuit Detail 2: SCR of negative half wave is short circuit Detail 3: SCR of positive half wave is open circuit Detail 4: SCR of negative half wave is open circuit	0x80	 0xFF21 0xFF22 0xFF23 0xFF24
0x12	0	1	0	0	1	High-Side-MosFET in Brake 2 circuit Detail 1: open circuit on positive half wave Detail 2: open circuit on negative half wave Detail 3: short circuit	0x80	 0xFF25 0xFF26 0xFF27
0x13	1	1	0	0	1	Low-Side-MosFET in Brake 2 Detail 1: open circuit Detail 2: short circuit	0x80	 0xFF28 0xFF29
0x17	1	1	1	0	1	12V-Power-Supply not OK	0x04	0x3200
0x18	0	0	0	1	1	Diagnostic inputs on bootup not OK	0x80	0xFF41
0x19	1	0	0	1	1	Brake Monitoring Contact-Type NO/NC: Detail 1: Brake 1 monitored as open but should be closed Detail 2: Brake 2 monitored as open but should be closed Detail 4: Brake 1 monitored as closed but should be open Detail 5: Brake 2 monitored as closed but should be open Contactless: Detail 13: Brake 1 blocked Detail 14: Brake 2 blocked	0x80	 0xFF81 0xFF82 0xFF84 0xFF85 0xFF8D 0xFF8E
0x1A	0	1	0	1	1	At least one test signal activated while BRAKE becomes active	0x80	0xFF42
0x1B	1	1	0	1	1	Brake 1 short circuit Brake 2 short circuit	0x80	0xFF4B 0xFF4C

Legend

colour of errors	Description
grey	Errors are only reported via CANopen, but never lead to shutdown
blue	Volatile errors, lead to shutdown if they occur 30 times during a journey, but are automatically deleted when all input signals are removed again
violett	Normal errors, lead to direct shutdown, but are automatically deleted when all input signals are removed again.

colour of errors	Description
orange	Critical errors, lead to direct shutdown and can be deleted by a reset.
rot	critical errors, lead to immediate shutdown, but must be explicitly deleted, *see „6.1.3 Clear critical errors“, page 29.*

6.1.3 Clear critical errors

Some errors, sometimes only sub-errors, are classified as critical and lead to the fact that the error still exists even after switching off and on again. To erase such a critical error:

