SCHMERSAL
BÖHNKE + PARTNER

Installation Manual

System “bp408”

- General instructions
- Safety instructions
- Commissioning
- EU Type Examination

This document has been translated from the German source text. If there is any conflict between this translation and the German version, only the German version shall be legally considered as binding.

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Release: July 2023

Contents

1 General Information

1.1 Thank you

Thank you for the confidence you have placed in us by purchasing “bp408” of Böhnke + Partner GmbH. Please take the time to read this installation manual and documentation on components carefully. Improper handling results in a high risk of injury. Follow all the instructions and you will save a lot of time and questions during commissioning.

We call our overall documentation, with the help of which we inform our customers extensively about our company and its products as Manual. To obtain a better overview, the manual has been divided into several parts. The “Installation manual” tells you about the hazards and risks, which can result in serious health problems and economic damage in case of incorrect behaviour. Furthermore, it will provide you with the necessary information on commissioning of the control system. The installation manual is supplied with every control system and is thus part of the complete control documentation.

If you still have questions, contact us:

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1.2 Intended Use

The control system ≫bp408≪ is an equipment for using in lifts.

1.3 Documentation References

This manual does not provide information on our overall delivery options. All information only serves to describe the product and must not be regarded as granted characteristics in the legal sense. Any claims for damages against us, irrespective of the legal basis, are excluded unless we are guilty of deliberate intent or gross negligence. We do not assume any guarantee that the specified circuits or procedures are free of copyrights of third parties.
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The information in this manual is regularly checked. The necessary corrections are included in subsequent editions.

Hazard warnings and special information are given in this technical manual in the following way and highlighted with a corresponding symbol.

CAUTION!
This symbol is used when inaccurate compliance with or failure to comply with instructions or procedures can result in damages to the device, injuries, or fatal accidents.

WARNING!
This symbol is used when inaccurate compliance with or failure to comply with instructions or procedures can result in injuries or fatal accidents due to electric current.

NOTE!
This symbol is used to bring attention to a specific characteristic.

2 Safety Instructions

NOTE!
Before installing and commissioning this device, please read these safety instructions and warnings carefully and follow all the warning signs attached to the device. Make sure the warning signs are legible and replace missing or damaged signs.

2.1 Qualified Personnel

Qualified personnel within the meaning of the documentation or warnings on the product are persons, who are familiar with setup, assembly, commissioning, operation and maintenance of the product and have the relevant qualifications for the activity, e.g.:

- Training and briefing or authorisation to switch on and off, earth and label the current circuits and devices according to the standards of the safety technology.
- Training and briefing in maintenance and use of appropriate safety equipment according to the standards of the safety technology.
- First-aid training.

2.2 Safety Instructions for Control System

ATTENTION!

Excerpts from chapter 5 of “DGUV 209-053 Activities performed on lifts” (edition 02/2017):
5.1 Notification
Before starting work on an existing lift, the fitter must notify the person using (operating) the lift or his representative and inform him about the extent of work and expected duration of work.
After the work is completed, a notice of departure must be given.
…

5.2 Blocking the lift
Before beginning work on a lift, the fitter must safely block it and put up a sign that is clearly visible and durable and says, for example, “Lift out of service”, at every shaft access.
…
5.3 Safety of shaft accesses
Open shaft accesses must be blocked such that unauthorised persons (third parties) are prohibited from entering them. Work for which doors of the lift shaft must be opened must only be carried out when the lift car is behind them. If this is not possible, additional measures must be taken.
…

5.4 Assistance by another person
If a fitter is performing an activity, which requires the presence of another person, this person must be an expert or trained in hazards.
…

5.5 Implementation of work
5.5.1 Entering and leaving the car roof
The car roof may be entered only in the presence of experts. Before entering the car roof, the emergency brake switch (“emergency stop”) and, if accessible, the inspection switch on the car roof must be switched on and their functioning checked.

The shaft doors may be closed only after the inspection control system is switched on. The functioning of the emergency brake switch and the inspection switch is checked, e.g., by closing the doors and enabling the hall call. The lift must not move in the process.
Before leaving the car roof, the effectiveness of the shaft door contact with the exit doors must be checked, the emergency brake switch enabled and after opening the shaft door the inspection switch must be unlocked again. The emergency brake switch may be unlocked again only after leaving the car roof.
…
5.5.2 Shaft lighting
Before beginning work in the shaft, sufficient lighting must be ensured, e.g. switch on the shaft lights and carry along a network-independent light.
5.5.3 Stay and drives in the shaft
There should not be more people on the car roof and more material must not be taken along than is necessary for carrying out the work. Load-bearing capacity and usable area must be kept in mind. Driving on the car roof is permissible only when there is no one present in the hazard zone.
It is forbidden to carry out work during the drive. Inspections (visual inspections) are only permissible during downward drives. There is a danger of crushing during upward drives, e.g., at counterweights and shaft fittings (see section 5.2.5.7 DIN EN 81-20).
…
5.5.4 Electrical hazard
After the main switch is switched off, voltage may remain in various equipment and components of the lift.
…

5.5.5 Bridging of safety equipment and control lines
It is strictly forbidden to bridge safety equipment, control lines and the switches. If it is not possible to avoid bridging in order to carry out work, it may be done only if:

- the person carrying out the work is trained in it
- the bridges are suitable and clearly recognisable for everyone.

…
The bridges must be removed immediately after the work is completed.

5.5.6 Switching agreements for time
Agreements for carrying out switching processes or car movements are forbidden at a certain time.
…
5.6 Completion of activities
After completion of activities, all equipment, especially the safety equipment related to the work, must be checked for proper functioning.
After carrying out repairs subject to approval, the lift may be operated again only after obtaining approval of an approved monitoring body (ZÜS).

2.3 Installer and Operator Requirements

ATTENTION!

- The control system “bp408” is built to state-of-the-art standards and is safe to operate. Hazards occur only when untrained personnel use devices incorrectly or for unintended purposes.
- Smooth and safe operation of devices requires proper transport, storage, setup, and assembly as well as careful operation and maintenance.
- Refrain from any working method that impairs safety of the devices.
- Unauthorised modifications and alterations, which may impair safety of the devices, are not permitted.
- During operation, the drive units have dangerous, live, moving or rotating parts. Hence, they can cause injuries or material damage, for example, if the necessary covers are removed without permission or in case of poor maintenance.
- Only qualified personnel may be assigned to work on the devices. The personnel must always have the supplied operating instructions and all the product documents available during work and follow them consistently. It is forbidden for unqualified personnel to work on or near the devices.
- The operator is responsible for bringing the drive into a safe state in case of failure of the devices because otherwise it can result in injuries or material damage.
- The packaging material must be disposed of in an environmentally friendly way; recycle paper, plastic, metal, electronic components etc.

WARNING!
Before each intervention, disconnect the devices from the mains and check the absence of voltage.

3 Product Certificates

3.1 Declaration of Conformity

The declarations of conformity of the control components used can be found in the latest versions in our online catalogue in the Lift Technology section at the documents of the respective component:

https://products.schmersal.com/en_IO/bp408-806.html

Figure 1:
Document area in online catalogue for the bp408

3.2 EU Type Examination

The system module bp408 contains an electronic monitoring unit for the safety circuit and a pre-control for the contactors. Moreover, a safety circuit (SMZ) is located on the circuit board. The safety circuit can be used in the following cases of DIN EN 81-20/-50 and DIN EN 81-1/-2:

- Preparatory measures with lift car and shaft door open
- Levelling with lift car and shaft door open
- Re-levelling with lift car and shaft door open
- Detection of an unintended movement of the lift car with open doors (UCM).

3.3 EU Type-Examination Certificate SPL-01 with SMZ

EU-Type Examination Certificate

Reg.-No.: 01/208/4A/6135.01/23

Product tested	- Electric safety device - Safety circuit with electronic components - Electronic monitoring circuits	**Certificate holder**	BÖHNKE + PARTNER GmbH Steuerungssysteme Heinz-Fröling-Str. 12 51429 Bergisch Gladbach Germany
Type designation	SPL-01A (Subarea of the printed circuit board SPL-01A of the system module bp408)		
Codes and standards	Directive 2014/33/EU EN 81-20:2020, 5.11.2.3		EN 81-50:2020, 5.6, 5.8.3.2.4, 5.15
Intended application	Use in passenger and goods passenger lifts as safety circuit with electronic components: - Detection of unintended car movement with open doors acc. to EN 81-20, 5.6.7.7 - Bypass of the door and locking element switches during levelling and re-levelling with open doors acc. to EN 81-20, 5.12.1.4 a) as electronic monitoring circuits: - Connections for gathering information acc. to EN 81-20, 5.11.2.1.2 at different points of the electric safety chain.		
Specific requirements	The instructions of the associated Installation and Operating Manual and the appendix to this certificate shall be considered.		

It is confirmed, that the product tested complies with the requirements for lifts defined in the EU-Directive 2014/33/EU.

Valid until 2028-07-26

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1247.03/23 dated 2023-06-23.
This certificate is valid only for products which are identical with the product tested.

Köln, 2023-07-26

Notified Body for Lifts and their Safety Components, NB 0035

Dipl.-Ing. Georg Theisen

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www.tuv.com

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Precisely Right.

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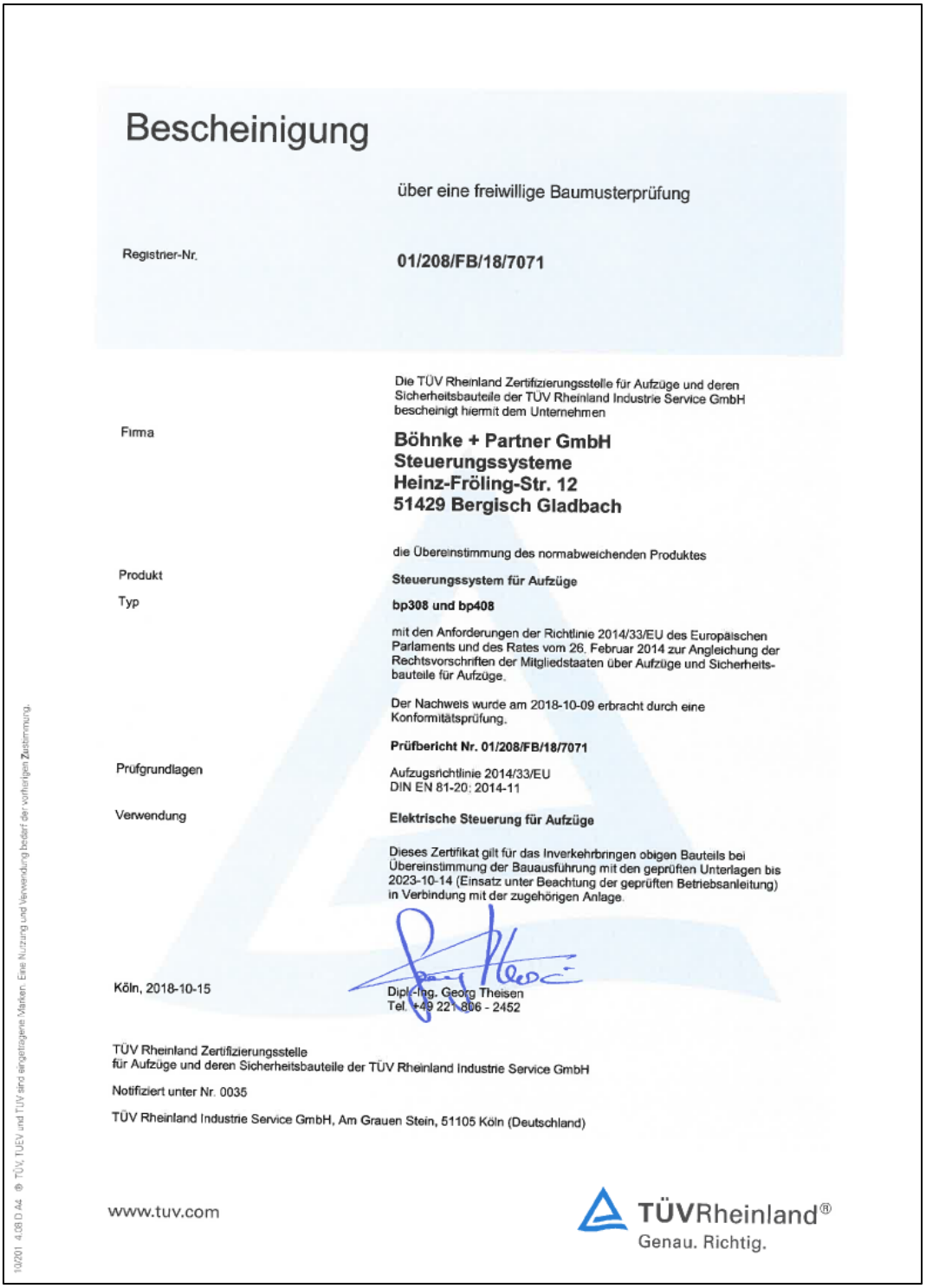
Figure 2:
System module bp408 - Subarea of the printed circuit board SPL-01
Reg. no. 01/208/4A/6135.01/23 dated 2023-07-26

3.4 Voluntary Type Examinations

3.4.1 Compliance of Product deviating from the norm with Requirements of the Directive 2014/33/EU



Bescheinigung

über eine freiwillige Baumusterprüfung

Registrier-Nr. **01/208/FB/18/7071**

Die TÜV Rheinland Zertifizierungsstelle für Aufzüge und deren Sicherheitsbauteile der TÜV Rheinland Industrie Service GmbH bescheinigt hiermit dem Unternehmen

Firma **Böhnke + Partner GmbH**
Steuerungssysteme
Heinz-Fröling-Str. 12
51429 Bergisch Gladbach

die Übereinstimmung des normabweichenden Produktes

Produkt **Steuerungssystem für Aufzüge**

Typ **bp308 und bp408**

mit den Anforderungen der Richtlinie 2014/33/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Aufzüge und Sicherheitsbauteile für Aufzüge.

Der Nachweis wurde am 2018-10-09 erbracht durch eine Konformitätsprüfung.

Prüfbericht Nr. 01/208/FB/18/7071

Prüfgrundlagen Aufzugsrichtlinie 2014/33/EU
DIN EN 81-20; 2014-11

Verwendung **Elektrische Steuerung für Aufzüge**

Dieses Zertifikat gilt für das Inverkehrbringen obigen Bauteils bei Übereinstimmung der Bauausführung mit den geprüften Unterlagen bis 2023-10-14 (Einsatz unter Beachtung der geprüften Betriebsanleitung) in Verbindung mit der zugehörigen Anlage.

Köln, 2018-10-15

Dipl.-Ing. Georg Theisen
Tel. +49 221 806 - 2452

TÜV Rheinland Zertifizierungsstelle
für Aufzüge und deren Sicherheitsbauteile der TÜV Rheinland Industrie Service GmbH

Notifiziert unter Nr. 0035

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln (Deutschland)

www.tuv.com

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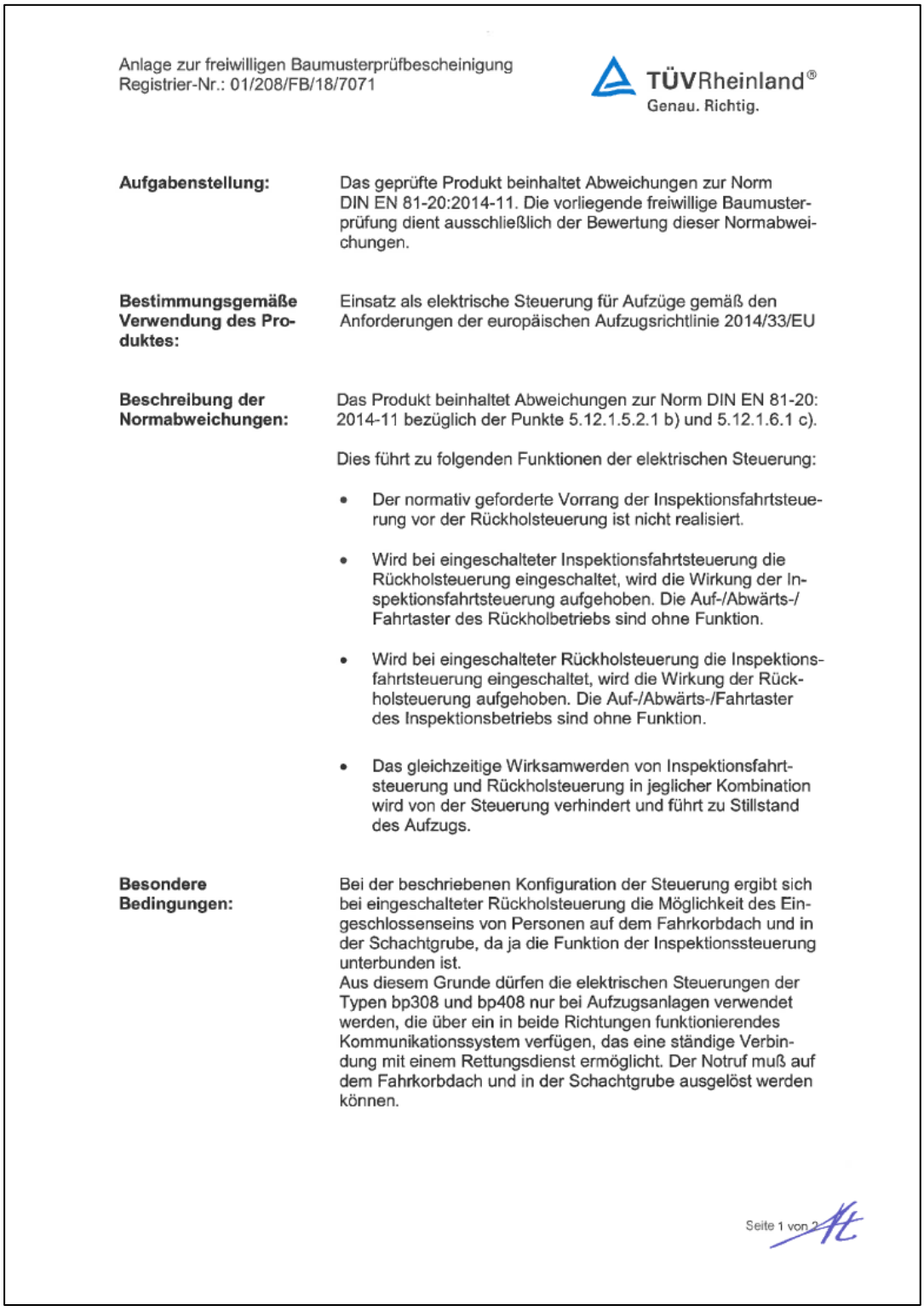
Genau. Richtig.

Figure 3:
Voluntary type examination – Compliance of product deviating from the norm with requirements of the directive 2014/33/EU - Page 1 of 3



Anlage zur freiwilligen Baumusterprüfbescheinigung
Registrier-Nr.: 01/208/FB/18/7071

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Aufgabenstellung:

Das geprüfte Produkt beinhaltet Abweichungen zur Norm DIN EN 81-20:2014-11. Die vorliegende freiwillige Baumusterprüfung dient ausschließlich der Bewertung dieser Normabweichungen.

Bestimmungsgemäße Verwendung des Produktes:

Einsatz als elektrische Steuerung für Aufzüge gemäß den Anforderungen der europäischen Aufzugsrichtlinie 2014/33/EU

Beschreibung der Normabweichungen:

Das Produkt beinhaltet Abweichungen zur Norm DIN EN 81-20: 2014-11 bezüglich der Punkte 5.12.1.5.2.1 b) und 5.12.1.6.1 c).

Dies führt zu folgenden Funktionen der elektrischen Steuerung:

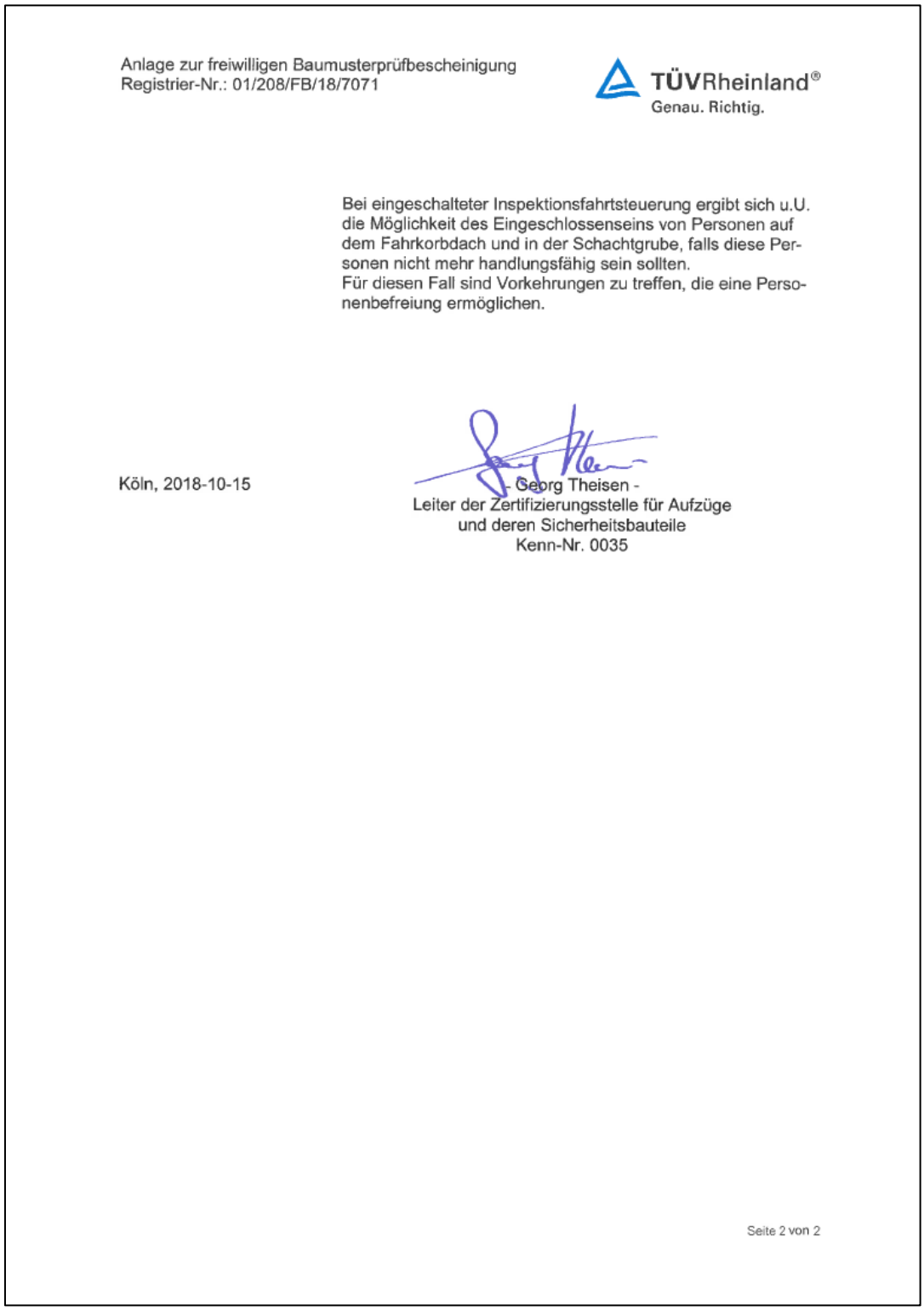
- Der normativ geforderte Vorrang der Inspektionsfahrtsteuerung vor der Rückholsteuerung ist nicht realisiert.
- Wird bei eingeschalteter Inspektionsfahrtsteuerung die Rückholsteuerung eingeschaltet, wird die Wirkung der Inspektionsfahrtsteuerung aufgehoben. Die Auf-/Abwärts-/ Fahrtaster des Rückholbetriebs sind ohne Funktion.
- Wird bei eingeschalteter Rückholsteuerung die Inspektionsfahrtsteuerung eingeschaltet, wird die Wirkung der Rückholsteuerung aufgehoben. Die Auf-/Abwärts-/Fahrtaster des Inspektionsbetriebs sind ohne Funktion.
- Das gleichzeitige Wirksamwerden von Inspektionsfahrtsteuerung und Rückholsteuerung in jeglicher Kombination wird von der Steuerung verhindert und führt zu Stillstand des Aufzugs.

Besondere Bedingungen:

Bei der beschriebenen Konfiguration der Steuerung ergibt sich bei eingeschalteter Rückholsteuerung die Möglichkeit des Eingeschlossenseins von Personen auf dem Fahrkorbdach und in der Schachtgrube, da ja die Funktion der Inspektionssteuerung unterbunden ist.
Aus diesem Grunde dürfen die elektrischen Steuerungen der Typen bp308 und bp408 nur bei Aufzugsanlagen verwendet werden, die über ein in beide Richtungen funktionierendes Kommunikationssystem verfügen, das eine ständige Verbindung mit einem Rettungsdienst ermöglicht. Der Notruf muß auf dem Fahrkorbdach und in der Schachtgrube ausgelöst werden können.

Seite 1 von 2

Figure 4:
Voluntary type examination - Compliance of product deviating from the norm with requirements of the directive 2014/33/EU - Page 2 of 3



Anlage zur freiwilligen Baumusterprüfbescheinigung
Registrier-Nr.: 01/208/FB/18/7071

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Bei eingeschalteter Inspektionsfahrtsteuerung ergibt sich u.U. die Möglichkeit des Eingeschlossenseins von Personen auf dem Fahrkorbdach und in der Schachtgrube, falls diese Personen nicht mehr handlungsfähig sein sollten.
Für diesen Fall sind Vorkehrungen zu treffen, die eine Personenbefreiung ermöglichen.

Köln, 2018-10-15

- Georg Theisen -
Leiter der Zertifizierungsstelle für Aufzüge
und deren Sicherheitsbauteile
Kenn-Nr. 0035

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Figure 5:
Voluntary type examination - Compliance of product deviating from the norm with requirements of the directive 2014/33/EU - Page 3 of 3

3.4.2 Return from Inspection Operation after use of the Pit Inspection Control by Operating Controls

TÜV-A-AT-1-18-0547

TÜV AUSTRIA

Bescheinigung

über die Konzeptprüfung einer Abweichung zu EN 81-20:2014

Certificate

about the examination of a concept concerning a deviation to EN 81-20:2014

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 証书 | 인증서

Produkt / *Product:* Konzept der Rückkehr aus dem Inspektionsbetrieb nach Verwendung der Schachtgruben-Inspektionssteuerung mittels Fahrbefehlsgeber
Concept of returning from inspection operation after use of the pit inspection by operating controls

Type / *Type:* bp308 & bp408

Antragsdatum / *Date of application:*
23.1.2018

Bescheinigungsnummer / *Certificate number:*
TÜV-A-AT-1-18-0547

Zugelassene Stelle / *Approved body:*
TÜV AUSTRIA SERVICES GMBH
Deutschstraße 10
A-1230 Wien

Bescheinigungsinhaber / *Certificate holder:*
Böhnke + Partner GmbH Steuerungssysteme
Heinz-Fröling-Strasse 12, D-51429 Bergisch Gladbach

Prüfstelle / *Test laboratory:*
TÜV AUSTRIA SERVICES GMBH
Deutschstraße 10
A-1230 Wien

Hersteller / *Manufacturer:*
Böhnke + Partner GmbH Steuerungssysteme
Heinz-Fröling-Strasse 12, D-51429 Bergisch Gladbach

Prüfgrundlage:
Basis of examination:
Konzept der Abweichung zu EN81-20:2014, 5.12.1.5.2.2.c)2
Concept of deviation to EN81-20:2014, 5.12.1.5.2.2.c)2

Datum und Nummer des Prüfprotokolls:
Date and number of laboratory report:
26.06.2018, 2018-AT-EP/0014

Bemerkungen: Das geprüfte Produkt erfüllt die Prüfgrundlagen im Rahmen des im Prüfprotokoll definierten Anwendungsbereichs.
Remarks: *The product fulfils the base of examination in the scope of application, defined in the laboratory report.*

Verbreitung dieser Bescheinigung nur im Ganzen.
Spread of this certificate allowed complete only.

