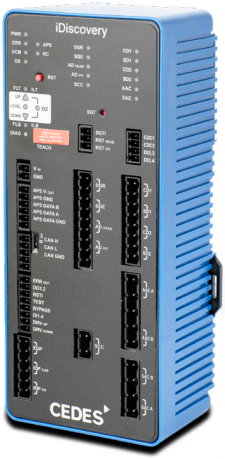
iDiscovery

Safety Manual



CEDES AG is certified according to ISO 9001: 2015

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Contents

Document history

Date	Version	Remarks
16.12.2019	01.00	Initial version
24.07.2020	01.12	Guarding operation (SW 01.10 required) Switch into config operation mode without MNT active (SW 01.10 requires)
16.06.2021	02.00	New functionality (SW 02.00 required) - Inspection limit switches (IOP split in IOP_{CAR} and IOP_{PIT}) - Extended inspection limit switches - Safety spaces in case of reduced headroom or pit (EN 81-21) - Overlapping doorzone - Monitoring external contactors for safety gear

Further applicable documents

[1] Installation and Operation Manual APS
[2] CEDES iDiscovery CANopen Object Directory
[3] CiA 417 CANopen Lift Standard

List of abbreviations

Abbreviation	Description
AAC	Auxiliary activation contact → additional brake e.g. rope gripper
AD	Access door → Additional contact which is opened if someone has entered the shaft
APS	Absolute positioning system → source of the positioning data used by iDiscovery
CD	Car door interface
DIAG	Diagnosis
DM	Door monitoring
DRV	Drive → Representation of the actual drive command (drive expectation)
DZ	Door zone
EOP	Emergency operation panel
ETSL	Emergency terminal speed limiting
FLB	Final limit bottom
FLT	Final limit top
IOP	Inspection operation panel
MNT	Maintenance operation (EOP and/or IOP active)
OS	Over speed
RC	Retardation control / ETSL
RST	Reset
RSTI	Reset input
SAC	Safety chain activation contact → opens the safety chain
SCC	Safety gear control contact → triggers safety gear
SD	Shaft door interface (landing door)
SGE	Safety gear extended
SGR	Safety gear retracted
SGT	Safety gear test
SGTI	Safety gear test input
SSW	Safety switch → safe input of iDiscovery using dynamic signals
TEACH	Teach button
UCM	Unintended car movement

1. About this manual

This installation and operation manual in English, with metric and inches measurements **is the original version**.

2. Safety information

IMPORTANT!
READ BEFORE INSTALLATION!

The iDiscovery was developed and manufactured using state-of-the-art systems and technologies. However, injury and/or damage to the iDiscovery can still occur. To ensure safe conditions: Read all enclosed instructions and information and make sure you have understood it. Follow the instructions given in this manual carefully.
Observe all warnings included in the documentation and attached to the iDiscovery. Do not use the iDiscovery if it is damaged in any way. Keep the instruction manual on site. It is the sole responsibility of the planner and/or installer and/or operator and/or buyer to ensure that this product is used according to all applicable standards, laws and regulations in order to ensure safe operation of the whole application. The safety of the whole system is the responsibility of the system integrator (installer and/or authorized representative). For safety-relevant use, the system integrator must only use the iDiscovery for the application as defined in this manual and according the instructions given herein. The manufacturers of the each of the following, system, controller and drive, together with the installer, the operator and those responsible for its maintenance have to follow the system integrator's instructions. Only personnel authorized and instructed by the system integrator are allowed to operate, install and maintain the iDiscovery. Any alterations to the system by anyone (e.g. buyer, operator, installer or user) may result in unsafe operating conditions. CEDES is not responsible for any liability or warranty claim that results from such manipulation. Failure to follow instructions given in this manual and/or other documents related to the iDiscovery may cause customer complaints, serious call backs, damage, injury or death.

SAFETY ADVICE

- On the installation of the PESSRAL system and components connected to it, the national regulations and the EN 81-20 are to be considered.

2.1 Non-intended use

The iDiscovery **must not be** used for:

Safety applications which do not comply with the applications contained in the iDiscovery certificate

- Equipment in explosive atmospheres
- Equipment in radioactive environments
- Equipment in aggressive environments

Use only specific and approved safety devices for such applications, otherwise serious injury or death or damage to property may occur!

iDiscovery

APS sensor and code tape

3. System

The iDiscovery is a powerful SIL 3 and EN 81-20/50 compliant position supervisor unit. In conjunction with CEDES' APS (Absolute Positioning System), it takes over safety-relevant functions of an elevator. This highly integrated system eliminates the need for many individual systems and components currently required by a conventional elevator. The APS and iDiscovery in combination significantly reduce the cost and complexity of the elevator as well as installation and maintenance time.

3.1 Safety features / functions

- Door monitoring
  Leveling, re-leveling and preliminary operation with open doors
- Detection of unintended car movement (UCM)
  Door zone speed monitoring
  Monitoring that door zone of target floor is not left with open doors
- Overspeed detection
  125% or 120% and 108% of rated speed
  0.63 m/s and 1.25 m/s (maintenance active)
- Retardation control / ETSL (2 limits)
- Final limit switches
- Bridging of door contacts for maintenance (BYPASS)
- Check if door contacts are faulty (bridged)
- Safety gear monitoring
  Monitoring external contactors if safety gear current / voltage rating is higher than SCC contact rating

- Inspection limit switches
- Extended inspection limit switches
  This safety function covers the following functions of EN 81-20 respectively EN 81-21
  Additional limit switch according to EN 81-21
  Pre trigger in case working space according to EN81-20 has been activated
- Safety spaces in case of reduced headroom and/or pit
  This safety function covers the following functions of EN 81-20 respectively EN 81-21
  Reduced top/bottom clearances according to EN 81-21
  Working space according to EN 81-20

3.2 Configuration clips

Safe configuration of rated speed and final limits is performed with configuration clips that are mounted together with the APS code tape. This allows the configuration of the safety parameters of the device in the field on the job site. The configuration can also be changed in the field. The use of the configuration clips in combination with the floor position indicator clips allow a fully automated teach process and lead to an efficient and straightforward configuration and teaching process.

Configuration clip (example of rated speed down clip)

Floor position indicator clip

The following clips are available:

- Rated speed down (mandatory)
  0.2 m/s … 16.0 m/s in increments of 0.1 m/s;
  CEDES part number: 115 092 XXXXX → XXXXX indicating the speed in mm/s,
  e.g. 115 092 02000 is rated speed 2.0 m/s
- Rated speed up (optional)
  0.2 m/s … 16.0 m/s in increments of 0.1 m/s;
  CEDES part number: 114 954 XXXXX → XXXXX indicating the speed in mm/s,
  e.g. 114 954 12000 is rated speed 12.0 m/s
- Bottom floor, includes offset for final limit bottom position (mandatory)
  10 mm … 350 mm in increments of 10 mm
  CEDES part number: 115 094 XXXXX → XXXXX indicating the final limit offset in mm,
  e.g. 115 094 00100 is 100 mm offset from bottom floor to final limit
- Top floor, includes offset for final limit top position (mandatory)
  10 mm … 350 mm in increments of 10 mm
  CEDES part number: 115 093 XXXXX → XXXXX indicating the final limit offset in mm,
  e.g. 115 093 00040 is 40 mm offset from top floor to final limit
- Clearance pit, bistable
  Switches, which are used to detect if a door that gives access to the pit was opened manually, are **bistable** (latching switch with protection against unintentional reset).
  Indicates the extended inspection limit bottom position and includes the distance to the safety space pit tripping position.
  CEDES part number: 116 364 00300 → Indicating the distance from extended inspection limit bottom to safety space pit tripping position is 300 mm.

SAFETY ADVICE

- It is the system integrator's responsibility to ensure that bistable switches (latching switch with protection against unintentional reset) are installed when a bistable clearance clip is used. This must be verified according chapter 17.20 Check wiring and type of the additional door switches for the safety spaces.

- Clearance pit

  Switches, which are used to detect if a door that gives access to the pit was opened manually, are **monostable**.
  Indicates the extended inspection limit bottom position and includes the distance to the safety space pit tripping position.
  CEDES part number: 116 365 00300 → Indicating the distance from extended inspection limit bottom to safety space pit tripping position is 300 mm.

- Clearance head, bistable

  Switches, which are used to detect if a door that gives access to the car roof was opened manually, are **bistable** (latching switch with protection against unintentional reset).
  Indicates the extended inspection limit top position and includes the distance to the safety space head tripping position.
  CEDES part number: 116 362 00300 → Indicating the distance from extended inspection limit top to safety space head tripping position is 300 mm.

SAFETY ADVICE

- It is the system integrator's responsibility to ensure that bistable switches (latching switch with protection against unintentional reset) are installed when a bistable clearance clip is used. This must be verified according chapter 17.20 Check wiring and type of the additional door switches for the safety spaces.

- Clearance head

  Switches, which are used to detect if a door that gives access to the car roof was opened manually, are monostable.
  Indicates the extended inspection limit top position and includes the distance to the safety space head tripping position.
  CEDES part number: 116 363 00300 → Indicating the distance from extended inspection limit top to safety space head tripping position is 300 mm.

- Floor position indicator clip

  CEDES Part number: 111 786

3.3 Types

There are different iDiscovery types available. The type key is formatted as follow “xxxxx-yyy” where as the “x” are options and “y” HW modules. The numbers are hexadecimal values which define single options.

Reserved	Inspection	UCM with SCC	Ext SG contactors	Reserved													Simplified SCC	No AAC	Reserved										SCC	SAC/AAC
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Option description

Opt 0	SAC/AAC module, reads in car and shaft doors, controls safety chain
Opt 1	SCC module, controls the safety gear and read in access doors
Opt 12	No AAC, AAC contact on the SAC/AAC is not available
Opt 13	Simplified SCC, SCC contact is opened during relay test
Opt 28	Ext. SG contactors; monitoring external contactors if safety gear current / voltage rating is higher than SCC contact rating
Opt 29	UCM with SCC
Opt 30	Inspection; extended inspection limits and safety spaces in case of reduced headroom and/or pit

Available type range with examples:

Basic - 0000[0...1]-001
00000-001 Standard type without OSG
Opt 0 SAC

00001-001 Standard type without OSG, no AAC contact
Opt 0 SAC, Opt 12 No AAC

Basic with OSG - [0...1]000[0...3]-003
00000-003 Standard type with OSG
Opt 0 SAC, Opt 1 SCC

10000-003 Standard type with OSG, external SG contactors
Opt 0 SAC, Opt 1 SCC, Opt 28 Ext. SG contactors

00001-003 Standard type with OSG, no AAC contact
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC

10001-003 Standard type with OSG, no AAC contact, external SG contactors
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 28 Ext. SG contactors

Basic with OSG and UCM with SCC – [2..3]000[0…3]-003
20001-003 Standard type with OSG, no AAC contact, UCM with SCC
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 29 UCM with SCC

30001-003 Standard type with OSG, no AAC contact, UCM with SCC ,external SG contactors
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 29 UCM with SCC, Opt 28 Ext. SG contactors

Inspection - [4...5]000[0…3]-003
40001-003 Inspection type with OSG, support for reduced headroom and/or pit, no AAC
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 30 Inspection

50001-003 Inspection type with OSG, support for reduced headroom and/or pit, no AAC, external SG contactors
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 28 Ext. SG contactors, Opt 30 Inspection

Inspection and UCM with SCC – [6...7]000[0…3]-003
60001-003 Inspection type with OSG, support for reduced headroom and/or pit, no AAC
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 30 Inspection, Opt 29 UCM with SCC,
70001-003 Inspection type with OSG, support for reduced headroom and/or pit, no AAC, external SG contactors
Opt 0 SAC, Opt 1 SCC, Opt 12 No AAC, Opt 28 Ext. SG power, Opt 30 Inspection, Opt 29 UCM with SCC

NOTICE

- All references to the SCC output in this document are only applicable for iDiscovery types with “Opt 1 SCC”. If it is described that SAC, AAC and SCC is opened in case of unsafe condition, only SAC and AAC are opened for iDiscovery without “Opt 1 SCC”.
- All references to the AAC output in this document are only applicable for iDiscovery types without “Opt 12 No AAC”. If it is described that SAC, AAC (and SCC) is opened in case of unsafe condition, only SAC (and SCC) is opened for iDiscovery with “Opt 12 No AAC”.
- All references to the inspection and /or reduced head room and/or pit functionalities are only applicable for iDiscovery types with “Opt 30 Inspection”.
- All references to the supervision of external contactors for high current safety gear (if required) are only applicable for iDiscovery types with “Opt 28 Ext SG contactors”.

The iDiscovery type can be read using the DIAG LED on the interface.

After boot up the iDiscovery type is shown with a blink code on the DIAG LED. The code sequence is repeated for five minutes as long as EOP or IOP is active. The sequence is aborted as soon as the reset or teach button is pressed or the car starts to move.

The code sequence displays five digits for the software configuration and three digits for the hardware configuration. Each digit starts with a short start pulse followed by longer value pulses. The number of value pulses represent the value of the corresponding digit. At the end of the sequence, after all eight digits are displayed, the LED is on for 5 s indicating that the sequence is over and will be repeated again.

Example sequence for 00000-003 → Standard type with safety gear interface:

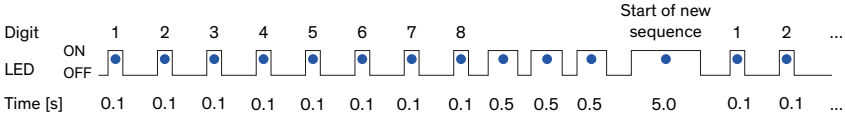
1. Digit: start pulse; no value pulse → 0
2. Digit: start pulse; no value pulse → 0
3. Digit: start pulse; no value pulse → 0
4. Digit: start pulse; no value pulse → 0
5. Digit: start pulse; no value pulse → 0

} SW configuration

6. Digit: start pulse; no value pulse → 0
7. Digit: start pulse; no value pulse → 0
8. Digit: start pulse; followed by three value pulses → 3

} HW configuration

LED on for 5 s, afterwards the sequence is repeated.



3.3.1 Required APS Type

S-2-IDI-1-RC-01/00-D/X-[M|U]-[A-Z], [0.5...5.0]

3.4 Intended use

The iDiscovery is designed and approved for the use in elevator applications according to EN 81-20/50 and EN 81-21.

The iDiscovery takes over safety features listed in this manual in Chapter 3.5 Intended application according to EN 81-20/50 and EN 81-21. If the iDiscovery is used in other applications or for other functions, safety is not guaranteed.

It can be used up to a rated speed of 16 m/s (max. tripping speed 20 m/s). The maximum travel length depends on the expected elongation of the code tape. The elongation is 1/1000 of the code tape length at delta T 60°C. It must be guaranteed that the elongation does not exceed ±100 mm.
Travel length can be up to 200 m, if the temperature does not change more than ±30°C after iDiscovery is taught.

The system integrator has to ensure that the used type matches the requirements for the entire elevator system. The iDiscovery type is indicated on the type plate. The type shall be verified using the LED blink code (see Chapter 3.3 Types) or CANopen object 0x2020, sub index 0.

NOTICE

- EN 81-21 references in this safety manual refer to EN 81-21:2018).

3.5 Intended application

3.5.1 The following safety features according EN 81-20 can be performed with iDiscovery

Safety feature / function	EN 81-20 clause	iDiscovery safety feature	Type			Remark
			0000[0...1] - 001	[0...3]000[0...3] - 003	[4...7]000[0...3] - 003	
Check of the locking of car door (Überwachung der Verriegelung der Fahrkorbtür)	5.2.5.3.1 c)	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Check on the locked position of landing door locking device (Überwachung der Verriegelung der Schachttüren)	5.3.9.1	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Check of the closed position of landing doors (Überwachung der Schließstellung von Schachttüren)	5.3.9.4.1	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Check of the closed position of the panels without locks (Überwachung der Schliessstellung von nicht durch die Verriegelung verriegelten Türblättern)	5.3.11.2	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Check of the closed position of car door (Überwachung der Schliessstellung der Fahrkorbtür)	5.3.13.2	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Check of the inactive position of the car safety gear (Überwachung der nicht eingerückten Stellung der Fangvorrichtung am Fahrkorb)	5.6.2.1.5	Chapter 10.10 Safety gear monitoring		x	x	
Over speed detection (Erkennung der Übergeschwindigkeit)	5.6.2.2.1.6 a)	Chapter 10.1 Overspeed	x	x	x	
Check of the release of the over speed governor (Überwachung der Rückstellung des Geschwindigkeitsbegrenzers)	5.6.2.2.1.6 b)	Chapter 10.1 Overspeed Chapter 10.10 Safety gear monitoring		x	x	
Check of the ascending car over speed protection means (Überwachung der Schutzeinrichtung für den aufwärts fahrenden Fahrkorb gegen Übergeschwindigkeit)	5.6.6.5	Chapter 10.1 Overspeed	x	x	x	Overspeed 120% / 125% is also triggered if SCC module is not vailable (iDiscovery without option 1, SCC module). In this case SAC and AAC is opened and a reset is required.
Detection of unintended car movement with open doors (Erkennen der unbeabsichtigten Bewegung des Fahrkorbs bei geöffneten Türen)	5.6.7.7	Chapter 10.5 Detection of unintended car movement (UCM)	x	x	x	

Safety feature / function	EN 81-20 clause	iDiscovery safety feature	Type			Remark
			0000[0...1] - 001	[0...3]000[0...3] - 003	[4...7]000[0...3] - 003	
Check of the activation of the unintended car movement with open doors protection (Überwachung des Ansprechens der Schutzeinrichtung gegen unbeabsichtigte Bewegung des Fahrkorbs bei geöffneten Türen)	5.6.7.8	Chapter 10.5 Detection of unintended car movement (UCM)	x	x	x	
Check of the retardation in the case of reduced stroke buffers (Verzögerungskontrollschaltung bei Puffern mit verkürztem Hub)	5.12.1.3	Chapter 10.6 Retardation control / ETSL	x	x	x	
Check on levelling, re-levelling and preliminary operations (Überwachung des Einfahrens, Nachstellens und von vorbereitenden Maßnahmen)	5.12.1.4 a)	Chapter 10.4 Door monitoring (DM1)	x	x	x	
Bypass device for landing and car door contacts (Überbrückungseinrichtung für Schacht- und Fahrkorbtürkontakte)	5.12.1.8.3.b) 5.12.1.8.3.c) 5.12.1.8.3.d)	Chapter 10.9 Bridging of door contacts for maintenance (BYPASS)	x	x	x	Only if recommended wiring of door contacts is used (see chapter 3.7.1 Recommended wiring of door contacts)
Final limit switches (Notendschalter)	5.12.2.3.1 b)	Chapter 10.3 Final limit	x	x	x	
Check for faulty door contacts (bridged) (Verhinderung des Normalbetriebs bei fehlerhaften Türkontaktkreisen)	5.12.1.9	Chapter 10.8 Check if door contacts are faulty (bridged) (OVB)	x	x	x	Only if recommended wiring of door contacts is used (see chapter 3.7.1 Recommended wiring of door contacts)
Electronic over speed governor (elektronischer Geschwindigkeitsbegrenzer)	5.6.2.2.x	Chapter 10.1 Overspeed		x	x	Deviation of EN 81-20/50!
Inspection limits (Inspektions-Grenzen)	5.12.1.5.2.1 g)	Chapter 10.12 Inspection limits	x	x	x	

Safety feature / function	EN 81-20 clause	iDiscovery safety feature	Type			Remark
			0000[0...1] - 001	[0...3]000[0...3] - 003	[4...7]000[0...3] - 003	
Check of the opening of any door providing access to the pit * (Überwachung des Öffnens von Türen, die Zugang zur Schachtgrube gewähren)	5.2.6.4.4.1 d)	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	
Check of the inactive position of the mechanical device * (Überwachung der Ruheposition einer mechanischen Einrichtung)	5.2.6.4.4.1 e)	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	
Check of the active position of the mechanical device * (Überwachung der aktiven Stellung einer mechanischen Einrichtung)	5.2.6.4.4.1 f)	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	

* Working spaces

SAFETY ADVICE

- The safety spaces/clearances according to EN 81-20 5.2.5.8 must always be implemented by the system integrator with separate and autonomous means, independent to iDiscovery. Only the working space in the pit according to EN 81-20 5.2.6.4.4 can be provided by iDiscovery.
- The working space as as requested by EN 81-20 5.2.6.4.4.1 a) can only be guaranteed in conjunction with a suitable permanently installed safety gear which is capable to mechanically stop the car and keep it stopped with the load requirements as defined in EN 81-20 5.2.6.4.4.1 a). The speed to be considered for the activation of the safety gear is the effective maximum tripping speed as defined in chapter 10.2 Overspeed maintenance.