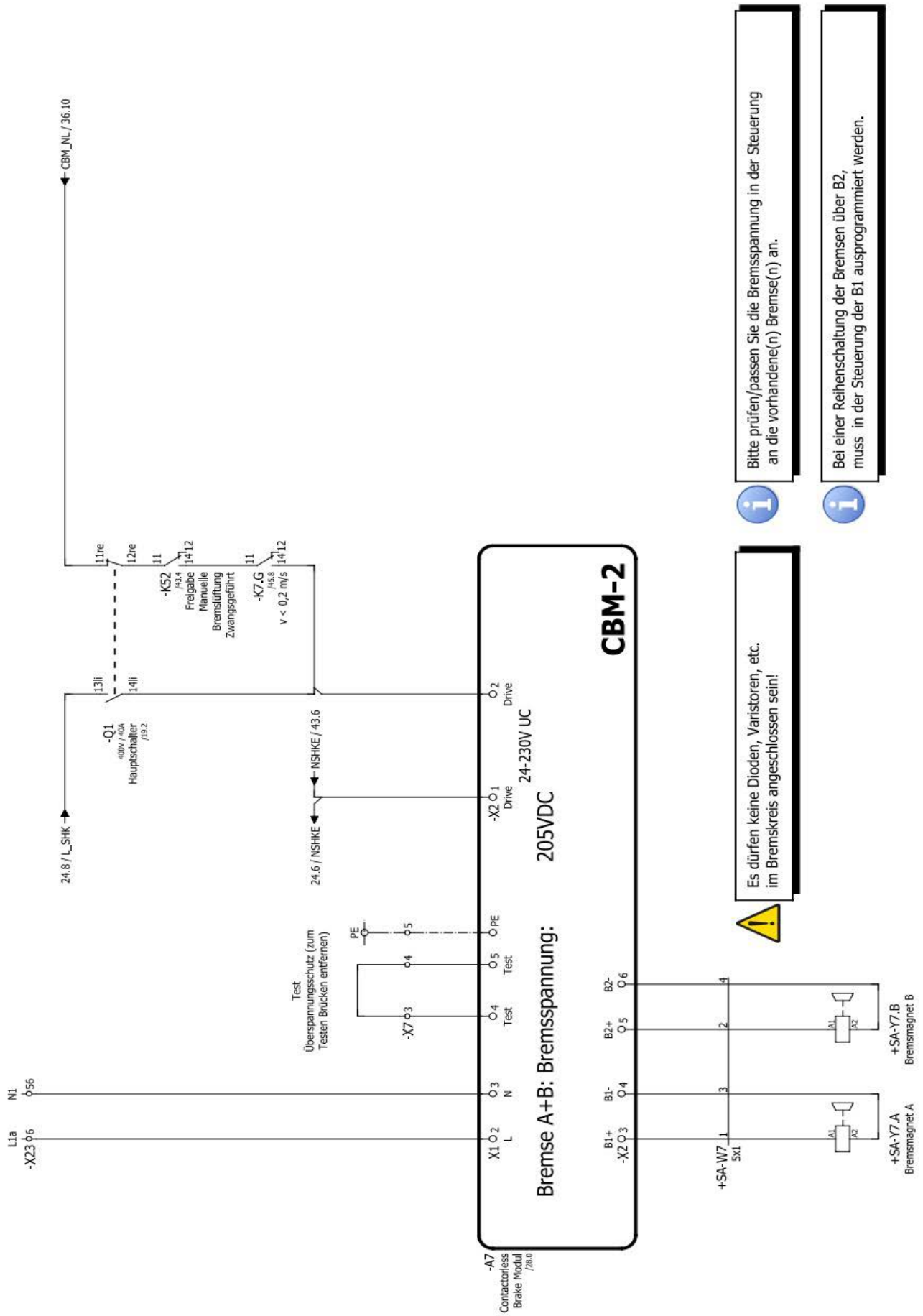
- ► Switch **ON** CBM.
- ► During the start up press button **T2**
  or (if this is not present) set a jumper between **X3.1** and **X3.6**.
- ► Turn CBM **OFF** again.
- ► Releas button **T2** or remove the jumper.