27.06.2018
Gültig ab
Valid from

Ing. Thomas Maidet
Zertifizierungsstelle
Certifying Department

TÜV AUSTRIA SERVICES GMBH
TÜV AUSTRIA

26.06.2023
Gültig bis
Valid until

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FM-ITR-KA-0001a, Rev.00

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Figure 6:
Certificate about the examination of a concept concerning a deviation from DIN EN 81-20:2014 : Return from inspection operation after use of the pit inspection control by operating controls

2018-AT-EP-0014

TÜV AUSTRIA

TÜV AUSTRIA SERVICES GMBH

Prüfbericht Nummer / *Report no.*
2018-AT-EP-0014

über / *about*
die Konzeptprüfung der Einrichtung zur Rückkehr aus dem Inspektionsbetrieb in den Normalbetrieb mittels Fahrbefehlsgeber

Dieser Bericht wurde erstellt in / *This report has issued in:*
☒ Deutsch / *German*
☐ Englisch / *English*

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TÜV ®

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Kesselprüfstelle
Testing Laboratory,
Inspection Body,
Certification Body,
Calibration, Laboratory,
Inspection Body for vessels

Benannte Stelle 0408
Notified Body 0408

Vorsitzender des Aufsichtsrats:
Non-executive Board of Directors:
KR Dipl.-Ing. Johann MARIHART

Geschäftsführung:
Management:
Dipl.-Ing. Dr. Stefan HAAS
Mag. Christoph WENNINGER

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St. Pölten, Wels, Wien 23
Brixen (I) und Filderstadt (D)

Firmenbuchgericht/ -nummer:
Company Register Court / - Number:
Wien / FN 288476 f

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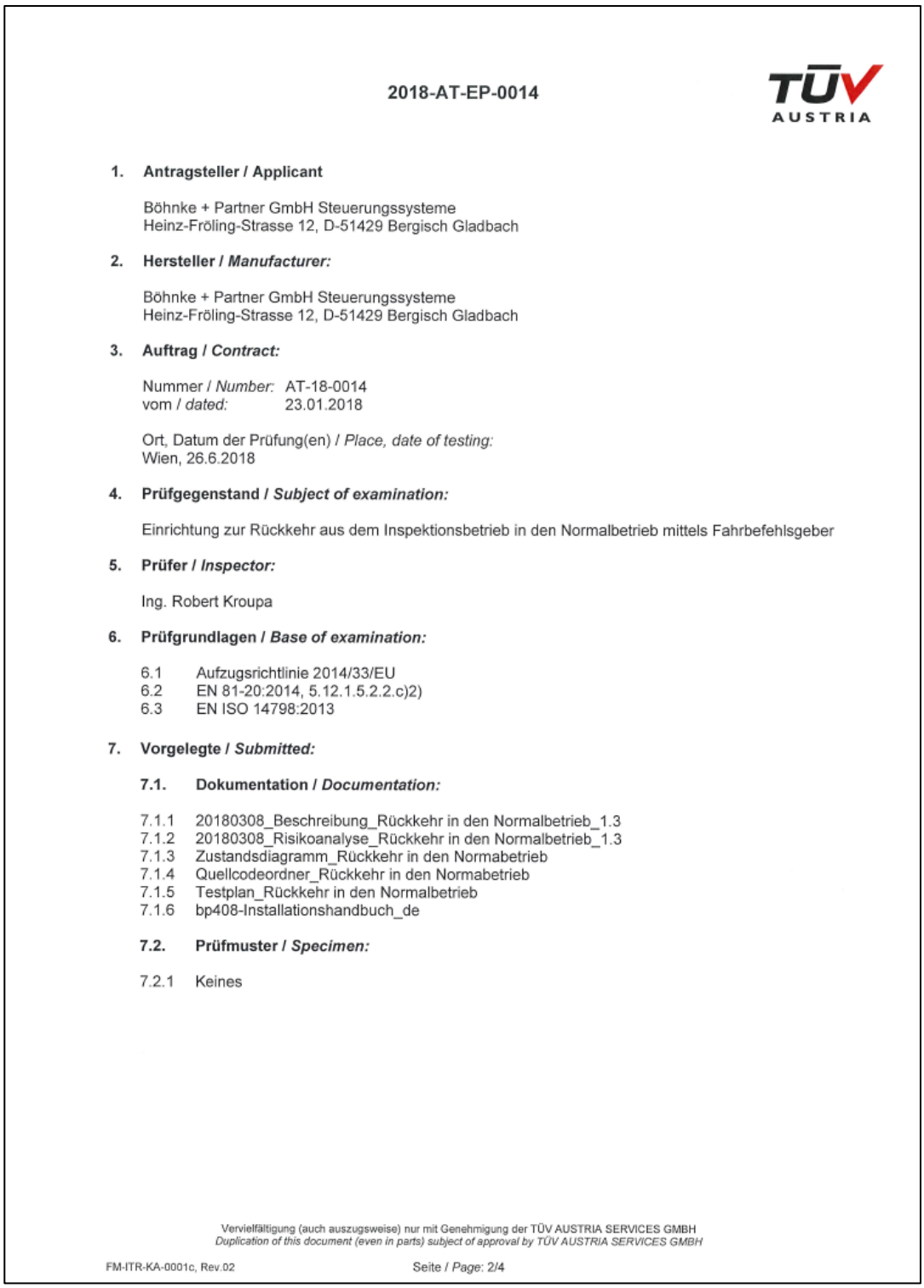
Bank details:
UC BA
IBAN
AT131200052949001066
BIC BKAUATWW
RBI
IBAN
AT153100000104093282
BIC RZBAATWW

UID ATU63240488
DVR 3002476

Figure 7:
Test report on certificate about the examination of a concept concerning a deviation from DIN EN 81-20:2014 : Return from inspection operation after use of the pit inspection control by operating controls - Page 1 of 4



2018-AT-EP-0014

TÜV AUSTRIA

1. **Antragsteller / Applicant**

   Böhnke + Partner GmbH Steuerungssysteme
   Heinz-Fröling-Strasse 12, D-51429 Bergisch Gladbach

2. **Hersteller / *Manufacturer:***

   Böhnke + Partner GmbH Steuerungssysteme
   Heinz-Fröling-Strasse 12, D-51429 Bergisch Gladbach

3. **Auftrag / *Contract:***

   Nummer / *Number:* AT-18-0014
   vom / *dated:* 23.01.2018

   Ort, Datum der Prüfung(en) / *Place, date of testing:*
   Wien, 26.6.2018

4. **Prüfgegenstand / *Subject of examination:***

   Einrichtung zur Rückkehr aus dem Inspektionsbetrieb in den Normalbetrieb mittels Fahrbefehlsgeber

5. **Prüfer / *Inspector:***

   Ing. Robert Kroupa

6. **Prüfgrundlagen / *Base of examination:***

   6.1 Aufzugsrichtlinie 2014/33/EU
   6.2 EN 81-20:2014, 5.12.1.5.2.2.c)2)
   6.3 EN ISO 14798:2013

7. **Vorgelegte / *Submitted:***

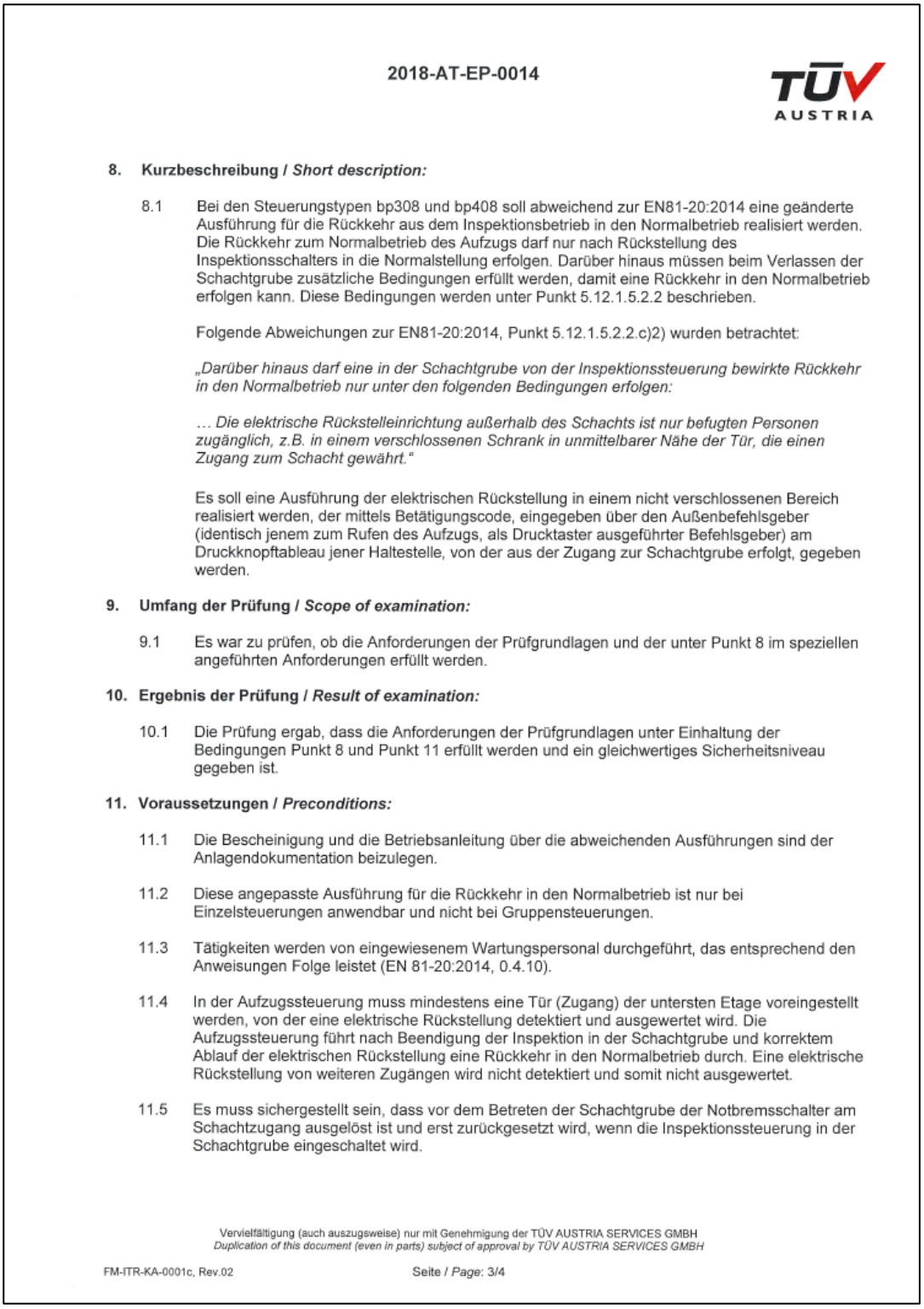
   7.1. Dokumentation / *Documentation:*

   7.1.1 20180308_Beschreibung_Rückkehr in den Normalbetrieb_1.3
   7.1.2 20180308_Risikoanalyse_Rückkehr in den Normalbetrieb_1.3
   7.1.3 Zustandsdiagramm_Rückkehr in den Normabetrieb
   7.1.4 Quellcodeordner_Rückkehr in den Normabetrieb
   7.1.5 Testplan_Rückkehr in den Normalbetrieb
   7.1.6 bp408-Installationshandbuch_de

   7.2. Prüfmuster / *Specimen:*

   7.2.1 Keines

Figure 8:
Test report on certificate about the examination of a concept concerning a deviation from DIN EN 81-20:2014: Return from inspection operation after use of the pit inspection control by operating controls - Page 2 of 4



2018-AT-EP-0014

TÜV AUSTRIA

8. Kurzbeschreibung / *Short description:*

8.1 Bei den Steuerungstypen bp308 und bp408 soll abweichend zur EN81-20:2014 eine geänderte Ausführung für die Rückkehr aus dem Inspektionsbetrieb in den Normalbetrieb realisiert werden. Die Rückkehr zum Normalbetrieb des Aufzugs darf nur nach Rückstellung des Inspektionsschalters in die Normalstellung erfolgen. Darüber hinaus müssen beim Verlassen der Schachtgrube zusätzliche Bedingungen erfüllt werden, damit eine Rückkehr in den Normalbetrieb erfolgen kann. Diese Bedingungen werden unter Punkt 5.12.1.5.2.2 beschrieben.

Folgende Abweichungen zur EN81-20:2014, Punkt 5.12.1.5.2.2.c)2) wurden betrachtet:

„Darüber hinaus darf eine in der Schachtgrube von der Inspektionssteuerung bewirkte Rückkehr in den Normalbetrieb nur unter den folgenden Bedingungen erfolgen:

… Die elektrische Rückstelleinrichtung außerhalb des Schachts ist nur befugten Personen zugänglich, z.B. in einem verschlossenen Schrank in unmittelbarer Nähe der Tür, die einen Zugang zum Schacht gewährt."

Es soll eine Ausführung der elektrischen Rückstellung in einem nicht verschlossenen Bereich realisiert werden, der mittels Betätigungscode, eingegeben über den Außenbefehlsgeber (identisch jenem zum Rufen des Aufzugs, als Drucktaster ausgeführter Befehlsgeber) am Druckknopftableau jener Haltestelle, von der aus der Zugang zur Schachtgrube erfolgt, gegeben werden.

9. Umfang der Prüfung / *Scope of examination:*

9.1 Es war zu prüfen, ob die Anforderungen der Prüfgrundlagen und der unter Punkt 8 im speziellen angeführten Anforderungen erfüllt werden.

10. Ergebnis der Prüfung / *Result of examination:*

10.1 Die Prüfung ergab, dass die Anforderungen der Prüfgrundlagen unter Einhaltung der Bedingungen Punkt 8 und Punkt 11 erfüllt werden und ein gleichwertiges Sicherheitsniveau gegeben ist.

11. Voraussetzungen / *Preconditions:*

11.1 Die Bescheinigung und die Betriebsanleitung über die abweichenden Ausführungen sind der Anlagendokumentation beizulegen.

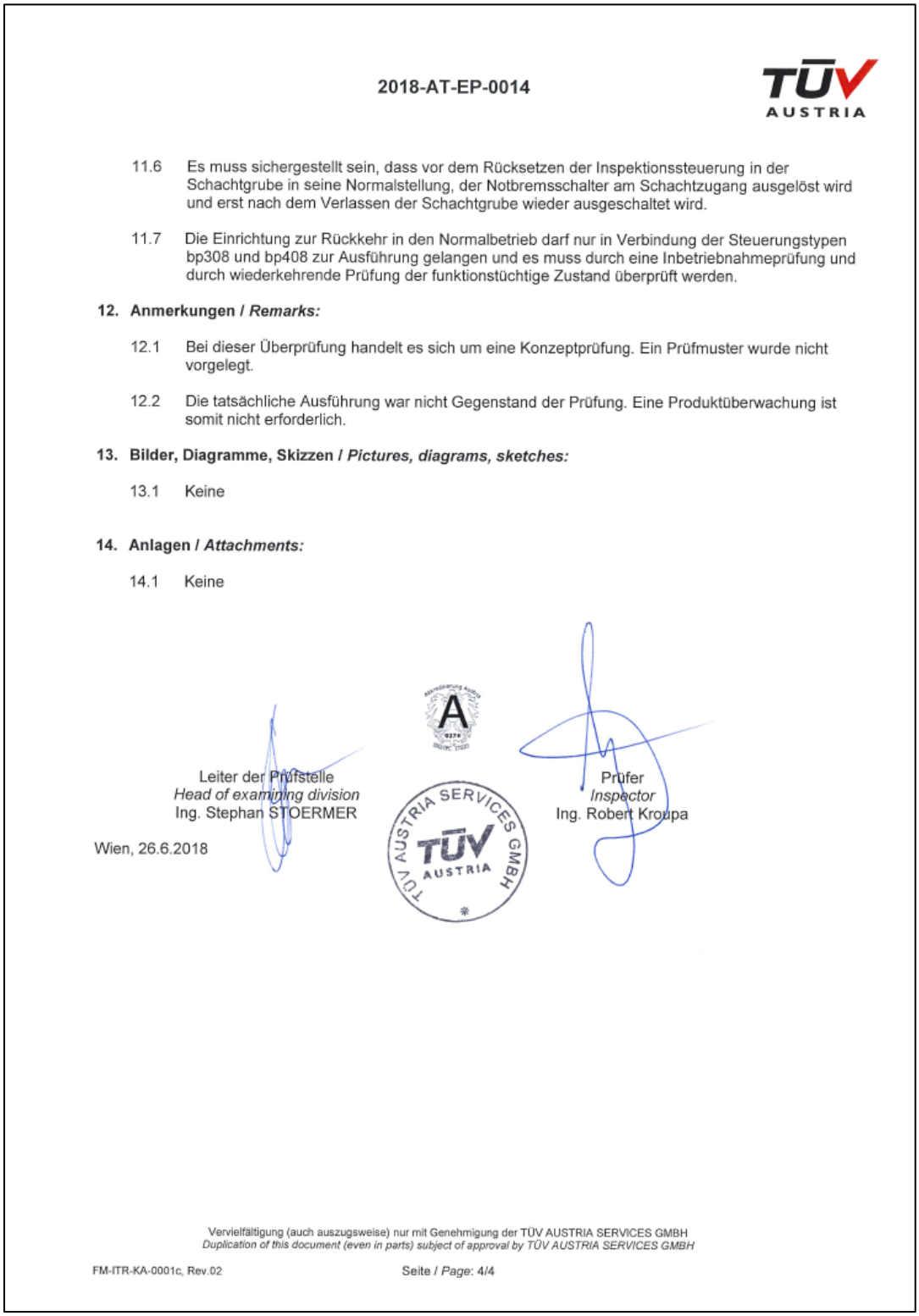
11.2 Diese angepasste Ausführung für die Rückkehr in den Normalbetrieb ist nur bei Einzelsteuerungen anwendbar und nicht bei Gruppensteuerungen.

11.3 Tätigkeiten werden von eingewiesenem Wartungspersonal durchgeführt, das entsprechend den Anweisungen Folge leistet (EN 81-20:2014, 0.4.10).

11.4 In der Aufzugssteuerung muss mindestens eine Tür (Zugang) der untersten Etage voreingestellt werden, von der eine elektrische Rückstellung detektiert und ausgewertet wird. Die Aufzugssteuerung führt nach Beendigung der Inspektion in der Schachtgrube und korrektem Ablauf der elektrischen Rückstellung eine Rückkehr in den Normalbetrieb durch. Eine elektrische Rückstellung von weiteren Zugängen wird nicht detektiert und somit nicht ausgewertet.

11.5 Es muss sichergestellt sein, dass vor dem Betreten der Schachtgrube der Notbremsschalter am Schachtzugang ausgelöst ist und erst zurückgesetzt wird, wenn die Inspektionssteuerung in der Schachtgrube eingeschaltet wird.

Figure 9:
Test report on certificate about the examination of a concept concerning a deviation from DIN EN 81-20:2014 : Return from inspection operation after use of the pit inspection control by operating controls - Page 3 of 4



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11.6 Es muss sichergestellt sein, dass vor dem Rücksetzen der Inspektionssteuerung in der Schachtgrube in seine Normalstellung, der Notbremsschalter am Schachtzugang ausgelöst wird und erst nach dem Verlassen der Schachtgrube wieder ausgeschaltet wird.

11.7 Die Einrichtung zur Rückkehr in den Normalbetrieb darf nur in Verbindung der Steuerungstypen bp308 und bp408 zur Ausführung gelangen und es muss durch eine Inbetriebnahmeprüfung und durch wiederkehrende Prüfung der funktionstüchtige Zustand überprüft werden.

12. Anmerkungen / *Remarks:*

12.1 Bei dieser Überprüfung handelt es sich um eine Konzeptprüfung. Ein Prüfmuster wurde nicht vorgelegt.

12.2 Die tatsächliche Ausführung war nicht Gegenstand der Prüfung. Eine Produktüberwachung ist somit nicht erforderlich.

13. Bilder, Diagramme, Skizzen / *Pictures, diagrams, sketches:*

13.1 Keine

14. Anlagen / *Attachments:*

14.1 Keine

Leiter der Prüfstelle
Head of examining division
Ing. Stephan STOERMER

Wien, 26.6.2018

A

TÜV AUSTRIA SERVICES GMBH
TÜV AUSTRIA

Prüfer
Inspector
Ing. Robert Kroupa

Figure 10:
Test report on certificate about the examination of a concept concerning a deviation from DIN EN 81-20:2014 : Return from inspection operation after use of the pit inspection control by operating controls - Page 4 of 4

4 Standards

INFORMATION ABOUT OTHER REGULATIONS AND RISKS

- The procedural notes and circuit details shown in all documents must be understood to apply mutatis mutandis. The transferability to the relevant application must be checked; Böhnke + Partner GmbH assumes no guarantee for applicability.
- To ensure proper functioning of the complete control unit, you must follow the supplied documentations of other manufacturers (e.g., the operation manual of the inverter).
- The control system bp408 may only be used for information processing in lift control systems.
- Control systems, assemblies, modules or other devices, which were damaged during transportation to you, must not be used or operated.
- The assemblies contain electrostatically sensitive components. Before touching an electronic assembly, your own body must be discharged. This can be done by touching an earthed conducting object just before touching the electronic assembly (e.g. bare-metal control cabinet parts).

4.1 EMC Directive

All industrial, electronically controlled automatic control elements (PCs, microprocessors, computers, PLC) can be influenced by interference impulses if counteractive measures are not taken. These interference impulses can be generated by external systems such as voltage changes in supply line as well as control pulses of power elements of inverters. Böhnke + Partner GmbH considers all the usual measures when manufacturing the control system. The components used have low sensitivity to interference impulses of the surroundings.

ATTENTION!

- Always follow the EMC instructions of the inverter manufacturers.
- If you have any questions regarding the EMC Directive, our service team are happy to help.
- Also follow the instructions on interference suppression measures in this manual.

4.2 DIN EN 81

Specifications of DIN EN 81-20/-50:
As a precaution, we wish to draw attention to the fact that Böhnke + Partner GmbH cannot be held liable for damages that can arise due to compliance with EN 81-20/-50 requirements!
Example: Readjustment in hydraulically operated lifts despite runtime monitoring due to failure of a phase.

5 The Control System “bp408”

5.1 Product and Functional Description

The control system bp408 is an electronic assembly for controlling lifts. Various designs with integrated safety circuit are available for selection, with safety circuit monitoring for various voltages.

Basic functions of a lift control system such as safety circuit monitoring and safety circuit have been consequently integrated in the control system bp408.

Control system bp408 is a decentralised microprocessor system with distributed “intelligence” The decentralised assemblies are connected by default via the two CANopen lift interfaces in accordance with the international standard CiA 417 (www.CANopen-Lift.org). Furthermore, other protocols that are widespread in the lift construction, can also be processed.

Figure 11:
The control system bp408 is equipped with all the modern interfaces of lift technology

The control system bp408 contains the following assemblies

- Pilot control
- Safety circuit monitoring unit
- Safety circuit
- Freely programmable inputs, outputs and repays
- Electronically monitored standard inputs and outputs

The following interfaces are also integrated:

- Interface for activating inverters with DCP3, DCP4+ and CANopen Lift (CiA 417)
- Interface for absolute encoders of various manufacturers and technologies
- Interface for remote diagnosis of data with WinMOS®300 via Bluetooth™ or WiFi, modem (USB) or Ethernet
- Interface for building automation via EIS protocol, LON works- standard, Modbus, OPC or Profibus DP
- Interfaces for CANopen lift components.
- LAN for remote diagnosis and monitoring
- USB device for connecting a laptop for diagnosis and software updates,
- USB host for USB sticks, modems, Bluetooth™ or Wi-Fi adapter.

Because of the focus on functioning and decentralised control concept, small control cabinets can be used. The standard control cabinet for the control system bp408 has the size 600 x 600 x 300 mm (W x H x D). Thus, bp408 is predestined for use in lifts, in which only little space is available.

In combination with the remote monitoring system WinMOS®300 (www.WinMOS.de), the availability of the lift can be significantly increased. Using this system, complete conversion into demand-oriented maintenance is also possible.

5.2 Summary of the Functions of bp408

- Control of a single lift
- Group control of up to 8 lifts without separate group computer
- 128 landing settings
- SFS – automatic push button control
- SFR – automatic push button control with landing call memory (“taxi control”)
- 1KS – one button collective control
- 1KSab – one button down collective control
- 1KSauf – one button up collective control
- 2KS – two-button up and down collective control
- Operating data logs: travels, operating hours, malfunctions, messages
- Traction lift: pole-changing, one speed, two speeds, frequency inverter
- Hydraulic lift: Star-delta and direct start-up, valve control, soft start, frequency inverter
- PTC thermistor monitoring integrated for drive motor
- Safety circuit monitoring unit integrated
  (standard 230 V AC, optional 48 V AC/DC or 110 V AC)
- Main contactor selection 230 V AC integrated
- Safety circuit (SMZ) integrated
- Inputs and outputs integrated for all standard requirements
- Positive switching logic (24 V DC)
- Outputs protected against overload
- Diagnosis of inputs and outputs via LCD or laptop
- Diagnosis and configuration of CANopen lift components with CANwizard®
- Operator guidance using laptop with WinMOS®300 or with Lift2CLOUD®
- Operator guidance with 7 buttons and illuminated, graphic LCDisplay
- Local parameterisation using LCD, with mobile phone via Bluetooth™ or WiFi or laptop
- Parameters stored in EEPROM in a fail-safe way (2 complete data records)
- Real-time clock integrated
- Setup menu and service menu separate
- Code lock separately adjustable
- Menu guidance in German, English, Dutch and Swedish
- Interfaces for DCP, LAN, USB and CANopen lift are integrated
- Optional remote diagnosis via modem (USB) or LAN
- Different codes possible for landing signals and direction indicator (Gray, binary, user-specific)
- Zero load, full load, and actual load in kg

- Direction indicator, landing gong, selection landing door as well as direction of travel
- Home landing (Parking), fire service landing, fire brigade landing, monitoring and control room landing adjustable
- Parking program adjustable by LCD
- Door tables 1, 2 and 3 externally switchable
- Magnetic switch detection with 4 and 6 switches
- Absolute encoder selector with AWG-05 or CANopen lift devices
- Next landing and short landing distance up to 15 mm (with absolute encoding only)
- Selective calls for door sides A, B and C
- Priority landing calls with two stages (low and high position)
- Door selection for sides A, B and C (all door operators)
- Doors adjustable to different times and functions
- Early opening doors and re-levelling
- Door locks on side A, B or C separately selectable by lockage control
- Service intervals settable in relation to travels, hours and date
- Malfunction stack memory of up to 128 messages (type of malfunction, landing and time (date and hour) as well as signal map)
- Malfunction list (type, landing and frequency)
- Batch memory of up to 128 important messages
- On-site monitoring possible using laptop
- Remote diagnosis with WinMOS®300 via modem or LAN possible
- 4 relays, freely programmable with a changeover contact
- Company logo (text) adjustable on LCD
- Landing names (text) adjustable
- Optional guest operation, chemical operation, docking service, earthquake operation and other special function are possible
- Automatic and manual emergency rescue
- RoHS compliant production (lead free)

5.3 Decentralised Lift Control System

The control system bp408 is a decentralised control system. This means the “intelligence” is distributed across the devices connected and no longer at just a centralised location. CANopen lift application profile CiA 417 (www.CANopen-Lift.org) forms the basis for the decentralised lift control system. Communication between individual assemblies of the group of lifts takes place via this application profile that is standard worldwide. The connected assemblies have a complete functional image and thus can independently make a multitude of decisions. Thus, open modular systems are possible, which can undertake very complex control tasks.