3.5.2 The following safety features according EN 81-21 can be performed with iDiscovery

Safety feature / function	EN 81-20 clause	iDiscovery safety feature	Type			Remark
			0000[0...1] - 001	[0...3]000[0...3] - 003	[4....7]000[0...3] - 003	
Additional inspection limit to prevent tripping of the stopping gear under inspection operation in up / down direction (Zusätzliche Inspektionsgrenze zur Verhinderung, dass die Auslöseeinrichtung die Anhalteeinrichtung in Aufwärtsrichtung / Abwärtsrichtung während Inspektionstätigkeiten auslöst)	5.5.3.4 5.7.3.4	Chapter 10.13.2 Extended inspection limits			x	
Check of the operation of the stopping gear in up direction resp. down direction (Überwachung des Betriebs der Anhalteeinrichtung in Aufwärtsrichtung bzw. Abwärtsrichtung)	5.5.2.3.3 f) 5.7.2.3.3 f)	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	
Check of the opening to any door giving access to the car roof resp. to the pit (Überwachung, ob eine Tür, die Zugang zum Fahrkorbdach bzw. zur Schachtgrube ermöglicht, geöffnet wurde)	5.5.3.1 5.7.3.1	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	
Electric reset device of the safety system acc. to EN 81-21 5.5.3, access to the car roof resp. EN 81-21 5.7.3, access to the pit (Überwachung der Rückstelleinrichtung für das Sicherheitssystem gemäß EN 81-21 5.5.3, Zugang zum Fahrkorbdach bzw. EN 81-21 5.7.3, Zugang zur Schachtgrube)	5.5.3.3 c) 5.7.3.3 c)	Chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20			x	

SAFETY ADVICE

- The safety spaces/clearances as requested by EN 81-21, 5.5.2.4 resp. 5.7.2.4 can only be guaranteed in conjunction with a suitable permanently installed safety gear which is capable to mechanically stop the car and keep it stopped. The speed to be considered for the activation of the safety gear is the effective maximum tripping speed as defined in chapter 10.2 Overspeed maintenance

3.6 Segregation

The safety of the whole system is the responsibility of the operator/system integrator or any other responsible person or organization. A risk analysis must be performed by the operator/system integrator or any other responsible person/ organization e.g. regarding code tape and smoke (use of smoke detectors, automatic fire detection systems, use in fire workers elevators) in order to plan and implement appropriate measures, if applicable. For safety-relevant use, the system integrator must only use iDiscovery and APS for the application as defined in this safety manual and according the instructions given herein as well as in the general APS Installation and Operation Manual. The manufacturers of the system, controller and drive, together with the installer, the operator and those responsible for its maintenance, have to follow the system integrator's instructions. Only personnel authorized and instructed by the system integrator are allowed to operate, install and maintain the iDiscovery and APS systems.

3.7 Door contact wiring options

The door contacts must be wired to iDiscovery according to one of the following options.

3.7.1 Recommended wiring of door contacts

If door contacts are single contact type for closed and locked status and the contacts are wired directly to the iDiscovery interface contacts SD and CD (see Chapter 6.1 Recommended wiring), the check if doors are bridged (EN 81-20 5.12.1.9) and the functionality for BYPASS (EN 81-20 5.12.1.8) is done by iDiscovery.

3.7.2 Use of separate door contacts for closed and locked status

If separate contacts for closed and locked status are used, the check if door contacts are bridged (EN 81-20 5.12.1.9) and BYPASS (EN 81-20 5.12.1.8) can not be performed by the iDiscovery and must be implemented separately and autonomously, independent to the iDiscovery by the system integrator. The contacts have to be wired in series.

3.7.3 Alternative wiring of door contacts

If the door wiring is done alternatively (see Chapter 6.2 Alternative door wiring), the check if door contacts are bridged (EN 81-20 5.12.1.9) and BYPASS (EN 81-20 5.12.1.8) can not be performed by the iDiscovery and must be implemented separately and autonomously, independent to the iDiscovery by the system integrator.

3.8 Safe State

In the iDiscovery safe state all safety related relay outputs (SAC A/B, AAC A/B and SCC) are open. Safe state is maintained during power up and when the device is not powered.

3.9 Code tape presence and elongation control

3.9.1 Code tape presence switch (CTPS)

If the code tape is not in place or moving unexpectedly in vertical direction, the system can not be considered as „safe“. To guarantee that the code tape is present and correctly installed along its entire operational length, a code tape presence switch has to be installed. The code tape presence switch has to open the safety chain, if it detects an unexpected movement of the code tape. Therefore this contact must be wired into the safety chain. It is the system integrator's responsibility to ensure that the code tape presence switch is installed and connected as it is described in Chapter 7.4.1 Code tape presence switch .

3.9.2 Code tape presence and elongation switch (CTPES)

The iDiscovery system is designed that safety is guaranteed as long as the elongation of the tape is within ±100 mm. If elongation will exceed ±100 mm a code tape presence and elongation switch has to be used. This switch will open the safety chain if it detects elongation, which is > ±100 mm. Therefore this contact must be wired into the safety chain. It is the system integrator's responsibility to ensure that the code tape presence and elongation switch is installed and connected as it is described in Chapter 7.4.2 Code tape presence and elongation switch.

The expected elongation has to be determined by the system integrator. The elongation depends on the expected temperature difference and the code tape length. For detailed characteristics of the APS code tape, please refer to the APS Installation and Operation Manual.

3.10 System and elevator requirements

3.10.1 Power supply

- The operating voltage is 24 VDC ±20%.
- Current consumption, maximal 470 mA @ 24 V (400 mA for iDiscovery + 70 mA for APS).
- Power-up inrush current, maximal 1 A/100 ms @ 24 V
- Recommended fuse, 2 A, Type B

SAFETY ADVICE

- iDiscovery and APS must be powered by a SELV/PELV power supply, where the output voltage will not exceed 60 VDC under normal conditions and under single-fault conditions, respectively an ES1 electrical energy source, where the accessible output voltage will not exceed the ES1 limits as stated in IEC 62368-1:2018, 5.3.1.

3.10.2 Environmental

The creepage and clearance distances are designed according to IEC 60664-1 for operational altitudes below 5,000 m above sea level (uppermost height of application e.g. top of the building). Do not use the product above this.

Operating temperature range	:	-20°C … +65°C
Storage temperature range	:	-40°C … +85°C
Humidity	:	≤ 95% (non-condensing)

3.10.3 Mechanical

Dimensions of the iDiscovery housing are 206.7 mm × 88.5 mm × 60 mm (without plugs).
For drawing see Chapter 24 Dimensions.
iDiscovery has to be mounted in an external enclosure to reach IP43 (together with iDiscovery which is IP20).

SAFETY ADVICE

- It needs to be ensured by the selection of an appropriate place that environmental influences like water, conductive dust and condensation don't have a negative impact to the safety circuit.

4. Modules

4.1 Main module

Performs safety features and provides inputs for CAN (CANopen; DS 417), APS, Power 24 VDC, emergency and inspection operation control station.

4.2 SAC module

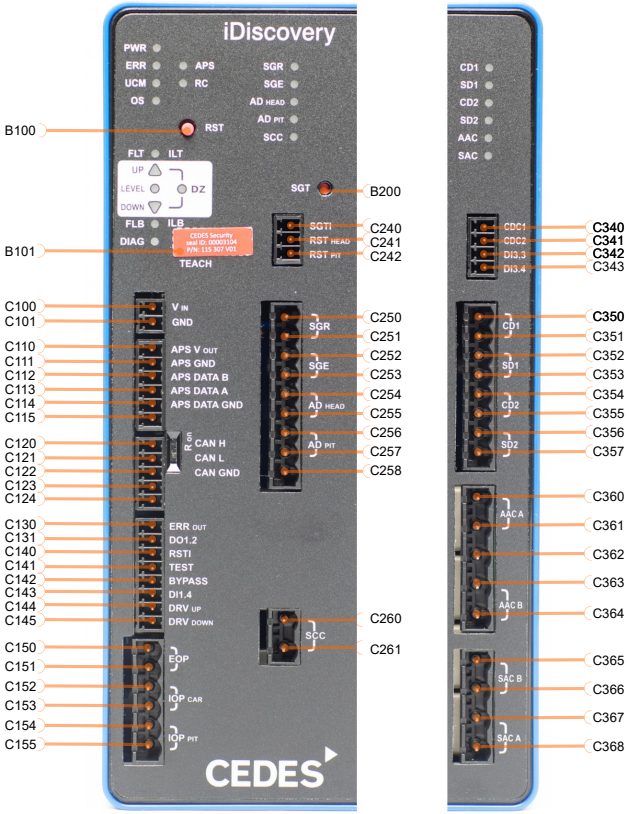
Provides 2 × 2 potential free actor contacts. 2 for the safety chain and 2 for an auxiliary braking device. Interface to the door loops, 2 for car door loop and 2 for shaft door loop.

4.3 SCC module (optional)

Provides a safety relay output to wire the safety gear and a safety relevant input to monitor status of the safety gear.

5. Interfaces

5.1 Overview



5.2 Main - Module

Performs safety features and provides inputs for CAN, APS and Power 24 VDC.

5.2.1 LED

LED	Description	Color	Function
PWR	Power	green	- Blinks with 0.5 Hz if iDiscovery is powered.
ERR	Error	red	- Illuminated if an internal error is detected. - Blinks in different sequences to indicate different errors. - Blinks 5 Hz if MNT must be activated to travel.
APS	APS	orange	- Illuminated if no communication between APS and iDiscovery. - Blinks 5 Hz if data from APS are bad or invalid. - Blinks 1 Hz if safe state is triggered due to APS error.
UCM	UCM	orange	- Illuminated if safety feature UCM is triggered. - *Used to indicate the operation mode.* - *Used during teach procedure.*
OS	Overspeed	orange	- Illuminated if safety feature OS 125% / 120% or OS MNT 1.25 m/s is triggered. - Blinks 5 Hz if OS 108% or OS MNT 0.63 m/s is triggered. - *Used to indicate the operation mode.* - *Used during teach procedure.*
RC	Retardation control / ETSL	orange	- Illuminated if safety feature retardation control / ETSL is triggered. - *Used to indicate the operation mode.* - *Used during teach procedure.*
FLT / ILT	Final limit top / Inspection limit top	orange	- Blinks 5 Hz if safety feature final limit top is triggered. - Illuminated if safety feature inspection limit top is triggered. - Illuminated if safety feature extended inspection limit top is triggered. - Illuminated if safety feature safety space headroom is triggered. - *Used to indicate the operation mode.* - *Used during teach procedure.*
FLB / ILB	Final limit bottom / Inspection limit bottom	orange	- Blinks 5 Hz if safety feature final limit bottom is triggered. - Illuminated if safety feature inspection limit bottom is triggered. - Illuminated if safety feature extended inspection limit bottom is triggered. - Illuminated if safety feature safety space pit is triggered. - *Used to indicate the operation mode.* - *Used during teach procedure.*
UP	Up	green	- Illuminated if car is moving upwards. - Blinks 10 Hz if a safety feature is triggered in the up direction. - Indicates rated speed up during power up.
DZ	Door zone	green	- Illuminated if car is in door zone.
LEVEL	Level	green	- Illuminated if car is leveled.
DOWN	Down	green	- Illuminated if car is moving downwards. - Blinks 10 Hz if a safety feature is triggered in the down direction. - Indicates rated speed down during power up.
DIAG	Diagnostic	blue	- Illuminated to guide the operator to enter teach mode. - Indicates iDiscovery type during power up.

NOTICE

▸ See chapter 18 Troubleshooting for detailed information.

5.2.2 Buttons

Button	Name	Description
B100	RST	Used to perform a manual reset after a safety feature was triggered. Also used to enter teach mode in combination with teach button.
B101	TEACH	Used to enter teach mode in combination with reset button.

5.2.3 Interface (Input, Output)

Contact	Name	Description	Specification	Wire size
C100	V_{IN}	**Power supply** Power supply device must fulfill requirements for SELV/PELV (see Chapter 3.10.1 Power supply).	24 VDC ±20% (SELV/PELV)	Max 1.5 mm²
C101	GND			
C110	APS V_{OUT}	**APS interface** Interface to the APS sensor. * is the isolated ground of the RS485 transceiver	Max. distance between APS Sensor and iDiscovery is 1,500 m.	Max 1.5 mm²
C111	APS GND			
C112	APS DATA B			
C113	APS DATA A			
C114	APS DATA GND*			
C115	N/A	N/A		
C120	CAN H	**CAN interface** Interface to the elevator controller. Termination (120 Ohm) can be switched on/ off.	CAN is galvanic isolated.	Max 1.5 mm²
C121	CAN L			
C122	CAN GND			
C123	N/A	N/A		
C124	N/A	N/A		
C130	ERR OUT	**Fault output** Digital output to signal different failures.	PNP $V_{OUT} = V_{IN} - 1.5$ V Max. 20 mA, Max 100 nF	Max 1.5 mm²
C131	DO 1.2	**Floor level indicator** Output is high if floor level is reached.		Max 1.5 mm²
C140	RSTI	**Reset input** Digital input to reset the device (can also be used to initiate the relay test).	Max. 60 VDC Referenced to GND C101 R_a = 8 kOhm low < 2.0 VDC high > 12 VDC Signal is filtered 100 ms.	Max 1.5 mm²
C141	TEST	**Test input** Digital input which is used to activate - Buffer test - Tests for safety space headroom/pit - Enable guarding operation		Max 1.5 mm²
C142	BYPASS	**BYPASS** Digital input to activate BYPASS (EOP or IOP must also be activated)		Max 1.5 mm²
C143	DI 1.4	N/A		
C144	DRV_{UP}	**Expected car move in upwards direction (DRV_{UP})** Digital input to get the information / expectation if the car is intended to move upwards. This information is used in case of reduced headroom / pit. *Only used for iDiscovery type with "option 30" inspection.*	Max. 60 VDC Referenced to GND C101 R_a = 8 kOhm low < 2.0 VDC high > 12 VDC Signal is filtered 100 ms.	Max 1.5 mm²
C145	DRV_{DOWN}	**Expected car move in downwards direction (DRV_{DOWN})** Digital input to get the information / expectation if the car is intended to move downwards. This information is used in case of reduced headroom / pit. *Only used for iDiscovery type with "option 30" inspection.*		Max 1.5 mm²

Contact	Name	Description	Specification	Wire size
C150	EOP out	**Emergency operation panel active (EOP)** Interface to connect emergency operation active.	Pulsed signal 20 mA Max voltage = V_{IN} – 1.5 V Contact close current 100 mA Must be connected to a potential free contact. Up to 1,500 m cable length. Open status is filtered 150 ms Close status is filtered 60 ms	Max 2.5 mm²
C151	EOP in			
C152	IOP_{CAR} out	**Car inspection operation panel active (IOP_{CAR})** Interface to connect car inspection active.		Max 2.5 mm²
C153	IOP_{CAR} in			
C154	IOP_{PIT} out	**Pit inspection operation panel active (IOP_{PIT})** Interface to connect pit inspection active.		Max 2.5 mm²
C155	IOP_{PIT} in			Max 2.5 mm²

SAFETY ADVICE

- Only safety contacts in conformance with EN 81-20, clause 5.11.2.2 or switching elements with at least the same safety level shall be connected to the safety inputs of the system; the belonging wiring shall fulfill the requirements for short-circuit-proof.

5.2.4 APS Interface

The iDiscovery contact assignment of the APS interface matches the following colors of the APS wires:

Contact	Name	APS wire color
C110	APS V_{OUT}	white
C111	APS GND	green
C112	APS DATA B	grey
C113	APS DATA A	blue
C114	APS DATA GND	yellow
C115	N/A	brown

5.2.5 Emergency operation panel EOP

The emergency operation panel contact (C150/C151) monitors the state of the emergency operation panel. Therefore this contact has to be wired to the emergency operation active switch, which has to fulfill the requirements from EN 81-20, 5.11.2.2 or equivalent.

If EOP is active (contact between C150 and C151 is open),

- Maintenance overspeed limits are activated; 0.63 m/s (SAC) and 1.25 m/s (SCC).
- Final limits are disabled that it is possible to travel from buffer to buffer.
- SGR is disabled (if available).

SAFETY ADVICE

- It is the system integrators responsibility to ensure that normal operation is not possible if EOP is active. The system integrator also needs to ensure that all requirements of EN 81-20, 5.12.1.6 are fulfilled.

5.2.6 Inspection operation panel car and pit (IOP_{CAR} / IOP_{PIT})

The inspection operation panel contacts for car (C152/C153) and pit (C154/C155) monitors the state of the car and pit inspection operation panel. These contacts have to be wired to the car inspection operation active switch respectively to the pit inspection operation active switch, which has to fulfill the requirements from EN 81-20, 5.11.2.2 or equivalent.