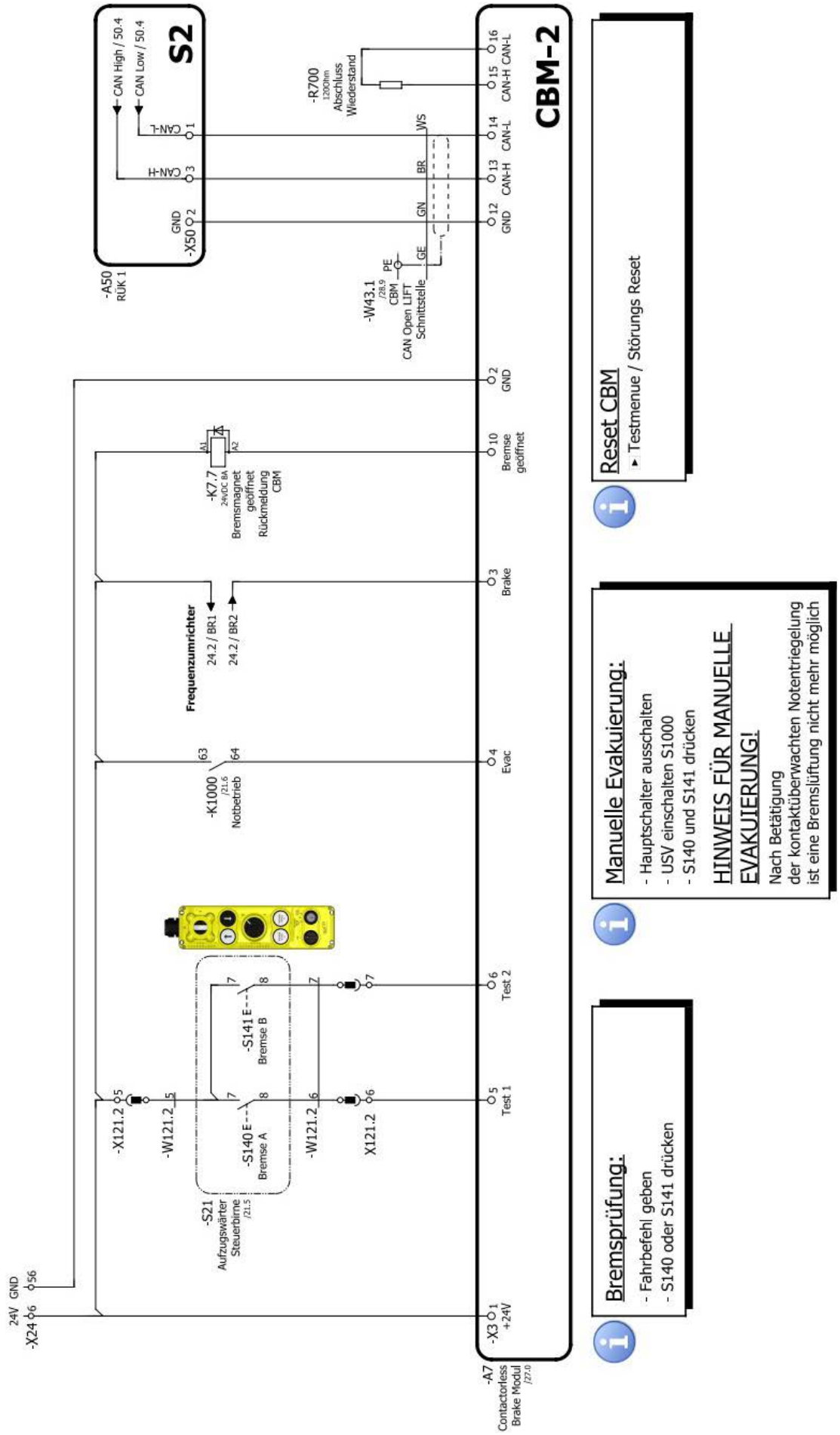
At the next power up, all errors will be cleared.

7 Tecnical Data

Description	Value
Supply Voltage	230V AC ±5%
Typical power consumption	Brake inactive – 160mA (with active brakes depending on connected brakes)
Internal Fuse	5A T – 1500A safe switch off capability
Permissible current consumption of the brake coils	6A – briefly (up to 5s) 4A – continuous
Temperature range	Lagerung: -20 - +70°C Betrieb: 0 - +60°C
Relative humidity (not condensing)	Storage/Transport: +5 - +95% Operation: +15 - +85%
Length x width x depth	245mm x 50mm x 158mm
Mass	800g

8 Circuit diagram




S2
CAN High / 50.4
CAN Low / 50.4
CAN-L
CAN-H
GND
-X50
-A50
RÜK 1
-R700
120Ohm
Abschluss
Wiederstand
-W43.1
/28.9
CBM
CAN Open LIFT
Schnittstelle
PE
WS
BR
GN
GE
CBM-2
CAN-H
CAN-L
GND
Bremse geöffnet
Brake
Evac
Test 2
Test 1
+24V
-X3
-A7
Contactorless Brake Modul
/27.0
-K7.7
24VDC 6A
Bremsmagnet geöffnet Rückmeldung CBM
-K1000
/21.6
Notbetrieb
Frequenzumrichter
24.2 / BR1
24.2 / BR2
-S21
Aufzugswärter Steuerbirne
/21.5
-S140
Bremse A
-S141
Bremse B
-X121.2
-W121.2
X121.2
24V GND
-X24
Reset CBM
▸ Testmenue / Störungs Reset
Manuelle Evakuierung:
- Hauptschalter ausschalten
- USV einschalten S1000
- S140 und S141 drücken
HINWEIS FÜR MANUELLE EVAKUIERUNG!
Nach Betätigung
der kontaktüberwachten Notentriegelung
ist eine Bremslüftung nicht mehr möglich
Bremsprüfung:
- Fahrbefehl geben
- S140 oder S141 drücken