5.4 The Group System

Modern group control systems are equipped with efficient 32-bit processors. They can assess a large amount of information of the entire group of lifts in a short time and based on that, take the correct decision for group mode.

The group control program ensures smooth lift operation in groups of two to eight lifts. The application profile CiA 417 based on CANopen lift forms its basis. Data and commands of all components are made available on the bus in a standard way. Every group computer is thus in the position to independently decide the sequence in which individual calls must ideally be implemented and the group member that implements them. The group function does not require a master computer, but one may be used optionally to expand group performance by certain special functions such as the load-related evacuation of all lifts within one building when using emergency power or in the case of fire or the automatic static evaluations for determining group parameters.

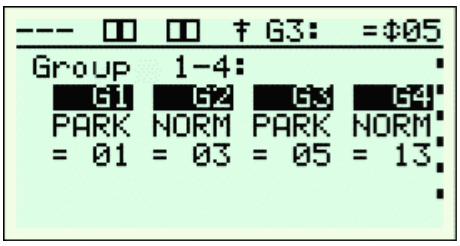


Figure 12:
Group status in bp408

Landing calls are entered via bus nodes, which can be in the landing call panels or in the control cabinet. These nodes assess the incoming signal and sends the call with information about its direction, priority, destination etc. on the CAN bus to all group members at the same time.

In the group control system, the algorithms of the call controller decide with the help of the set parameters (e.g., park mode, number of parking lifts on the mail level, priority calls per floor etc.) the sequence in which and from which lift the individual destinations must be approached. If a lift is no longer part of group operation because it has been switched to inspection, for example, during maintenance, this information is also sent to the remaining group members immediately and can be considered in calculations. If several lifts can answer a call at the same time, the lift that has been standing still the longest picks up the call. If the standing times are also the same, the rule G1 before G2 applies.

The following states must be considered in the group algorithm along other things:

- Distance to target landing
- Opposite travel /call direction
- Lift is stopped or running
- Number of intermediate stops in between
- Lift cabin call on the target landing
- And a few more.

5.4.1 Priority Calls

When setting priority calls to bp408 itself or a CANopen lift component such as CAP-01/02 or CIO-01, it is stated which lifts should answer the priority call. The most effective of the selected lifts then answers the call. Two further options, "collect priority calls" and "several priority calls per landing" in the group setting of the service menu make it possible to call further lifts if one is already answering the priority call on the landing on which the standby delay is running. This option is intended for bed transports, for instance. A high priority landing call cancels a low priority landing call. Otherwise, the same rules apply for the high priority landing call than for the low priority landing call.

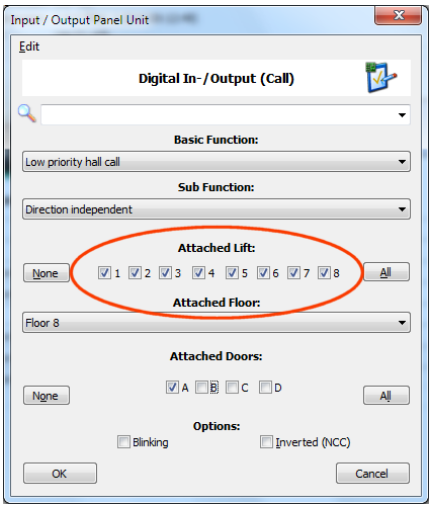


Figure 13:
Specification of priority calls

5.4.2 Group Display in WinMOS®300

WinMOS®300 offers the option of displaying a view based on group data in “Diagnosis” as well as “Monitoring”.

In bp408, the target landing currently being operated by the lift is displayed in the group window inside the lift shaft. Furthermore, ETA (Estimated time of arrival) of the call is also dynamically displayed in the window. This can change at any moment - e.g., if the call situation changes. In this case, priority calls are displayed using a separate symbol, which also indicates whether the call has low or high priority.

This functionality enables a better comprehensibility of the processes in a group control system.

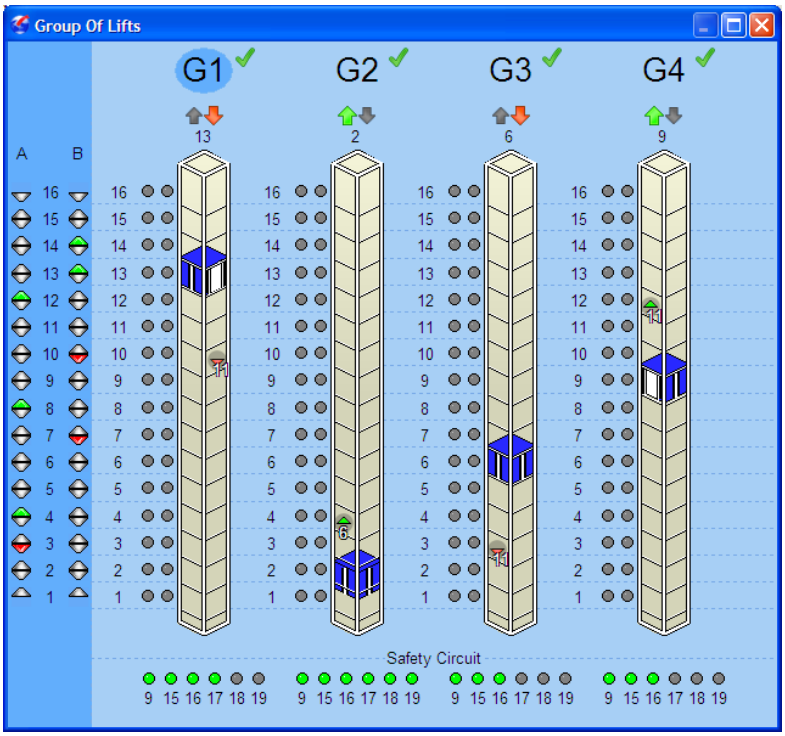


Figure 14:
Display of dynamic call assignment of a group control system in WinMOS®300 in control system bp408

5.5 Components for bp408

For the control system bp408 Böhnke + Partner GmbH has currently provided the following components:

- Landing call unit CAP-02 (8 I/O)
- Car operation unit CLK-03
- CAN-Wireless-Interface CWI-01
- CAN-I/O module CIO-01 (32 I/O)
- CAN serial interface CSI-01

Other components from various manufacturers such as absolute encoders or panels, which comply with the standard CiA 417, are available and can be used.

An overview of deliverable CANopen lift components and their description can be found on the Internet under www.CANopen-Lift.org.

Figure 15:
Board CAP-02 for connecting the landing calls to the CANopen lift bus

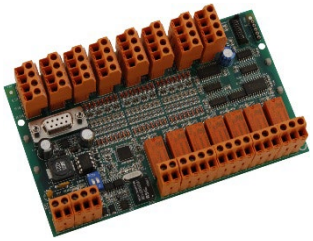


Figure 16:
Board CLK-03 for connecting the car electronics to the CANopen lift bus

Figure 17:
Board CWI-01 for remote control of the control system (e.g. from the car) using a mobile device (phone, tablet, notebook).

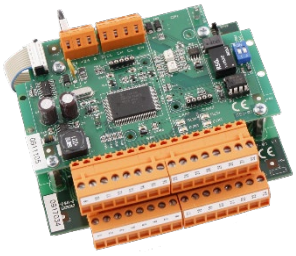


Figure 18:
Board CIO-01 for connecting 32 inputs/outputs or calls

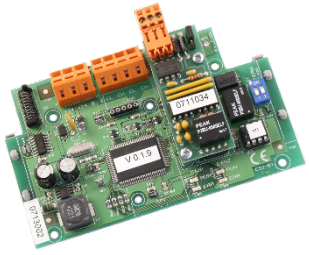


Figure 19:
Board CSI-01 for using as repeater or bridge

5.6 Versions of bp408

This installation manual refers to all versions of the control system bp408.

bp408 is available with 48 V AC/DC, 110 V AC and 230 V AC safety circuit input voltage including safety circuit.

5.7 Brief Description of bp408

5.7.1 Top view

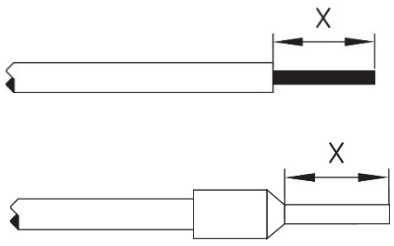
Figure 20:
Top view of bp408

	Description of figure 20
A	USB-B interface: Connection of a PC for diagnosis or software updates
B	USB-A interface: Usable for analogue USB modem, USB sticks, BöPa Bluetooth, or BöPa-WiFi-Adapter
C	LAN interface: Ethernet 10/100 Mbit for monitoring systems
D	Terminals for freely programmable relay
E	Terminal 24 V DC, resistor inputs
F	Terminals for freely programmable inputs, special inputs
G	Display
H	Control panel
I	CAN 1 + CAN 2: Interfaces for communicating with all components
J	RS-485: Communication with inverter via DCP protocol, energy meter
K	RS-232: Remote data transmission, interface for monitoring
L	8 freely programmable inputs
M	8 freely programmable outputs
N	16 freely programmable inputs/outputs
O	Terminals for pre-control relays
P	Terminals for safety circuit monitoring
Q	Terminals for zone switch input

5.7.2 Technical Features

	bp408
Technical features	
Regulations	DIN EN 81-1/-2; DIN EN 81-20/-50
Mechanical data	
Dimensions (H x W x D)	315 x 100 x 80 mm
Connection version	Screw and plug terminals
Installation position	To be installed lying on vertically installed assembly plate in the control cabinet
Control cabinet assembly	At least IP2xD
Guidelines	Lift Directive (2014/33/EU), RoHS (2011/65/EU), EMV (2014/30/EU)
Electrical data	
Supply voltage	24 V DC +10 %/-15 % (PELV)
Current consumption typ.	150 mA
Ports	- 8 inputs, 24 V DC, input current 7 mA - 8 outputs, 24 V DC, output current max. 500 mA - 16 inputs / outputs (calls), 24 V DC, input current 7 mA, output current max. 500 mA, protected from overcurrent and short-circuit - PTC resistor input (PTC), 24 V DC, 1 mA - Safety circuit inputs 48 V AC/DC, 110 V AC and 230 V AC, max. 2 A - Safety circuit inputs 48 V AC/DC, 110 V AC and 230 V AC, max. 2 A - 3 preselection relays (normally open contact), 230 V AC, 500 mA - 4 freely programmable relays (changeover contact), 230 V AC, 500 mA
Interfaces	- CAN 1 (car), CANopen Lift (CiA 417) - CAN 2 (shaft/group) CANopen Lift (CiA 417) - USB Host - USB Device - Ethernet 10/100 Mbit, full duplex (network connection) - RS-485 (DCP) - RS-232 (Gateways, e.g., for Profibus, Modbus, etc.)
Indicators and control element	Graphic display with navigation keys: - second menu level and separate call menu - permanent display of door status (max. 3), safety circuit, travel signal, lift state and direction independent of the menu
Performance data	
Application range	Passenger and freight lifts
Floors	up to 127
Operating mode	- Cable elevators regulated/unregulated - Hydraulic lifts
Copying tool	digital with absolute encoder system
Software	
Memory	Fault, maintenance, and message stack with max. 128 entries
Language settings	German, English, French, Italian, Swedish, Dutch
Groups	integrated group algorithms for up to 8 lifts
Functions	For comprehensive standard and special functions, see **chapter 5.2**
Remote-controlled control menu	Via WLAN/Ethernet with mobile device or PC with WinMOS®300 as APP or PC software
Backup/update	Backup and update via USB stick

Electrical connection:



Settle length x of the conduction 9 - 10 mm

5.7.3 Control Panel and LCD in bp408

With the help of the graphic LC display and the control panel, the state of the lift can be determined and parameters in the control system and connected CANopen lift devices changed.

5.7.3.1 Standard View

After the system is switched on and during normal mode, if special menu is not called, the standard view is displayed on the display. This view gives a quick overview of the latest state of the lift and provides individually configurable information.

The following information is displayed on the LCD by default:

- Lift status bar
- Safety circuit status bar
- Logo “SCH” (or customer-specific characters)
- Optionally also the board or cabinet temperature,
- State of internal buffer battery
- Current system time
- Depending on the configuration:
  - Current malfunctions or messages
  - Last malfunction
  - Statistical information
  - Current lift speed

Figure 21:
Display and keys of bp408. Here is a display of two doors A and B.

5.7.3.2 Lift Status Bar

The lift status bar is in the top part of the display. It is displayed in all menus. The following information is displayed in the lift status bar:

- Pre-control (relay K1-K3)
- Doors A/B/C with limit switches and reversal signals
  (photocell, push button “door open”)
- Mode (e.g. inspection mode)
- Flush level information +/ =/ -
- Direction indicator (Signal of travels)
- Car position

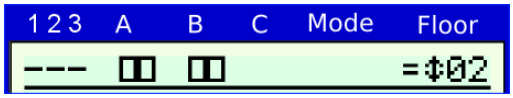
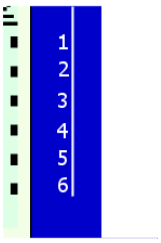


Figure 22:
The lift status bar is displayed in all menus

5.7.3.3 Safety Circuit Status Bar

The safety circuit status bar is located on the right side of the display. It is displayed in all menus. In the safety circuit status bar, the status of the safety circuit of terminals is displayed:



1	→	passive safety circuit	(terminal 10)
2	→	Emergency stop	(terminal 11)
3	→	Shaft door	(terminal 12)
4	→	Car door A	(terminal 12A)
5	→	Car door B	(terminal 12B)
6	→	Door lock	(terminal 13)

Figure 23:
The safety circuit status bar is displayed in all menus

5.7.3.4 Operator Panel

The operator panel is at the bottom of the display. It has 7 buttons that are used for navigating through the various menus, displaying status information, and changing parameters. The operator panel buttons are arranged as central navigation block with buttons “Up”, “Down”, “Left”, “Right” and “OK”. The “Call/End” button is located to its left and “Info/Set” button to its right.

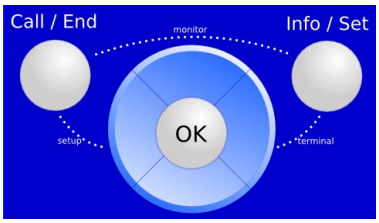


Figure 24:
You can navigate through the menus using buttons of the operator panel.

5.7.4 Setup Menu

The setup menu contains basic parameters, which cannot be changed during ongoing operation of the lift, e.g., traction or hydraulic lift, number of stops, etc.

Starting Setup Menu:

To get into the setup menu, proceed as follows:

- Ensure that nobody is present inside or on the lift car and the system can be safely switched off.
- Push down and hold the left »Call/End« button and quickly push the »left« button.

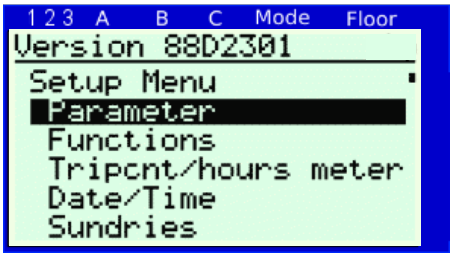


Figure 25:
Setup menu of bp408

The following notice appears: **> Entering the setup menu... <**

Now you are in the setup menu. All control functions are now switched off. If a service code (secret number) has been set, the correct code must be entered. The default setting of Böhnke + Partner GmbH is >5061<.

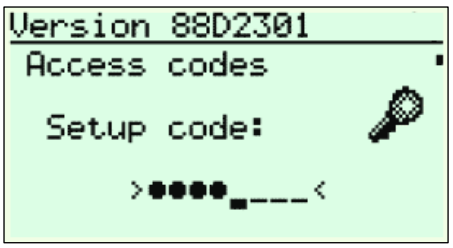


Figure 26:
Input of setup code

After entering the correct code, you can call up and change menus and parameters. You can exit the setup menu by briefly pressing the key “Call/End”. A restart is executed and then the start window of bp408 is displayed again.

5.7.5 Service Menu

In the service menu of bp408, parameters and times, which are not safety relevant and which can be changed during ongoing operation, can be adjusted, e.g. door times, energy-saving functions BlueModus on/off etc.

Start in the service menu:

Press the “OK” key, the display automatically jumps to the service menu. If a service code (secret code) has been set, the correct code must be entered. A service code is not set by default by Böhnke + Partner GmbH.

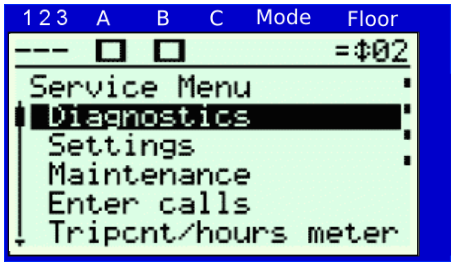


Figure 27:
The service menu of bp408

After entering the correct code, you can call up all menus and parameters of the service menu and change during on-going operation. If the control system is to be re-encoded after leaving the service menu, press the “Left” key until the following question appears in the LCD: “Activate service code?”

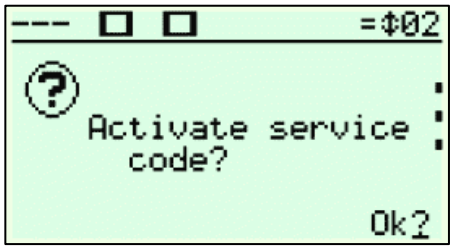


Figure 28:
Code activation

Confirm with “OK” key. The following note will appear shortly:

Service code activated

You will then return to the start menu of bp408.

The service code can be changed or reset anytime in the service menu under

MISCELLANEOUS > ACCESS CODES > SERVICE CODE

.

5.7.6 Call Menu

From service menu, you can directly go to the call menu by pressing on the “Call/End” button. If the call menu is active, it is displayed in the lift status bar using a diamond symbol.

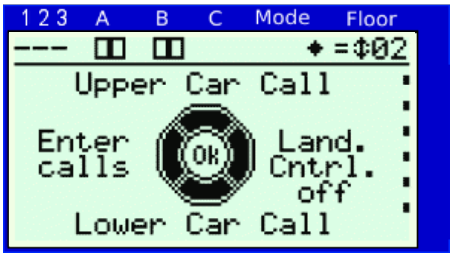


Figure 29:
The call menu of bp408 is signalled using a diamond in the lift status bar

By clicking the OK button, the targets switch from *cabin call top/bottom* to *next cabin call top/bottom*. Now you can make a cabin call to the next stop of the current car position in an upward or downward direction. You can also select between *door open or close* with another click in the call menu.

If you want to enter cabin or landing calls on specific landing, you can call up the *Make Calls* dialogue by clicking on the “Left” button. Here you can select the desired call type and make calls to the respective landings and doors.

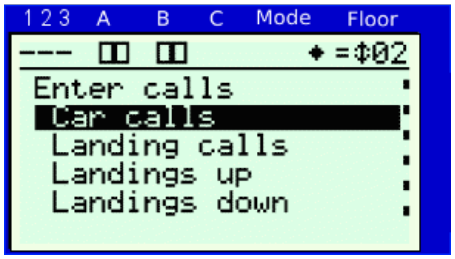


Figure 30:
The dialogue “*Enter calls*” allows you to send the lift to a specific floor.

If you are in the call menu, you can activate or deactivate the landing control by pressing on the “Right” button. If the landing control is deactivated, it is displayed in the message window.

5.7.7 Info Menu

In the info menu you can switch between two menu points with the click of one button. You can use this option to change service menu parameters or make calls and view the system reactions such as travel signals with just one click.

To toggle in the info menu, click on the Info/Set button once. If the information menu is active, it is signalled with an “i” in the lift status bar. Now you can navigate through the menu. With another click, you are again at the menu point, where you activated the info menu. You can now toggle between the two menus with the click of one button.

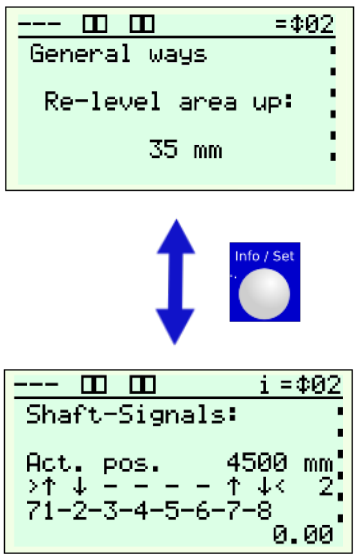


Figure 31:
Menu change

5.7.8 Terminal Mode

The following procedure has been specified in the application profile CANopen Lift (CiA 417): An assembly that is connected to the CAN-Bus sends the content of the display to another device via bus. It represents the content.

In this way, it is possible to navigate through the menu of the external device.

This procedure was integrated in the control system bp408 and is available in the menu under node list and in the terminal mode specially for the frequency inverter.

It is possible to toggle to the terminal mode by simultaneously pressing the buttons Info/Set and “Right”. The menu of the frequency inverter connected is displayed on the display of bp408. The signals of the navigation buttons “Up”, “Down”, “Left”, “Right”, “OK” and “INFO/SET” are now sent to the frequency inverter. By pressing the “Call/End” button for minimum 3 seconds, the terminal mode is ended and the last menu point of bp408 is displayed again.

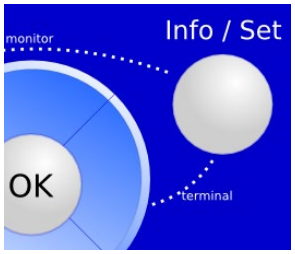


Figure 32:
You can switch over to the terminal mode by simultaneously pressing the keys Info/Set and Right.

5.7.9 Monitor Program LPCmon

Using the monitor program “LPCmon”, the program version of the lift software is monitored and the software of the system can be updated. This process should be carried out by trained personnel only when requested by Böhnke + Partner GmbH.

5.7.9.1 Start of the Monitor Program

To access the monitor program of bp408, first ensure that nobody is present inside the lift car and deactivating the lift will not result in a hazardous situation.

Hold down the “Call/End” and “Info/Set” buttons simultaneously for at least 3 seconds. The monitor is thus started. All control functions are now switched off.

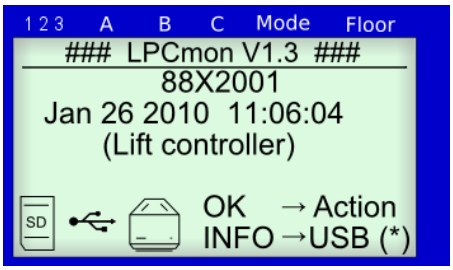
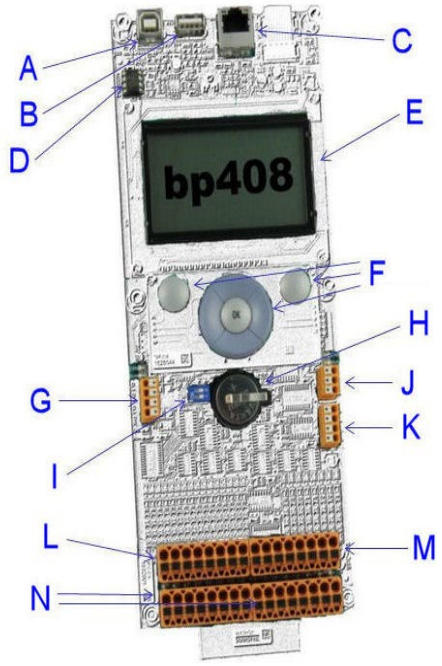


Figure 33:
Monitor program “LPCmon”

5.7.10 Memory for the Program and Parameters

5.7.10.1 General Information

Items of the interfaces and EEPROM are given in the figure. The digital control electronics with the processor, program memory as flash, parameter memory as EEPROM, real-time clock, battery, LC-Display and keys are located on the circuit board. The interfaces for two CAN networks, serial remote data transmission, USB or Ethernet, USB host and USB device and serial activation of a inverter via DCP are also accommodated on this board. In addition, bp408 has 8 inputs, 8 outputs and 16 calls, which can also be parameterised as inputs or outputs. The lift program is stored in the Flash memory. All lift-related parameters such as lift type, stops, doors, times, parking landing etc. are stored in EEPROM in a fail-safe way.



	Description of figure
A	USB-B
B	USB-A
C	LAN
D	EEPROM
E	Display
F	Buttons
G	CAN 1 / CAN 2
H	Battery
I	Termination
J	RS-485 (DCP)
K	RS-232 (DFÜ)
L	Inputs
M	Outputs
N	Inputs/outputs/calls

5.7.10.2 Battery

A replaceable battery, which is necessary for buffering date and time, is located below the control panel on the upper board of bp408.

The replacement of the battery is only permitted in the disconnected state of the controller. The battery can be carefully removed from the holder. To insert, the new battery is pushed below the holder. While doing so, attention must be paid to polarity. Battery replacement is now completed.

The battery is a type of CR 2032 and shall only be replaced with the identical type.

NOTE!
Maintenance of the battery
The battery must be replaced every 5 years. Spare batteries can be ordered via our service.

NOTE!
Disposal of the battery
Batteries must not be disposed of as household garbage. Used batteries must be put in collection boxes specifically designed for that. If there is no collection box nearby, used batteries can also be disposed of at municipal collection centres for hazardous household wastes. Of course, you can return to us used batteries received from us.
You can thus fulfil the legal obligations (Battery Ordinance) and contribute to environmental protection.

Batteries that contain hazardous substances are marked with the crossed-out dustbin symbol. The chemical name of the hazardous substance is given under the dustbin symbol - “Cd” for Cadmium. “Pb” stands for lead, “Hg” for mercury.

5.7.10.3 Exchange

To exchange the EEPROM use a special EEPROM snag, pull the EEPROM straight out of the socket. The new EEPROM is slightly pressed into the socket horizontally. While doing so, attention must be paid to the marking (groove) to insert the component correctly.

NOTE!
The connection pins of EEPROM can bend and break very easily. Therefore, use a snag as a suitable tool.

CAUTION!
The warranty shall expire if the program is changed and the lift control system is subsequently modified without the service support of Böhnke + Partner GmbH.

5.7.10.4 Software Update

A software update is necessary if the lift system is to be refurbished with additional functions. Exchanging the EEPROM is necessary only if the printed circuit board needs to be exchanged and the data related to the lift has to be transferred to the new printed circuit board.

NOTE!
To secure the actual state of an existing system, the existing software version and parameter set before a software update should be saved on a mobile phone or a laptop. A software update can then be carried out with the new software and the system then monitored. The parameter set of the EEPROM and the existing lift program can be saved using the monitor LPCmon.

There are several options for carrying out a software update. It can either be done using a USB stick or via the USB-B interface using a laptop.