If IOP_{CAR} and/or IOP_{PIT} is active (contact between C152/C153 and/or contact C154/C155 are open),

- Maintenance overspeed limits are activated; 0.63 m/s (SAC) and 1.25 m/s (SCC).
- Final limits are active.
- SGR is enabled (if available).
- Inspection limits are active.
- Extended inspection limits and safety spaces in case of reduced head/pit are activated (iDiscovery type with option 30 inspection).

If EOP and IOP are active at the same time, IOP has the higher priority.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that normal operation is not possible and emergency operation control is suppressed if IOP is active. The system integrator also needs to ensure that all requirements of EN 81-20, 5.12.1.5 are fulfilled.

5.2.7 Expected car move direction, upwards (DRV_{UP}) and downwards (DRV_{DOWN})

These inputs are only used for extended inspection limits and safety space in case of reduced headroom and/or pit (iDiscovery type with option 30).
The inputs for the expected car move direction shall represent the direction in which the car is indented to travel. If no traveling is expected both inputs must be 0. Best practice is to wire the up/down button of the EOP and IOP panels or the direction commands to the drive controller.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that traveling during emergency or inspection operation is only possible if the up/down button (and drive button) is pressed. The requirements of EN 81-20, 5.12.1.5.2 and 5.12.1.6 must be fulfilled.

5.2.8 Fault output

The fault output “ERR_{OUT}” transmits failure code pulses. Each pulse is 500 ms low and 500 ms high. Idle level is always high. The failure code is repeated continuously with a pause of two seconds between the pulse sequence. See Chapter 18 Troubleshooting for detailed information.

SAFETY ADVICE

- The signals transmitted on this output must not be used for safety relevant applications.

5.2.9 Level indicator output

Output 1.2 (DO1.2) indicates that the car is on floor level. In teach mode, when the clips are taught, the signal is high as soon as the clip is detected with the 1st camera and switches back to low as soon as the 2nd camera detects the clip. In all other modes the signal is high if the car is leveled (within ±10 mm of the floor level) .

SAFETY ADVICE

- The signals transmitted on this output must not be used for safety relevant applications.

5.3 SAC - Module

Connected to the door interlock switches and 2 pairs of safety related outputs. One group is connected to the safety chain and the other group is connected to an auxiliary braking device (e.g. rope gripper).

5.3.1 LED

LED	Description	Color	Function
CD1	Car door interface 1	orange	- Illuminated if car door loop 1 is open. - Blinks 2.5 Hz if an interface failure is detected.
SD1	Shaft door interface 1	orange	- Illuminated if shaft door loop 1 is open. - Blinks 2.5 Hz if an interface failure is detected.
CD2	Car door interface 2	orange	- Illuminated if car door loop 2 is open. - Blinks 2.5 Hz if an interface failure is detected.
SD2	Shaft door interface 2	orange	- Illuminated if shaft door loop 2 is open. - Blinks 2.5 Hz if an interface failure is detected.
AAC	Auxiliary activation contact	green	- Illuminated if AAC contact is closed. - Blinks 2.5 Hz if an interface failure is detected or relay test is not performed.
SAC	Safety chain activation contact	green	- Illuminated if SAC contact is closed. - Blinks 2.5 Hz if an interface failure is detected or relay test is not performed.

5.3.2 Buttons

No buttons available.

5.3.3 Interface (Input, Output)

Contact	Name	Description	Specification	Wire size
C340	CDC1	Door 1 closed signal	Max. 60 VDC Referenced to GND C101 R_a = 8 kOhm low < 2.0 VDC high > 12 VDC Signal is filtered 100 ms.	Max 1.5 mm²
C341	CDC2	Door 2 closed signal		Max 1.5 mm²
C342	DI 3.3	Reserved		
C343	DI 3.4	Reserved		
C350	CD1 out	**Car door interface 1** Contact to wire the car door interlock loop 1.	Pulsed signal 20 mA Max voltage = V_{IN} – 1.5 V Contact close current 100 mA Must be connected to the potential free door interlock safety contact(s). Up to 1,500 m cable length. Open status is filtered 120 ms Close status is filtered 80 ms	Max 2.5 mm²
C351	CD1 in			
C352	SD1 out	**Shaft door interface 1** Contact to wire the shaft door interlock loop 1.		
C353	SD1 in			
C354	CD2 out	**Car door interface 2** Contact to wire the car door interlock loop 2.		
C355	CD2 in			
C356	SD2 out	**Shaft door interface 2** Contact to wire the shaft door interlock loop 2.		
C357	SD2 in			
C360	AAC A in	**Auxiliary activation contact A / B** Contact to wire the auxiliary braking device (e.g. rope gripper). Contact A/B must be wired in series (connect AAC A out directly to AAC B in). Current must be limited to max contact rating. *This contact is not available on iDiscovery with option 12.*	Potential free contact AC 15: 230 V / 3 A DC 13: 24 V / 5 A AC: max 250 V / 6 A DC: max 24 V / 6 A ... 120 V / 0.3 A	2.5 mm²
C361	AAC A out			
C362	Not connected			
C363	AAC B in			
C364	AAC B out			
C365	SAC B out	**Safety chain activation contact A / B** Contact to wire the safety chain. Contact A/B must be wired in series (connect SAC A out directly to SAC B in). This contact represents the safety features and opens if an unsafe condition occurred. Current must be limited to max contact rating.	Potential free contact AC 15: 230 V / 3 A DC 13: 24 V / 5 A AC: max 250 V / 6 A DC: max 24 V / 6 A ... 120 V / 0.3 A	Max 2.5 mm²
C366	SAC B in			
C367	SAC A out			
C368	SAC A in			

SAFETY ADVICE

- Only safety contacts in conformance with EN 81-20, clause 5.11.2.2 or switching elements with at least the same safety level shall be connected to the safety inputs of the system; the belonging wiring shall fulfill the requirements for short-circuit-proof.

WARNING

- It is prohibited to bridge SAC and AAC contact at any time!

5.3.4 Door contacts car door (CDI) / door contacts shaft door (SDI)

The iDiscovery provides independent safety inputs for car and shaft door contacts. This allows to distinguish if car or shaft doors are open, independent from the safety circuit of the elevator. With these independent safety inputs, the entire door monitoring functionalities (see Chapter 10.4 Door monitoring (DM1)) as well as Bypass (see Chapter 10.9 Bridging of door contacts for maintenance (BYPASS)) and check if door contacts are bridged (see Chapter 10.8 Check if door contacts are faulty (bridged) (OVB)) are completely integrated in the iDiscovery.
In addition iDiscovery is capable to detect stuck at or shorts between the different safety inputs.

The inputs are divided in car door contact loops and shaft door contact loops. The iDiscovery features two pairs of contacts to connect two different shaft sides. The shaft door contacts respectively the car door contacts which have to fulfill the requirements of EN 81-20, 5.11.2.2 or equivalent must be wired in series between output and input of the corresponding interface (SDx or CDx). Ensure that the contacts are not combined or interchanged with the contacts from the other side.

To avoid false triggering due to bouncing contacts, the input signals are filtered.

SAFETY ADVICE

- Only door contacts as described above are allowed to be connected to these inputs. No other contacts or circuits shall be attached to these inputs.

SAFETY ADVICE

- In case of overlapping door zones the doors of the different sides must be provided separately. If more than 2 sides must be wired, the doors of two sides which are not overlapping can be wired in series. This must be done for the shaft and for the car doors.

NOTICE

- Unused door interface contacts must be bridged. For example if only one shaft side is used.
- If the doors can not be wired as intended, check chapter 6.2 Alternative door wiring for alternative wiring.

5.3.5 Door closed signal

The door closed signal is a dedicated signal, as described in EN 81-20 5.12.1.8.3 d), which indicates that the car door(s) is/are in closed position. In the default settings the digital inputs are used. It is also possible to switch the door closed signal to CANopen. If the door closed signal shall be provided by CANopen the corresponding door closed RPDO 267 and 269 must be enabled. In this case the digital input signals are ignored.

The door closed signal is used for the safety features Bypass (Chapter 10.9 Bridging of door contacts for maintenance (BYPASS)) and check if door contacts are not bridged (Chapter 10.8 Check if door contacts are faulty (bridged) (OVB)).

NOTICE

- If only shaft side 1 is used, SD2 and CD2 must be bridged and the corresponding door closed signal CDC2 must indicate door closed (input must be high). Ensure that the signal is switched to digital input (CANopen RPDO 269 must be disabled).

5.4 SCC module

Module to control the safety gear.

5.4.1 LED

LED	Description	Color	Function
SGR	Safety gear retracted	green	- Illuminated if safety gear is fully retracted (switch closed). - Blinks 2.5 Hz if an interface failure is detected.
SGE	Safety gear extended / external	orange	- Illuminated if safety gear is fully extended (switch closed). - Blinks 2.5 Hz if an interface failure is detected.
SCC	Safety gear control contact	green	- Illuminated if SCC contact is closed. - Blinks 2.5 Hz if an interface failure is detected or relay test is not performed.
AD_{HEAD}	Access doors head (AD_{HEAD})	orange	- Illuminated if contact is open • If bistable switches are configured it is pulsed 2 times • If monostable switches are configured it is pulsed 1 time • No pulse if safety space is not configured
AD_{PIT}	Access doors pit (AD_{PIT})	orange	- Switched off if contact is closed • No pulse if safety space is not active respectively reset • If bistable switches are configured it is pulsed 2 times • If monostable switches are configured it is pulsed 1 time • No pulse if safety space is not configured - Blinks 2.5 Hz if an interface failure is detected.

5.4.2 Buttons

Button	Name	Description
B200	SGT button	Used to manually activate the safety gear test or manually trigger the safety gear.

5.4.3 Interface (Input, Output)

Contact	Name	Description	Specification	Wire size
C240	SGTI	**Safety gear test input** Digital input to initiate the safety gear test or manually trigger the safety gear.	Max. 60 VDC Referenced to GND C101 R_a = 8 kOhm low < 2.0 VDC high > 12 VDC Signal is filtered 100 ms.	Max 2.5mm²
C241	RST_{HEAD}	**Reset safety space head (RST_{HEAD})** Reset the safety space in the headroom. *Only used for iDiscovery type with "option 30" inspection.*		Max 2.5mm²
C242	RST_{PIT}	**Reset safety space pit (RST_{PIT})** Reset the safety space in the pit. *Only used for iDiscovery type with "option 30" inspection.*		Max 2.5mm²
C250	SGR out	**Safety gear retracted** Contact to wire the feedback contact of the safety gear retracted position. Safety chain is opened if contact is open. Is ignored during maintenance after the SCC was triggered.	Pulsed signal 20 mA Max voltage = V_{IN} – 1.5V Contact close current 100 mA Must be connected to a potential free contact. Up to 1,500 m cable length. Open status is filtered 120 ms Close status is filtered 80 ms	Max 2.5mm²
C251	SGR in			
C252	SGE out	**Safety gear extended/external** Functionality depends on the used iDiscovery type, see chapter 5.4.5 SGE.		Max 2.5mm²
C253	SGE in			
C254	AD_{HEAD} out	**Access doors head (AD_{HEAD})** Contact to wire the additional switches which are opened if a door which gives access to the car roof is opened manually. *Only used for iDiscovery type with "option 30" inspection.*		Max 2.5mm²
C255	AD_{HEAD} in			
C256	AD_{PIT} out	**Access doors pit (AD_{PIT})** Contact to wire the additional switches which are opened if a door which gives access to the pit is opened manually. *Only used for iDiscovery type with "option 30" inspection.*		Max 2.5mm²
C257	AD_{PIT} in			
C258	Not connected			
C260	SCC in	**Safety gear control contact** Output to control the safety gear. (current must be limited to max contact rating)	Potential free contact AC 15: 127 V / 3 A DC 13: 24 V / 2 A AC: max. 127 V / 6 A DC: max. 30 V / 6 A	Max 2.5mm²
C261	SCC out			

SAFETY ADVICE

- Only safety contacts in conformance with EN 81-20, clause 5.11.2.2 or switching elements with at least the same safety level shall be connected to the safety inputs of the system; the belonging wiring shall fulfill the requirements for short-circuit-proof.

WARNING

- It is prohibited to bridge SCC contact at any time!

5.4.4 SGR

This contact (C250/C251) is wired to the contact on the safety gear which stops the machine according EN 81-20; 5.6.2.1.5 and has to fulfill the requirements of EN 81-20, 5.11.2.2 See chapter 13.2 Safety Gear Retracted (SGR) (EN 81-20, 5.6.2.1.5).

5.4.5 SGE

The function of this contact (C252/C253) depends on the used iDiscovery type:

- Type without Option 28 “external safety gear contactors” This contact is wired to the contact of the safety gear which indicates if that the safety gear is extended. It is for information purpose only and can be read out on CANopen
- Type with Option 28 “external safety gear contactors” This contact is wired to the forcibly guided mirror contacts of the external contactors (if required due to high current safety gear)

See chapter 13.3 Safety Gear Extended / External (SGE) for detailed information.

5.4.6 Access doors head (AD_{HEAD}) and access doors pit (AD_{PIT})

The contacts AD_{HEAD} (C254/C255) and AD_{PIT} (C256/C257) are used for extended inspection limits and safety spaces in case of reduced headroom and/or pit (iDiscovery type with option 30 inspection).

The additional switches which are indicating that a door is opened manually must be wired as follow:

- All doors which gives access to the car roof are wired in series between C254 and C255 (AD_{HEAD})
- All doors which gives access to the pit are wired in series between C256 and C257 (AD_{PIT})

All switches have to fulfill the requirements of EN 81-20 5.11.2.2 or equivalent.

See chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20 for detailed information.

5.4.7 Reset safety space head/pit (RST_{HEAD} / RST_{PIT})

These inputs (C241 and C242) are used to reset/deactivate the extended inspection limits and safety spaces in case of reduced headroom and/or pit (iDiscovery type with option 30 inspection).

See chapter 10.13.4 Disabling / reset of the extended inspection limits and safety spaces for detailed information.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that the signals provided to RST_{HEAD} respectively RST_{PIT} are in accordance to EN 81-20 5.2.6.4.4.1 g) respectively EN 81-21 5.5.3.3 / 5.7.3.3.

SAFETY ADVICE

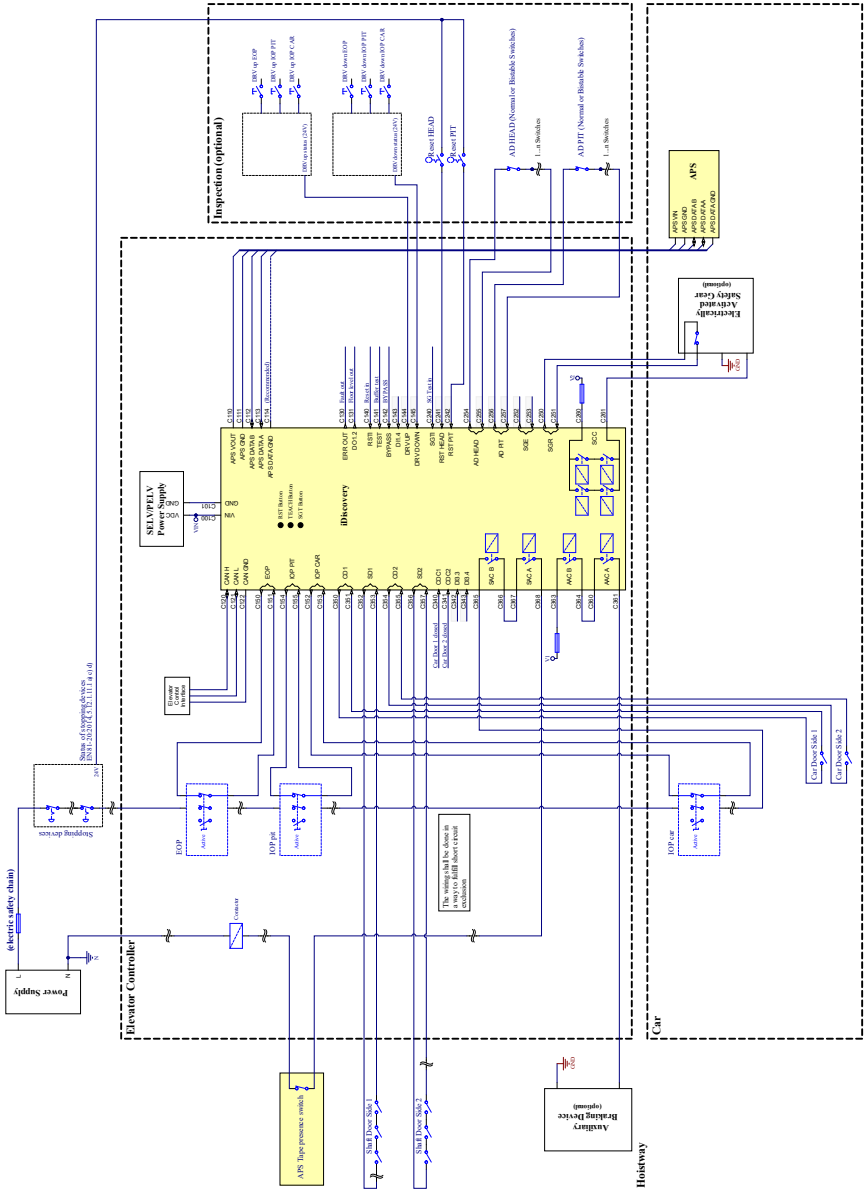
- The state of the stopping devices according to EN 81-21 5.5.3.2 b) and 5.7.3.2 b) is not read in by iDiscovery. It is the system integrator's responsibility to ensure that the state of the stopping devices according to EN 81-21 5.5.3.2 b) and EN 81-21 5.7.3.2 b) is considered as part of the reset signals.