9 Certificates

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RvA C 067

EU-TYPE EXAMINATION CERTIFICATE

Issued by Liftinstituut B.V.
identification number Notified Body 0400,
commissioned by Decree no. 2018-0000125182

Certificate no.	:	NL19-400-1002-310-01 Revision no.: 1
Description of the product	:	Universal electronic brake module with ACOP/UCMP brake monitoring functionality
Trademark	:	NEW LIFT Service Center GmbH
Type no.	:	CBM2
Name and address of the manufacturer	:	NEW LIFT Neue Elektronische Wege Steuerungsbau GmbH Lochhamer Schlag 8 82166 Gräfelfing, Germany
Name and address of the certificate holder	:	NEW LIFT Service Center GmbH Ruwerstraße 16 54427 Kell am See, Germany
Certificate issued on the following requirements	:	Lifts Directive 2014/33/EU
Certificate based on the following standard	:	EN 81-20:2020, 5.6.6.2, 5.6.7.3, 5.6.7.9, 5.9.2.2.2.3, 5.11.2.3 and EN 81-50:2020, 5.6, 5.8.3.2.5 and 5.15
Test laboratory	:	Sebert Trillingstechniek B.V., The Netherlands
Date and number of the laboratory report	:	25-04-2019; Report M19.001-P19.001 Liftinstituut
Date of EU-type examination	:	October 2018 – August 2019 Rev.1; March – November 2021
Additional document with this certificate	:	Report belonging to the EU-type examination certificate no.: NL19-400-1002-310-01 rev.1
Additional remarks	:	-
Conclusion	:	The safety component meets the requirements of the Lifts Directive 2014/33/EU taking into account any additional remarks mentioned above.

Amsterdam
Date : 26-11-2021
Valid until : 26-11-2026

ing A.J. van Ommen
International Business Manager

Certification decision by

liftinstituut
SINCE 1933

RvA PRODUCTEN RvA C 067

Report EU-type examination

Report belonging to EU-type examination certificate number	:	NL19-400-1002-310-01
Date of issue of original certificate	:	27-08-2019
Certificate applies to	:	Lift Safety component
Revision number / date	:	1 / 26-11-2021
Requirements	:	Lifts Directive 2014/33/EU Standards: EN 81-20:2020, 5.6.6.2, 5.6.7.3, 5.6.7.9, 5.9.2.2.2.3, 5.11.2.3 and EN 81-50:2020, 5.6, 5.8.3.2.5 and 5.15
Project number	:	P210054 / P200221

1. General specifications

Description of the product	:	Universal electronic brake module with ACOP/UCMP brake monitoring functionality
Trademark	:	NEW LIFT Service Center GmbH
Type no.	:	CBM2
Name and address of the manufacturer	:	NEW LIFT Neue Elektronische Wege Steuerungsbau GmbH Lochhamer Schlag 8 82166 Gräfelfing, Germany
Laboratory	:	Sebert Trillingstechniek B.V., The Netherlands
Address of examined lift	:	-
Date of examination	:	October 2018 - August 2019 Rev.1; March – November 2021
Examination performed by	:	P.J. Schaareman

2. Description lift safety component

The mechanical brake of the lift motor is performed with one or more electro-mechanical brake coils. According EN 81-20 clause 5.9.2.2.2.3 it shall require a continuous flow of current to hold off the brake. The interruption of this current shall be made by two independent electromechanical devices or an electrical circuit satisfying clause 5.11.2.3.

Liftinstituut B.V.
Buikslotermeerplein 381
NL - 1025 XE Amsterdam

VAT number: NL.8103.99.441.B.01
Registered by the Dutch Chamber of Commerce
under number 34157363

+31 (0)20 435 06 06
contact@liftinstituut.com
www.liftinstituut.com

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For this feature CBM2 (Contactless Brake Modul 2) is developed. The CBM2 is an electronic device which interrupts the current to the brake(s) directly with electronics which makes the use of contactors in front of the brake unnecessary.
To provide DC power for the brake(s) the AC power from the grid (230VAC) is rectified. The rectifier circuit generates a voltage from 0–207VDC for the brake(s) depending on the phase angle where the thyristors are switched on.
It is possible to connect 2 brakes to the CBM2; For each brake 2 MosFET's are used to switch the power to the brake. The safety chain (24-230VUC) is connected directly to the CBM2 on connectors X2:1/2. The safety chain directly controls the signals to fire the MosFET's without any software drive sub signals.