To carry out an update via a USB stick, insert the USB stick into the USB-A connection of bp408. After switching on the control system, hold down the buttons “Call/End” and “Info/Set” for at least 3 seconds to start the monitor program LPCmon. After clicking on “OK”, it is possible to select the storage medium (USB stick) that contains the new program version using the menu point *Open file* . Then navigate to the file on the medium (e.g. 78D2508.BIN) that contains the new program and select it. The software can now be updated. Follow the instructions on the display.

NOTE!
After a software update, the old software version is deleted. Before an update, find out about the functional scope of the new version and save it, if necessary.

The system must be restarted after a successful update. For this, press the “Call/End” button. The system start and the following system check should now run faultlessly. The version number of the latest program version can be seen under system information in the service menu on the display.

The name of the program version is based on the following key:

- 78 = for target hardware:
  - 78 - bp408
- D = main version identification:
  - D - Standard main version (no longer modified)
  - S - special version (customer version deviating from standard)
  - X - current interim version (later becomes D-Version)
- 21 = annual key of programming:
  - 21 – 2011
  - 22 - 2012 etc.
- 01 = current version number

Using the software “Fw408”, a software update can also be carried out using a laptop via the USB-B interface. For assistance when handling this program, please contact a service employee of Böhnke + Partner GmbH.

5.7.11 Control System bp408 in the Control Cabinet with Inverter

The control cabinet is supplied as a painted steel sheet housing. The wall cabinets have mounting holes or threaded bolts on the backside, to which the supplied mounting attachments can be screwed.

Floor-standing cabinets are mounted on supplied feet or on a prepared frame.

They are placed an upright position so that the ventilation slots are clear. Please ensure there is sufficient sound insulation to the building in case of critical environments. In this case, all contactors and the entire assembly plate can be supplied as pre-mounted in the cabinet with sound insulation.

A sound pressure level of approximately 55 dB(A) has been measured at 1 m distance and 1.6 m height at our standard control cabinets, with closed control cabinet doors and a control system bp408. This is equivalent to a volume between a quiet radio [40 dB(A)] and a normal conversation [60 dB(A)].

The cable inlets are located at the bottom of the control cabinet. Use the corresponding inlets and attachments for properly attaching the incoming lines and cables.

Control cabinet:

- Enclosed (DIN 41488)
- Textured coating RAL 7035 (light grey)
- Mounting plate with cable channel
- Main contactors on rubber-bonded metal (only upon request)
- Protection class up to IP54 possible
- Filter protector on request
- Door lock: Triangular sash lock or special closure
- Wall mounted
- Bottom cable inlet
- Dimensions W x H x D:
  800 x 800 x 300 mm standard
  1000 x 1200 x 300 mm regulated (frequency inverter installed)

Safety circuit

- 48 V AC/DC, 110 V AC or 230 V AC

Rectifier

- Brake (cable) 180 V DC / 4 A
- Bolt (optional) 180 V DC / 4 A
- Valves (hydraulic system) 180 V DC / 4 A

Travel contactors

- Rated current 14 A
- Power 7.5 kW AC 3-operation
- Brand Schneider
  (other makes optional)

Terminals

- Brand Weidmüller or WAGO

PTC resistor request

- Integrated in bp408
- PTC threshold values Normal mode < 2.2 kΩ;
  PTC resistor trip > 2.7 kΩ

Control system

- System module bp408, 32-Bit processor system

Safety circuit (integrated)

- for re-levelling, doors opening early and deletion of an accidental car movement with open doors

Shaft copying

- Magnetic switch,
- Absolute encoder (AWG),
- other encoder systems on request

Inspection control unit

- Metal housing
- Control elements integrated in the inspection control unit

Documentation

- Circuit diagram (DIN A4 copyable)
- Equipment marking in clear text in circuit diagrams
- Parts list of control system and terminal assignment plan
- Description of central unit with programming overview
- Description of general operating instructions
- Documentation for acceptance tests (TÜV) of bp408 with valid connection assignment and description of the safety circuit

Regulations:

DIN EN 81, SIA, ÖNORM, DIN, VDE, VBG 4

5.7.12 Easy Servicing thanks to clear Structure

The cables are installed on the base plate according to industrial standard. Incoming lines can be laid in the cable duct. All processor terminals are connected to a separate terminal strip arranged at the bottom of the control cabinet. The control components are arranged on a zinc-plated installation plate. The dimensions stated refer to a standard configuration of lift systems with eight or more landing call stations and with a main drive power of max. 15 kW. Systems with a higher power can be supplied on demand.

5.7.13 Optional Equipment

5.7.13.1 Uninterruptible Power Supply (UPS)

Böhnke + Partner GmbH supplies control systems for the lift industry. Optionally, the control system ordered by you can be equipped with a UPS, which should contribute to function preservation of emergency operation in case of power failure.

The compact and powerful UPS used by us is part of the newest generation of UPS devices. High reliability, low operating costs and excellent electrical properties are important advantages of the technology used.

The efficiency of the UPS system is designed on site for the use that you specify. As the UPS system must be operational in an emergency, the operational readiness must be checked regularly.

The operator is responsible for constant operational readiness of the UPS. He can transfer this task to the company entrusted with the maintenance work of the lift.

CAUTION!
Before the UPS is installed or put in operation, the operation manual of the UPS must be carefully read and all instructions, guidance and safety instructions regarding installation and commissioning must be followed.
The operation manual must be always stored at the UPS for later use.
All maintenance work may only be carried out by qualified and trained skilled personnel.
Do not try to repair or maintain the UPS yourself.
When opening the casing or removing covers, voltage-carrying elements are exposed.
Contact with these may be fatal.
Böhnke + Partner GmbH does not assume responsibility for consequential damages that were caused due to faulty manipulation of the UPS. Only the commitment of manufacturer of the UPS supplied applies.

5.7.13.2 Operational Readiness of the UPS System

Böhnke + Partner GmbH supplies control systems with integrated UPSs and expects operational installation of components within four months.

If the UPS system is not immediately installed, it must be stored in a place, in which the temperature lies between +5 ° and +40 °C and the relative humidity is always below 90 %. If the transport container has been removed, the UPS must also be protected from dust.

The UPS system contains tightly sealed, maintenance-free lead batteries, which however can suffer damage if they are stored for a long time in discharged state or are exposed to high temperature. Therefore, the storage time must not exceed: six months at +20 °C, three months at +30 °C and two months at +35 °C, without

recharging the batteries. Ensure that not more than six months pass between two battery charges.

CAUTION!
During the installation phase, it must be ensured that the UPS is switched off.

NOTE!
OPERATIONAL READINESS OF UPS
As the UPS must be operationally ready in an emergency, the operational readiness must be checked constantly. The operational readiness must be checked regularly (support duration) at intervals of 6-12 months or if there are signs of decreasing operational readiness. Follow all warning, indicator, and operating elements of the UPS precisely.
The operational readiness required for function preservation must be regularly checked as described in the operation manual of the UPS. Follow the instructions precisely.
A defective UPS system must be immediately replaced by a new UPS equipped with the same performance.

NOTE!
AVAILABILITY OF UPS
The availability of the UPS depends on the performance of the batteries. The service life of the batteries is heavily influenced by ambient temperature. The batteries have the longest service life if the ambient temperature is between +20 °C and +25 °C.
To ensure availability for the benefit of the users, the entire battery set must be replaced after four years by a new battery set having with the same performance.

Observe the local regulations applicable for the disposal of replaced batteries.

If unexpected problems occur with the UPS or if you need safety-related information, please contact the manufacturer address stated in the operation manual.

6 Installation and Assembly

Before installing and commissioning the control system, please read the safety instructions and warnings carefully and follow all the warning signs attached to the device. Make sure the warning signs are readable and replace missing or damaged signs.

WARNING!
The prerequisite of safe operation of the device is proper installation and operation of system by qualified personnel in compliance with the warnings stated in this installation manual. In particular, the general and regional installation and safety regulations for working on power installations (e.g., VDE) as well as the regulations regarding proper use of tools and use of personal protective equipment.

Ensure that a clearance of at least 100 mm is available for unobstructed entry and exit of cooling air in addition to the ventilation openings. Avoid excessive vibrations and shocks to the device.

ATTENTION!
PROTECTION AGAINST OVERHEATING!
When installing a motor (e.g., car fan), protection against overheating must be provided. The corresponding protective components are available with Böhnke + Partner GmbH, which can be used. Further information is available on request.

6.1 Storage, Transport and Operating Conditions

CAUTION!
Improper storage, transport or operating conditions can result in destruction of the system and danger to persons.

- Storage and transport conditions
  Ambient temperature: -20 °C to 70 °C,
  relative humidity up to max. 90% (non-condensing)
- Operating conditions
  Ambient temperature: 0 °C to 60 °C,
  relative humidity up to max. 90% (non-condensing),
  Max. height
  - Types 230 V AC and 110 V AC: 2000 m
  - Type 48 V AC/DC: 4000 m
- The ambient temperature of the control cabinet must not exceed +40 °C and its average value over a period of 24 h must not exceed +35 °C. If the operating temperature is below 5 °C, disturbance of visible characters on the LCD is expected. At ambient temperatures >40 °C, the control cabinet must be cooled with a cooling unit. Existing inlets and outlets for air conditioning must be kept free.

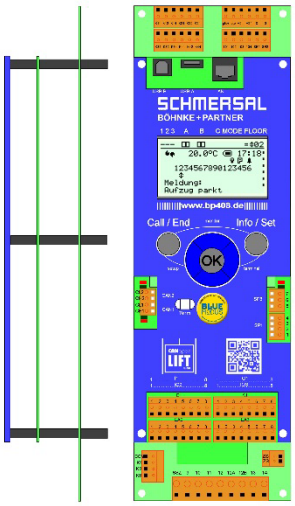
- Aggressive mediums, dust, fog, water, or humidity must not reach the assemblies. The control cabinet should hence fulfil at least protection class IP2xD.
- Condensation must be avoided on all components!
  Example: Water condensation in damp machine room after the control system is switched off
- In critical environments, please ensure there is sufficient sound insulation to the building.
- Out system controls are designed for primary voltage 230 V AC 50 Hz.
- When using residual current-protective circuits in control systems having frequency converters, it must be ensured that these RCD circuit breakers must be sensitive to universal current. Other RCD circuit breakers must not be used in accordance with DIN VDE 0160, 5.5.3.4.2 because the DC residual current generated through the input circuit of the frequency converter could increase the minimum triggering level of RCD circuit breaker culminating in non-triggering. The maximum permissible release current of these selective RCD circuit breakers that are sensitive to universal current must not exceed value $I_{\Delta N}$=0.3 A.

6.2 Preparations

NOTE!

- The complete lift control system is checked at Böhnke + Partner GmbH. The delivery status is documented in the circuit diagrams and the record of the setup and service menu.
- Circuit diagrams uniquely marked with a controlling number and technical documents are part of every control system.
- The control system must be connected according to our circuit diagrams.
- The control lines 24 V DC and data lines RS-232, RS-485, USB, CAN, LON, Ethernet and telephone must be separately laid from the load lines!
- When connecting the control system, comply with the technical data, according to which the control system has been manufactured according to your order.

6.3 Installation of System Module bp408



The system module bp408 is connected to the backside of the control cabinet using bolts and M4 screws. The assembly must be safely installed on its mechanical mounting links provided for it.

6.4 Installation of the Control Cabinet

Figure 34:
The control cabinet are supplied as installed in control cabinets for wall mounting, as floor standing cabinets or in door frames.

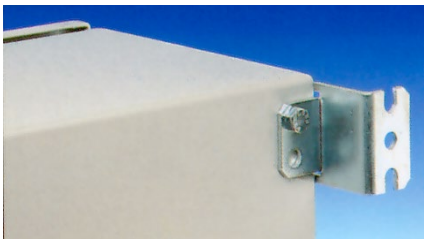


Figure 35:
There are holders on the control cabinets for wall mounting of the wall cabinets

The control systems of Böhnke + Partner GmbH are supplied in control cabinets. Depending on the desired design, they are wall cabinets or floor standing cabinets. Mount the control cabinet as described in the enclosed control cabinet / frame manual.

6.5 Assembly of the Car Terminal Box

The car terminal box is to be fixed to the car in a way that the switches for inspection and any sockets are easily and safely accessible and the travelling cable can be properly inserted.

6.6 Installation of Travel Cable

When installing the travelling cable in the shaft, make sure that the cable is unrolled and installed according to the following illustration.

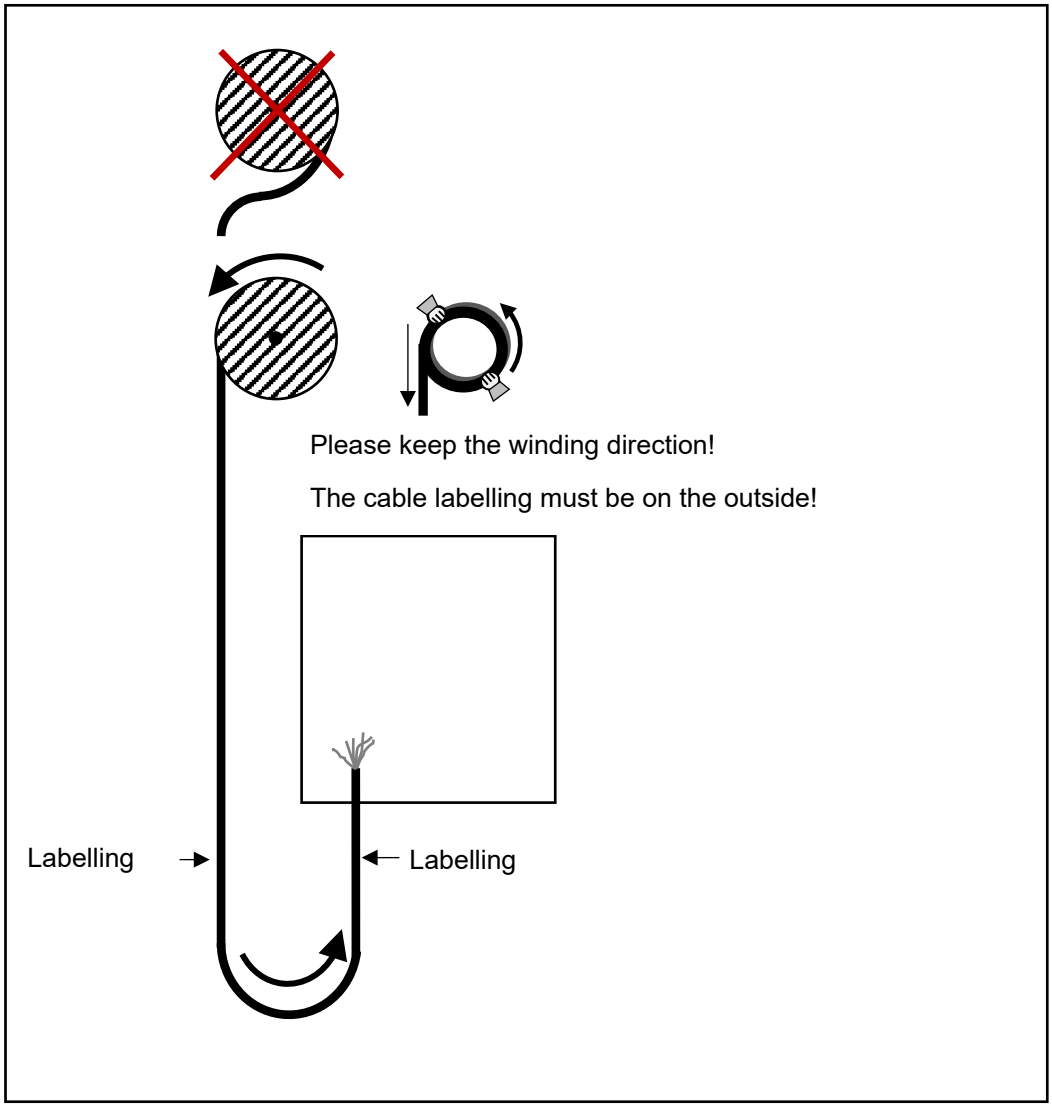
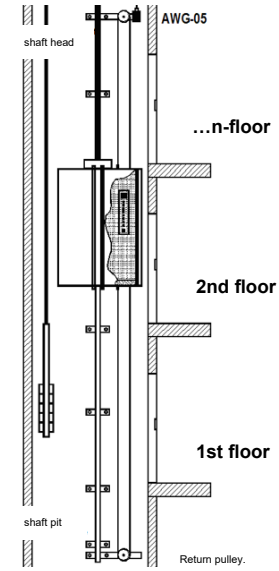


Figure 36:
Installation Travelling Cable

6.7 Installation of Absolute Encoder System

The bp408 control system can be operated with different shaft-copying systems. Absolute encoder systems are usually used.

Examples of standard systems are given below. They are adapted for bp408 control system and thus enable an uncomplicated commissioning. These systems can also be directly obtained from Böhnke + Partner.



AWG-05
Toothed-belt-based
positioning system

Elgo Limax
Magnetic-tape-based
positioning system

Kübler LEB
Steel-tape-based
positioning system

Cedes APS
Code-tape-based
positioning system

Figure 37:
Overview of absolute encoder systems

The absolute encoder is installed as described in the installation manual supplied.

The installation of AWG-05 tooth belt system is explained in more detail below.

6.7.1 Absolute Encoder AWG-05

The absolute encoder AWG-05 provides the position and speed of the car to all bus participants. The installation can be carried out on the shaft head or on the car. A tooth belt establishes a slip-free connection. Furthermore, an installation is possible on the speed govenor. In that case, the tooth belt can be omitted. However, a magnetic switch must be provided for correcting the belt slip. Please refer to the accompanying installation manual for the installation procedure.

6.7.1.1 Absolute Encoder Fastening Sets

For installing the absolute encoder in the shaft or on the car there are different fastening sets for different use cases.

Type S 100

AWG-05 with fastening set “shaft” with tooth roller 5 mm wide, angular edges, conveyor height: max. 60 m, speed: max. 4.0 m/s

Type K 105

AWG-05 with fastening set “car” with tooth roller 5 mm wide, angular edges, conveyor height: max. 180 m, speed: max. 4.0 m/s

Tooth belt

Flat tooth belt – 5 mm, angular edges, black, for S 100, K 105

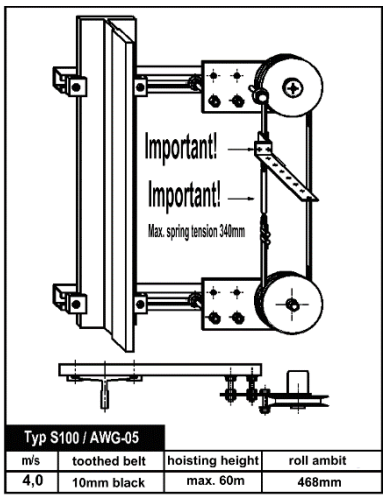


Figure 38:
Fastening sets for installation in the shaft (type S100).

6.7.1.2 Installation in the Shaft

The AWG is attached to the guard rail in the shaft. It is driven by a tooth belt, which is connected to the car via a deviating roller in a slip-free way.

6.7.1.3 Installation on the Car

An alternative for the mentioned installation is the installation of the absolute encoder on the car. Here, a tooth belt stretched from the shaft head to the shaft pit drives the AWG. The advantage of needing lesser tooth belt is countered by the disadvantage that the tooth belt creates a rolling noise at high speeds when passing through the pulleys. It is effectively reduced by a special coating on the belt pulley.

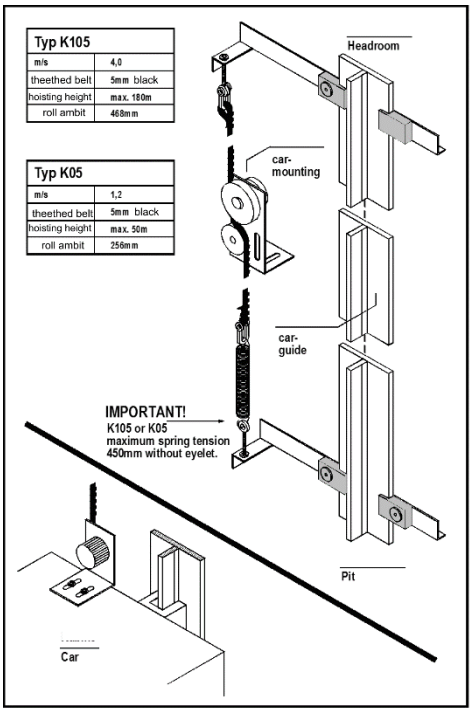


Figure 39:
Fastening sets for installation on the car

7 Electrical Connection

7.1 Preparations

Before installing and commissioning this device, please read these safety instructions and warnings carefully and follow all the warning signs attached to the device. Make sure the warning signs are readable and replace missing or damaged signs.

WARNING!
HAZARDOUS VOLTAGE!

- Make sure that you are not working on live devices. Deenergise the system (according to the circuit diagram).
- Before working on the lift control system, ensure that no voltage > 50 V AC is available.
- Plug must not be inserted if the corresponding devices are not switched off.
- Handling rules for sensitive electronic boards must be applied (protection against electrostatic charging).
- Before connecting to supply voltage, check whether the information on the identification plate of the control system conforms to the connection values.
- During the electrical installation, the general installation regulations must be followed. These include:
  1. VDE 0100 provision for setting up power installations with rated voltages up to 1000 V
  2. DIN EN 60204-1 (VDE 0113) Provision for electrical equipment of processing machines.
  3. DIN EN 50178 (VDE 0160) Equipment of power plants with electronic equipment.
  4. Statutory accident prevention regulations e.g., BGV A2.
- If the lift control system or associated components are used in special applications (e.g. area with potentially explosive atmosphere), the standards and regulations necessary therefor must be complied with.
- If an uninterruptible power supply (UPS) is present in the control system, switching off the main switch is not sufficient to deenergise the system. The UPS must be separately switched off.

WARNING!
Cables and plugs may only be mounted or removed in a deenergised state.

7.2 Interference Suppression Measures and Notes

All industrial, electronically controlled automatic control elements (PCs, microprocessors, computers, PLC) can be influenced by interference impulses if counteractive measures are not taken. These interference impulses can be generated by external systems such as voltage changes in supply line as well as control pulses of power elements of inverters. Böhnke + Partner GmbH considers all the usual measures when manufacturing the control system. The components used have low sensitivity to interference impulses of the surroundings.

The control systems have been designed for operation in industrial environments where high levels of electromagnetic interferences are expected. In general, a professional installation ensures safe and smooth operation. If any difficulties arise nonetheless, the following guidelines may prove useful. Grounding the system reference potential (0 V) to the control system, as described below, may prove to be effective.

NOTE!

- The complete lift control system has been checked at Böhnke + Partner GmbH. The delivery status is documented in the circuit diagrams and the record of the basic and service menu.
- Circuit diagrams uniquely marked with a controlling number and technical documents are part of every control system.
- The control system must be connected according to the circuit diagram.
- The control lines and the bus lines must be laid spatially separated from the load lines.
- When connecting the control system, comply with the technical data, according to which the control system has been manufactured according to your order.
- Always follow the EMC instructions of the inverter manufacturers.
- If you have any questions regarding the EMC Directive, our service team are happy to help.
- Also follow the instructions on cable shields (chapter 7.3).

You must keep these measures in mind:

- The control system bp408 exclusively helps for information processing in lift control system. All control signals are processed with positive switching logic or via the CAN bus. The safety guidelines of DIN EN 81 are not restricted by electronic information processing.
- The control system is designed, built, and checked according to DIN EN 81 and VDE regulations. You must follow the relevant regulations for commissioning electric control devices and equipment. The local lightening protection measures are a prerequisite for operation. Circuit diagrams uniquely marked with a controlling number and technical documents are part of every control system.
- For all third-party devices, the manufacturer’s assembly and installation instructions must be followed exactly.

- To ensure compliance with the EMC guidelines, a suitable single-phase mains filter must be connected to the 230 V AC control circuit with the connected signal circuit.
- The control lines should be routed away from the load lines as far as possible using separate cable ducts. When intersecting, an angle of 90° should be maintained wherever possible.
- Control units are always connected using choke, filter and shielded cables according to the assembly and installation instructions of the manufacturer.
- Make sure that all devices in the cabinet are well grounded using short grounding wires with a large cross-section, which are connected to a common grounding point or ground rail. It is particularly important that each control unit (e.g., a speedometer) connected to a inverter is connected to the same grounding point as the inverter itself via a short cable with a large cross-section. Flat leads (e.g., metal holders) are preferred because they have lower impedance at high frequencies.
- Use shielded or armoured cables for the load connections between the drive and inverter or control system and ground the shield / armour at both ends.
- Data connections (group, DFÜ, printer port etc.) are generally established using shielded lines. The shield of the data lines should be earthed on one side.
- Mounting plates consist of galvanised steel plates in order to be able to produce large-area ground connections to all control components.
- Use of fail-safe components causes increased insensitivity to environmental influences.
- The car must be grounded by means of the green / yellow cable, which also leads through the travelling cable.
- The free travelling cable cores should be earthed on one side of the control cabinet.
- The components used in the control systems comply with the regulations of DIN EN 81 as well as VDE 0100 / 0101 / 0551 / 0660 and BGV A2. The control cabinets comply with the installation standard VDE 0660 / part 500.
- The main and auxiliary contactors used in the control system comply with DIN EN 81-20, 5.10.3 and VDE 0660, but at least device class D3.
- Voltage fluctuations that are within the tolerance range (+10 %; -20 %) of energy supply companies (RUs) are permissible.
- Faults caused by an impermissible increase in voltage cannot lead to claims for damages against the manufacturer.
- If the user attaches additional coils (inductors) on his own initiative, it is of utmost importance that these are also suppressed.
- For DC-powered inductors such as contactors, relays, brake magnets, bolt magnets and hydraulic valves, always place a diode (1000 V / 1 A) anti-parallel and as close as possible to the coil. (Free-wheeling diode at Böhnke + Partner GmbH)
- For AC-powered contactors, relays, brake magnets, bolt magnets and hydraulic valves, it is always necessary to install an RC combination, matched to the coil type, parallel and as close as possible to the coil. (RC combination of Böhnke + Partner GmbH can be used universally.)

- In the case of three-phase powered door drives, brake and bolt motors, an RC combination matched to the motor type must always be installed parallel and as close as possible to the motor winding. The RC combinations are connected to the motor windings in star formation (RC combinations of Böhnke + Partner GmbH can be used universally.)
- Interference suppression measures must be installed practically.