6. Integration into the elevator

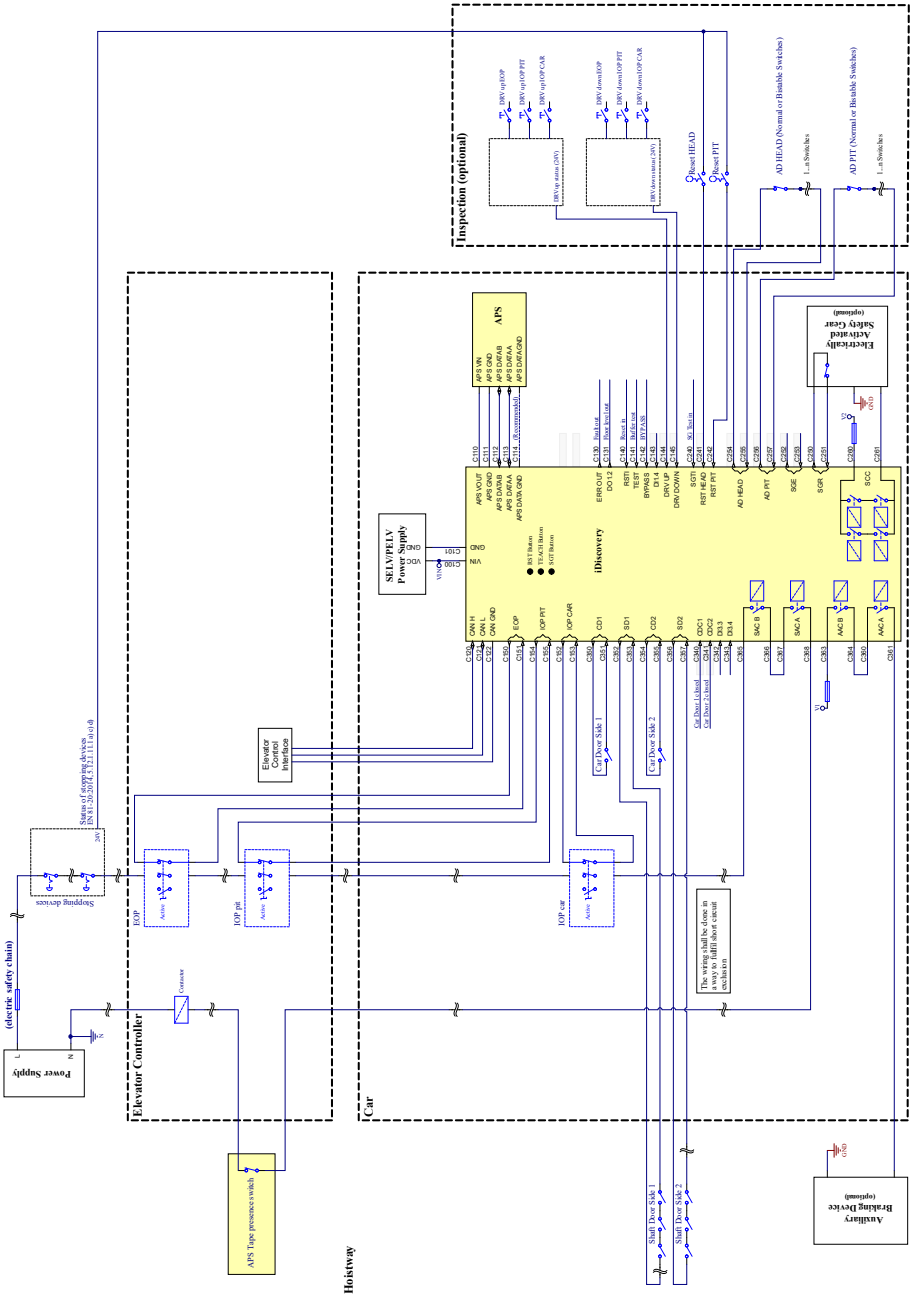
Contact your CEDES representative for high resolution schematics

6.1 Recommended wiring

6.1.1 iDiscovery mounted in the hoistway, machine room or landing door frame



6.1.2 iDiscovery mounted on car

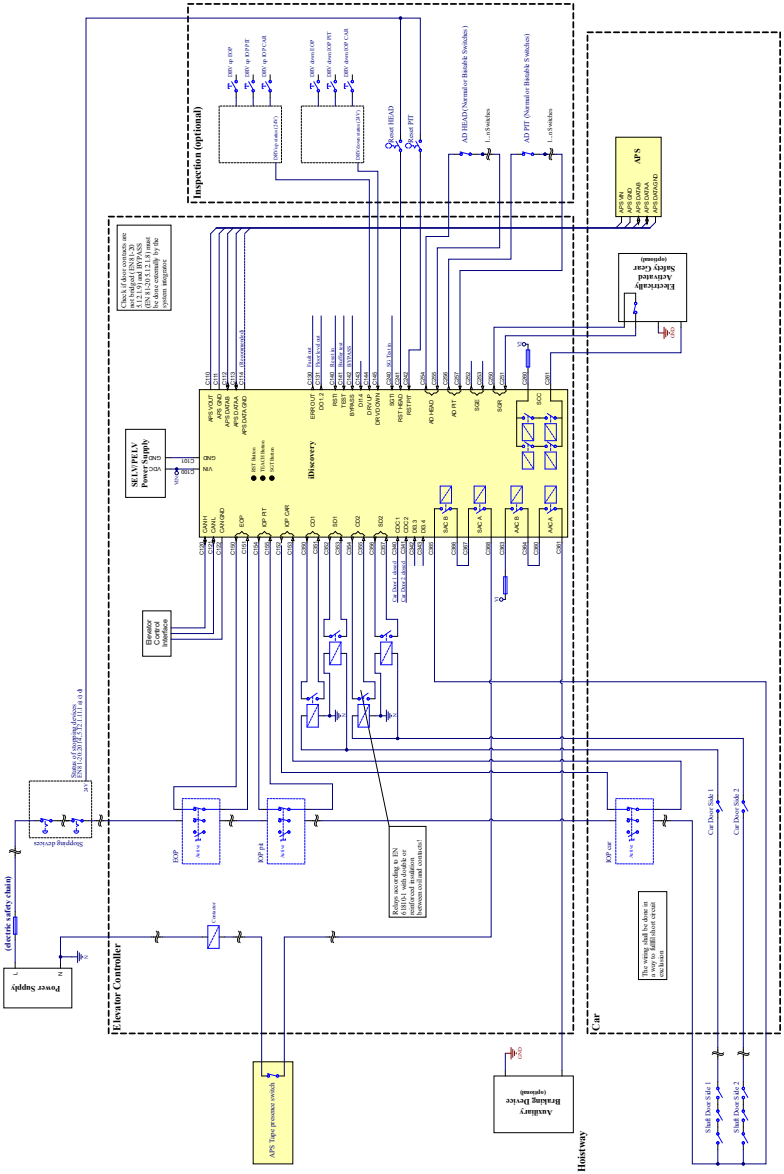


6.2 Alternative door wiring

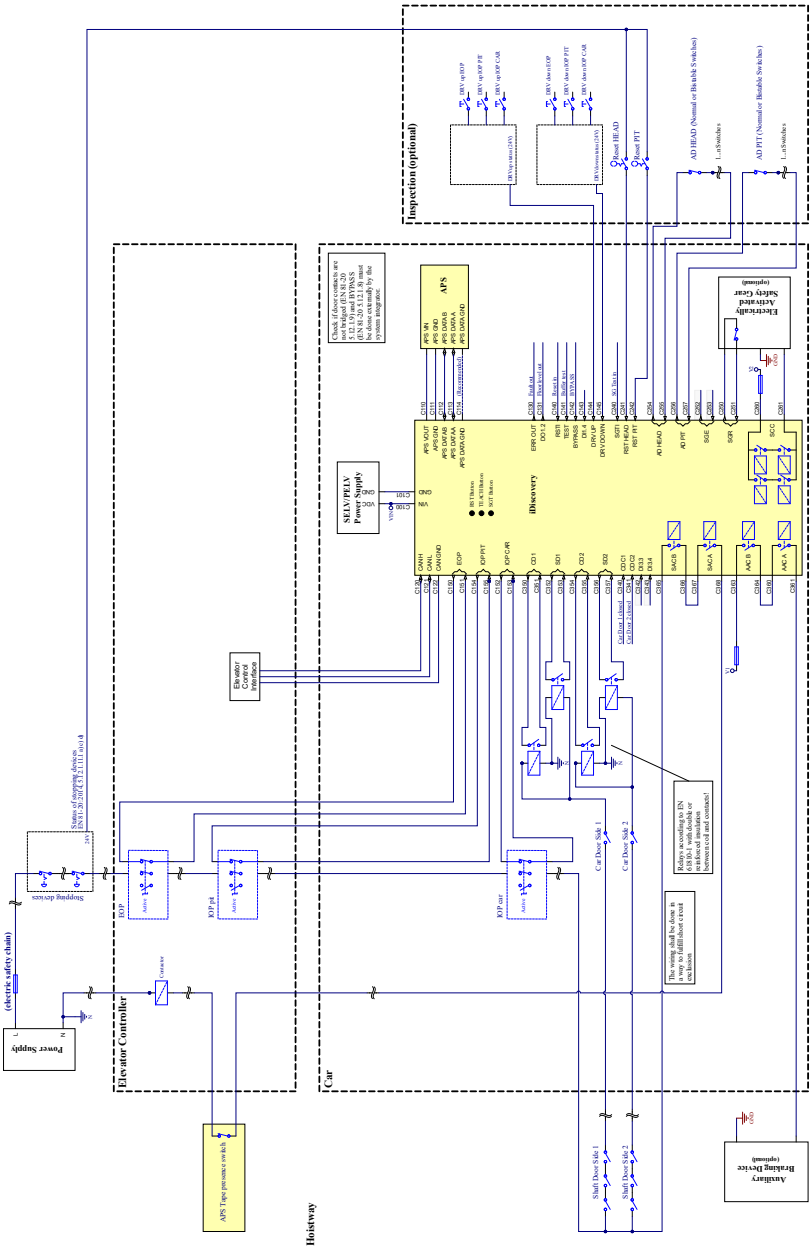
SAFETY ADVICE

- If the door wiring is done alternatively, the check if door contacts are bridged (EN 81-20 5.12.1.9) and BYPASS (EN 81-20 5.12.1.8) will not be performed by the iDiscovery and must be implemented separately and autonomously, independent to the iDiscovery by the system integrator.

6.2.1 iDiscovery mounted in the hoistway, machine room or landing door frame



6.2.2 iDiscovery mounted on car



7. Installation

7.1 APS and Code Tape

The code tape has to be mounted that the upper end of the tape is fixed. The lower end has to be floating to compensate building compression and thermal elongation.
The tape needs to be visible for APS from buffer to buffer to ensure that iDiscovery is fully functional along the entire operation range of the elevator.

The installation has to be carried out as detailed in the APS Installation and Operation Manual.
Furthermore, when installing the APS system, the national regulations and, when applicable, the EN 81-20/50 must be taken into account.

7.2 iDiscovery

iDiscovery can be installed in the machine room, in the landing door frame or directly onto the car. iDiscovery has to be mounted in an external enclosure to reach IP43 (together with iDiscovery which is IP20). Access to iDiscovery has to be restricted to qualified persons only. iDiscovery is intended to be mounted to a DIN-Rail. It is not allowed to mount iDiscovery with the connectors facing downwards (overhead).

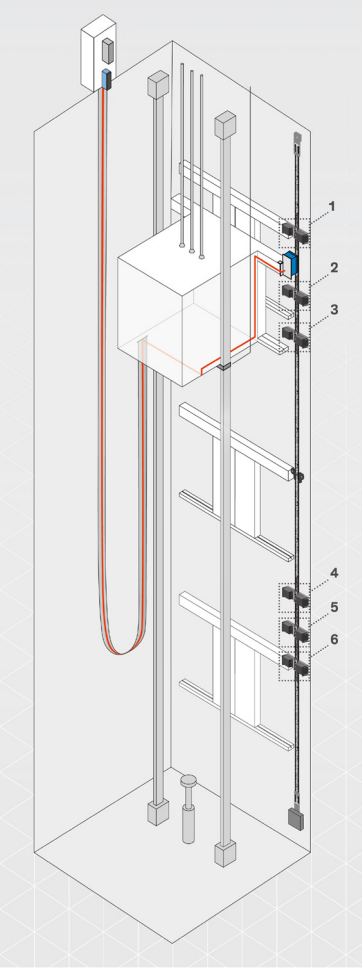
7.3 Configuration and floor position indicator clips

SAFETY ADVICE

- It is the installers responsibility that the floor position indicator clips and the configuration clips are mounted in a way that they can not move or fall off.

7.3.1 Configuration clips

The bottom floor clip (6) has to be mounted on the level position of the bottom floor (lowest floor) and the top floor clip (1) has to be mounted on the level position of the top floor (highest floor). The center of the configuration clip has to be mounted within ±50 mm of the level position. Exact position can be set within this tolerance using manual offset correction in the configuration mode. The clip must be mounted with a fix reference to the corresponding floor level (e.g. mounted to the building/ door frame or guide rail) and the tape must be able to move freely to allow thermal elongation of the tape.



The rated speed down clip (5) has to be mounted minimum 150 mm and maximum 600 mm above the bottom floor clip (6). The rated speed up clip (2), this clip is optional, has to be mounted minimum 150 mm and maximum 600 mm below the top floor (1). For the rated speed clip, a fix reference to the top/bottom floor is required.
The center of the rated speed clip(s) must be at least 50 mm away from floors. If code tape length exceeds 50 m this distance must be at least 100 mm.

In case of reduced headroom and/or pit (iDiscovery type with option 30 inspection) the clearance clips are used to define the position of the extended inspection limits (pre triggering of safety spaces (open SAC)). The final triggering for the safety spaces (open SCC) is done 300 mm after the position which is marked with the clip. Depending on the required safety space(s), clearance top clip (3), clearance bottom clip (4) or both clips are used. If no clip is mounted no safety space is generated and normal inspection limits are active.

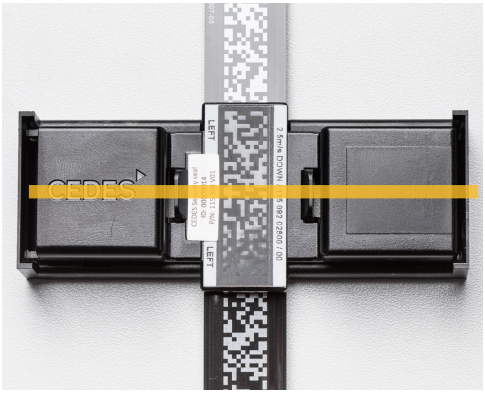
It must be ensured that all configuration clips have at least 150 mm distance to each other.

SAFETY ADVICE

- To define the mounting position(s) of the clearance clip(s), retraction and braking distance of a suitable safety gear, as well as the reaction time of all involved components, and potential thermal elongation of the code tape must be considered., see also relevant SAFETY ADVICE in chapter 3.5.1.
- The requirements about the working space as requested by EN 81-20 5.2.6.4.4.1 a) respectively the safety spaces as requested by EN 81-21 5.5.2.4 / 5.7.2.4 must be fulfilled after the car has stopped using the safety gear.

Mounting of configuration clips

Code tape must be able to move freely, code tape must be correctly placed within the snap



Floor level position is the center of the configuration clip

Sealing rated speed clip(s) and clearance clip(s)

After the clips are mounted on the correct location, the rated speed clip(s) and the clearance clip(s) must be sealed by an authorized technician and recorded in the elevator's logbook (see Chapter 25 Appendix A, Checklist). The seal has to be attached on the right side of the configuration clip at the designated area. It must be ensured that the seal is attached to the mounting base and the cover of the configuration clip.

Rated speed / clearance clip sealed with security seal

NOTICE

- Before the seal is stick to the clip ensure that the surface is clean, dry, dust and grease free.

7.3.2 Floor position indicator clips

Each floor position indicator clip has to be mounted on the corresponding floor level position. The level indicator bar of the clip has to be mounted within ±50 mm of the floor level position. Exact position of each clip can be set within this tolerance using manual offset correction in the configuration mode. The clip must be mounted with a fix reference to the building and the tape must be able to move freely to allow thermal expansion of the tape.

Code tape must be able to move freely

Floor level position is at the position of the bar

The installation has to be carried out as detailed in the APS Installation and Operation Manual.

7.3.3 Minimal distance in between floors

The minimal distance between two floor indicator clips must be 20 mm. If the distance between two floor positions is smaller than 20 mm, they can be adjusted manually after teach in (see chapter 14.2 Manual adjustment).

As long as there are no overlapping door zones there is no need to assign the related shaft/door side for the floors.

After teach in it is checked if there are floors which might have overlapping door zones. Overlapping door zones might be possible if the floor to floor distance is less than 800 mm. This results from the maximal mechanical unlocking zone of ±350 mm according to EN 81-20 and the maximal possible manual floor adjustment ±50 mm (with CANopen).

Each potential overlapping floor must be configured or taught for the corresponding shaft side to ensure that UCM is correct handled. As long as the shaft side is not set, leveling, re leveling and preliminary operation is not possible on this floors.

See chapter 14.3 Assign shaft side in case of overlapping door / unlocking zones for detailed information how to assign the shaft side.

NOTICE

- All required conditions described in Chapter 7.3 Configuration and floor position indicator clips will be automatically checked by iDiscovery at the end of the teach procedure. The teach procedure can only be completed if these conditions are fulfilled.

7.4 Code tape presence and elongation

It is mandatory to mount a code tape presence switch, respectively code tape presence and elongation switch, at the lower end of the code tape (see Chapter 3.9 Code tape presence and elongation control for detailed information and requirements).

7.4.1 Code tape presence switch

For elevators with travel length up to 100 m the simple code tape presence switch can be used. It can be assumed, that the temperature change after teach in is not more than 60°C, therefore the maximal elongation of the code tape is not more than 100 mm.

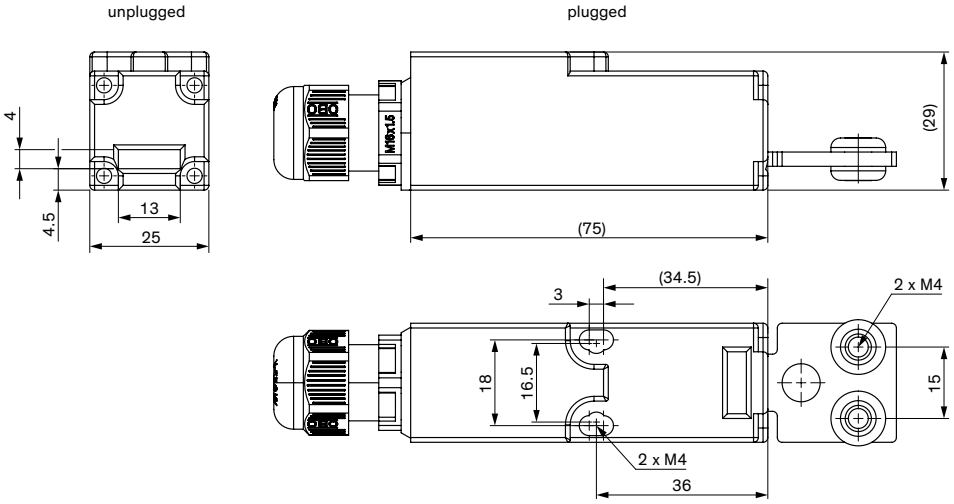
CEDES part number 115 581 Code Tape Presence Switch, packed (complete mounting set).