A 2-channel structure is fully implemented for each output to guarantee switching off the brake(s) in case of a failure. Any failure in the system will be detected and will keep the CBM2 out of service until the failure is solved. The intervention of a competent person is necessary.

The CBM2 is also capable to monitor the proper operation of the brake(s). This can be done by connecting monitoring switches of the brake to the CBM2 to check if they open or close or by a specific current measurement. Defective brakes will be detected and will prevent further normal operation of the lift.
The CBM2 can be configured to suit the proper brake voltage, allow a power reduction level and time, brake monitoring option on/off/type, ramping and PTC monitoring option. Also input signals can be connected to the CBM2 for testing and evacuation purposes.

Technical details	:	CBM2
HW PCB	:	CBM 5-89-21
Dimensions	:	ca. 245x47x160mm (LWD)
Weight	:	ca. 800 gram
Safety related connections	:	X1:1/2/3; PE/L/N (230VAC) X2:1/2 Drive Signal (Safety chain) (~48-230VUC) X2:3/4; Brake 1 Coil +/- X2:5/6; Brake 2 Coil +/- X3:3; Brake-Signal X3:4; Evac-Signal X3:5/6; T1/T2-Signal X3:7/8; BM1/BM2-Signal
Degree of protection	:	IP2X
Pollution degree	:	PD III
Temperature	:	0 °C up to 60 °C
Altitude	:	Up to 2000m above sea level
SW-version	:	V5.04 (16-11-2021)
For further specifications see manual CBM2		

See annex 1 for a general overview of the product.

Liftinstituut B.V.
Buikslotermeerplein 381
NL - 1025 XE Amsterdam

VAT number: NL.8103.99.441.B.01
Registered by the Dutch Chamber of Commerce
under number 34157363

+31 (0)20 435 06 06
contact@liftinstituut.com
www.liftinstituut.com

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RvA C 067

3. Examinations and tests

The end of the safety chain is connected to the CBM2 printed circuit board.
Power supply is connected to connector X1.2 and 3. Maximum voltage is 230VAC.
Safety chain of the lift is connected to connector X2:1 and 2. Maximum voltage is 230VAC.
The output for the brake is connected to X2:3 to 6, maximum voltage is 207VDC.
Other circuits are used on the PCB for controlling and triggering the electronic components used as electronic safety circuits. Maximum voltage 12 VDC.

According to EN 81-50 clause 5.15 the creepage and clearance distances shall fulfill the requirements of the EN-IEC 60664-1 taking into account:

- pollution degree 3
- material group III
- inhomogeneous electrical field
- over-voltage category III
- printed wiring column not used

Outer layers:
For 250 VAC these distances shall be min. 4.0mm for creepage and 3.0mm for clearance.
For 12 VDC these distances shall be min. 1.15mm for creepage and 0.8mm for clearance.
For 5 VDC these distances shall be min. 1.0mm for creepage and 0.8mm for clearance.

Inner layers:
For 250 VAC the creepage distances shall be min. 2.5mm.
For 12 VDC the creepage distances shall be min. 0.45mm.
For 5 VDC the creepage distances shall be min. 0.4mm.

The examination covered a check whether compliance with the Lift Directive 2014/33/EU is met, based on the harmonized product standards EN 81-20 and 50.
Issues not covered by or not complying these Standards are directly related to the above-mentioned essential requirements based on the risk assessment, resp. failure analyses.

Final HW PCB versions for this examination: CBM 5-89-21 (05-11-2021).
Final SW version for this examination was V5.04 (16-11-2021).

The examination included:

- Examination of the technical file (See annex 2);
- Examination of the representative model in order to establish conformity with the technical file;
- Temperature and shock/vibration tests according EN 81-50 clause 5.6; and
- Inspections and tests to check compliance with the requirements.