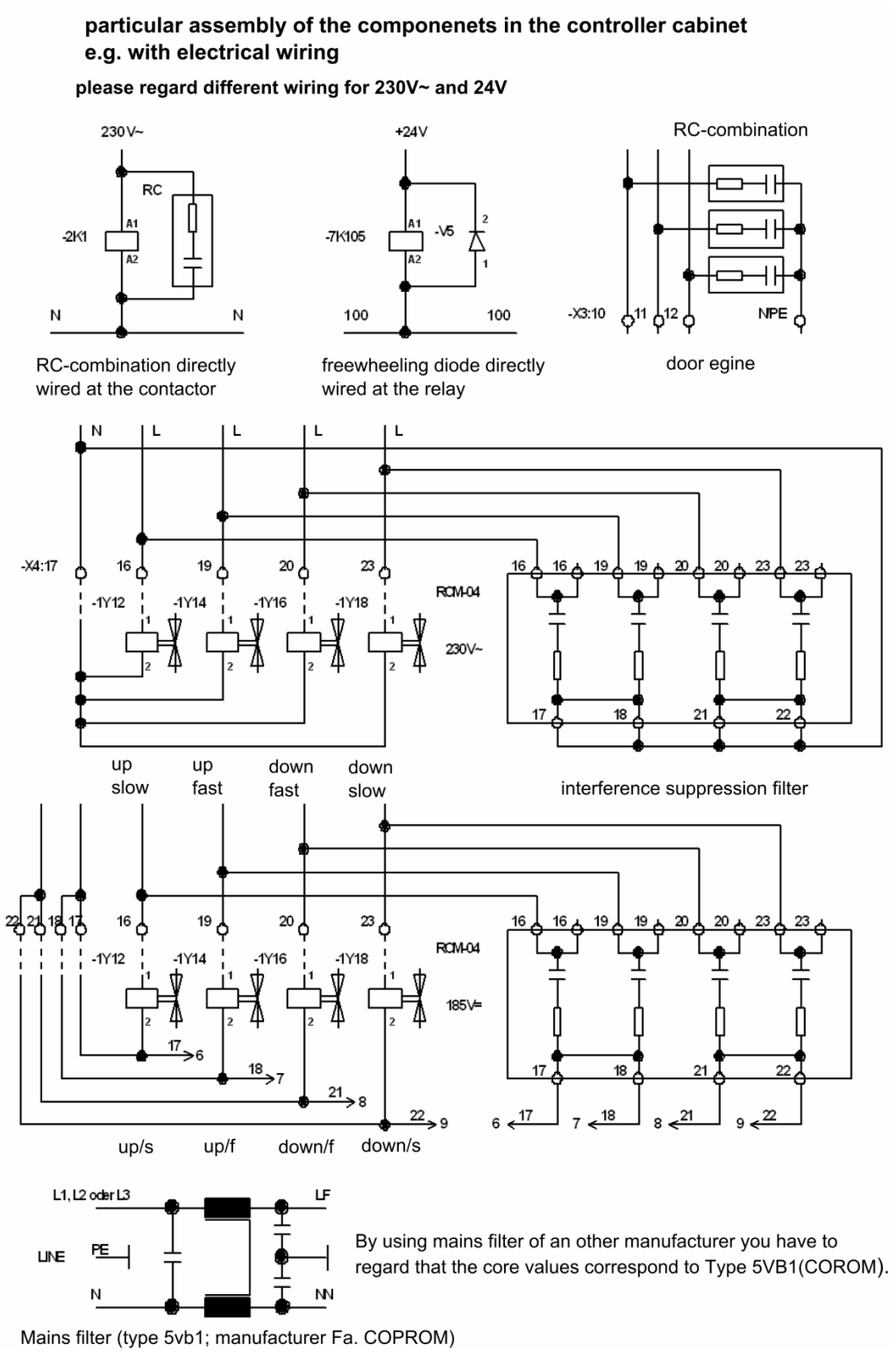


Figure 40:
Circuit diagrams for interference suppression measures

7.3 Connections for Cable Shields

To achieve a good electromagnetic compatibility (EMC) of the lift system, all shielded cables must be connected as shown in the figures below, unless they have been assembled as EMC-compliant plug connections.

NOTE!
It is not enough just to twist the cable shielding und and to clamp this “shielding braid” (see also “Pigtail”) to PE potential. Regarding good EMC, it is important that the shields are always connected to the entire surface.

If the user is installing other shielded cables on his own initiative, it is of utmost importance that these shields are also connected as specified in the figures!

Always follow the EMC instructions of the inverter manufacturers.

If you have any questions regarding the EMC Directive, our service team are pleased to help with advice and assistance.

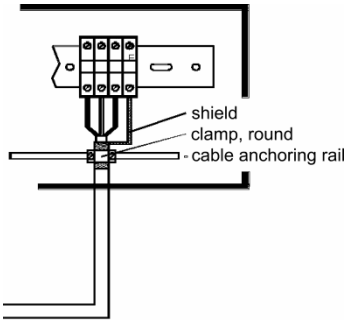


Figure 41:
Connection example for shielded cables

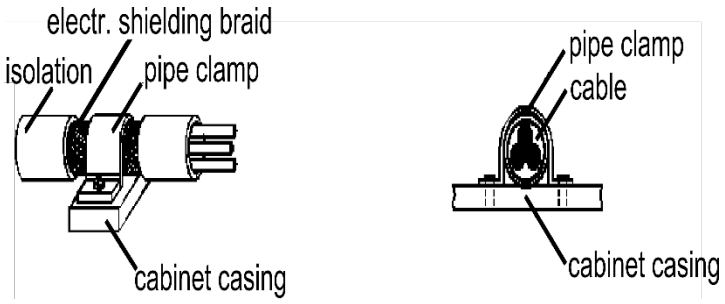


Figure 42:
The shields must always be connected to the entire surface of PE potential by means of cable or pipe clamp.

7.4 Designation of Circuit Diagrams

Böhnke + Partner GmbH defines the different components in terms of functional groups. We decided not to apply a fixed system when naming the components. By preparing the circuit diagrams with a CAD system, we achieve a high flexibility in designating the circuit diagrams and parts lists. Each component is designated directly in the circuit diagram with reference to function as well as project, i.e., in a specific way for each customer.

7.5 Safety Circuit

NOTE!
Once the safety devices are activated, they prevent the lift from starting when called and/or stop a travelling car immediately.

The safety circuit is designed, for example, for monitoring the following external signals:

- Closed position of maintenance door and emergency exits,
- Locked status of car doors,
- Locked status of landing doors,
- Closed position of landing doors,
- Closed position of car doors,
- Emergency stop switch on top of car, in car and in machine room,
- Speed governor,
- Buffer contacts,
- Emergency limit switch top and bottom,
- Safety gear,
- Landing door zone with safety circuit.

Doors and locks are monitored within the landing door zone, while the car is approaching the landing with door starting to open and while it is relevelled. Every travel contactor and auxiliary contactor of the safety circuit is laid out according to VDE 0660, device class D3. The safety circuit has a signal voltage of 230 V AC.

The safety circuit works independently of the control system bp408. In case of a malfunction, the operational voltage of the output module for control elements is switched off.

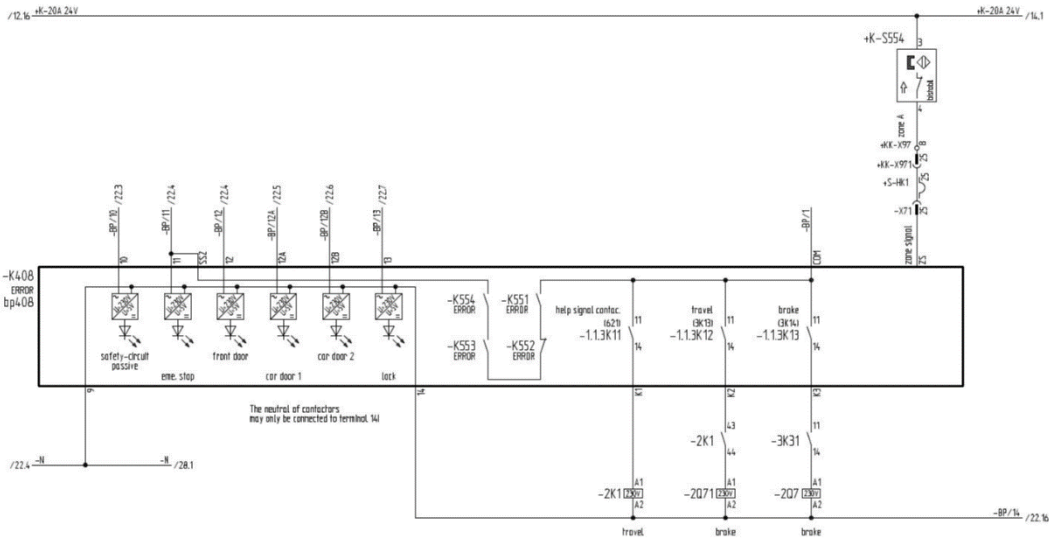


Figure 43:
Standard switching of the safety circuit in the example of bp408

7.6 Electrical Installation

After mechanical assembly of all components, carry out the electrical installation using the circuit diagrams provided. Ensure proper connection of all terminal points and compliance with EMC wiring guidelines.

WARNING!
Cables and plugs may only be mounted or removed in a de-energised state.

7.7 Cable Entry Control Cabinet

The control systems are installed by Böhnke + Partner GmbH in control cabinets which are qualified for use for protection class IP54 (in accordance with IEC/EN 60529).

This protection class remains unchanged if the required cables are inserted through a correctly made opening in the foam rubber seal on the bottom side of the control cabinet.

For the insertion of the travelling cable, it is recommended to make a smooth cut with a suitable tool in the foam rubber seal with a length of approx. 5 cm (slightly smaller than the width of the travelling cable) and to insert the ready-made travelling cable through this.

For round cables it is recommended to drill a hole with a diameter of the cable in the foam rubber seal. This hole should then be extended by a smooth cut (possibly crosscut for very wide plugs) in the length of the plugs of the ready-made cable.

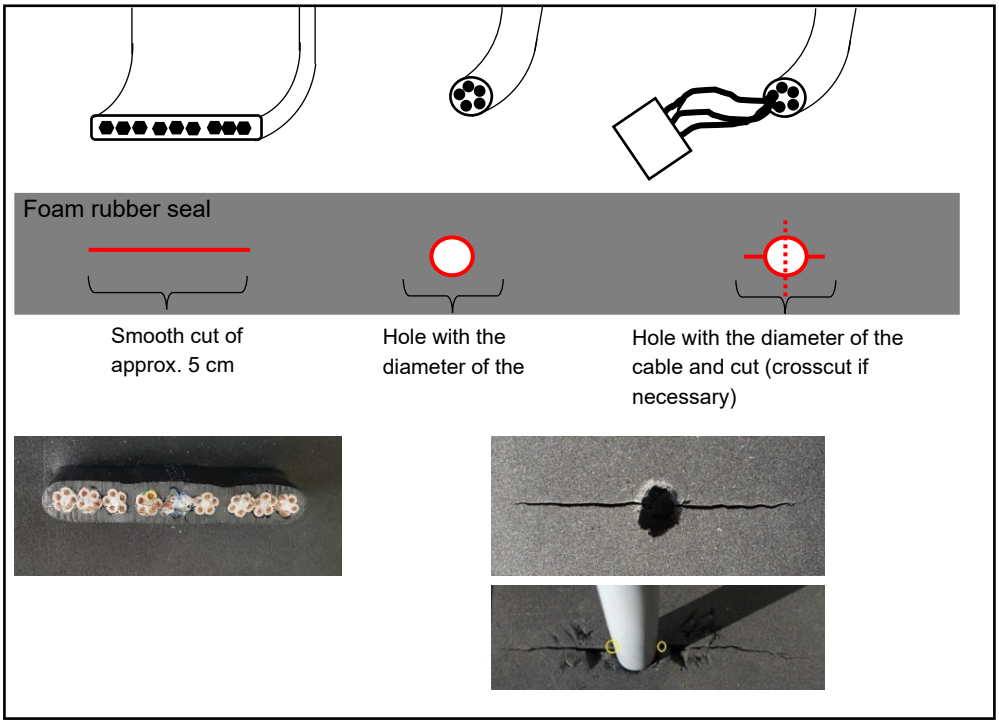


Figure 44:
Cable Entry Control Cabinet

7.8 Bus Connections

The bp408 control system uses the CAN Bus according to the application profile CiA 417. This profile also describes the physical parameters of the bus lines and the topology. Special regulations generally apply for the wiring of bus systems.

Figure 45:
Lift components that comply with the application profile CiA 417 must bear this logo.

7.8.1 Electrical Bus Medium

The components corresponding to CiA-417 require a two-wire data communication line. Speaking in bus-terms, the components connected are denominated as nodes. Nodes are connected to the bus in parallel. It must be ascertained that the topology of the bus line always forms a line.

The CAN high-speed standard (ISO11898-2) requires that the bus be terminated at the beginning and at the end with a resistor (120 ohms). Termination can be done in different ways. For some nodes, an internal resistor can be activated via a DIL switch or jumper, and for others, a resistor must be connected to the bus terminals. For exact termination, refer to the manuals of all connected nodes!

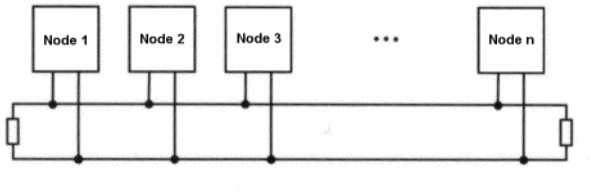


Figure 46:
The bus must be terminated at the beginning and end with a 120 ohms resistor.

The driver modules used restrict the maximum number of nodes per bus to 64. If more nodes are required, repeaters or gateways must be used (see further below).

Furthermore, the baud rate of all connected nodes must be equal. As network master, bp408 provides a baud rate of 250 kBit to the interfaces CAN1 and CAN2. All other components of Böhnke + Partner GmbH have an automatic baud rate detection or are pre-set at 250 kBit. For the baud rate used, the bus must not exceed a length of maximum 200 m. Stub lines to the nodes in total must not be longer than 3 m.

7.8.2 Cable Colours

The cable colours for bus lines are not defined in CANopen Lift. To facilitate wiring and fault-finding, we recommend using the following colours for the bus lines:

Signal	Description	Colour
CAN_L	CAN-Bus-Signal (dominant low)	blue
CAN_H	CAN-Bus-Signal (dominant high)	white
GND	External ground	black
CAN_V+	External voltage supply (+24 V)	red

7.8.3 Network Topology

Bus systems dictate a topology based on the laws of physics. For the CAN-Bus used, a line structure is dictated in the specification CiA 417.

This cable routing is not always feasible in practise. Therefore, additional lines can be connected via repeaters. Note that each section behind a repeater is an independent bus and must therefore be terminated at the beginning and at the end.

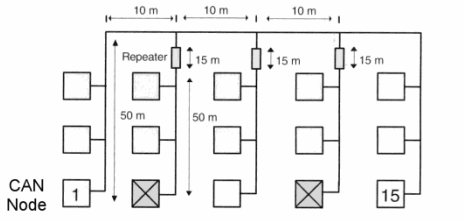


Figure 47:
Lines can be connected using repeaters:

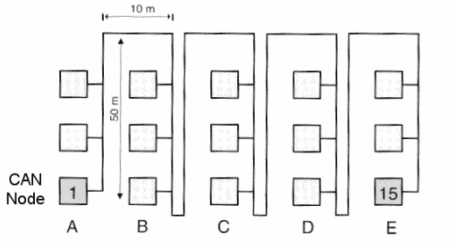


Figure 48:
The wiring of all nodes must always form a line.

7.8.4 Examples for a Correct Topology

7.8.4.1 Individual Control System

In figure 48, you can see an example for compliance with line structure and termination in an individual control system. The car bus is blue and group bus red. Provided that the stub line to the inverter is shorter than 3 m, termination can be realised at the bp408 as well. Termination on the car is done by means of a connected absolute encoder or a DIP switch (DIP 2 set to "on") on the CLK-03. Termination of the group bus at the end of the shaft is normally realised by activating the termination on the DIP switch of the last CAP-01/02 (DIP 2 set to "on").

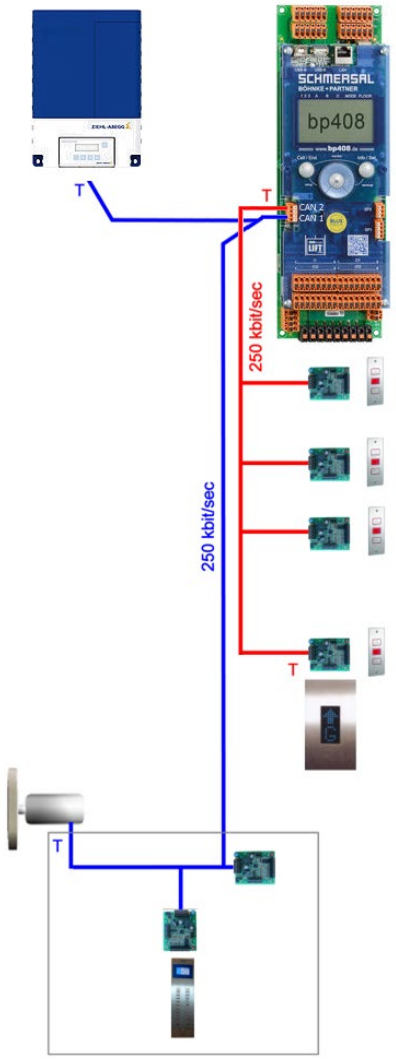


Figure 49:
Example for the topology of an individual control system.

7.8.4.2 Two-part Group with one Line

Figure 48 shows the bus topology of a two-part group with one line for landing calls. This is also a line structure with properly terminated ends.

NOTE!
Pay attention to the termination during commissioning. Usually only a single lift is put into operation and the group connection is established later. In this case, the termination must be adjusted (see individual control system).

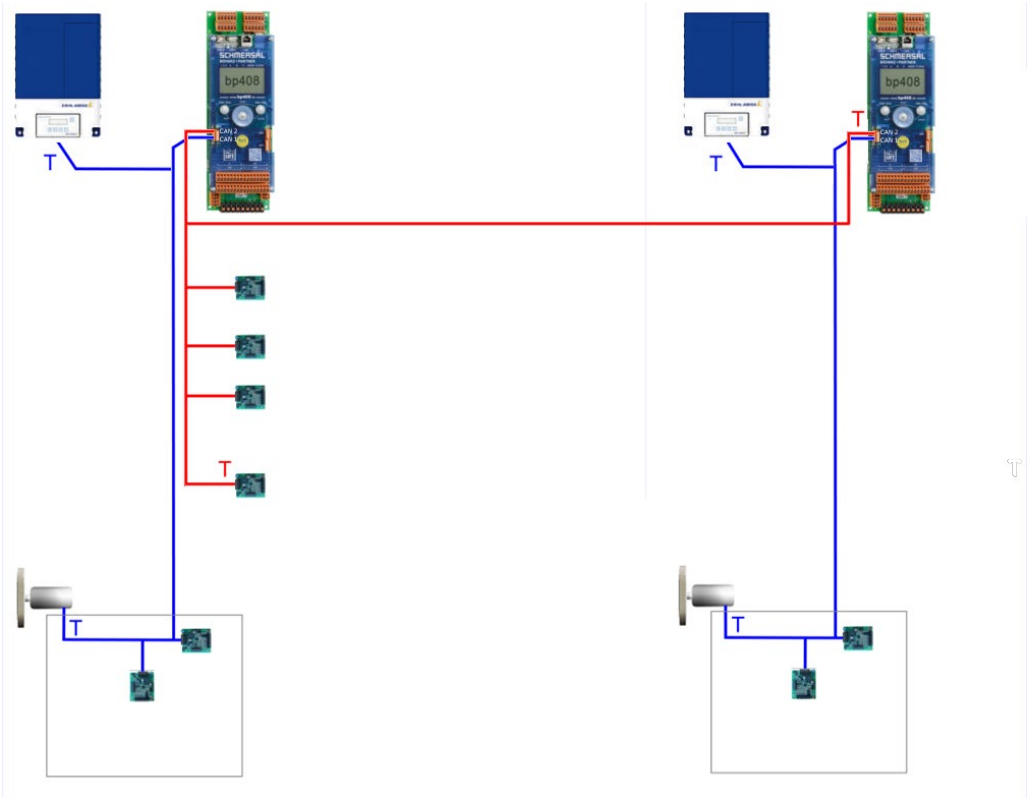


Figure 50:
Example of the topology of a two-part group with only one line

7.8.4.3 Two-part group with two lines

Figure 49 shows the bus topology of a two-part group with two lines for landing calls. The line structure is given by the

terminations at both ends of the shaft..

NOTE!
Pay attention to the termination during commissioning. Usually only a single lift is put into operation and the group connection is established later. In this case, the termination must be adjusted (see individual control system).

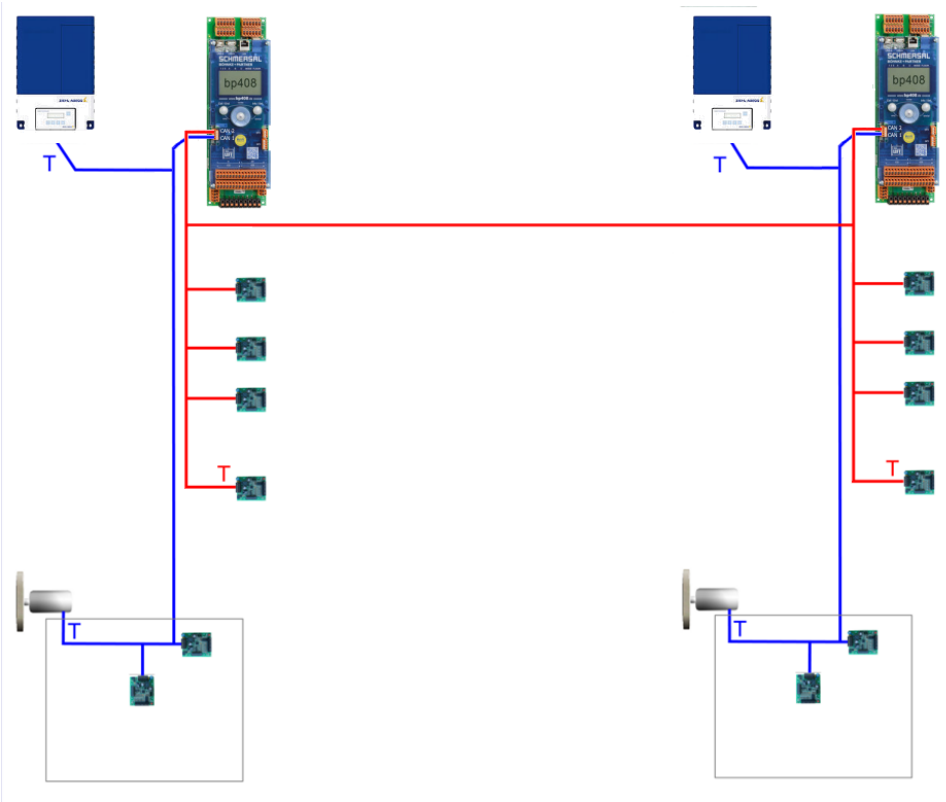


Figure 51:
Example of topology of a two-part group with two lines

7.8.4.4 Two-part Group with Three Lines

Figure 50 shows the bus topology of a two-part group with three lines for landing calls. Since a line structure can no longer be adhered to with more than two lines, gateways are used here. Thus, each cable in turn forms an independent line. The bus is terminated at each end.

NOTE!
Pay attention to the termination during commissioning. Usually only a single lift is put into operation and the group connection is established later. In this case, the termination must be adjusted (see individual control system).

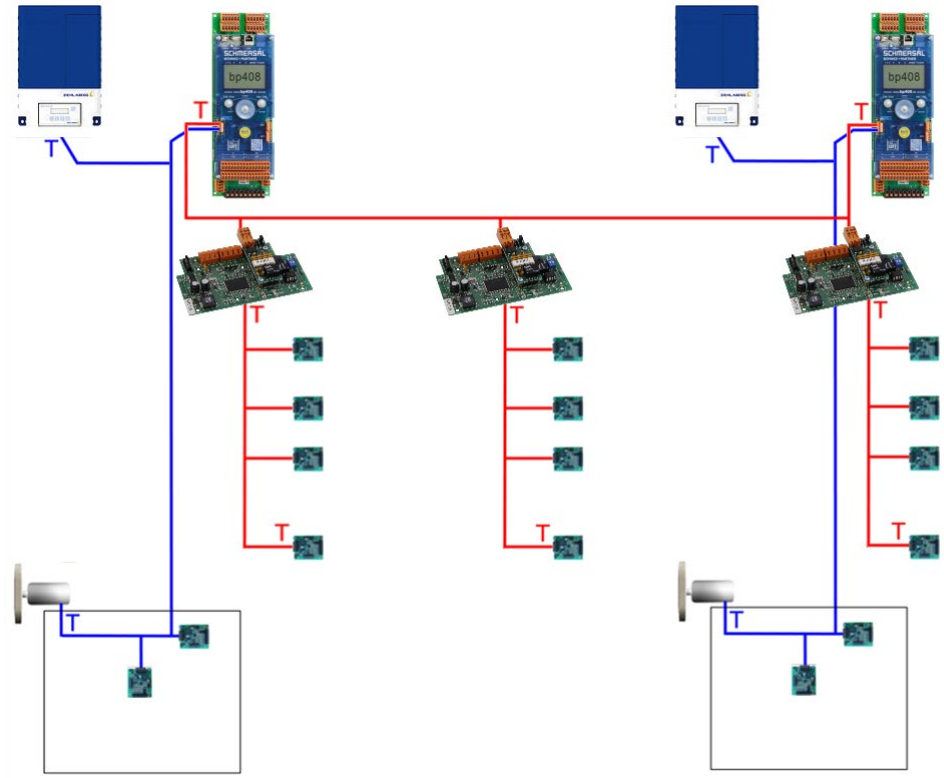


Figure 52:
Example of topology of a two-part group with three lines

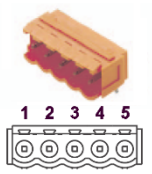
7.8.5 Connector Pin Assignments

In the CANopen Lift Standard the assignments of the most common connectors are standardised. In the application profile for lifts the following connectors are recommended for lift components:

- D-Sub 9-pin
- RJ45
- Open-Style plug

Figure	Pin	Signal	Description
D-Sub plug 9-pin 	1	-	Reserved
	2	CAN_L	CAN-BUS-Signal (dominant low)
	3	CAN_GND	CAN ground
	4	-	Reserved
	5	CAN_SHLD	Optional shield
	6	GND	Optional ground (from Pin 9)
	7	CAN_H	CAN-BUS-Signal (dominant high)
	8	-	Reserved
	9	CAN_V+	Optional external voltage supply (+ 24 V DC)

Figure	Pin	Signal	Description
RJ45 socket 	1	CAN_H	CAN-BUS-Signal (dominant high)
	2	CAN_L	CAN-BUS-Signal (dominant low)
	3	CAN_GND	CAN ground
	4	-	Reserved
	5	-	Reserved
	6	CAN_SHLD	Optional shield
	7	GND	Optional ground
	8	CAN_V+	Optional external voltage supply +24 V DC

Figure	Pin	Signal	Description
Open-Style plug 	1	CAN_GND	CAN ground
	2	CAN_L	CAN-BUS-Signal (dominant low)
	3	CAN_SHLD	Optional shield
	4	CAN_H	CAN-BUS-Signal (dominant high)
	5	CAN_V+	Optional external voltage supply (+24 V DC)

7.8.6 Node Numbers of CAN Components

Each CANopen Lift component has a node number (Node-ID) for identification. It must be unique within a CANopen Lift network. If there are two components with the same ID on the bus, these assemblies cannot be approached.
At Böhnke + Partner GmbH, the node numbers (Node-ID) are issued according to the recommendation of the SIG-Lift Control (www.CANopen-Lift.org/wiki/Node-IDs) according to the following scheme:

Node-ID [decimal]	CAN1 Local bus	CAN2 Shaft bus
1	bp408 - lift control system	bp408 – lift control system G1
2	Drive (frequency converter)	bp408 – lift control system G2
3	reserved	bp408 – lift control system G3
4	Transmitter/positioning 1	bp408 – lift control system G4
5	Transmitter/positioning 2	bp408 – lift control system G5
6	reserved	bp408 – lift control system G6
7	Door control system 1 (door A)	bp408 – lift control system G7
8	Door control system 2 (door B)	bp408 – lift control system G8
9	Door control system 3 (door C)	CDG-01 /CSI-01 – Bridge / Repeater
10	CDG-01 - Gateway / CSI-01 - Bridge	Bridge / Repeater 2
11	CIO-01 in control cabinet	Bridge / Repeater 3
12	Inspection box with CLK-03	Bridge / Repeater 4
13	Load measurement	Bridge / Repeater 5
14	Energy meter	Bridge / Repeater 6
15	reserved	Bridge / Repeater 7
16	CAP-02 / CBK-01 inner tableau node 1	Bridge / Repeater 8
17-20	CAP-02 / CBK-01 inner tableau nodes 2 - 5	
21-84	CAP-02 / CBK-01 / CIO-01 in shaft	
111-118	CAP-02 / CIO-01 in control cabinet	
119	CWI-01	
125	Default Node-ID (default setting of a bearing component such as CAP-02, CBK-01 or CIO-01)	
126	Flash update of bootloader	
127	CANWizard	

If you obtain the control system from Böhnke + Partner GmbH, all node numbers (Node-IDs) are already set by default.