SAFETY ADVICE

- If travel length is higher than 100 m code tape presence switch must not be used. In this case code tape presence and elongation switch must be used.

Pull out safety interlock switch

The code tape presence switch is used to detect if the code tape is not longer correctly mounted (broken, fell off, …). It must be wired in series into the safety chain to guarantee that the elevator can not move if the code tape is not in correct position. The safety chain must be wired to terminals 11 and 12. These terminals represent a positively driven NC contact and opens if the safety actuator is pulled out.

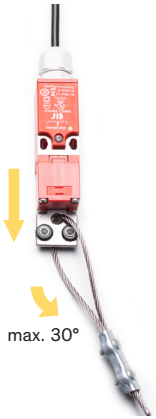


The code tape presence switch is connected via a steel cable to the lower end of the code tape. If the tape moves too far, the attached cable pulls out the safety actuator of the switch. In this case the contact respectively the safety chain is opened.

The code tape presence switch must be mounted in a way, that the position is fix and is able to withstand the force required to pull the safety actuator. For example to the building or a mounting support of the rail. It must be guaranteed that the code tape can move far enough that it is ensured that the cable can be stretched and the safety actuator is pulled off.

The switch must be mounted with the safety actuator facing downwards. It must be ensured that the safety actuator is pulled out straight (max. 30°), otherwise the required force might be too high.

The unused slot of the switch must be protected using the provided blind cover.



Cable

The cable must be mounted / routed in a way that it can freely move and can not stuck at any other mechanical device/ mounting points. Be aware of the angle of the cable in the position where the plug must be pulled out and ensure that the cable can be stretched enough to pull the plug. Ensure that the wire clamps are tightened with a torque of 3.0 Nm ±0.5 Nm to guarantee that the cable can not slip out.

SAFETY ADVICE

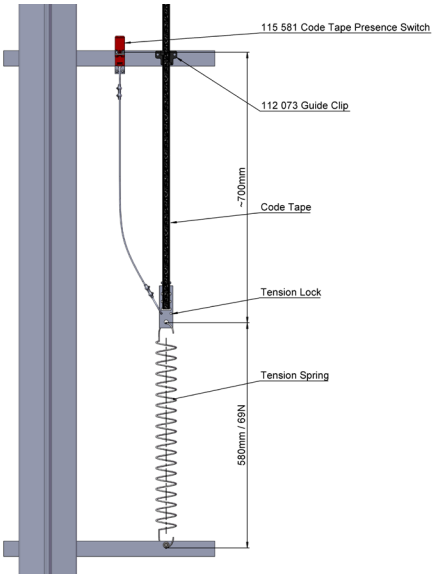
- Carefully read the instruction manual of the safety switch, which is part of the code tape presence switch, for detailed information about mounting, wiring and electrical specification.

Mounting

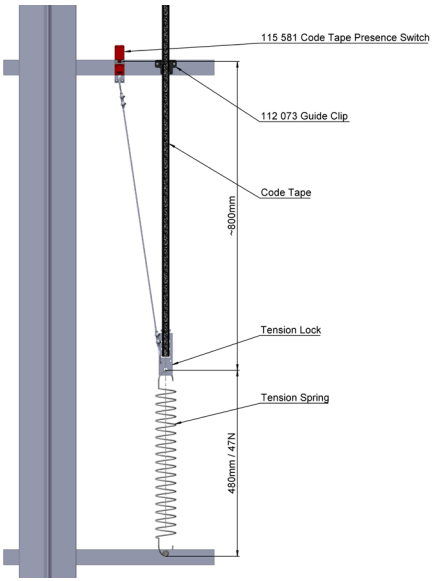
The following drawings show the correct mounting to ensure correct operation of the code tape presence switch.

Code tape mounted using the spring

Presence switch in normal operation position



Presence switch in the position short before the safety actuator is pulled out

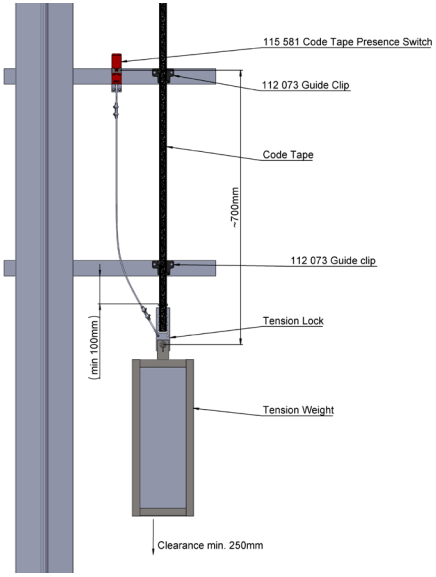


SAFETY ADVICE

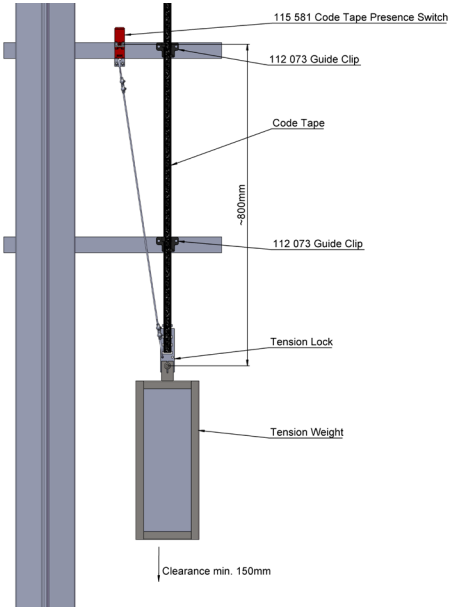
- Ensure that the tension spring is expanded at least 480 mm at the point where the plug is pulled out to ensure that the generated force to pull the plug is sufficient.
- During the final approval it must be checked whether the actuator of the code tape presence switch works correctly and the safety chain is opened. This can be done by pulling the safety actuator.
- During maintenance the correct function of the code tape presence switch must be tested, at least once per year.

Code tape mounted using the tension weight

Presence switch in normal operation position



Presence switch in the position short before the safety actuator is pulled out



SAFETY ADVICE

- Ensure that the tension weight has enough clearance to the bottom (min. 150 mm, when the cable is fully stretched), that it can move as far as required to pull the plug.
- During the final approval it must be checked whether the actuator of the code tape presence switch works correctly and the safety chain is opened. This can be done by pulling the safety actuator.
- During maintenance the correct function of the code tape presence switch must be tested, at least once per year.

7.4.2 Code tape presence and elongation switch

For elevators with travel length above 100 m the code tape presence and elongation switch must be used. It must be assumed that the elongation due to temperature changes can be more than allowed. The code tape presence and elongation switch ensures that traveling is not possible if elongation is outside the range of ±100 mm.

To ensure the system operates within the allowed range, the expected temperature change and the travel length have to be taken into account. For example, if expected temperature change after teach in is 30°C (positive or negative) the travel length can be 200 m. This results in an operating range of -10° ... 50°C if teach in was made at 20°C.

NOTICE

- The elongation of the code tape is 1/1000 of the length at delta T 60°C.

CEDES part number 115 582 Code Tape Presence and Elongation Switch, packed

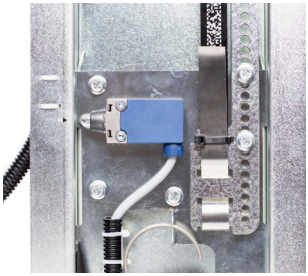
SAFETY ADVICE

- Elevators with a travel length higher than 100 m must always use the code tape presence and elongation switch.

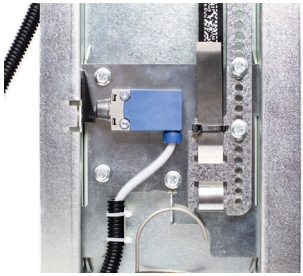
Position safety interlock switch

The code tape presence and elongation switch detects if code tape has moved more then ±100 mm. It must be wired in series into the safety chain to guarantee that the elevator cannot move if the code tape is not in correct position. The safety chain must be wired to the yellow and white wire. These wires are connected to the positively driven NC contact and open if the actuator is pressed. This is the case if the tape elongation is too much.

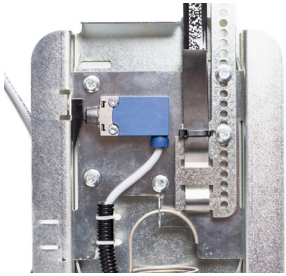
Presence switch in normal operation position, actuator is not pressed, safety chain is closed



Maximal lengthening (+100 mm) of the code tape, actuator is pressed, safety chain is opened

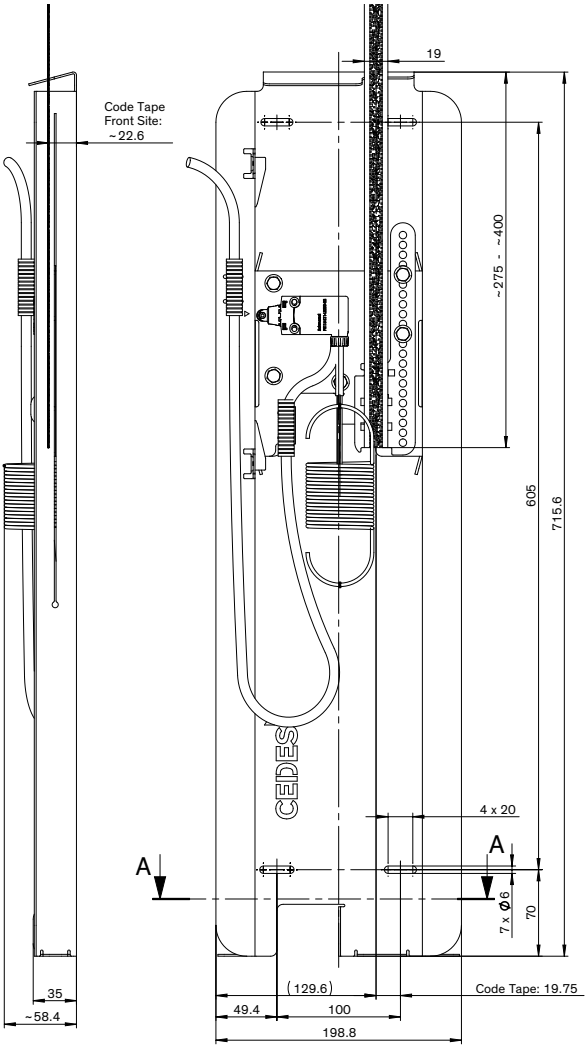


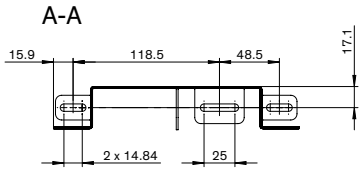
Maximal shrinking (-100 mm) of the code tape, actuator is pressed, safety chain is opened



Mounting the base to the building

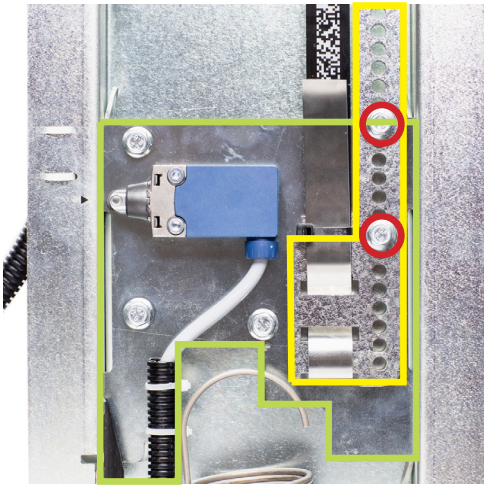
The code tape presence and elongation switch must be mounted in a way, that the position is fix and is able to withstand the force generated by the spring which is attached to the code tape.
It can be mounted to the wall or to the ground using the corresponding holes.





Mounting the code tape

To mount the code tape the bracket (yellow) which holds the code tape can be detached from the sled (green) by loosening the screws (red). Before the bracket is detached, it is recommended to mark the tape at the position of the bottom edge of the bracket, when the sled is in center position. This mark can be used as a reference when the tape is threaded through the bracket, as described below.

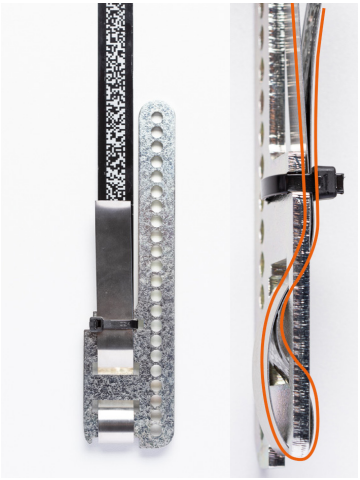


NOTICE

- There are two washers between the sled and the bracket. Ensure that these washers are correct placed if the bracket is mounted to the sled.

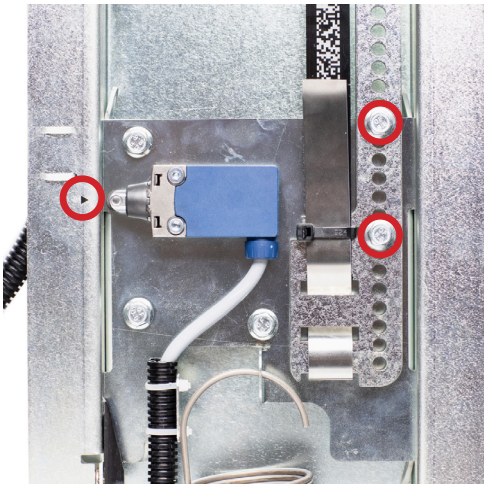
The code tape must be threaded exactly the way as described here. Otherwise it cannot be guaranteed that the code tape does not slip out of the bracket. Also ensure that the zip tie is mounted at the designated position.

1. Slide the tape into the 1st slot (upper most slot). Enter the slot from the front side, the tape is now behind the bracket.
2. Align the mark, described above, with the bottom edge of the bracket and pull the tape over the edge to the front side. The backside of the tape is now visible and in front of the bracket.
3. Slide the tape now into the 2nd slot. Enter the slot from the front side, and slide out at the 1st slot.
4. Tighten the tape and mount the zip tie.



Mount and align the bracket onto the sled

The bracket must be mounted while the sled is centered. The center position is marked with a triangle and has to be aligned with the position safety interlock switch. This can be done by using the appropriate holes in the bracket. To tighten the screws a torque of 10 Nm ±1 Nm shall be applied.



SAFETY ADVICE

- The presence switch must be mounted with the sled in centered position to guarantee that it can move ±100 mm during normal operation. Therefore it has to be ensured that the sled is in centered position at the time the teach procedure is started. This also applies if a new teach of the system must be made. Otherwise the safety-related function of the code tape presence and elongation switch is not guaranteed.

SAFETY ADVICE

- It must be ensured that the spring is correctly mounted and the code tape is properly tight.
- Ensure that the sled can freely move over the full length. During the final approval it must be checked if the code tape presence and elongation switch works correctly. Check if the safety chain is opened when the sled is moved to the upper end position.
- During maintenance the correct function of the presence switch must be tested, at lest once per year.

8. Operation modes

8.1 Pre commissioning mode

This mode provides the possibility to use EOP or IOP during installation of the elevator. To move the car, EOP or IOP must be active (see Chapter 10.11 Guarding operation for additional protection during pre commissioning).
Pre commissioning mode is automatically entered when iDiscovery is not configured.

SAFETY ADVICE

- Due to the fact that rated speed is not yet configured in this mode, maintenance overspeed limits are active:
  Overspeed MNT 0.63 m/s → SAC is opened if car travels faster than 0.63 m/s.
  Overspeed MNT 1.25 m/s → SAC, AAC and SCC are opened if car travels faster than 1.25 m/s.

8.1.1 Prerequisite

- Code tape mounted
- APS sensor mounted and roughly aligned with code tape
- Code tape presence (and elongation) switch mounted
- All required iDiscovery connectors are connected and correctly wired
- **EOP or IOP active to move the elevator car**

8.2 Teach mode

In this mode iDiscovery learns the floor positions and the configuration clips like top floor, bottom floor and rated speed clips. Teach mode is completed if all conditions according Chapter 12.4 Teach procedure are fulfilled. If teach procedure is not finished within 1 hour the mode is automatically switched to pre commissioning mode. To move the car, EOP or IOP must be active.

Teach mode can be activated as described in Chapter 12.3 Enter teach mode.

SAFETY ADVICE

- Due to the fact that rated speed is not yet configured in this mode, maintenance overspeed limits are active:
  Overspeed MNT 0.63 m/s → SAC is opened if car travels faster than 0.63 m/s.
  Overspeed MNT 1.25 m/s → SAC, AAC and SCC are opened if car travels faster than 1.25 m/s.

8.2.1 Prerequisite

- APS sensor aligned with code tape
- Configuration clips mounted (top floor, bottom floor, and rated speed down)
- If intended to use, configuration clip for rated speed up must be mounted
- Clearance clip(s) mounted, if required (only for iDiscovery type with option 30 inspection)
- Position indicator clip mounted on each floor level
- Tests described in Chapters 17.1 Check iDiscovery type to 17.7 Check AAC wiring performed
- **EOP or IOP active to move the elevator car**

8.3 Configuration mode

In the configuration mode additional parameters like door zone size, floor adjustments and some other parameters can be configured. The original values learned during teach mode cannot be changed.
All configurable parameters are checked for plausibility in the validation mode, before entering normal mode. To move the car, EOP or IOP must be active.

Configuration mode is activated using CANopen:

1. Ensure elevator is stopped.
2. Read the request code from object 0x63E2 sub index 4 (valid once for 5s) and write it back.

To switch back to normal mode CANopen must be used:

1. Ensure elevator is stopped.
2. Read the request code from object 0x63E2 sub index 6 (valid once for 5s) and write it back.
   Validation mode is automatically started before normal mode is active.

8.3.1 Prerequisite

- Successful teach in (valid configuration)
- Configuration mode can only be entered from normal mode

8.4 Validation mode

Validation mode is automatically started before normal operation is activated. During validation the parameters are internally checked for plausibility. Only if the check is passed, normal mode is started. If the check fails, iDiscovery goes into the appropriate mode. For example if parameters are changed in the configuration mode and the check fails, iDiscovery will stay in configuration mode.