Liftinstituut B.V.
Bukslotermeerplein 381
NL - 1025 XE Amsterdam

VAT number: NL.8103.99.441.B.01
Registered by the Dutch Chamber of Commerce
under number 34157363

+31 (0)20 435 06 06
contact@liftinstituut.com
www.liftinstituut.com

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4. Results

The creepage distances and clearances between terminals, connected to the safety circuit and tracks behind these terminals to each other and to another voltage do fulfill to the above (chapter 3) mentioned distances or alternative failure exclusion.

The energy flow to the brake is interrupted safely to guarantee that the brake remains off when the safety circuit of the lift is not available.

The brake monitoring options are able to detect a failure in the lifting and dropping of the ACOP and/or UCMP stopping means (machine brake). If a failure is detected the reset requires the intervention of a competent person.

After the final examination the product and the technical file were found in accordance with the requirements. The functional tests passed without remarks.

The temperature, vibration and bumping tests according EN 81-50 clause 5.6 passed without remarks and did not lead to permanent deformations or loss of stability.

5. Conditions

Additional to or in deviation of the applicable demands in the considered requirements / standards (see certificate and/or page 1 of this report), the following conditions shall be taken into account:

- In the final acceptance test it shall be verified that the brake function operates as intended.
- The interruption of the current to the motor shall be separately done by the lift control according the relevant requirements of the standard.
- The electronic brake device shall be installed, set, commissioned, and maintained according the instructions of the manufacturer.
- Brake monitoring for ACOP and/or UCMP can be configured with brake monitoring switches or brake current monitoring.
  Before taking the lift into service and after each change in the software of the CBM2, the proper functioning of this monitoring must be checked.
  The checking shall be done by disconnecting and short circuiting the brake monitoring switches one by one or in case of brake current monitoring, the brake shall be kept mechanically open/closed.
  Each time after a command is given, the manipulation shall be detected by the system and a reset (T2) shall be necessary to bring the lift back into operation.
  (Power off and power on shall not reset the detected brake monitoring failure).

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6. Conclusions

Based upon the results of the EU-type examination, Liftinstituut B.V. issues an EU-type examination certificate.

The EU-type examination certificate is only valid for products which are in conformity with the same specifications as the type-certified product. The certificate is issued based on the requirements that are valid at the date of issue. In case of changes of the product specifications, changes in the requirements or changes in the state of the art the certificate holder shall request Liftinstituut B.V. to reconsider the validity of the certificate.

7. CE marking and EU Declaration of conformity

Every safety component that is placed on the market in complete conformity with the examined type must be provided with a CE marking according to article 18 of the Lift Directive 2014/33/EU under consideration that conformity with eventually other applicable Directives is proven. Also, every safety component must be accompanied by an EU declaration of conformity according to annex II of the Directive in which the name, address, and Notified Body identification number of Liftinstituut B.V. must be included as well as the number of the EU-type examination certificate.

An EU type-certified safety component shall be random checked e.g. according to annex IX of the Lift directive 2014/33/EU before these safety components may be CE-marked and may be placed on the market. For further information see regulation 2.0.1 ‘Regulations for product certification’ on www.liftinstituut.com.

Prepared by:

P.J. Schaareman
Product Specialist Certification

Certification decision by:

liftinstituut
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Annexes

Annex 1. Impression CBM2

Liftinstituut B.V.
Buikslotermeerplein 381
NL - 1025 XE Amsterdam

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www.liftinstituut.com

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Annex 2. Documents of the Technical File which were subject of the examination