7.9 Travelling cable to Car Terminal Box

The car terminal box is connected via a H05VEA7VH6-F travelling cable. The assignment of the wires can be found in the circuit diagrams enclosed with the control system.

7.10 Activation of Inverter

There are three ways to activate an inverter using bp408. Depending on the selected inverter, it can be activated via the CAN bus, the DCP interface or parallel wiring with the RVM-01.

7.10.1 Activation via CAN-Bus

If you have an inverter with a CANopen Lift interface according to the application profile CiA 417, the connection to the bp408 should be made via the CAN bus. This activation of the inverter requires the least installation and configuration effort since the standardised application profile provides a certain plug-and-play capability and excellent diagnostic capabilities.

Connect the inverter to the CAN1 connection of the bp408 according to the enclosed plans. When routing and terminating bus lines, observe the instructions in section 7.9.4.

7.10.2 DCP-Connection to Inverter

The DCP interface is used for the serial connection between the inverter and the control system. The connection is a RS-485 point-to-point connection.

The DCP interface is on the right side of the bp408 (see designation SP3, 3-pin connector). The pin assignment can be found in the following table.

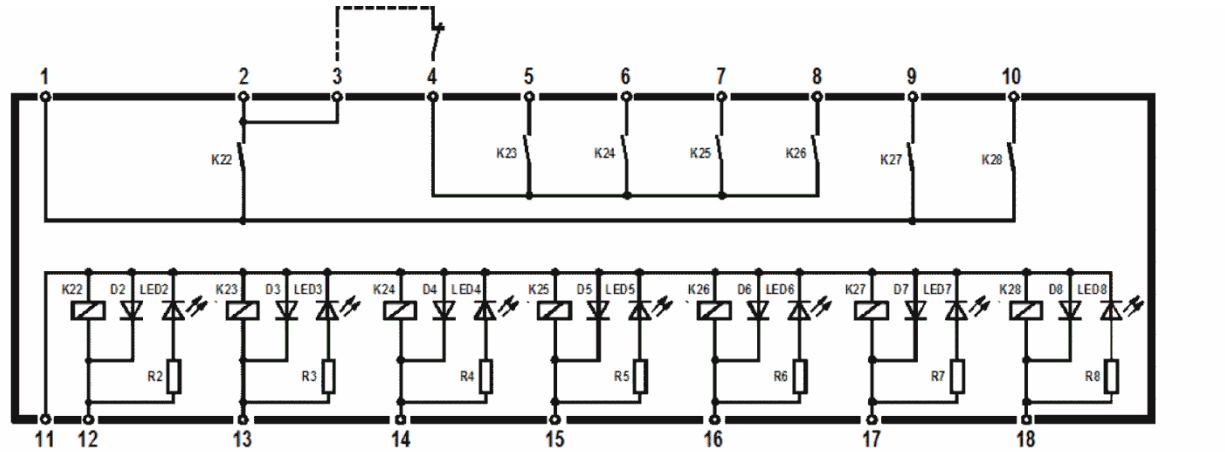
Pin assignment of DCP plug

Pin	Signal	Description
5	COM	Signal ground
6	B	Signal line RS-485 inverted
3	A	Signal line RS-485

Connect the signal lines to the inverter using the corresponding connection terminals. The cable must be twisted and shielded. The shield must be placed on one side of the inverter. Here, it is important to ensure a large-area connection (see chapter 7.3). The maximum cable length for the DCP connection is 15 m.

7.10.3 Parallel Wiring with RVM-01

The controller/pre-control module “RVM-01” is used to control all known inverters that do not have the option of serial interface. The control signals for the various speeds and directions are displayed potential-free via seven relays. These have gold-plated double contacts to ensure reliable switching for all expected requirements.



terminal connections:

1	reference potential
3/4	bridge, or if claimed, drive pre-limit switch
2/5-18	configuration depending on application, please regard circuit diagram !!!

e.g.: function of the relay at

		a) cable elevator	b) hydraulic elevator
K22	v0	approaching	fast drive
K23	v1	floor drive	drive
K24	v2	max. speed	free
K25	vI	inspection	fast up
K26	vR	emerg. rescue	fast down
K27	vN	re-levelling	slow up
K28		free	slow down

Figure 53:
Circuit of RVM-01

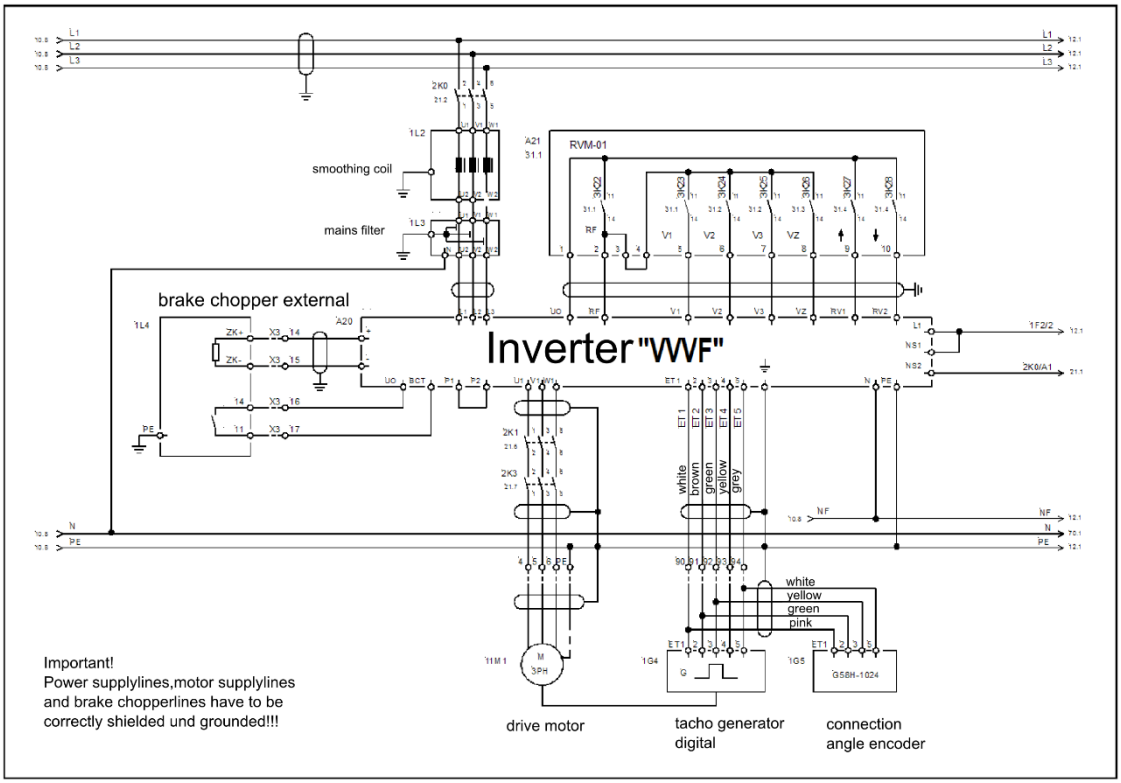


Figure 54:
Example of an inverter control with RVM-01.

Control inputs like in example see figure 53:

GND	Ground
UO	Control voltage of inverter Voltage output for controlling inputs
RF	Controller release, the input “RF” must be controlled during the travel.
V0	Speed
V1	Fine position speed
V2	Levelling speed
V3	Travel speed
VR	Retaining / inspection speed
VN	Levelling speed
RV1	Direction specification 1 UP
RV2	Direction specification 2 DOWN If the inverter is connected according to the suggested circuit, the motor in the factory setting rotates on the left with activated input “RV1”, on the right with “RV2” (view of the drive end of the shaft).
ZE1	Additional speed V_ZE
ZE2	Additional speed V_ZE2 Preferably, these speeds must be used for inspection travel and emergency electrical operation .
ZE3	Additional speed V_ZE3 This input can trigger various functions in the inverter. The setting is carried out in the menu INTERFACES. The additional speed V_ZE3 having the same name is selected ex works.
BCT	Brake chopper temperature. At this input, the temperature switch or the fault output of the brake chopper is monitored.

7.11 Connection of Absolute Encoder (AWG)

The absolute encoder is designed with a 9-pin D-sub connector. The pin assignment complies with the standard of CANopen Lift. The CAN-Bus is terminated in AWG-05 CANopen Lift. If the absolute encoder is located on the car, the connection cable can be plugged directly into the socket on the CLK. If the absolute encoder is in the shaft head, the connection cable can be plugged into the correspondingly labelled absolute value encoder socket in the control cabinet.

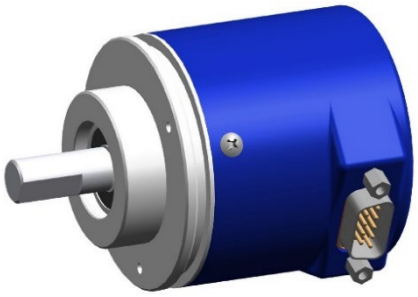


Figure 55:
The absolute encoder AWG-05 CANopen Lift can be installed in the shaft head or on the car.

NOTE!
The bus is generally terminated by positioning systems of different manufacturers. If the positioning system is mounted and connected to the car, in such a case the termination must be deactivated via the DIP switch 2 on CLK-03. Instructions on terminating the devices can be found in the relevant manuals or on the Internet at www.CANopen-Lift.org .

7.12 Group Connection

The group connection is used to communicate between the individual control systems and to transmit the shaft signals. The interface for the group connection is the “CAN2” connection.
The data lines must be twisted. They are led down from the connection terminals to the terminal block of the control system. The connection to the other group participants is done via a connector.

The lines with the shaft signals are connected as described in the chapter “Topology”. If the shaft signals are conventionally laid for control system, they are replaced by assemblies, e.g., of type CAP-01/02 or CIO-01, converted into CANopen lift data.

7.13 Data Lines for Remote Diagnosis

The remote diagnosis can be done via different media. There are different rules for each.

7.14 Analogue Telephone Line

If an analogue telephone connection is available for the remote diagnosis, the data transfer takes place with an analogue modem. An analogue modem can be connected to the USB-A port of the bp408. It must be a “real” hardware modem and not a soft modem. The USB modems supplied by Böhnke + Partner GmbH for bp408 are “real” hardware modems. Furthermore, the modem must support V.250 standard. If more than one control unit is allocated to a joint telephone outlet or if there is an emergency call system that uses this analogue telephone outlet as well, you have to use an emergency call manager (refer to the "Connection of the Emergency Call System" section).

7.15 Ethernet

If remote diagnostics is to be carried out via an intranet or the Internet, an Ethernet-connection is usually available in the machine room. In this case, use the LAN port of bp408.

7.16 Connection of the Emergency Call System

Emergency call devices usually require a telephone connection. If a separate connection is available for the emergency call system, the wiring is as specified in the description of the emergency call system. Mostly, however, the emergency call system must share the telephone line with the modem of the control system. In this case, it must be ensured that the emergency call system has priority. Some emergency call systems provide a switched-through connection for a remote diagnosis system as long as there is no emergency call. If such a connection to the emergency call system is not available, a so-called emergency call manager must be appointed. He immediately interrupts an existing remote diagnosis connection when an emergency call occurs and makes the telephone connection available to the emergency call system. There is no general scheme for connecting an emergency call system. Therefore, refer to this information from the enclosed circuit diagrams and the documentation of the emergency call system.

8 Commissioning

CAUTION!
The control systems of Böhnke + Partner GmbH and the drive may only be put into service if the following conditions are met:

- The control system has been installed and connected according to this description.
- Operation and setting options are known (see user manual of bp408).
- The current regulations for EMC (Electromagnetic Compatibility) are complied with!
- The connection of the power circuit, control circuit and the safety circuit has been carried out and checked in accordance with this description (see checklist).
- When commissioning the system, the instructions must continue to be followed:
  - First travel with Emergency Electrical Operation (section 8.7),
  - First travel with Inspection Controls (section 8.8),
  - First travel in Normal Operation Controls (section 8.13) and
  - Setup of Floor selector system (section 8.12).

NOTE!
For special versions, the enclosed additions must also be observed before commissioning.

- After completion of commissioning, the current parameterisation must be recorded in the printout of the setup and service menus, or a current printout must be made on a storage medium (memory card, USB mass storage).
- Malfunctions stored during commissioning (malfunction stack memory/ malfunction list) can be deleted in the submenu “Diagnosis”.
- If access by third parties (such as janitors) is possible, protect access to the menus by assigning a setup and service code number (at least 4 digits).

WARNING!
Before each drive, the operator must ensure that neither persons nor equipment can be endangered.

During the acceptance test, the “Technical Information” (section 8.3) must be observed.

8.1 Preparations

During commissioning on site, no measuring instruments are required except a universal measuring device.

8.1.1 Before First Switch-on

According to VDE 0100 and DIN EN 81, the control circuit must be earthed. The terminal “PE” of the control system is therefore always connected to the power supply via a green / yellow cable.

8.2 Technical Information about the Control System

1. Error-free and safe operation of the product is subject to appropriate transport, storage, erection, and installation as well as to careful operation and maintenance

2. The control system is designed, built, and checked according to DIN EN 81 and VDE regulations. You must follow the relevant regulations for commissioning electric control devices and equipment. The local lightening protection measures are a prerequisite for operation. Circuit diagrams uniquely marked with a controlling number and technical documents are part of every control system.

3. The control system bp408 exclusively helps for information processing in a lift control system. All control signals are processed with positive switching logic. The safety guidelines of DIN EN 81 are not restricted by electronic information processing.

4. The control system bp408 has received an EU-type examination certificate from notified bodies. Section 3.1 lists the EU type examination certificate and chapter 3.3 the EU declaration of conformity within the meaning of EU Directive (2014/33/EU), which shows that the assembly we use complies with the regulations.

5. The components used in the control systems comply with DIN EN 81 as well as VDE 0100 / 0101 / 0551 / 0660 and BGV A2. The control cabinets comply with the installation standard VDE 0660 / part 500.

6. Main and auxiliary contactors used in the control systems comply with DIN EN 81-20, 5.10.3 and VDE 0660, but at least device class D3.

7. Voltage fluctuations that are within the tolerance range (+10%; -20%) of energy supply companies (RUs) are permissible.

8. Damages for malfunctions caused by an impermissible voltage rise may not be claimed from the manufacturer.

9. Special features when using an uninterruptible power supply (UPS) must be observed. Before commissioning the connected UPS, read the operation

manual. The UPS must ensure supply to all necessary control functions. Regularly check the functioning and smooth use of UPS. The instructions of the device manufacturer must be followed.

10. Insulation and short circuit measurement:
    1) An attenuation filter is installed in all control systems. The attenuation filter can get destroyed during insulation measurement. Before carrying out insulation measurement in the safety circuit, the control fuse must be removed.
    2) For all control systems in which a UPS is installed, this UPS must be completely disconnected before the insulation or short-circuit measurement and the connections must be bridged in the control system accordingly.
    3) Follow the usual safety regulations during insulation measurements. There is danger for man and machine.
11. All relays and contactors installed in the control systems must be suppressed (see section 7.2).

12. The motor circuit-breakers, excess current release, RCD circuit breaker, etc. installed in the control systems are supplied by default and must be checked during commissioning and, if necessary, adapted to the connected equipment.

13. The neutral conductor of the power supply of the safety circuit must be connected to terminal 9 of bp408; the neutral conductor of the main contactors must be connected to terminal 14 of bp408.

14. According to VDE regulations, the ground line (V DC) must be connected to the protective conductor (PE) of the mains supply.
    - The terminal (100) (ground) is connected to the terminal PE (protective conductor) in the control system. As a result, there is no floating network and an earth fault of the signal voltage (+24 V DC) is detected immediately.
    - Transformers are grounded on one side on the secondary side (e.g. special voltages of the brake or the valves). As a result, there is no floating network and an earth fault of the secondary voltage is detected immediately.

15. The safety circuit with the monitoring unit in bp408 is protected with max. 1 A (in exceptional cases with a maximum of 2 A).

16. The impulse diagram for the control system must be observed. The impulses listed there are not drawn to scale. It is a schematic representation.

17. The arrangement of the cut-off points in the levelling area (levelling zone) must be strictly adhered to.

18. The signals of the impulse generators and level switches can be checked during drive, inspection and return drive in the service menu under Shaft Signals on the LCD display.

19. During maintenance and inspection work, it is possible to keep the car door closed on the landings. See service menu Maintenance on the LCD.

20. During checks, the car can be driven to the top or bottom landing by activating the »Call« switch:
    Switch up: car travels to top landing,
    Switch down: car travels to bottom landing.

21. During inspection control mode the terminals E1 (101), E17 (401) or (801) at bp408
    or CLK-03 de-energised (see DIN EN 81-20, 5.12.1.5):
    - All car and landing calls are deleted and blocked,
    - Doors cannot be opened, automatic door movement is disabled,
    - High travel-speed is automatically reduced at the correction switch,
    - The travel is stopped at the flush-level switch of the terminal landing,,
    - The re-levelling device is switched off,
    - The homing function for hydraulic lifts is not effective.
    - The emergency electrical operation control system is not effective.

22. During emergency electrical operation the terminal E2 (102) at bp408 is de-energised (see DIN EN 81-20, 5.12.1.6):
    - All car and landing calls are deleted and blocked
    - Doors cannot be opened, automatic door movement is disabled,
    - High travel-speed is automatically reduced at the correction switch
    - The flush-level switch of the terminal landing can be over-travelled in the emergency electrical operation!
    - See service menu “Maintenance” on the LCD.
    - The re-levelling device is switched off,
    - The homing function for hydraulic lifts is not effective.

23. If the emergency electrical operation and the inspection control are “simultaneously activated”, the car cannot move.

24. After switching off the landing control via the menu item “External control system off”, all cabin and landing calls are deleted. Landing calls are no longer accepted. Cabin calls are continued to be accepted.

25. If landing controls are switched off, the parking landing is also ineffective

26. Light voltage disruptions are monitored by the control unit. If it fails, the moving car is stopped and remains at the landing with open door.

Further travels are blocked.
If it is a hydraulic operated lift, it sinks down to the home landing.
The inspection and emergency electrical operation remain operational as well as the re-levelling device (see DIN EN 81-20,5.4.10).

27. The motor is protected by PTC resistor monitoring (PTC) with PTC resistor wrapped in the coil of the three-phase motor. The monitoring circuit integrated in the bp408 control system controls the motor operating temperature.

28. The PTC threshold values are monitored and processed by a sequential circuit.
    a) Temperature normal value < 2.2 kΩ = normal operation,
    b) Temperature too high value > 2.7 kΩ = PTC resistor has tripped, See fault messages

    Settings in the setup menu:
    Traction lift
        Immediate stop without switch-off
        Stop at next flush-level switch ahead without switch-off
        Immediate stop with switch-off
        Stop at next flush-level switch ahead with switch-off
    Hydraulic lift
        Stop with return without switch-off
        Stop without return without switch-off
        Stop with return with switch-off
        Stop without return with switch-off

29. The error message concerning excess motor temperature is stored in the batch memory and malfunction list. If the data remote monitoring system is connected, it immediately reports this malfunction to the service centre.

30. The homing function of hydraulically operated lifts to the bottom landing during normal operation, i.e., all safety functions, are OK,
    a) If it is automatically initiated after the pre-set period (max. 15 min.).
    b) If it is automatically initiated as soon as the control unit is switched off. (e.g., remote switch-off).
    c) If it is automatically initiated after the pre-set period (max. 15 min.) after switching off the landing controls.
    - In all three cases [a), b), c)], the creeping correction system remains operational (see DIN EN 81-20, 5.12.1.10)
    - When the car arrives at the bottom landing, the door opens and closes in all three [a), b), c)] cases. The »door open« button always remains active.
    - The cabin light can be switched off in idle condition and with the door closed; this function is adjustable to 1, 10 or 30 minutes.

    The cabin light is switched on as soon as the lift resumes operation.

31. If the top emergency limit switch is actuated in hydraulic lifts, the lift will shut down immediately. If the car is released again by subsequent creeping, all

normal functions are switched off and the car is returned to the bottom landing if safety circuit is closed. The car door opens and closes again and the car parks at the bottom landing and does not accept any call. The »door open« button always remains active.

32. The creeping correction system continues to remain in operation (see DIN EN 81-20, 5.12.1.10).

33. In case of hydraulic lifts, the creeping correction system is activated as soon as the runtime monitoring is activated and the lift is immediately shut down.

34. In case of hydraulic lifts, the anti-creep monitor is requested as follows:
    a) The up-creeping monitor automatically causes the car to be returned to the bottom landing and shut down there. If the runtime monitoring responds outside the landing area zone during this action, the lift is blocked at once and the creeping correction system is not activated as the first malfunction registered was »up-creeping monitor«.
    b) The down-creeping monitor causes the lift to be shut down at once. The creeping correction system remains operational.

35. In case of overload, the creeping correction system in hydraulic lifts remains in operation.

36. The overload input is queried at standstill only.

37. An excess pressure switch on a hydraulic lift is connected and requested to terminal 50. In the setup menu, the corresponding parameters can be set according to the required function (»Excess pressure On«, »With lock« or »Without lock«).

38. A hydraulically operated lift can principally be equipped with an emergency circuitry down (similar to emergency circuitry »up only«). If an emergency circuitry down is installed, the following switches may be bridged: shortfall in pressure, pipe rupture, bottom limit switch and safety gear contact.

WARNING!
Combined clamp contact / slack rope switch as well as all other switches may not be bypassed.
For the emergency switch >>Down<<, the following applies:
1) In case of an emergency switch »Down«, the emergency limit switch may not be bypassed.
2) An emergency switch >>Down<< may not be used for systems 2:1 without slack rope switch!

CAUTION!
The operating instructions and the labels on the emergency control must indicate risks.
Example: If there is a defective hydraulic hose or a defective hose connection, the oil supply is pumped into the shaft.

39. All requirements set by the “WHG-Water Resources Act" for the hydraulic lift must be met.

40. The runtime monitoring is available as standard for all control systems. To check the function, you must do the following (DIN EN 81-20, 5.9.2.7 and 5.8.3.10):
    Floor selector using magnet switches
    a) Stop the car at the bottom landing,
    b) Disconnect pulse transmitter from S75 or S77,
    c) Enter travel command to top landing,
    d) Car passes by the pulse transmitters without receiving the necessary signals,
    e) After the pre-set time interval (max. 45 s), the electronic monitoring device of the lift control unit automatically interrupts the travel,
    f) Afterwards, the lift control remains blocked for further travels (see information on LCD),
    g) Connect pulse transmitter again to S75 and S77,
    h) Operate call button (call/end) and confirm with OK to unblock the car; alternatively, switch the control unit off and on again.
    i) The control unit is now operational again.

41. Floor selector using an absolute encoder
    a) Make the car stop at the bottom landing,
    b) Reduce the set runtime of the runtime monitoring in the control system (LC display) corresponding to the travel speed,
    c) Enter travel command to top landing,
    d) The car does not reach the next encoding point within the runtime period,
    e) After the pre-set time, the electronic monitoring function of the lift control automatically interrupts the travel,
    f) Afterwards, the lift control remains blocked for further travels (see information on LCD),
    g) Set the runtime of the runtime monitoring in the control system (LC display) to a value corresponding to the travel speed,
    h) Operate call button (call/end) and confirm with OK to unblock the car; alternatively, switch the control unit off and on again.
    i) The control unit is now operational again.

42. The creeping correction system of a hydraulically operated lift remains operational, even if the runtime monitoring has responded.

CAUTION!
The motor is damaged if the creeping correction system (readjustment) remains in operation due to failure of a phase (e.g. contact problems on the drive contactors) although the runtime monitoring has responded.

NOTE!
1) The program sequences, times etc. parameterised in the control systems have been pre-set by us in the setup menu and in the service menu according to the present technical data sheets. Here, the parameters must be adapted to the connected equipment and local conditions during the commissioning by you.
2) The due diligence of the correct parameterisation is the responsibility of the installation company. Observe the local regulations of the fire protection experts for the firemen lifts and fire lifts.
3) The setup menu and the service menu can each be locked by a 4-digit code number. The code numbers serve to protect against unintentional alteration of the parameters and must be kept carefully by you. Pass on your code numbers only to authorised persons.

43. To save the individual inputs of the lift system, open the menu option Save system data parameters in the setup menu under Miscellaneous.

44. To complete the entries, please press »OK« after making the changes and return to the basic view of the display.

8.3 Checklist before Switching On the Control System

WARNING!

Please note the following points after reinstallation or modifications. Continue only after you have responded to every question with a "Yes".

A weight compensation has taken place between car and counterweight.	Yes □
The mechanical brake has been adjusted.	Yes □
The car is located at a sufficient distance from the limit switches (at least 1 m).	Yes □
The mains voltage of 3 x 400 V AC is available.	Yes □
Buffers have been mounted and are functioning.	Yes □
Speed governor and safety gear have been mounted and are functioning.	Yes □
Safety circuit contacts of well and car have been mounted and installed.	Yes □
Have you observed and applied the safety instructions in the chapter "Safety instructions"?	Yes □
A control system of Böhnke + Partner GmbH includes: Circuit diagrams with unique allocation through a serial number (e.g.: 25461) Parts lists, EU Type-examination certificate and Certificates of conformity for the system module bp408, Terminal diagrams, Basic setting, plans of terminal connections and general instructions regarding control system bp408. Are these documents completely available?	Yes □
Have you followed the circuit diagrams that belong to the control system?	Yes □
Have you observed and applied the interference suppression measures in the chapter "Interference suppression measures"?	Yes □
Have you checked that all terminal points are correctly and tightly connected?	Yes □
Have you turned off the main switch?	Yes □
Check the power supply. Are L1, L2, L3, N and PE correctly connected (clockwise-rotating field)?	Yes □
Are the wire cross-sections chosen according to the power consumption of the lift?	Yes □
If there is a load switch, have you checked whether the admissible fusible elements are installed as well?	Yes □

Is the automatic circuit breaker for the control voltage switched off?	Yes □
Is the circuit breaker for the safety circuit switched off?	Yes □
Have the power supply lines been correctly fused?	Yes □
If there is a quick activation circuitry available for the brake, have the protection switches been turned on?	Yes □
The motor protection switches, overcurrent releases, Residual Current-operated protective Device (RCD) circuit breakers , phase monitors, etc. installed in the control system can only be pre-set by Böhnke + Partner GmbH and must be adapted to the connected equipment during commissioning by you. Have you made the adjustments?	Yes □
Have all the PE conductors been connected properly?	Yes □
Have you followed all the interference suppression measures and EMC instructions of the inverter manufacturer?	Yes □
Have you followed the commissioning instructions concerning speed? and drive controls?	Yes □
Has the emergency electrical operation been switched on??	Yes □

If you have responded to all questions with »Yes«, then you may switch on the mains voltage in compliance with the following chapters.