8.5 Normal mode

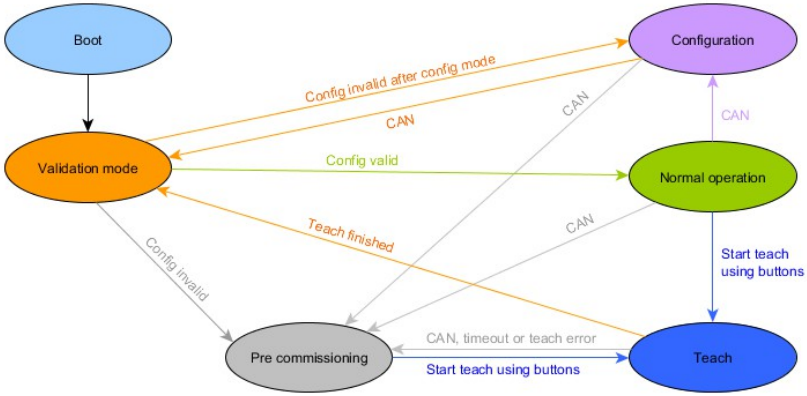
Normal operation mode of iDiscovery, elevator can move with nominal speed. All safety features such as UCM, overspeed and so forth are active and continuously processed. The floor positions are continuously adjusted based on the detected floor clips (see Chapter 14 Floor position adjustment and shaft side assignment).

8.5.1 Prerequisite

- Successful teach in and validation passed

8.6 Overview of operation modes (state diagram)

The following state diagram illustrates the different operation modes and the mode transitions.



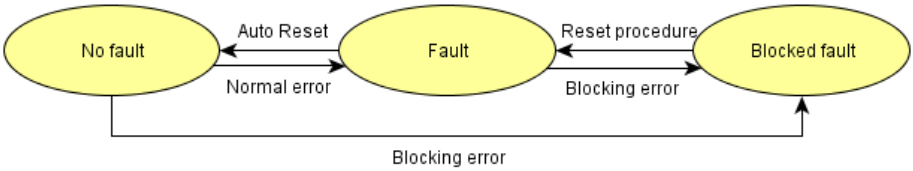
9. Fault modes

9.1 Fault mode

In case, a safety feature is triggered the fault mode is activated. Functions which do not need a manual reset are hold in fault mode as long as the unsafe condition is present. If the unsafe condition(s) are not present any longer the fault mode is automatically left. For example doors open / close.

9.2 Blocked fault mode

If a manual reset is needed to release the fault mode iDiscovery stays in this mode no matter if the unsafe condition(s) are present any longer. After the reset procedure is performed and the unsafe condition(s) are not present any longer the blocked fault mode is left.
Internal errors like RAM/ROM, voltage and so forth always trigger the blocked fault mode.



10. Safety features / functions

10.1 Overspeed

iDiscovery monitors different speed levels in upwards as well as in downwards direction. Overspeed limits refer to the rated speed which is taught using the rated speed down clip. With the use of the optional rated speed up clip a higher limit for upwards direction can be set. Overspeed limits are active when the rated speed is set. If rated speed is not set, maintenance overspeed limits are active.

10.1.1 Overspeed 108%

If the speed of the elevator car exceeds 108% of the rated speed, SAC is opened. In this case iDiscovery is in fault mode and is automatically released if the car stands still for 10 seconds.

10.1.2 Overspeed 125% / 120%

If the speed of the elevator car exceeds 125% of the rated speed, SAC, AAC and SCC are opened. This limit applies if rated speed is smaller or equal than 2.5 m/s. If rated speed is greater than 2.5 m/s the overspeed limit is reduced to 120% of the rated speed. In the case overspeed occurred iDiscovery is in blocked fault mode and requires a reset to be released.

10.2 Overspeed maintenance

Overspeed maintenance, in upwards as well as in downwards direction, is active if EOP or IOP is active, or in any other mode than normal mode.
If the speed of the elevator car exceeds 0.63 m/s, SAC is opened. In this case iDiscovery is in fault mode and is automatically released if the car stands still for 10 seconds.
If the speed of the elevator car exceeds 1.25 m/s, SAC, AAC and SCC contact are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.
The limits 0.63 m/s and 1.25 m/s are default values and can be reduced using CANopen object 0x2010 sub index 3 and 4.

NOTICE

- Overspeed 108% and 125% / 120% remain active and will be triggered if the corresponding limits are lower than the maintenance limits.

10.3 Final limit

iDiscovery calculates the final limit switch position by using the offset defined with the bottom/top floor configuration clip and opens SAC if they are over-traveled by the elevator car. In this case iDiscovery is in fault mode and is automatically released if the car is not in the final limit anymore.
By activating EOP the final limits are suppressed and the elevator car can be moved out of the final limit.

NOTICE

- If IOP is active too, final limits are not suppressed.

SAFETY ADVICE

- In case of hydraulic elevators the system integrator has to provide an independent anti-creep system.

10.4 Door monitoring (DM1)

Car and shaft doors are monitored separately (if recommended wiring is used). If at least one door is not locked respectively not closed, no matter if it is car or shaft door, SAC is opened and remains open as long as not all doors are locked respectively closed. Exceptions are leveling, re-leveling or preliminary operations with open doors.

To ensure the safety in case of overlapping door zones leveling, re leveling and preliminary operation is not possible until the relevant shaft side is configured or taught in. See chapter 14.3 Assign shaft side in case of overlapping door / unlocking zones for detailed information.

10.4.1 Leveling with open doors

iDiscovery monitors the conditions that must be fulfilled to allow leveling with open doors. The elevator car has to be in the door zone of the target floor and the enable signal for leveling must be active. Target floor number and enable signal have to be transmitted by the elevator controller via CANopen. The allowed speed limit for leveling is 0.8m/s. If all conditions are fulfilled SAC stays closed. If the car starts to move after it has stopped SAC is opened.

Target floor has to be transmitted in bit 24-31 of object 0x63E0 sub index 1 (RPDO 387). Enable bit for leveling has to be transmitted in bit 0 of object 0x63E0 sub index 1 (RPDO 387). The door zone size for leveling can be adjusted using CANopen object 0x63E8 sub index 1.

10.4.2 Re-leveling with open doors

iDiscovery monitors the conditions that must be fulfilled to allow re-leveling with open doors. The elevator car has to be in the re-leveling door zone of the target floor and the enable signal for re-leveling must be active. Target floor number and enable signal have to be transmitted by the elevator controller via CANopen. The allowed speed limit for re-leveling is 0.3m/s. If all conditions are fulfilled SAC stays closed.

Target floor has to be transmitted in bit 24-31 of object 0x63E0 sub index 1 (RPDO 387). Enable bit for re-leveling has to be transmitted in bit 1 of object 0x63E0 sub index 1 (RPDO 387). The door zone size for re-leveling can be adjusted using CANopen object 0x63E8 sub index 2.

10.4.3 Preliminary operation with open doors (fast start)

iDiscovery monitors the conditions that must be fulfilled to allow preliminary operations with open doors. The elevator car has to be within ±20 mm from the level position of the target floor and the enable signal for preliminary operation must be active. Target floor number and enable signal have to be transmitted by the elevator controller via CANopen. If all conditions are fulfilled SAC stays closed.

Target floor has to be transmitted in bit 24-31 of object 0x63E0 sub index 1 (RPDO 387). Enable bit for preliminary operation has to be transmitted in bit 2 of object 0x63E0 sub index 1 (RPDO 387).

10.5 Detection of unintended car movement (UCM)

If car and shaft doors are monitored separately according Chapter 6.1 Recommended wiring, UCM detection is only active if car door is not closed and shaft door is not locked.
If alternative wiring is used according Chapter 6.2 Alternative door wiring, UCM detection is active as soon as one door is not locked respectively closed.

The door zone size can be adjusted using CANopen object 0x63E8 sub index 1.

SAFETY ADVICE

- UCM detection is only active if SD1 and CD1 respectively SD2 and CD2 are open together (indicating that shaft door is not locked and the car door is not closed). If alternative wiring is used, the system integrator must ensure that both contacts SD1 and CD1 respectively SD2 and CD2 are open together.

SAFETY ADVICE

- UCM calculation and approval tests must be performed with a door zone of ±150 mm. The door zone parameter can be changed anytime and therefore the maximum door zone size must be considered for UCM calculation and approval tests.

10.5.1 Door zone speed monitoring (DDZS)

If the elevator car exceeds a defined speed limit within the door zone while car door is not closed and shaft door is not locked, SAC and AAC are opened. For leveling with open doors the speed limit is 0.8 m/s. As soon as the elevator car has stopped, the limit is reduced to 0.3 m/s and remains at this level for the entire door zone. In case the speed limit has been exceeded iDiscovery is in blocked fault mode and requires a reset to be released.

If iDiscovery type with option 29 UCM with SCC is used, SCC is opened in addition to SAC and AAC.

10.5.2 Monitoring that door zone is not left with open doors (DM2)

If the elevator car leaves the door zone while the doors are not closed/locked SAC and AAC are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

If iDiscovery type with option 29 UCM with SCC is used, SCC is opened in addition to SAC and AAC.

10.5.3 Temporary door zone

If the elevator stops outside of an iDiscovery door zone and opens the car and shaft door, a temporary door zone of ±50 mm is generated. If the car leaves this temporary door zone or travels faster than 0.3 m/s while car door is not closed and shaft door is not locked, SAC and AAC are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

Inside overlapping door zones the temporary door zone is also active if the doors are open on the wrong side or not assigned.

If the iDiscovery type with option 29 UCM with SCC is used, SCC is opened in addition to SAC and AAC.

10.6 Retardation control / ETSL

The speed limit is calculated for each position and is lowered towards the ETSL end point. The ETSL end point is equal to the level position of the corresponding top or bottom floor.

The speed limits are calculated according to the following formula:

$v_{ETSL} = \sqrt{2 \cdot a_{ETSL} \cdot s} + v_{offset}$; limited to v_{min}

v_{ETSL}	= the speed limit at the current position
s	= distance between actual position and ETSL end point
a_{ETSL}	= deceleration used for calculation (maximum for normal deceleration of the elevator)
v_{Offset}	= offset to the calculated deceleration curve (tolerance)
v_{min}	= minimum speed limit which is monitored for ETSL, below this limit ETSL is not triggered

SAFETY ADVICE

- The system integrator has to determine the required buffer type which is capable to absorb the max possible impact speed. The max possible impact speed depends on the calculated ETSL limit curve, the reaction time (PST) of the entire ETSL system (iDiscovery + braking system), deceleration value of the brake and the space between buffer and ETSL end point.

For test purpose ETSL end points can be shifted using CANopen.

10.6.1 ETSL 1

If the car exceeds the speed limit at the current position, SAC is opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

ETSL 1 is calculated with the following values:

v_{min} = 1.0 m/s
a_{ETSL} = 1.26 m/s²
v_{Offset} = 0.2 m/s

10.6.2 ETSL 2

If the car exceeds the speed limit at the current position, SAC and AAC are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

ETSL 2 is calculated with the following values:

v_{min} = 1.3 m/s
a_{ETSL} = 1.26 m/s²
v_{Offset} = 0.5 m/s

10.7 Maintenance operation (MNT)

If EOP or IOP are active, maintenance operation is enabled.
MNT is used for:

- enabling maintenance overspeed limits
- allow reset
- allow to move the car if the device is not in normal mode (otherwise SAC is open)
- required to switch to pre commisioning using CANopen commands

If EOP only is active, final limits and SGR are disabled according EN 81-20; 5.12.1.6.1 d) { 2), 3), 4), 6) }.

10.8 Check if door contacts are faulty (bridged) (OVB)

iDiscovery monitors if door contacts are bridged as required by EN 81-20 Chapter 5.12.1.9. If the elevator car is within the door zone and at least one door contact (CDx or SDx) or the door closed signal (see Chapter 5.3.5 Door closed signal) indicates an open door, all corresponding door contacts and signals need to change to open state within two seconds. If this is not the case, SAC contact is opened and iDiscovery is in fault mode. The fault mode is released automatically when all corresponding door contacts and signals are indicating open state together or MNT is activated. While MNT is active the check is not performed.

SAFETY ADVICE

- This feature can **ONLY** be used if recommended wiring according to Chapter 3.7.1 Recommended wiring of door contacts is used.
- If the door wiring is done alternatively, the check if door contacts are bridged (EN 81-20 5.12.1.9) will not be performed by iDiscovery and must be implemented separately and autonomously, independent to iDiscovery by the system integrator.

10.9 Bridging of door contacts for maintenance (BYPASS)

During maintenance (EOP or IOP) the bypass of one door loop (shaft door or car door) is allowed if a dedicated BYPASS signal is active. This is in accordance with EN 81-20 5.12.1.8.

BYPASS is active if EOP or IOP is active and the digital input (DI 1.3) is high. With BYPASS active, iDiscovery monitors SDI, CDI and the door closed signal(s) (see Chapter 5.3.5 Door closed signal). If either shaft door contacts or car door contacts are open (EN 81-20 5.12.1.8.3 c)) and the corresponding signal indicates car door closed (EN 81-20 5.12.1.8.3 d)), SAC stays closed (EN 81-20 5.12.1.8.3 b)). As soon as both door contacts are open (car and shaft) or the door closed signal is not present the SAC is opened.

SAFETY ADVICE

- The system integrator has to ensure that normal operation is suppressed (EN 81-20 5.12.1.8.3 a), f)). Signals as required by EN 81-20 5.12.1.8.3 g) have to be provided by the system integrator, too.

SAFETY ADVICE

- This feature can **ONLY** be used if recommended wiring according to Chapter 3.7.1 Recommended wiring of door contacts is used.
- If the door wiring is done alternatively, BYPASS (EN 81-20 5.12.1.8) will not be performed by the iDiscovery and must be implemented separately and autonomously, independent to the iDiscovery by the system integrator.

10.10 Safety gear monitoring

This functionality is only available if SCC Module is used. See Chapter 13 Safety gear interface.

10.11 Guarding operation

During guarding operation overspeed limit is lowered to 0.2m/s. If the speed of the elevator car exceeds the limit, SAC, AAC and SCC contact are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

If the elevator stops and at least one door input (SDx/CDx) is opened the actual position is stored. If the car travels more then ±50 mm while the door input is still open, SAC and AAC are opened. In this case iDiscovery is in blocked fault mode and requires a reset to be released.

If iDiscovery type with option 29 UCM with SCC is used, SCC is opened in addition to SAC and AAC.

The guarding operation is active if:

- Pre commissioning mode is active
- EOP, IOP_{CAR} and IOP_{PIT} inputs are open/active
- Test input is high (C141, TEST)

SAFETY ADVICE

- This feature cannot be used as stand alone safety device during the installation. Additional safety measures have to be provided by the system integrator and/or system operator and/or technician to ensure the safety.

10.12 Inspection limits

If IOP_{CAR} and/or IOP_{PIT} is active, the inspection limit top and bottom are active.
The inspection limit positions can be adjusted with CANopen. If no offset is defined the inspection limits are set to the top/bottom floor level.

If the inspection limit is overrun SAC is opened and iDiscovery is in fault mode. It is automatically released if the car stands still for 10 s. Every time the car travels unexpected further into the limit, SAC is opened again after 50 mm.

NOTICE

- This inspection limits are not active if the corresponding extended inspection limit and safety space is active. See chapter 10.13.6 Overview of the traveling limits during inspection operation.

10.13 Reduced top and/or bottom clearances

Extended Inspection limits and safety spaces (EN 81-21) respectively working spaces (EN 81-20) are only available for iDiscovery types with option 30 inspection.
The extended inspection limits and safety spaces are configured by using the clearance clips, see Chapter 7.3.1 Configuration clips.
An overview with the traveling limits is given in Chapter 10.13.6 Overview of the traveling limits during inspection operation.

10.13.1 Activation of the extended inspection limits and the safety spaces

If a safety space is configured (by the clearance clip(s)) and a door which gives access to the shaft is opened manually (AD_{HEAD} / AD_{PIT}) or the inspection panels is activated (IOP_{CAR} / IOP_{PIT}) the corresponding extended inspection limit and safety space is activated.

- If safety space head is configured and IOP_{CAR} is activated or AD_{HEAD} input indicates that a door which gives access to the car roof is opened manually, the extended limit top and the safety space top is activated.
- If safety space pit is configured and IOP_{PIT} is activated or AD_{PIT} input indicates that a door which gives access to the pit is opened manually, the extended limit bottom and the safety space bottom is activated.

In case monostable switches are configured (with clearance clips) the corresponding extended inspection limit(s) and safety space(s) are automatically activated at boot up.

As soon as one of the access doors is opened, traveling is only possible by using EOP or IOP. Normal operation and disabling of the extended inspection limits and the safety spaces is only possible by correct reset conditions.

SAFETY ADVICE

- The system integrator has to ensure that normal operation is suppressed while inspection operation or emergency operation is active (EN 81-20 5.12.1.5, 5.12.1.6).

10.13.2 Extended inspection limits

If the extended inspection limit is overrun, SAC is opened and iDiscovery is in fault mode. The fault mode is automatically released if a rising edge on the input of the intended traveling direction is detected. If the signal on DRV_{UP} / DRV_{DOWN} is not longer active or both signals are active, SAC is opened again.

- If the car is in the top limit, the intended traveling direction must be down (DRV_{DOWN})
- If the car is in the bottom limit, the intended traveling direction must be up (DRV_{UP})

If the car is moving by mistake against the expectation, SAC is opened again after 50 mm.

10.13.3 Safety spaces EN 81-21 / Working space EN 81-20

To ensure the safety spaces respectively the working space SAC, AAC and SCC are opened as soon as the extended inspection limits are overrun more than 300 mm. In this case iDiscovery is in blocked fault mode and requires a reset to be released.
After reset is performed the extended inspection limits are still active and traveling is only allowed as described in 10.13.2 Extended inspection limits.

If the car is moving towards the shaft end, while or after the reset is performed, SAC, AAC and SCC are opened again after 50 mm.

SAFETY ADVICE

- If safety space is triggered and SCC is open, moving out of the limit is only possible using emergency operation panel (EOP) due to the fact that SGR must be bridged (EN 81-20, 5.6.2.1.5). See chapter 13.2 Safety Gear Retracted (SGR) (EN 81-20, 5.6.2.1.5) for detailed information.

10.13.4 Disabling / reset of the extended inspection limits and safety spaces

Once the extended inspection limits and safety spaces are activated (access door was opened and/or IOP was activated) they stay active until they are disabled / reset manually. Top and bottom limits/safety spaces have to be reset individually

Disable / reset conditions

- Both inspection panels must be disabled, read in by iDiscovery (IOP_{CAR} / IOP_{PIT})
- The reset signal in accordance to EN 81-21 5.5.3.3 / 5.7.3.3 must be provided to the iDiscovery inputs RST_{HEAD} respectively RST_{PIT} (pulse for 5 - 10 s).
- The state of the stopping devices according to EN 81-21 5.5.3.2 b) and EN 81-21 5.7.3.2 b) is not read in by iDiscovery. The state of the stopping devices must be considered as part of the reset signals.
- The corresponding switches (AD_{HEAD} / AD_{PIT}) which are indicating that a door is opened manually must be closed.
- All car and shaft doors must be closed, read in by iDiscovery (SD1/2 and CD1/2).