Title	Document number	Date
Impression NEW Lift CBM	180914_brake.pdf	10-10-2018
Extended fault tree analyses	FTA-CBM_with_comments,pdf	12-11-2018
PCB-file interface board	EF337.5_CBM_IO-PCB.brd	04-12-2018
PCB-file main board	EF336.9_CBM_MAIN-PCB_rev2.brd	07-08-2019
Electrical diagram main board	EF336.9_CBM_MAIN-PCB_rev2.sch	07-08-2019
Electrical diagram interface board	EF337.5_CBM_IO-PCB.pdf	04-12-2018
Wiring of the interface cables	EF341.1_CBM_Cables.pdf	04-12-2018
Manual of CANopen (German/English)	hb_cbm_CANopen_2019_08_xx_v1.1.pdf	07-08-2019
Electrical diagram of test-setup	CB180002_SP_2018_11_13 el dia test.pdf	04-12-2018
Manual of CBM (German/English)	hb_cbm_2019_08_xx_v1.4.pdf	07-08-2019
CBM design document	CBM_v1.4.pdf	04-12-2018
Listing/info of firmware revisions	firmware_version_history.pdf	04-12-2018
Electrical diagram of CBM in lift	CB180003_SP_2018_12_06_EN.pdf	06-12-2018
Sebert Triltechniek testlab report	25-04-2019; Report M19.001-P19.001 Liftinstituut	25-04-2019
IP64 test report	186-19 V1U.pdf	13-06-2019
EMC test report	em-6843.pdf	29-07-2019
Documents for rev.1		
Schematics and PCB file for CBM2	211105_Produktionsdaten_Newlift_CBM_5-89-21	05-11-2021
Bill of material for CBM2	211105_CBM 5-89-21_BOM.xlsx	05-11-2021
CBM2 design document	CBM2_v4.2.pdf	23-11-2021
Updated manuals (German/English)	hb_cbm2_2021_11_xx_v1.1.pdf	23-11-2021
Manual for EMC test setup	emv_cbm_2021_09_de_v0.1.pdf	29-09-2021

Annex 3. Reviewed deviations from the standards

EN 81-20 par.	Requirement	Accepted design
Clause 5.9.2.2.2.3	5.9.2.2.2.3 To hold off the brake shall require a continuous flow of current except as permitted by 5.9.2.2.2.7. a) 2) an electrical circuit satisfying 5.11.2.3. This means is regarded as a safety component and shall be verified according to the requirements in EN 81-50, clause 5.6	CBM2: The CBM2 is an electronic design fulfilling the requirements of 5.11.2.3. CBM2 passed examination and tests successfully.

Annex 4. Revision of the certificate and its report

Rev.:	Date	Summary of revision
-	27-08-2019	Original
1	26-11-2021	Updated version of CBM to CBM2, changes in layout, inputs, outputs, brake monitoring functionality and enclosure; also updated to EN 81-20/50:2020

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under number 34157363

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contact@liftinstituut.com
www.liftinstituut.com

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EU Declaration of Conformity

According to the EU-directive

Product description:

Universal electronic brake module with brake monitoring functionality

Device type: "CBM2" in all delivered variants

The EU-type examination (Certificate-no. NL19-400-1002-310-01 Rev. 1) was conducted by the Liftinstituut B.V., ID-Nr.: CE0400.

Manufacturing control according to QM-System ISO 9001:2015 and ARL 2014/33/EU Annex VI is carried out by the Association for Technical Inspection (TÜV Rheinland Industrie Service GmbH, ID-No.: CE0035).

The named brake module CBM2 has been developed, constructed and produced in accordance with the Council Directives on the approximation of the laws of the Member States.

- Low Voltage Directive 2014/35/EU
- EMV-Directive 2014/30/EU
- Lift Directive 2014/33/EU

The following standards were used to assess the unit:

- EN81-20:2020, Section 5.6.6.2, 5.6.7.3, 5.6.7.9, 5.9.2.2.2.3, 5.11.2.3
- EN81-50:2020, Section 5.6, 5.8.3.2.5, 5.15

There exists a complete technical documentation. The manual for the devices is available. The safety instructions of the delivered manual must be observed! This declaration confirms the conformity of the mentioned standards and directives. It does not, however, include a guarantee of characteristics.

Graefelfing, 26.11.2021

Legally binding signature:

Peter Zeitler, Managing Director

NEW *LIFT* - Neue elektronische Wege Steuerungsbau GmbH
Lochhamer Schlag 8 - 82166 Graefelfing - Germany

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NEUE ELEKTRONISCHE WEGE

NEW LIFT Neue Elektronische Wege
Steuerungsbau GmbH
Lochhamer Schlag 8
DE 82166 Gräfelfing

+49 (0) 89 898 66 0
+49 (0) 89 898 66 300
info@newlift.de
www.newlift.de

NEW LIFT
Service Center GmbH
Ruwerstraße 16
DE 54427 Kell am See

+49 (0) 6589 919 540
+49 (0) 6589 919 540 300
info@newlift-sc.de
www.newlift.de