8.4 Connecting the Mains Voltage

If you have answered "Yes" to every question in the "Checklist before switching on the control system", you can switch on the mains voltage. Subsequently check the items in the following checklist.

Have you turned on the mains switch?	Yes □
Has the emergency electrical operation been switched on?	Yes □
Is the automatic circuit breaker for the control voltage switched on?	Yes □
Is the circuit breaker for the safety circuit switched on?	Yes □
Have all the safety components remained inactive?	Yes □
Does the LCD show no problem with the voltage in the bp408 system?	Yes □
Is the voltage at the power supply between terminals L and N 230 V AC?	Yes □
Is the voltage at the power supply in the control cabinet terminal +24 compared to terminal 0 equal to 24 V DC? Are the car operating panel and CLK supplied with 24 V?	Yes □
The LCD light is not flashing? (System would be blocked.)	Yes □
Is the colon of time on the LCD of the bp408 flashing?	Yes □
Is car light voltage at the X92.LN and X92.3 = 230 V AC?	Yes □
Do the LED(s) for 5 V and 24 V operating display glow, on the external power supply, if available?	Yes □
Is the ERO symbol displayed on the display of the bp408 (emergency electrical operation active)?	Yes □

If you have answered all questions with »Yes«, then you can proceed with checking the parameters of the control system and of the drive.

8.5 Checking the Parameters of Control System and Drive

After the mains voltage has been switched on correctly and no clear errors can be detected, the set parameters of the control system and the drive are checked.

To check the drive, refer to its commissioning documentation.

The control documentation includes a printout of all parameters set by Böhnke + Partner GmbH. Check if they match the local conditions. If necessary, the parameters must be adjusted accordingly on the display of the bp408 (see User Manual bp408).

8.5.1 Checking the Bus Lines

A first indication of the function of the CAN bus is provided by the diagnostic LEDs, which are located to the left of the display next to the corresponding connector. Each bus connection has an Error LED flashing in red and a Run LED flashing in green on the board. These LEDs indicate current faults and operating states of the respective bus. The following table shows the status of the LEDs and their meaning. During the system start-up, both LEDs are active for a short time.

CAN-ERROR-LED	State	Meaning
	off	CAN-Bus: no errors or interface deactivated
	1 impulse	CAN-Bus: Warning
	2 impulses	CAN-Bus: Fault
	on	CAN-Bus: Bus-Off (out of operation, Auto-Reset after approx. 10 s)
	Flashing	Node-ID error: double Node-ID in the network

CAN-RUN-LED	State	Meaning
	off	CAN-Bus: Interface deactivated
	2 impulses	CAN-Bus: Monitor active
	Flashing	CAN-Bus: Setup menu active
	on	Normal operation

8.5.2 Checking the Termination

As described in chapter "Bus connections", the bus must be terminated at both ends. Verify that the car bus and the group bus are terminated at both ends.

NOTE!
The bus is always terminated by positioning systems of different manufacturers. In such a case, termination on the CLK-03 must be deactivated via the DIP switch. Instructions on terminating the devices can be found in the relevant manuals or on the Internet at www.CANopen-Lift.org .

8.5.3 Checking the CAN Parameters

To check the CAN parameters in the control system, go to the setup info or the setup menu of the control system. Under
PARAMETERS → TERMINALS → TERMINAL CAN1 / 2
, you will find a list of all connected CAN devices.

Check if the devices used in your system are activated. Since the CAN devices are preconfigured when you receive the control system from us, no further parameterisation is necessary at this point.
If you are assembling a control system made up of OEM components, you can optionally receive a USB-CAN adapter for the PC and the »CANwizard®« software for the parameterisation of the CAN devices. However, configuration of the input/output terminals is also possible via the control display. Information about the CANwizard® and the configuration of the devices can be found in the CANwizard®manual or on the website www.CANwizard.de. If all devices are correctly reported, you can carry out the first drive using the emergency electrical operation.

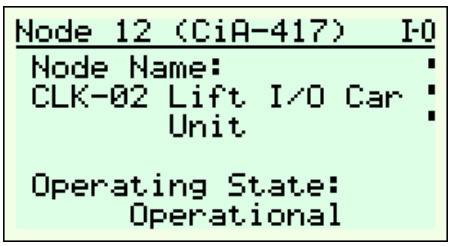


Figure 56:
An example of a CLK that has been registered correctly.

Figure 57:
Example of a USB-to-CAN adapter from Ixxat for configuring the CAN components.

8.5.4 Checking the DCP connection

If the inverter is activated via a DCP connection, the following points must be checked.

- Does the wiring comply with the circuit diagrams,
- Has bp408 been set to the correct drive/inverter type,
- Has the DCP interface been activated in bp408 and in the inverter,
- Have both units (control and drive) been set to the same protocol (DCP3/DCP4+)
- Are there no malfunctions at present.

8.6 First Travel with the Emergency Electrical Operation

The emergency electrical operation is used to move the lift for assembly and maintenance purposes.

WARNING!
Follow the safety information in the chapter "Safety instructions". For your personal safety it is important that the switches of emergency electrical operation, inspection control and emergency stop as well as buttons up and down have been wired into the safety circuit as stipulated in the wiring diagram.
The bypass switch must be reset before normal operation is possible again. The emergency stop contacts must not be bypassed.

If the emergency electrical operation is on, terminals 11 and (102) must be de-energised and terminal 101 must be live.

If the correction switches S71 and S72 are present, they must be installed at the terminal landing at the right deceleration point and must switch safely.
If either switch up or switch down of the emergency control is activated, the contacts of the safety circuit must either be closed or bridged by the switch of the lift control.

Travel commands are controlled and monitored by the control system bp408.

If a photocell is integrated, terminal X97.53 (door B: X97.56) must be live.

The command key (emergency electrical operation switch) is in the door of the control cabinet in the machine room or on the external control unit.

NOTE!
During the first travel in emergency electrical operation, check whether the displayed speed matches the speed displayed on the inverter under DIAGNOSE > SIGNALS > SHAFT SIGNALS.
If not, the conversion factors in both systems must be checked.

NOTE!
Turning on the inspection control will cancel the emergency electrical operation. In case of control systems from Böhnke + Partner GmbH, the priority of the inspection control is given even if movements of the lift car and the door drives are no longer possible with the inspection control switched on and the emergency electrical operation activated. To counteract the possible lock up of persons, an emergency call system according to DIN EN 81-28 is required.

The emergency electrical operation essentially works like the inspection control. However, the following safety devices are bypassed:

- Speed governor,
- Buffer contacts,
- Emergency limit switch,

- Safety gear contact, and
- Minimum pressure switch of hydraulic lifts.

The car can be moved out of the limit switches if the inspection control is switched off and the emergency electrical operation is switched on.

Switching on the emergency electrical operation deletes all calls and disables the push buttons for cabin calls, landing calls and superior control functions.

If the control system is not equipped with an absolute encoder, a correction travel is necessary after it has been switched back to normal operation. Enter a call for that purpose.

8.7 First Travel with Inspection

The inspection control is used to move the lift for assembly and maintenance purposes.

WARNING!
Follow the safety information in chapter 2. For your own safety, the emergency electrical operation, inspection and emergency stop buttons and the Up and Down buttons must be wired into the safety circuit as specified in the circuit diagram.

The bypass switch must be reset before normal operation is possible again. The emergency stop contacts must not be bypassed.

In case of activated inspection control switch, terminals 11, (101) or (401) must be de-energised. The correction switches S71 and S72 must be installed at the terminal landing at the right deceleration point and must switch safely.

If either switch »Up« or switch »Down« of the inspection control is activated, the contacts of the safety circuit must be closed.

Travel commands are controlled and monitored by the control system bp408. All safety circuit devices remain operational. If any of the contacts in the safety circuit are interrupted, the lift is shut down immediately. If a photocell is integrated, terminal X97.53 (door B:X97.56) must be live.

The inspection control is situated on the roof of the car. Switching the inspection control on disables automatic door functions and automatic lift operation. Moving the car and the door is only possible by activating the command buttons of the inspection control unit (dead man's circuit) in absence of the emergency control functions (either switched off or not installed). In addition, activation of a stop button, which can only be returned to its original position by turning it, can cause an emergency stop. The limit switches prevent the car from over-travelling the terminal landings.

NOTE!
Turning on the inspection control will cancel the emergency electrical operation. In case of control systems from Böhnke + Partner GmbH, the priority of the inspection control is given even if movements of the lift car and the door drives are no longer possible with the inspection control switched on and the emergency electrical operation activated. To counteract the possible lock up of persons, an emergency call system according to DIN EN 81-28 is required.

Switching on the inspection control deletes all calls and the command transmitters for car calls, landing calls and superior control functions. All devices of the safety circuit remain effective.

Once the lift system is switched back to normal operation, you can make a call to trigger correction travel for the landing counter. Control units equipped with an absolute encoder do not require a correction travel.

8.8 Inspection Control Shaft Pit

The inspection control in the shaft pit serves for testing and maintenance purposes. The return to normal operation of the lift may only take place after resetting the inspection switch to its normal position and must call for the intervention of a competent person responsible for the maintenance.

In addition, a return to normal operation effected in the shaft pit by the inspection control may only take place under the following conditions:

- Shaft doors, which allow access to the shaft pit, are closed and locked
- all emergency brake switches in the shaft pit are not actuated
- an electric reset device outside the shaft is actuated

The lift control system supports two different electrical reset devices:

- Reset by means of Key Switch
- Reset by means of landing call

8.8.1 Reset by Means of Key Switch

The return to normal operation is carried out by operating the key switch “Reset Shaft Pit Inspection (805)" and in compliance with the above-mentioned conditions by the control system.

The reset by means of key switch is allowed for individual and group control systems.

8.8.2 Reset by Means of Landing Call

The reset by means of the landing call is only applicable for individual control systems and not allowed for group control systems.

In the lift control system, at least one access of the lowest landing must be set, from which an electrical reset is accepted.

This setting can be made in the setup menu under
Features > *Control system* > *Special functions* > *Floor/door for return to normal operation*.

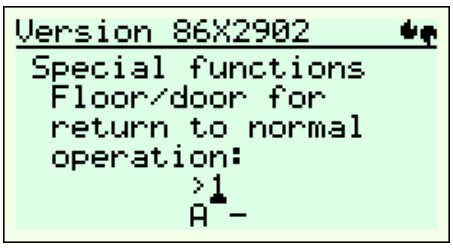


Figure 58:
Setting the access for leaving the shaft pit

When entering the shaft pit, it is mandatory to follow the steps below in the specified order:

1. Open shaft door of the access to the shaft pit
2. Actuate emergency brake switches in the shaft pit
3. Enter shaft pit
4. Close shaft door of the access to the shaft pit
5. Activate Inspection mode Switch setting
6. Switch off emergency brake switches in the shaft pit

When leaving the shaft pit, it is mandatory to follow the steps below in the specified order:

1. Actuate emergency brake switches in the shaft pit
2. Bring the inspection switch to the normal position
3. Open shaft door of the access to the shaft pit
4. Leave shaft pit
5. Switch off emergency brake switches in the shaft pit
6. Acknowledgment of the landing call starts to flash for a maximum of 30 seconds
7. Close shaft door of the access to the shaft pit
8. Activate the landing call in the phase in which the movement command acknowledgment is switched off
9. Press landing call for at least 3 seconds and maximum 6 seconds

After valid operation of the landing call, the flashing acknowledgment disappears, and the doors are locked. The lift is available for normal operation.

If the required sequence has not been complied with or if a valid actuation of the

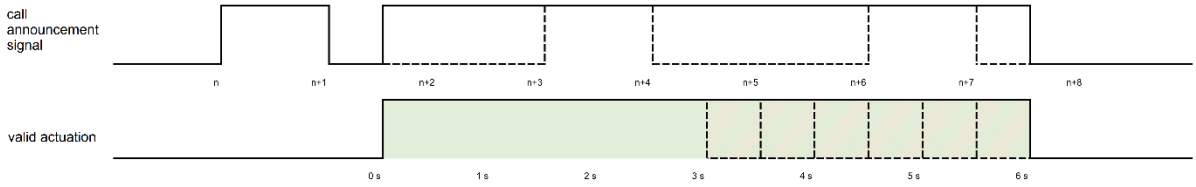


Figure 59:
Valid actuation of the landing call

landing call has not been carried out within 30 seconds, the lift is not available for normal operation. The required work steps can be repeated at any time in the specified order.

Alternatively, returning to the normal operation can be carried out by activating and deactivating the emergency electrical operation, the inspection control on the car, or unlocking on the lift control with multi-level security question.

The reset by means of the landing call button has been confirmed by an independent inspection body as conforming to the requirements of DIN EN 81-20, 5.12.1.5.2.2. The certificate of the type of examination certificate can be requested by Böhnke + Partner GmbH Steuerungssysteme.

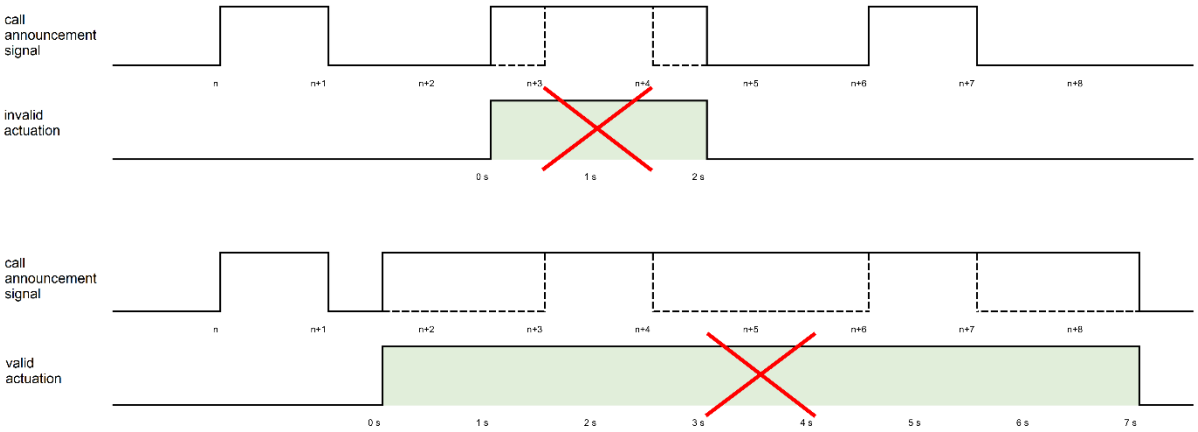


Figure 60:
Invalid actuation of the landing call button

8.9 Sequence of a Regulated Two-Speed Travel

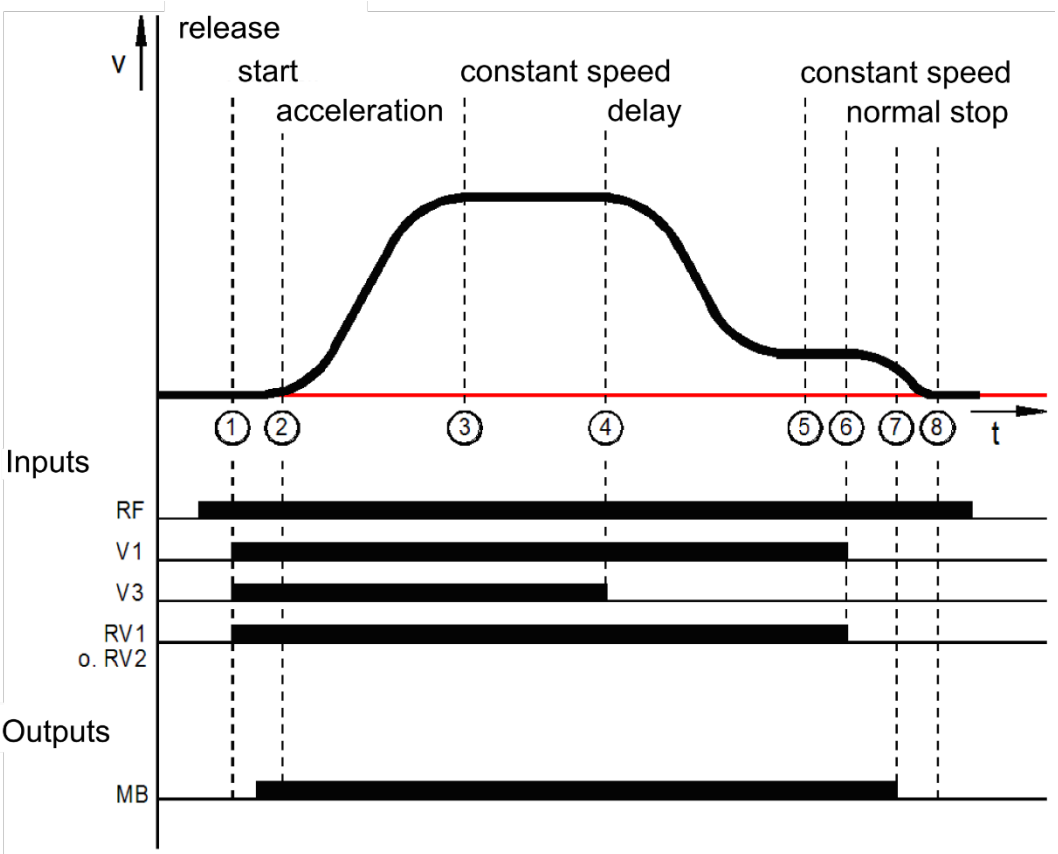


Figure 61:
Control system of an inverter with the RVM-01 in a normal drive

After switching on the main contactors and release of RF through the control system, the convertor receives the signal for start-up with the activation of the direction and speed V2. The inverter keeps the drive with speed n=0 at standstill and sends the signal MB to open the electromagnetic brake via terminal 31 to the control system (1 to 2). After switching on the brake via the relay on the control system, the drive accelerates until the specified speed is reached (2 to 3). Subsequently, a drive at constant speed (3 to 4) takes place until the activation of the speed V2=0 is stopped. The drive decelerates to the positioning speed V0 (4 to 5). After a short distance, the speed is no longer controlled (5 to 6), the drive continues to decelerate (6 to 7). When the drive has come to a standstill, the inverter applies the electromagnetic holding brake MB (7 to 8). The main contactors are switched off with the signal RF with a time delay.

NOTE!

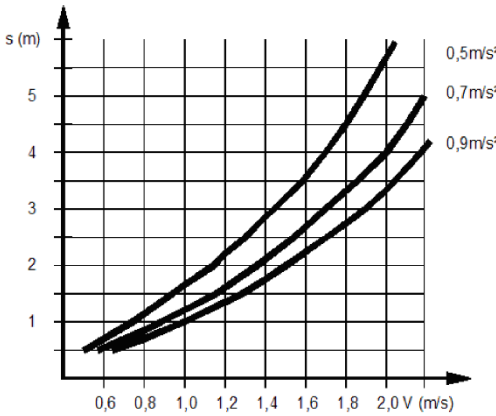
- The electromagnetic holding brake must be switched on and off immediately via the relay MB. This is the only way to ensure that the inverter can start and stop smoothly.
- The main contactors to the motor must be switched on and off instantaneously with the relay RB. This is the only way to ensure that smooth start and stop are possible.
- If, in the event of a fault, the collective fault relay is triggers on the inverter, the control system must ensure that the mechanical brake and the main contactors to the motor are switched off immediately. The collective fault signal output of the inverter is connected to terminal 34 of the control system.
- With the mains contactor of the inverter, the mains contactor in the control system must be closed or opened immediately. Only then is it possible to monitor the brake chopper for overtemperature and to disconnect the inverter from the mains, if necessary.

8.9.1 Disconnection Points for the High Travelling Speed

The deceleration distance can be taken from the diagram. The values shown are only valid if the factory set rounding remains unchanged. Moreover, it is assumed that the control unit gives the disconnection points to the inverter without delay.

The values shown here are guidelines and should be adapted to personal on-site preferences.

NOTE!
The disconnection point should – if possible – be set to a greater value than the determined braking distance to have a free space for optimising the driving behaviour.



V	brakedis.1	brakedis.2	brakedis.3
0,8	1,18	0,90	0,70
1,2	2,25	1,73	1,41
1,6	3,60	2,70	2,36
2,0	5,40	4,10	3,40

Figure 62:
Braking distance diagram and table

8.10 Sequence of a Direct Travel with DCP

In case of the DCP3 protocol, only the signals that occur via terminals when the inverter is controlled are exchanged serially between the control system and the inverter. The drive behaviour corresponds to a normal drive as described in the previous chapter.

In case of the DCP4 or CANopen Lift protocols, in addition to a few control signals, the remaining distance to the next floor is transferred cyclically from the control system to the inverter. This allows the inverter to calculate an ideal drive curve and to carry out a drive with direct drive-in into the stop.

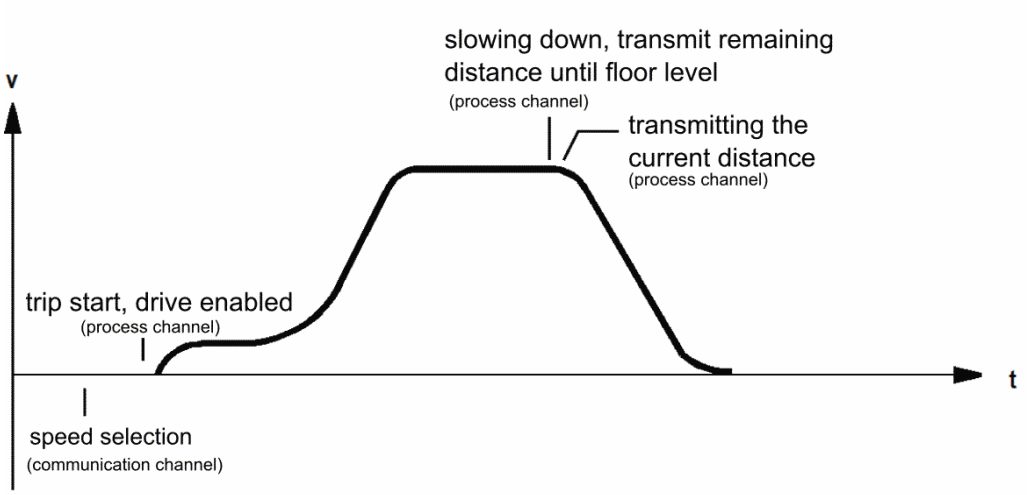


Figure 63:
Drive curve of a drive with direct drive-in

8.11 Setting up the Floor selector system

As soon as it possible to travel with inspection control, the transmitters of the Floor selector system can be mounted and installed. It can be either magnet switches, absolute rotary shaft encoders (AWG-05) or linear encoder systems such as USP or laser positioning systems.

8.11.1 Installing the Deceleration Switches

WARNING!
For your personal safety, make sure that the inspection switch ONOFF as well as the buttons UP-DOWN and EMERGENCY STOP have been wired into the safety circuit according to the circuit diagram.

To decelerate the first travels even when the absolute encoder has not yet been installed, first install the deceleration switches S81 and S82 for inspection and emergency control at the terminal landings putting them at their correct deceleration points in the well and ascertain that they switch properly.

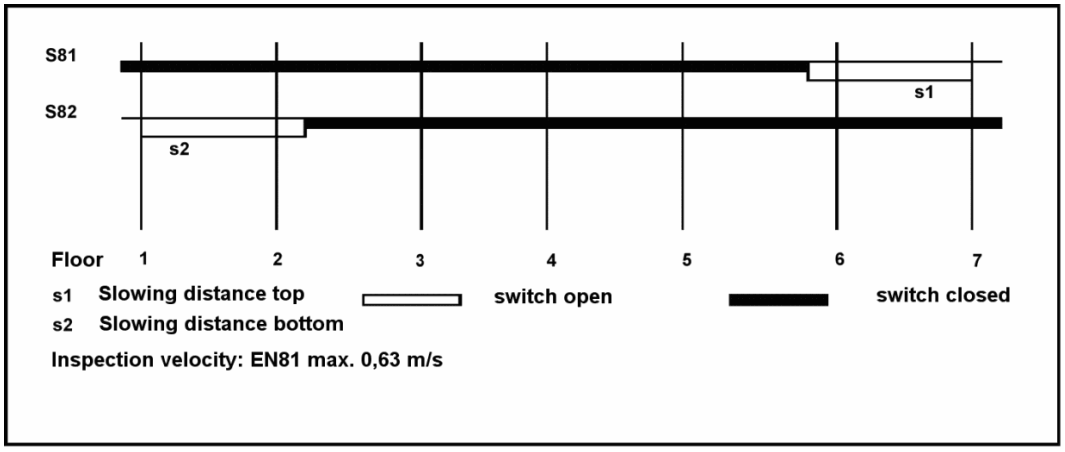


Figure 64:
Impulse diagram of the deceleration switches

Deceleration is initiated when the switches in the direction of travel open accordingly. Deceleration switch S81 opens and starts deceleration for the top landing. Deceleration switch S82 opens and starts deceleration for the bottom landing. The deceleration of inspection and emergency travels must be carried out at these deceleration points as well. The flush-level position of the terminal landings must not be over-travelled.

Make the following settings in the service menu:

> *MAINTENANCE*
> *MAINTENANCE FUNCTIONS*

Scroll down to the function in this category

> *ACTIVATE ASSEMBLY DRIVE*

and select ON. Now, continue to scroll to

> *ASSEMBLY DRIVE WITH PRE-LIMIT SWITCHES*

(S81/S82) and select *ON*.

Now you can perform the first travel via inspection control or emergency electrical operation to install the absolute encoder system as described in chapter 6.6.

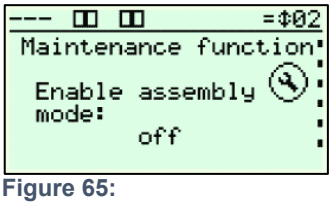


Figure 65:
Activation of the assembly drive to be able to move the car without encoder system.

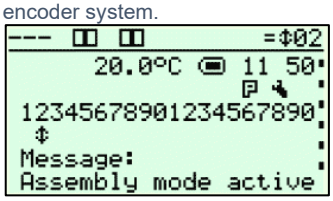


Figure 66:
Note regarding the activated assembly drive in the default image.

8.11.2 Basic Settings

After installing the absolute encoder system (see attached installation description), the following default settings must be carried out on the bp408 in the setup menu:

Setup menu:
> PARAMETERS
> LIFT DATA
> COPYING TOOL > ABSOLUTE ENCODER (CAN)

next:
> PARAMETERS
> COPYING TOOL

> AWG1 PARAMETERS
> ENCODER SYSTEM

or

> USER-DEFINED

Deceleration points and flush-level positions can be comfortably changed via setup menus.

In the service menu, the following basic settings must be carried out:

Service menu:
> SETTING
> FUNCTIONS
> DRIVE
> DRIVE SPEED
> BRAKING DISTANCE
> MINIMUM DRIVE DISTANCES

Here, enter the nominal and intermediate speeds of the system.

Further in the menu:

> SETTING
> DISTANCE MEASUREMENT
> PARAMETERS
> GENERAL DISTANCES
SHAFT PIT
SHAFT HEAD
CAR HEIGHT

The approximate shaft pit depth must be specified. This is the distance between the threshold of the bottom landing and the shaft pit. This value is set to 1 m by default and serves for receiving the image of the shaft as accurately as possible.