SAFETY ADVICE

- It is the system integrator's responsibility to ensure that the state of the stopping devices according to EN 81-21 5.5.3.2 b) and EN 81-21 5.7.3.2 b) is considered as part of the reset signal.

SAFETY ADVICE

- The system integrator has to ensure that all requirements of the stopping devices according EN 81-20 5.12.1.11 are fulfilled.

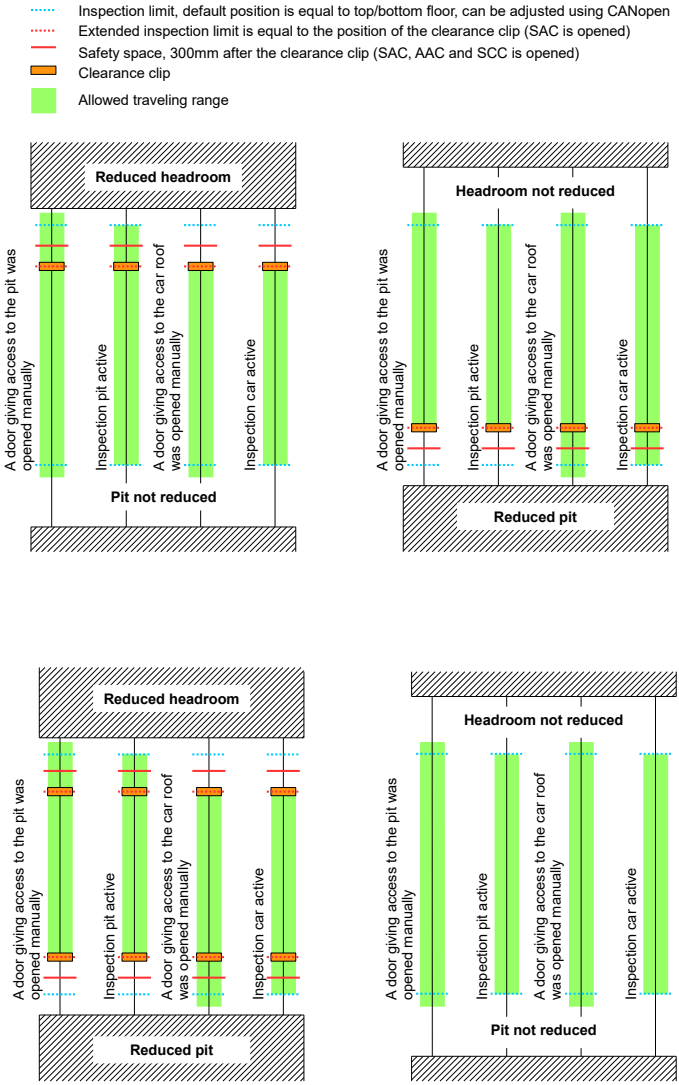
10.13.5 Special handling in case of monostable switches

In case monostable switches are configured (with clearance clips) the corresponding extended inspection limit(s) and safety space(s) are automatically activated at boot up.
This is required to ensure the safety in case someone entered the shaft while iDiscovery was not powered.

NOTICE

- The system integrator shall implement a solution (e.g. UPS) to prevent that a manual reset of the extended inspection limits and safety spaces is required after power loss. Otherwise traveling is only possible with EOP /IOP

10.13.6 Overview of the traveling limits during inspection operation



10.14 Safety feature matrix

The following matrix gives an overview of the safety features and the related contacts as well as the fault and operation modes. Check the appropriate chapters above for detailed information of each safety feature.

Safety features	Contacts			Fault mode		Operation mode			
	SAC A/B	AAC A/B (Note 1)	SCC (Note 4)	Blocked fault	Fault	Precom.	Teach	Config	Normal
OS Final (120% / 125%) 125% if rated speed is ≤2.5 m/s 120% if rated speed is > 2.5 m/s *Blocked fault, manual reset*	open	open	open	×				×	×
OS (108%) *Fault, automatic reset if car stands still for 10 s*	open	closed	closed		×			×	×
OS Maintenance 1.25 m/s *Blocked fault, manual reset*	open	open	open	×		×	×	×	×
OS Maintenance 0.63 m/s *Fault, automatic reset if car stands still for 10 s*	open	closed	closed		×	×	×	×	×
Final Limit *Fault, automatic reset if final limit is left*	open	closed	closed		×			×	×
ETSL 1 *Blocked fault, manual reset*	open	closed	closed	×				×	×
ETSL 2 *Blocked fault, manual reset*	open	open	closed	×				×	×
SGR *Fault, automatic reset if safety gear fully retracted (SGR contact closed)*	open	closed	closed		×	×	×	×	×
Door monitoring (DM1) (Door over bridging not active) Leveling, re-leveling or preliminary operations not active	open	closed	closed			×	×	×	×
Door monitoring (DM1) (Door over bridging active) Leveling, re-leveling or preliminary operations active	closed	closed	closed						×
BYPASS Conditions not fulfilled for BYPASS	open	closed	closed			×	×	×	×
Check if doors are over bridged (OVB) *Fault, automatic reset if door contacts are not longer bridged*	open	closed	closed		×			×	×
UCM, Monitoring that door zone is not left with open doors (DM2)[Note 3] *Blocked fault, manual reset*	open	open	closed open	×				×	×
UCM, Door zone speed monitoring (DDZS)[Note 3] *Blocked fault, manual reset*	open	open	closed open	×				×	×
Temporary door zone (UCM outside door zone)[Note 3] *Blocked fault, manual reset*	open	open	closed open	×		×	×	×	×
Inspection limit *Fault, automatic reset if car stands still for 10 s*	open	closed	closed		×			×	×
Extended inspection limit[Note 2] *Fault, automatic reset if the expected traveling direction is correct*	open	closed	closed		×			×	×
Safety space in case of reduced top and/or bottom clearances[Note 2] *Blocked fault, manual reset*	open	open	open	×				×	×

Notes:

Note 1 On iDiscovery type with option 12 “No AAC” AAC relays are not assembled, the contact is not available.
Note 2 This features are only available for iDiscovery type with option 30 “inspection”.
Note 3 SCC is only opened if Discovery type with option 29 “UCM with SCC” is used.
Note 4 SCC is only available if iDiscovery type with option 1 “SCC” is used. If it is described that SAC, AAC and SCC is opened in case of unsafe condition, only SAC and AAC are opened for iDiscovery without option 1 “SCC”.

11. Error handling

There are two different fault types. The first type are faults that are cleared automatically as soon as the conditions that triggered the fault aren't present anymore (fault mode). The second type of faults require a manual reset as described in the chapter reset procedure (blocked fault mode). First the corresponding error conditions need to be cleared, before the reset procedure can be started.

See Chapter 10.14 Safety feature matrix for the safety features and the corresponding fault types and reset conditions.

The different error LEDs indicate the error which has been triggered. In addition UP or DOWN LED blinks with 10 Hz to show in which direction the car was traveling when the error occurred.

11.1 Reset procedure

1. Ensure that elevator car stands still.
2. Set EOP or IOP (MNT) active.
3. Activate reset. This can either be done by pressing the reset button (pressed for 3 - 7 s) or triggering the reset input (active for 3 - 7 s). The PWR LED starts flashing at 5 Hz indicating that the reset button can be released.
   This step can also be performed using CANopen, read the request code from object 0x63E2 sub index 1 (valid once for 5 s) and write it back.
4. Check if SAC, AAC and SCC are closed after the reset is performed.

NOTICE

- Depending on the error status the SAC stays open after the reset procedure was performed. For example if doors are open SAC stays open to prevent the elevator car from moving with open doors.

WARNING

- SCC is closed after a reset is performed. Safety gear must not be retracted automatically when it was mechanically engaged.

12. Configuration and teach process

The use of the configuration clips in combination with the floor indicator clips allow a fully automated teach process and leads to an efficient and straightforward configuration and teaching process. Ensure that code tape, APS, configuration clips, floor indicator clips and the code tape presence switch respectively code tape presence and elongation switch are installed according Chapter 7 Installation.

SAFETY ADVICE

- It must be guaranteed that the floor positions are always within the allowed offset of ±100 mm. Therefore, if code tape presence and elongation switch is used, it must be ensured that the switch is centered when teaching iDiscovery.

12.1 New iDiscovery

A new iDiscovery is not configured when it is delivered to the job site. Therefore it is in pre commissioning mode after boot up.

12.2 Re-teach of iDiscovery

If iDiscovery is replaced with a previously taught device, the teach procedure must be performed again. The teach procedure must also be repeated if the code tape or the APS has been replaced.
Remove seal on teach button and reseal after the device has been taught again. The new seal number needs to be recorded into the elevator's logbook (see Chapter 25 Appendix A, Checklist).

12.3 Enter teach mode

To teach the device, the teach mode needs to be activated. If iDiscovery is not in pre commissioning mode the teach mode can only be activated one minute after power-up. The teach procedure is active for 1h. The teach mode is entered by the following procedure:

1. Press and hold Reset Button (RST)
   blue DIAG LED is on
2. When the DIAG LED starts flashing, press and hold teach button (TEACH)
   blue DIAG LED is on
3. When the DIAG LED starts flashing again, release teach button
   blue DIAG LED is on
4. When the DIAG LED starts flashing again, release reset button
   blue DIAG LED is off

NOTICE

- Teach mode can be entered even if the device is in fault or blocked fault mode. Reset of errors can be done in teach mode. Before teach process is started, errors have to be cleared.
- If teach mode is entered, all teachable and configurable parameters are set back to default values. Normal operation is not longer possible until a successful teach has been performed.
- If iDiscovery is rebooted in teach mode it starts up in pre- commissioning mode.
- Teach mode can be entered at any position within the code tape range.

12.4 Teach procedure

If the device is in teach mode, the following conditions are present:

- SAC contact is open while the configuration is cleared
- To move the elevator car EOP or IOP must be active (otherwise SAC is open).
  LED: OS is blinking 5 Hz if EOP and IOP is not active.
- Active teach mode is indicated by FLT, FLB and OS LED,
  LED: FLT, FLB, OS are blinking 1 Hz, UCM and RC are off
  LED: ERR LED blinks 9 times → Invalid configuration
- If car is already on a configuration clip the corresponding LED is blinking and the car must be moved out first.
  LED: FLT is blinking 10 Hz if car is on the top floor clip.
  LED: FLB is blinking 10 Hz if car is on the bottom floor clip.
  LED: FLT and FLB are blinking 10 Hz if car is on any other configuration clip.

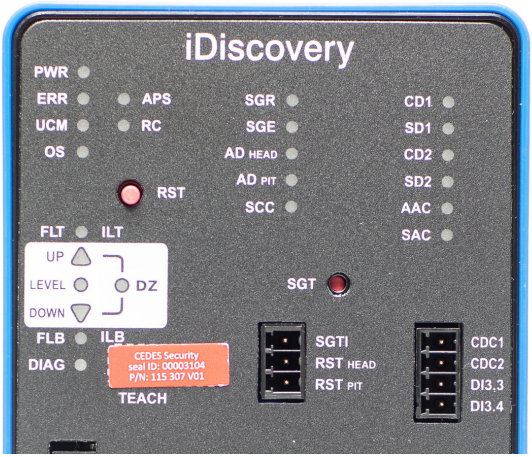
Teach procedure can be done in upwards or downwards direction. The procedure starts as soon as the corresponding clip (bottom or top floor) is detected. The following description describes the procedure in upwards direction starting at the bottom floor:

1. Move the elevator car to the lowest floor. When the bottom floor clip is read, the bottom floor position and the final limit bottom position are stored. The final limit position is determined by the offset that is coded on the bottom floor clip. The LED FLB is now switched off to indicate that the final limit bottom position has been stored. If the car is traveling further towards the lower end of the hoistway, the SAC is opened for 10 seconds. The SAC is opened to stop the car from running into the buffer and indicating that the bottom floor has been detected.

SAFETY ADVICE

- If the car travels at very low speed (< 0.1 m/s) towards the shaft end while the clip is read, the SAC contact might not be opened. If the car stops after the clip was detected, SAC is not opened if the car travels over the clip towards the shaft end. Final limits are not active during teach in!

2. Move the elevator car to the highest floor. Now all the configuration clips (rated speed down/up, clearance head/pit) and the floor position indicator clips are learned and stored with the corresponding position information. The LED OS is switched off as soon as the rated speed down clip is read. The LED DZ switches on each time a floor position is detected. It is switched off, when the corresponding door zone is left. When the top floor clip is read, the top floor position and the final limit top position are stored. The final limit position is determined by the offset that is coded on the top floor clip. The LED FLT is now switched off to indicate that the final limit top position has been stored. The SAC is opened for 10 seconds to stop the car from running into the buffer and indicating that the necessary parameters have been learned and the teach procedure is finished. At the end of the teach procedure, iDiscovery performs an automatic plausibility check of the taught parameters.
3. Check if plausibility check of the configuration has been performed successfully.
   - If check is successful, the LEDs UCM, RC, OS, FLT and FLB are switched on for 10 seconds. The plausible configuration is stored into the non volatile memory and iDiscovery switches automatically into normal mode.
   - If check has failed, SAC stays open and teach procedure must be repeated.
     LED UCM is blinking with 5Hz if floor table is not plausible.
     LED OS is blinking with 5Hz if rated speed down clip is not detected or the mounting position of the rated speed clip(s) is/are not correct (see Chapter 7.3.1 Configuration clips).
     LEDs UCM, RC, OS, FLT and FLB are blinking with 5Hz if other failures like bad detection of clearance clips and so forth are detected (see chapter 7.3.1 Configuration clips).
4. Perform a power cycle.
5. Once the device is taught the teach button must be sealed with the corresponding security seal. The number on the seal has to be written into the elevator's logbook (see Chapter 25 Appendix A, Checklist).
6. Assign the shaft side in case of overlapping door zones. Otherwise leveling, re leveling and preliminary operation is not possible inside the overlapping door zones.
   See chapter 14.3 Assign shaft side in case of overlapping door / unlocking zones for detailed information how to Assign the shaft side.



TEACH button sealed with security seal after iDiscovery is taught.

NOTICE

- Before the seal is stick to the desired place ensure that the surface is clean, dry, dust and grease free.

SAFETY ADVICE

- After each teach run (no matter if first time or re-teach) the functionality of iDiscovery must be approved according to Chapter 17 Initial and periodic examinations and tests.

NOTICE

- Recommendation for the integration of the teach procedure into the elevator controller with CANopen communication CiA417:

1. Guide the technician with the user interface of the elevator controller on how to enter teach mode. Visualize button sequence.
2. Check if teach mode is active, operation mode in PSU status PDO.
3. If required adjust door zone size in object 0x63E8. See Chapter 10.5 Detection of unintended car movement (UCM) for UCM calculation and approval test restrictions.
4. Guide the technician through the teach procedure. Moving the elevator car through the hoistway using EOP or IOP.
5. Visualize the actual progress of the teach procedure. The information on teach status are accessible in object 0x2170, bit 13-15.
6. Teach procedure is finished if bit 0 in object 0x2170 is set.
7. Check bit 3-12 of object 0x2170 if an error has occurred.
8. After a successful teach run, the iDiscovery switches automatically to normal mode and is operational.
9. Read the floor table to set floors accordingly in the elevator controller.
10. No further configuration necessary. Adjustments can be made in configuration mode.

12.5 Parameters

There are two different kinds of configuration parameters. The parameters taught in the teach procedure and parameters entered in the configuration mode using CANopen commands.

Parameters configured with configuration and floor indicator clips (configured in teach mode) cannot be changed without reteaching iDiscovery.

Teachable parameter	Default	Min.	Max.	Unit
Bottom floor position Taught with bottom floor clip	16,777,215 (Error value)	0	3,000,000	0.5 mm
Final limit bottom offset Taught with bottom floor clip	-10	-350	-10	1.0 mm
Top floor position Taught with top floor clip	16,777,215 (Error value)	> bottom floor	3,000,000	0.5 mm
Final limit top offset Taught with top floor clip	10	10	350	1.0 mm
Rated speed down Taught with rated speed down clip	90	150	16,000	1.0 mm/s
Rated speed up Taught with rated speed up clip or set identical to rated speed down if rated speed up is not used (or not detected)	90	≥ speed down	16,000	1.0 mm/s
Floor positions (except bottom and top floor) Taught with floor position indicator clip	16,777,215 (Error value)	0	3,000,000	0.5 mm
Number of last floor Taught with the floor clips. This value represents the number of floors, except the first floor number is set to a value different than 1 (described below in configurable parameters). E.g. first floor set to 10 and two floors detected → results in 11 for the last floor.	0 (Error value)	> number of first floor	254	–
Extended inspection limit bottom position (offset to bottom floor) Taught with clearance pit clip	0	0	5,000	1.0 mm
Safety space pit offset (offset to bottom floor) Taught with clearance pit clip	-300	-300	4,700	1.0 mm
Safety space pit switch type (0 = not used; 1 = monostable; 2 = bistable)	0	0	2	–
Extended inspection limit top position (offset to top floor) Taught with clearance head clip	0	-5,000	0	1.0 mm
Safety space head offset Taught with clearance head clip	300	-4,700	300	1.0 mm
Safety space pit switch type (0 = not used; 1 = monostable; 2 = bistable)	0	0	2	–

NOTICE

- The check sum of the taught parameters can be read on CANopen object 0x2024, sub index 2.

Parameters which can be configured in configuration mode using CANopen.