8.11.3 Read-in Travel with Absolute Encoder

After completing all these settings, you can initiate the read-in travel in compliance with the following instructions. During the read-in travel, the flush-level positions of every landing are precisely determined and memorised in the program memory. From the data gathered by the read-in travel combined with the parameters set, the control program calculates the virtual floor selector.

Please proceed as follows:

1. Switch the system to Emergency electrical operation.
2. Using the emergency electrical operation take the lift to the bottom landing (Floor 1) as close as possible to the flush-level position. For a traction lift, you reach this precise position by releasing the brakes and turning the hand wheel.
3. For a hydraulically operated lift, approach the precise flush-level position of the bottom landing by operating the emergency valve or the hand pump..
4. If the lift stands levelled on floor 1, either press the >>OK<< key on the LC display or the car call key of Landing 1.
   For checking purposes, the correct reading of the levelling position is signalled by 1 through the acknowledgement lamp.
5. Proceed similarly for the remaining floors.
6. Switch off the emergency electrical operation.
7. Subsequently, drive to every landing and check the levelling positions. Make a note of the deviations.
8. Enter the corrections on the control system using the control panel.
9. Once all levelling positions are checked and corrected, the normal operation can be switched back again.

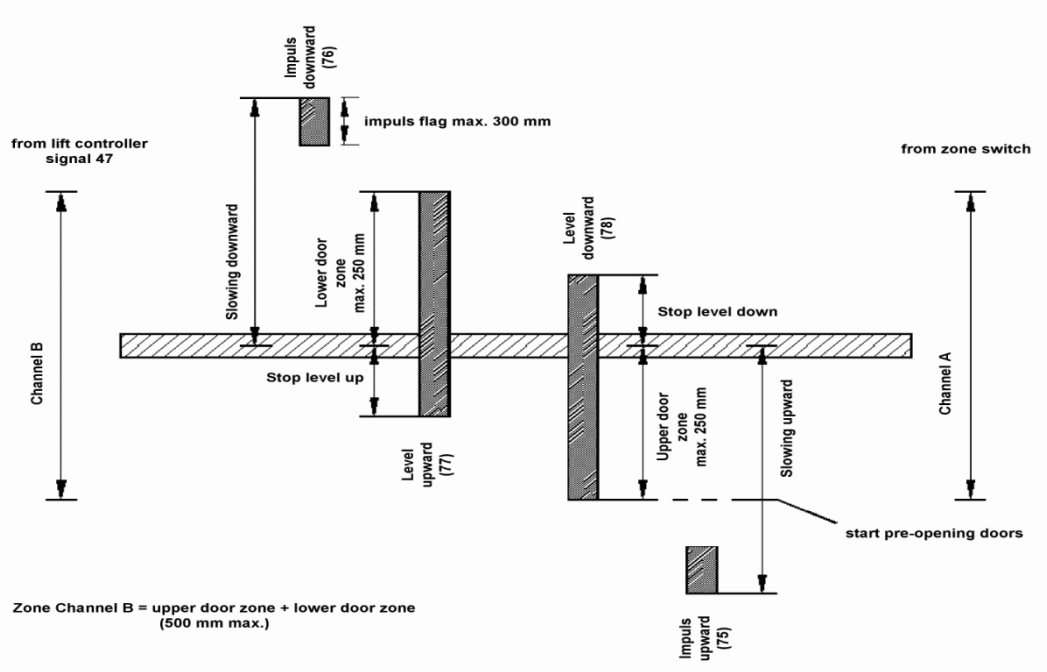


Figure 67:
Setting ranges

Now, drive to every landing from both directions of travel and check whether the lift does a levelled travel-in. For this, use the levelling test under *DIAGNOSIS > SHAFT SIGNALS > LEVELLING TEST*.

If the lift does not stop at the previously set position, the
BRAKING DISTANCE V0 (STOPPING DISTANCE) can be adjusted under *FUNCTIONS > DRIVE*.

The sensitivity of the readjustment range can be set independent of the levelling range. Refer to service menu:
TIMES > DRIVE / READJUST DECELERATION TIME

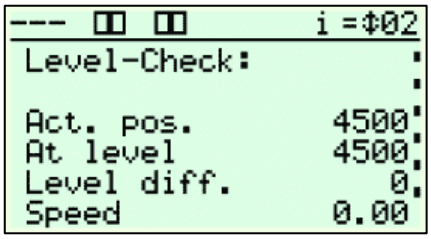


Figure 68:
Levelling test

8.11.4 Travel speeds

The travel speeds are set in the service menu in the menu option

SETTING> FUNCTIONS > DRIVE.

Abbreviation for the name of the speed:

VN = Re-levelling speed
VI = Inspection speed
VR = Emergency speed
V0 = Levelling speed
V1..V7 Intermediate speeds and fast speed, depending on the set drive type.

In case of a change in the drive speeds, a calculation of the braking and minimum drive distances will be offered. These must be adjusted, if necessary.

NOTE!
V0 < V1 < V2 < V3 < V4 < V5 < V6 < V7!

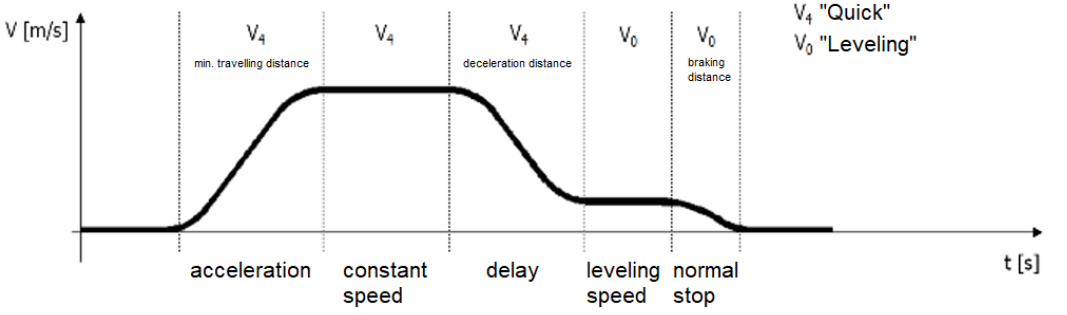


Figure 69:
Drive curve in the example of a DCP3 connection with V4 as nominal speed

NOTE!
For regulated lift systems, the instruction of the inverter manufacturer must be observed.

Deceleration distance V1...7	=	Deceleration distance to the landing
Deceleration distance VI	=	Deceleration distance in case of inspection
Deceleration distance VR	=	Deceleration distance in case of emergency electrical operation (If separately supported by the drive.)
Deceleration distance V0	=	Disconnection point (Stopping distance)
Re-levelling flush down	=	Re-levelling to the flush landing level
Re-levelling flush up	=	Re-levelling to the flush landing level
Landing area down	=	Level control when car stops
Landing area up	=	Level control when car stops
Zone area down	=	Switching threshold for door starting to open while car is slowing down to approach the landing
Zone area up	=	Switching threshold for door starting to open while car is slowing down to approach the landing

- Shaft pit (limit down travel)
  Standard is set to 1 m. It can be adapted to the actual value to calibrate the well with effective values. It also defines the operating range of the transmitter.
- Shaft head (limit up travel)
  Standard is set to 1.5 m. It can be adapted to the actual value in order to calibrate the well with effective values. It also defines the operating range of the transmitter.
- Car position
  This value is required for travelling to the maintenance position. It should be selected so that the field engineer can easily access the car roof.

8.11.5 Deceleration through S81/S82 at the Terminal Landings in Case of Normal Operation

Additional safety equipment for the terminal landings may be necessary due to the structural condition of the system. It should ensure that the lift is safely switched to the drive-in speed (V0) before reaching the terminal landings. This possibility offers the use of the deceleration switches S81 and S82.

WARNING!
What is essential for the function of the correction switches S81 and S82 is that they must be installed at the end stop at the right deceleration point and must switch safely.

Deceleration of a travel at maximum speed must set on at these deceleration points and the flush-level position of the terminal landings must not be over-travelled.

Deceleration is initiated when the switches in the direction of travel open accordingly.

Deceleration switch S81 is related to upward travel and opens to switch the lift to low speed (V0) before reaching the top landing. Deceleration switch S82 is related to downward travel and opens to switch the lift to low speed (V0) before reaching the bottom landing.
Setting in the setup menu:
> *FUNCTIONS*
> *COPYING TOOL*
> *PRE-LIMIT SWITCH* (S81/82) *ON*

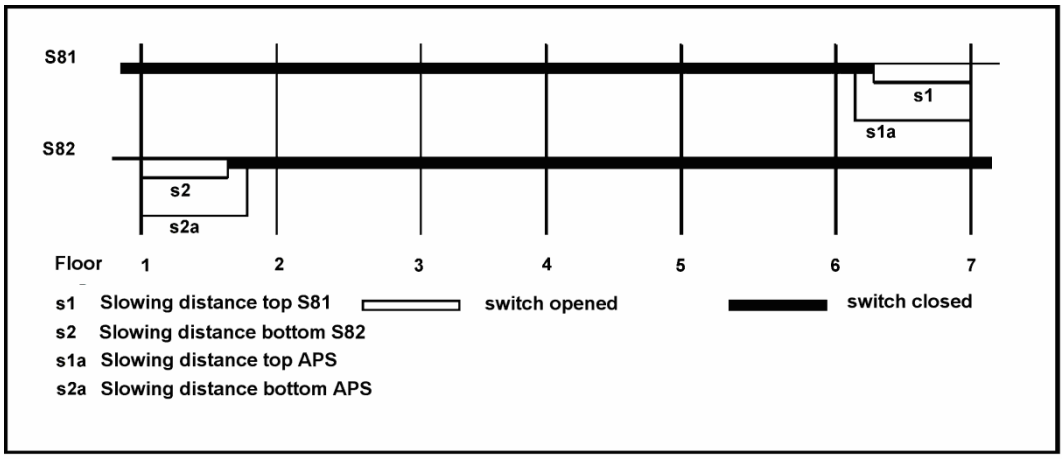


Figure 70:
Impulse diagram with magnetic switches and AWG-05

8.12 First Travel in the Normal Operation

WARNING!
All points must be checked for your own safety. Also follow the safety information in chapter 2.

Have you followed all points of the previous checklists (see chapter 8.4 and 8.5)?	Yes □
No current faults are displayed on the LCD display of the bp408 and of the drive?	Yes □
The emergency electrical operation and the inspection control are functional, as described in chapter 8.7 and 8.8.	Yes □
The emergency limit switches are installed, configured, and tested for functioning.	Yes □
The safety switches are installed, configured, and tested for functioning.	Yes □
Touchdown buffers have been mounted and their functions checked.	Yes □

The required switching magnets in the shaft are installed according to the pulse diagram.	Yes □
The correction switches are installed, configured, and tested for functioning according to the deceleration distance.	Yes □
Read-in travel with the absolute encoder AWG-05 is carried out as described. (Chapter 8.12.3)	Yes □
Read-in travel with the drive is carried out as described by the manufacturer.	Yes □
If there is a DCP connection to the inverter, the read-in travel with the DCP parameters is carried out as described. (Chapter 8.6.4)	Yes □
The deceleration onset points have been adjusted in order to enable. correct deceleration down to standstill.	Yes □
The car door blade passes through the outer door rollers at a sufficient clearance.	Yes □

If you have answered all questions with »Yes«, then you can proceed as follows.

Keep the doors closed, see maintenance menu. Switch off the landing control.	Yes □
Before the first start, place the car levelled in top or bottom landing with the inspection control or with emergency electrical operation.	Yes □
After switching back to normal operation (inspection and emergency control off), the LC display shows the status for the top or bottom landing.	Yes □
Now start the lift from the machine room, with the »Up« or »Down« buttons to control the free travel through the shaft.	Yes □
In the menu *DIAGNOSIS* > *SHAFT SIGNALS*, you can control the incoming impulses for the shaft copying.	Yes □
In the menu *DIAGNOSIS* > *SIGNALS*, you can control the input and output signals.	Yes □
After the first travel, you can control the flush-level position, the brake application points and, in case of speed-controlled systems, the control parameters and optimise them as required.	Yes □
Now check the course of the travel via the car control panel at all upward and downward stops.	Yes □
Switch on the landing control and now monitor the course of the travel via the landing panels at all stops upwards and downwards.	Yes □
Check landing signals, out-of-operation signals, and direction indicator	Yes □
Check photocell, closing force limiter, emergency alarm etc	Yes □

You can now continue with the optimisation of the drive behaviour.

8.13 Setting up the Emergency Call Device

According to DIN EN 81-28, every lift must be equipped with an emergency call device at a permanently manned location. After wiring the emergency call device, set up the emergency call device according to the attached description. The function of the emergency call system must be verified through test emergency calls.

8.14 Setting up the Group Connection

If it is a lift group and all lifts are running correctly as individual control systems, then establish the group connection with the pluggable cross connections. Check the correct setting of the group parameters and, in case of an activated landing control, pay attention to incoming hall calls in parallel for all group participants.

Switch off the landing control for all group participants. Hall calls may now no longer be accepted. Switch on the landing control one by one for only one group participant at a time and check the function of the hall calls.

8.15 Setting up the Remote Diagnosis

The remote diagnosis can be done via different networks. If the wiring is done according to the available circuit diagrams, you can set up the connection.

NOTE!
For trouble-free commissioning of our WinMOS®300 software, the specifications, and instructions from the WinMOS®300 manual must be complied with.

Please note that you can shut down the lift on site or via remote data transmission (DFÜ) unintentionally by entering incorrect parameters (e.g., runtime monitoring set too low). If switching devices for the parallel operation of a modem and an emergency call device are used on a common telephone connection, these must be approved by Böhnke + Partner GmbH.

The options provided by WinMOS®300 with regard to the lift attendant function do not relieve the user of the obligation to ensure, for any system on site, that the safety equipment (e.g. emergency stop and emergency call) is not put out of operation by any wilful damage.

A software update of the control system or components necessary for the function of the lift may only be carried out if it is checked on site by qualified personnel.

8.16 Setting up the Modem

If an analogue modem, which must correspond to the V 250 standard, is used for remote diagnostics, the parameters for the communication can be entered after the wiring has been completed. These include the interface used, the DFÜ300 protocol, the telephone numbers to be called in case of faults and emergencies. Furthermore, you should set when a call back to the control centre should be made, for every fault, only in case of lock, or never.

8.17 Setting up a Network Connection

If the remote diagnosis is carried out via a network connection, the following parameters must be entered:

- IP address: e.g. 192.168.0.119
- Subnet mask: e.g., 255.255.255.0
- Gateway: e.g. 192.168.0.2
- Port: e.g. 8000 (default setting)

NOTE!
The IP address, subnet mask and the gateway are provided by the administrators of the network. The port 8000 must be available on the network. The protocol used is TCP/IP. Further information about the remote diagnosis can be found in the current WinMOS®300manual.

8.18 Completion of Commissioning

After completion of the commissioning, it is advisable to store the current parameterisation of the system in the documents. To do this, read the parameters with WinMOS®300 from the system and attach the printout to the documents. If WinMOS®300 is not available for you, note down the settings in the attached printout of the setup and service menu.

The faults stored in the stack memory and the fault list during commissioning as well as the entries in the maintenance stack can be deleted.

If access by third parties (such as janitors) is possible, you should protect access to the menus by assigning a setup and service code.

9 Troubleshooting

Figure 71:
Representation of an entry in the stack memory with lock.

Thanks to the digital structure of the control systems, many possible reasons for malfunctions can be displayed concisely. Normally the reason can be found with the help of these messages/malfunctions in the event log or malfunction list. If the lift has been shut down due to a malfunction, the background of the LC display flashes and the abbreviation »BLK« (blocked) is displayed. To find out the exact reason of the malfunction, please refer to the event log or the malfunction list. After eliminating the reason for the malfunction, remove the block by pressing the Call/End button and answer the information with the OK button or by quickly switching off the operational voltage.

9.1 Monitoring Routines

The bp408 software monitors a lot of signals for correct behaviour and time characteristics. If any discrepancy arises, a corresponding error message is stored in the event log and time stamped. You can read how often this error occurred from the malfunction list.

If a control time or monitoring time (e.g., start monitoring, runtime monitoring, deceleration monitoring) is exceeded, the lift is stopped, and all travel commands cancelled. If any warning devices respond, the lift is shut down at the next landing ahead and blocked. Warning devices are, for example, motor overload switch, pressure switch and over-temperature switch of the hydraulic system.

If the safety circuit responds, the travel is interrupted and all travel commands deleted.

The door lock monitoring, if responding, also results in the travel commands being deleted. The door lock monitoring responds after three attempts.

The flush-level position of the car is monitored through the absolute encoder or flush-level switches. If the motionless car leaves the flush-level position, it is re-levelled, if necessary, with open doors because the door and bolt contacts within the door zone area are bypassed by the safety circuit accordingly.

- PTC thermistor
  Terminals PTC / PTC, all current PTC resistors are monitored.
- Travel time
  The start, fast and slow travel phases are monitored. See menu *»Control times«.*
- Contactor release (33)
  The drive contactors are checked for release before the start.

- Brake released (35)
  The release of the brake shoes is checked by contacts before the start.
- Door and lock control
  The closing of the safety circuit is monitored before the start. See menu *»monitoring times«.*
- Safety circuit
  The input and output signal of the integrated safety circuit is monitored.
- Speed controls / LRV (34)
  Monitors the malfunction output of the frequency inverter.
- Brake release / activation (31)
  The »mechanical brake« output of the inverter is monitored.
- Pulses/ flush-level position/ correction (71-78)
  The signals from the shaft are checked for plausibility if no absolute encoder is used.
- Re-levelling (without absolute encoder: 73-74 / 77-78)
  The monitoring takes place 20 times and 20 seconds per travel direction and landing.
- Safety circuit (Terminals SSZ, 9, 10, 11, 12, 12A, 12B, 13, 14)
  The monitoring is carried out during standstill and during travels.
- Correction signals /absolute encoder
  The signals from the shaft are checked for plausibility.
- Block
  Some monitoring functions may have been parametrized using the blocking option (lift will get blocked if fault message is thrown).

MONITORING NOTE!
Monitoring functions are directly displayed in the DIAGNOSTICS → MALFUNCTIONS menu. They are registered and stored in the event log and the malfunction list.

9.2 Malfunction information

Malfunctions impact the lift control functions so that proper operation is no longer possible. All current events that have resulted in a malfunction of the lift are displayed, e.g.:

- Speed governor has been activated
- PTC thermistor in the drive motor, PTC thermistor in the hydraulic unit,
- Start time check, travel check, deceleration check,
- Brake monitoring, contactor monitoring,
- Malfunction of the floor selector,
- Malfunction of the frequency inverter,
- Door open/close control,
- Safety circuit.

If a malfunction occurs, it is registered in the event log and the malfunction list. Provided that the system is connected to a WinMOS®300 Remote Diagnostics System, a call back can be initiated if a malfunction has occurred. All fault information can also be transmitted with Lift2CLOUD.

A critical fault can result in a shut-down of the system. After eliminating the fault, you can unblock the system again. Remove the block by pressing the Call/End button and answer the information with the OK button or by quickly switching off the operational voltage.

Serious malfunctions cannot be reset by switching off the operational voltage.

Smaller malfunctions, such as for example door locking faults, can be reset by entering a new call.

9.3 Report of Malfunctions

All bp408 are prepared for the remote diagnosis. To connect the control system to an intranet or the Internet, the bp408 control system is equipped with a LAN connection. If the connection is made via the telephone network, a modem can be connected to the USB-A interface. Gateways for the LON mark standard, OPC server, Profibus, Modbus and BACnet are available for the connection to the building automation.

Provided that the malfunction reports call back function has been activated in the setup menu, a malfunction will be reported to the service centre by stating the kind of malfunction, date and time.

More detailed information on the remote diagnosis can be found in the WinOS®300 manual or under www.WinMOS.de.

9.4 Malfunction Stack

The malfunction stack stores the last 128 malfunctions with time stamp, in chronological order. A display routine enables you to display the error messages in plain text on the LC display, stating:

- Date,
- Time,
- Malfunction,
- And the landing and recorded landing name in the case of landing related malfunctions.

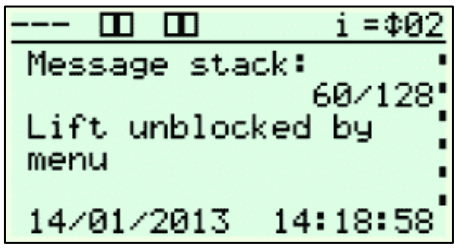


Figure 72:
Representation of an entry in the malfunction stack.

You can open a malfunction entry with the »Right« button. This shows you the position, speed and a selection of important signals that occurred at the time of the event. This enables you to reconstruct the history of the latest malfunctions.

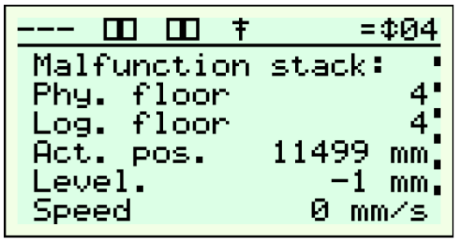


Figure 73:
Further information of an entry in the malfunction stack.

Press »OK« to delete the stack and answer the security question by pressing »OK«. To create a stringent protocol, we recommend deleting the event log only after having transmitted the entries to the WinMOS®300 centre or to the cloud.

9.5 Malfunction List

The malfunction list stores the frequency of occurrence of all malfunctions registered, stating:

- Malfunction,
- Frequency,
- Landing, if the malfunction is related to it.

A display routine enables you to display the error messages in plain text on the LC display.

Press »OK« to delete the stack and answer the security question by pressing »OK«. In order to create a stringent protocol, we recommend deleting the event log only after having transmitted the entries to the WinMOS®300 centre.

9.6 Messages

Messages inform you about special conditions within the system and that the lift might have restricted functionality. All data resulting in the message at that point is reported.

Examples:

- Landing control switched off
- Emergency stop activated in the car
- Inspection controls switched on
- Emergency controls switched on
- Cabin priority functions switched on
- Priority calls are waiting
- Full load or overload contact has responded
- Fire/fire brigade controls are switched on
- Emergency power supply activated
- Car travelling to parking landing
- Lift removed from group
- Car at parking landing

.

9.7 Repair

If a malfunction becomes apparent in the control electronics, it is recommended not to repair it on site, as this would not be economical.

To save time and money, please call us and state the serial number of the control unit and the circuit diagrams.

10 Maintenance

Before beginning a maintenance, we recommend registering this on bp408 in the service menu under

MAINTENANCE > MAINTENANCE FUNCTIONS > MAINTENANCE ON

From that point, the system no longer sends error messages via remote data transfer and the system is displayed as "undergoing maintenance“.

Figure 74:
The bp408 control system is a very maintenance-friendly system. In case maintenance is required, it can automatically inform you of the same

As part of the usual maintenance work, the following checks must be carried out on the control systems bp408:

- General visual inspection for possible dust deposits, moisture, or corrosion. If they are present, they must be removed.
- Are the connections of the control system mounted correctly?
- Do batch memory and/or malfunction list display any malfunction? Check the malfunctions registered and delete them, if necessary.
- Check both messages and message stack (recorded messages) for irregularities.
- For the emergency lighting unit, it must be ensured that the capacity of the battery is sufficient for one hour of emergency lighting in the car.
- During the use of uninterruptible power supply systems (UPSs), the maintenance instructions in the attached manuals must be complied with.

Figure 75:
Entry in the malfunction stack

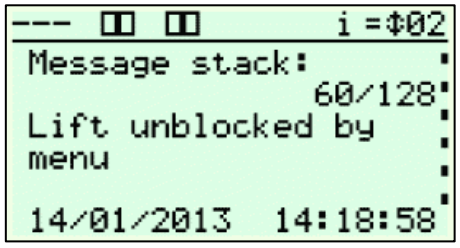


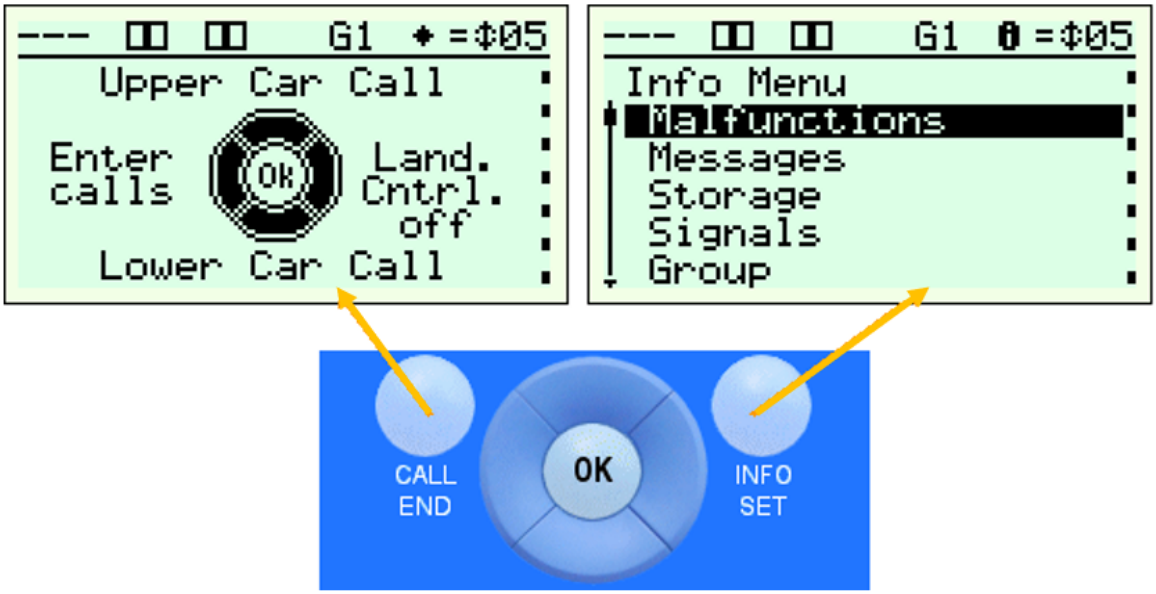
Figure 76:
Entry in the message stack

- The toothed belts of an absolute encoder system are maintenance-free under normal conditions.

Warning!
Cables and plugs may only be mounted or removed in a deenergised state

Appendix

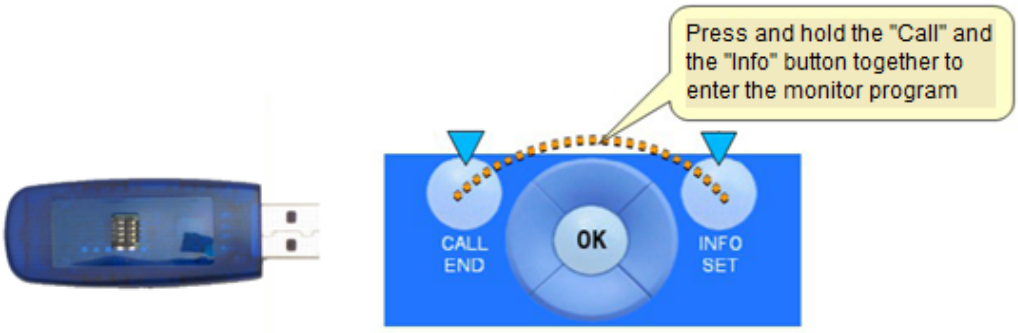
A) Menu Navigation bp408



B) Update of the Firmware via USB Stick

- **Update of the firmware via USB memory stick**

- **For entering the monitor program to save or update the firmware press and hold both outer push buttons for approx. 3 seconds.**



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