Configurable Parameter	Default	Min.	Max.	Unit
Retardation / ETSL end point bottom (offset to the bottom floor, end point is above the bottom floor) *Object 0x2011 sub index 1, see Chapter 10.6 Retardation control / ETSL for detailed information.* **SAFETY ADVICE** ▸ Parameter shall only be changed for test purpose. This is a not safety relevant adjustment of the end point. System integrator has to ensure that safety (buffer dimension) is guaranteed with ETSL offset 0.	0	0	3,000	1.0 mm
Retardation / ETSL end point top (offset to the top floor, end point is below the top floor) *Object 0x2011 sub index 2, see Chapter 10.6 Retardation control / ETSL for detailed information.* **SAFETY ADVICE** ▸ Parameter shall only be changed for test purpose. This is a not safety relevant adjustment of the end point. System integrator has to ensure that safety (buffer dimension) is guaranteed with ETSL offset 0.	0	-3,000	0	1.0 mm
Door zone size for leveling with open doors and UCM detection* (Door zone size of 150mm results in a total door zone of 300mm, 150mm above and 150mm below floor level). *Object 0x63E8 sub index 1, see Chapter 10.4 Door monitoring (DM1) and Chapter 10.5 Detection of unintended car movement (UCM) for detailed information.* **SAFETY ADVICE** ▸ See chapter 10.5 Detection of unintended car movement (UCM) for UCM calculation and approval test restrictions.	150	10	150	1.0 mm
Door zone size for releveling* The max. size is limited to the actual configured door zone size for levelling and UCM. (Door zone size for releveling of 50 mm results in a total door zone of 100 mm, 50 mm above and 50 mm below floor level). *Object 0x63E8 sub index 2, see chapter 10.4.2 Re-leveling with open doors for detailed information.*	50	10	150	1.0 mm
Manual floor offsets for level adjustment of each floor *Object 0x63ED sub index 1-254, see chapter 14 Floor position adjustment and shaft side assignment for detailed information.*	0	-50	50	1.0 mm

Configurable Parameter	Default	Min.	Max.	Unit
Maintenance OS 0.63m/s limit *Object 0x2010 sub index 3, see chapter 10.1 Overspeed for detailed information.*	630	50	630	1.0 mm/s
Maintenance OS 1.25m/s limit *Object 0x2010 sub index 4, see chapter 10.1 Overspeed for detailed information.*	1,250	300	1,250	1.0 mm/s
Number of first floor Used to map the actual floor number to the CANopen floor number If this value is adjusted, all floor numbers will be adjusted accordingly. *Object 0x63EC sub index 1*	1	1	255 – number of floors	–
Virtual shaft switch top slow (virtual input pre-limit switch top) Offset to the top floor. *Object 0x2015 sub index 4, see chapter 16.1 Virtual input group 1 (0x6100) for detailed information.*	-200	-10,000	0	0.5 mm
Virtual shaft switch top fast (Correction switch top) Offset to the top floor. *Object 0x2015 sub index 2, see chapter 16.1 Virtual input group 1 (0x6100) for detailed information.*	-1,000	-10,000	0	0.5 mm
Virtual shaft switch bottom slow (Pre-limit switch bottom) Offset to the bottom floor. *Object 0x2015 sub index 3, see chapter 16.1 Virtual input group 1 (0x6100) for detailed information.*	200	0	10,000	0.5 mm
Virtual shaft switch bottom fast (Correction switch bottom) Offset to the bottom floor. *Object 0x2015 sub index 1, see chapter 16.1 Virtual input group 1 (0x6100) for detailed information.*	1,000	0	10,000	0.5 mm
Inspection limit top Offset to the top floor. *Object 0x63E9 sub index 4.*	0	0	5,000	1.0 mm
Inspection limit bottom Offset to the bottom floor. *Object 0x2011 sub index 3.*	0	-5,000	0	1.0 mm
Shaft side assignment for overlapping door zones for each floor *Object 0x63ED sub index 1-254 or Object 0x2005 sub index 1-254, see chapter 14 Floor position adjustment and shaft side assignment for detailed information.* *0 = not assigned; 1 = shaft side one (SD1); 2 = shaft side two (SD2); 3 = both shaft sides (SD1 and SD2)*	0	0	3	–

*Door zone size can also be configured in teach mode.

NOTICE

- The check sum of the configured parameters can be read on CANopen object 0x2024, sub index 1.

12.6 Read out rated speed

The configured rated speed of iDiscovery can be read using the LEDs. The rated speed in upwards direction is indicated with the “UP” LED and the rated speed in downwards direction is indicated with the “DOWN” LED. The blink code is displayed for 5 minutes after power up when ever maintenance (MNT) is active. The blink code is aborted as soon as the car starts to move or the reset button is pressed.

The code sequence displays the five digits, which represent the rated speed value in mm/s. Each digit starts with a short start pulse followed by longer value pulses. The number of value pulses represent the value of the corresponding digit. At the end of the sequence, after the five digits are displayed, the LED is on for 5s indicating that the sequence is over an will be repeated again.

Example sequence for 1.2 m/s → 01200 mm/s:

1. Digit: start pulse; no value pulse → 0
2. Digit: start pulse; followed by one value pulse → 1
3. Digit: start pulse; followed by two value pulses → 2
4. Digit: start pulse; no value pulse → 0
5. Digit: start pulse; no value pulse → 0

LED on for 5 s than the sequence is repeated

Fault / Conditions	Possible causes	Actions
Teach mode can not be started	Starting teach mode is only allowed within 1 minute after boot up	Power cycle and start teach mode within 1 minute
		Switch to pre commissioning mode using CANopen and start teach mode (no time limit).
SAC contact is not closed (traveling not possible)	Traveling is only allowed using EOP or IOP	Activate EOP or IOP
	Error is active (APS reading, Doors open ...)	Ensure no error is active anymore and perform a reset.
First or last floor is not detected	Neither top nor bottom floor clip is detected	Check if the mounted clip is a top or a bottom floor clip
		Check if the clip is not mounted upside – down, check the “LEFT" mark on the clip.
		Clean code tape/configuration clip (dry or soapy water)
Floor position is not detected	Position indicator clip is not detected, due to unfavorable distance between two position indicator clips (40 mm - 80 mm).	Increase or decrease mounting distance between the two clips. Adjust floor level position using CANopen if neccesary.
OS LED does not switch off during teach in	Teach run not yet started, rated speed is not read in	Ensure that the first floor is read in (top or bottom floor clip)
	Clip not detected correctly	Same as for first or last floor is not detected
FLT LED does not switch off during teach in	Clip not detected correctly	Same as for first or last floor is not detected
FLB LED does not switch off during teach in	Clip not detected correctly	Same as for first or last floor is not detected
UCM, RC, OS, FLT and FLB LED are on after last floor is detected	Normal behavior, data are valid and now stored into EEprom	Wait 10 seconds, iDiscovery automatically starts the normal mode.
OS LED is blinking after last floor is detected	Rated speed down clip not detected correctly	Same as for first or last floor is not detected
	Rated speed down clip not within the correct mounting area	Rated speed down clip must be mounted within 150 – 600mm above the bottom floor
	Rated speed up clip not within the correct mounting area	Rated speed up clip must be mounted within 150 – 600mm below the top floor
	Rated speed up is less then rated speed down value	Ensure rated speed up is greater or equal than rated speed down
	Floors, too near to the rated speed clip(s) detected	Floor must be at least 50mm (100mm) away from the rated speed clip(s), move the rated speed clip(s)
UCM LED is blinking after last floor is detected	The minimal floor to floor distance is to small (overlapping door zones)	Reduce the door zone size, must be done in teach mode, but before the teach run is finished
	Top / Bottom floor clips not detected correctly	Same as for first or last floor is not detected
UCM, RC, OS, FLT and FLB LED are blinking after last floor is detected	General teach error	Check the teach status/error using CANopen Object 0×2170 sub index 0 for detailed information

NOTICE

- Detailed information about the teach status and errors can be read in the CANopen object 0x2170 sub index 0.

13. Safety gear interface

13.1 Activating Safety Gear manually

The safety gear can be activated by pressing the SGT button or activating the safety gear test input (SGTI) for at least 10 seconds. As soon as the button is released respectively the input is deactivated SCC is opened and the device will switch to blocked fault mode. SAC is opened due to the SGR contact and not directly opened by the safety gear activation. This feature helps to check the function of the safety gear for example during the inspection by the authority.

13.2 Safety Gear Retracted (SGR) (EN 81-20, 5.6.2.1.5)

The safety gear retracted (SGR) contact monitors the contact on the safety gear that indicates the fully retracted position. This contact on the safety gear has to fulfill the requirements of EN 81-20, 5.11.2.2 or equivalent. When the safety gear is not retracted this contact is open, and the SAC will be open to prevent the elevator from moving. In this case iDiscovery is in fault mode and is automatically released if SGR contact is closed. In emergency operation, EOP active (IOP not active), the SAC contact is closed even if the contact on the side of the safety gear (SGR) is still open.

13.3 Safety Gear Extended / External (SGE)

13.3.1 iDiscovery type without option 28 (no external safety gear contactors)

The safety gear extended (SGE) contact monitors the contact on the safety gear that indicates the fully extended position. When the safety gear is fully extended this contact is closed.

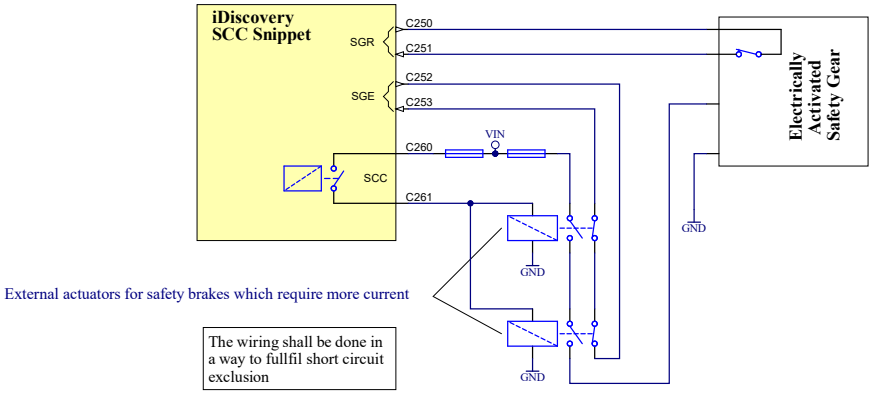
This contact is only for information purpose and is not used by iDiscovery for any functionality. It is only visible on CANopen, and indicated with the SGE LED on iDiscovery (LED on if SGE contact is closed).

13.3.2 iDiscovery type with option 28 external safety gear contactors

The safety gear extended/external (SGE) contact monitors the feedback contact (NC) of the external contactors. When SCC is closed, SGE (feedback contact of external contactor) must be open. When SCC is open, SGE must be closed. This expectation is checked during the safety gear test.

SAFETY ADVICE

- It is the system integrator's responsibility to consider the additional reaction time of the used external contactors for all safety features which are using SCC contact.



13.4 Safety gear test

iDiscovery features a safety gear test routine.
The safety gear test is activated by using the safety gear test input (SGTI) (pulsed from low to high for 1-5s and back to low), or safety gear test button (SGT) pressed for 1-5s.

The safety gear test can also be started using CANopen, writing 1 to object 0x3000 sub index 1.The test status can be read in object 0x3001 sub index 1.

The test can only be performed if the car stands still and SCC contact is closed. If these two conditions are not met, the request for the safety gear test will be ignored. During the test iDiscovery keeps SAC contact open, to ensure that the elevator car cannot move.

If the test is failed the device goes to fault mode and opens SAC, AAC and SCC open. The start and the end of the test is communicated to the elevator controller (CANopen or fault output). The test can be repeated even a previous test has failed and the iDiscovery is in fault mode. If the test fails more than 4 times in a row, the device goes into locked state and requires a reboot.

13.4.1 iDiscovery type without option 28 (without external safety gear contactors)

Test procedure:

1. SCC is opened as soon as the test is activated.
2. SCC stays open for 10 s.
3. SCC is closed.
4. SGR must close within 30 s after SCC is closed.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that the safety gear is tested within appropriate intervals. iDiscovery doesn't ensure that the safety gear test is initiated and performed nor does it monitor if the test is done within a certain cycle.

13.4.2 iDiscovery type with option 28 external safety gear contactors

The test must be performed every 30 days. This is required to guarantee that the contactors are working as expected. If the test is not initiated externally (elevator controller) within this time, the test is performed automatically by iDiscovery when the 30 days have elapsed.

Test procedure:

1. SCC is opened as soon as the test is activated.
2. SGE must close within 10 s.
3. SCC is closed.
4. SGR must close, SGE must open within 30 s after SCC is closed.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that the safety gear is tested within required intervals. iDiscovery does only ensure that the safety gear test is initiated every 30 days to test the external contactors.

14. Floor position adjustment and shaft side assignment

iDiscovery works with actual floor positions, which are based on the original taught positions, the manual offsets and the automatic offsets detected with the position indicator clips. The floor positions can be read with CANopen.
In object 0x63ED the actual floor positions are stored and in object 0x2000 the original taught floor positions.

14.1 Automatic adjustments

Due to thermal expansion of the code tape (steel) and/or building compression the floor positions might differ to the originally taught positions. Therefore iDiscovery continuously adjusts the floor level positions each time a position indicator clip is detected. The floor is adjusted within a range of ±20 mm from the taught in floor position. Based on the expected thermal expansion an additional offset is added. This is limited to 1/500 of the distance from the actual floor to the top floor (delta T 30°).

14.2 Manual adjustment

To compensate mounting tolerances of the position indicator clips, a manual offset can be applied. Each floor can be corrected within ±50 mm without re teaching iDiscovery.
Offset can be set using CANopen as defined in CiA 417. Writing magic “ADJF” or “A+[00...50]” respectively “A-[00...50]” to object 0x63ED. If the resulting adjustment offset is outside the allowed range of ±50 mm an abort message is transmitted.
If offset is adjusted with magic “ADJF” the related shaft/door side can be taught in within the same time, see chapter 14.3 Assign shaft side in case of overlapping door / unlocking zones for detailed information.

14.3 Assign shaft side in case of overlapping door / unlocking zones

In case of overlapping door zones the shaft side must be assigned for each floor which is overlapping. Floors which are not overlapping must not be assigned to a shaft side. Floors are overlapping if distance between two floors is less than 800 mm (max. unlocking zone ±350 mm plus manual floor adjustment ±50).
Leveling, re-leveling and preliminary operation is not possible on overlapping floors, until the floor is assigned to the shaft side.

The shaft side can be taught in or assigned manually.

Manually:

1. Switch to configuration mode.
2. Write the shaft side to the corresponding sub index of object 0x2005
   1 = shaft side assigned to SDI1/CDI1
   2 = shaft side assigned to SDI2/CDI2
   3 = shaft side assigned to SDI1/CDI1 and SDI2/CDI2
3. Repeat step 2 for each floor with overlapping door/unlocking zones.
4. Switch back to normal mode

Teach in:

1. Travel to the desired floor, ensure the car is leveled.
2. Open the doors.
3. Switch to configuration mode.
4. Write magic “ADJF” to the corresponding sub index of object 0x63ED to adjust floor position to the actual position and assign the shaft side according to the open doors.
5. Switch back to normal mode
6. Repeat this steps for all overlapping door/unlocking zones.

It is also possible to switch to configuration mode first and then teach/adjust all floors and switching back to normal mode at the end.

NOTICE

- The shaft side can only be assigned once after each new teach in.
- Check object 0x2003 and 0x2004 if floors are overlapping.

SAFETY ADVICE

- It is the system integrators responsibility to ensure that the correct shaft side is assigned. During examination the car must level with open doors on each floor to check if the correct shaft side is assigned.

15. Test features

15.1 Buffer test

To test the buffer with impact speed, iDiscovery features a buffer test routine. During this test Retardation / ETSL and final limits are bypassed.

To perform the buffer test, the following procedure has to be performed:

1. Move the elevator car to the start position.
2. Ensure that the elevator car stands still.
3. Set EOP active and ensure that all errors are cleared.
4. Activate buffer test.
   This can be done by triggering the test input (high for 1 - 5 s).
   This step can also be performed using CANopen, read the request code from object 0x3000 sub index 2 (valid once for 5 s) and write it back. The actual status can be read in object 0x3001 sub index 2.
   The LEDs RC, FLT and FLB are now blinking with 10 Hz and the error LED blinks 8 times to indicate that the test is active.
5. EOP shall be switched off after test is activated otherwise overspeed MNT might be triggered.
6. The buffer test is aborted if it is active for more than 3 minutes, as soon as car stops, if IOP is activated, if a safety feature is active or if at least one door is opened.
   The LEDs RC, FLT and FLB are switched off as soon as the test is aborted
7. Move elevator car into the buffer in one continuous run.
8. Test completed. The features deactivated for the test are now active again. FLT or FLB is on, depending which limit has been overrun.

Restoring normal operation

1. Set EOP active (IOP must be deactivated). The LED FLT or FLB is blinking at 5Hz.
2. Move elevator car out of the final limit. The LED FLT or FLB is switched off.
3. Deactivate EOP.

SAFETY ADVICE

- It is the authorized and instructed operators responsibility to ensure that the car does not hit the buffer with a higher speed then allowed for the used buffer while the test is performed.

15.2 Relay test

Within 30 days a relay test must be performed. This is required to guarantee safety according SIL3. The test is performed automatically by iDiscovery when the 30 days have elapsed.

The test can also be initiated by the elevator controller using the reset input (set high for 10-12s).
To start the test using CANopen object 0x63E0 sub index 1 is used (RPDO 387). The actual status can be read in object 0x63E1 sub index 1 (TPDO 388). The relay test request bit, which is set one day before the test is started automatically, can also be found in this object. It is recommended that the relay test is started only if requested.

That the test can be performed, the car needs to be stopped. During the test, the safety chain is open (SAC open) to ensure the elevator cannot move. The AAC contact will be open for maximum 2s during the test. SCC contact stays close during the test for iDiscovery types without option 13. If an iDiscovery type with option 13 is used, the SCC contact is opened during the test. The maximum duration of the complete relay test is 10 seconds.

In case the test fails, the internal error is set and SAC as well as at least the redundant relay contact of the contact which failed the test is open. If the tests fails more than 4 times in a row, safe state on iDiscovery is maintained (all outputs SAC, AAC and SCC open) and the device goes into locked state and iDiscovery needs to be rebooted.

15.3 Safety Gear Test

This functionality is only available on iDiscovery type with option 1 SCC module (see Chapter 13 Safety gear interface).

15.4 Test of safety spaces in case of reduced headroom and/or pit

Under normal circumstance SAC is opened as soon as the extended inspection limits are reached. Therefore its not possible to drive until safety space limit is reached (SCC). For testing the extended inspection limits must be disabled.

To perform the test, the following procedure has to be performed:

1. Move the elevator car to the start position.
2. Ensure that the elevator car stands still.
3. Ensure that the safety space which shall be tested is active. Open and close an access door manually.
4. Set EOP active and ensure that all errors are cleared.
5. Activate the test.
   This can be done by triggering the test input (high for 1 - 5 s).
   This step can also be performed using CANopen, read the request code from object 0x3000 sub index 3 (valid once for 5 s) and write it back. The actual status can be read in object 0x3001 sub index 3.
   The LEDs RC, FLT and FLB are now blinking with 10Hz and the error LED blinks 8 times to indicate that the test is active.
6. The test is aborted if it is active for more than 3 minutes, as soon as car stops, if IOP is activated, if a safety feature is active or if at least one door is opened.
   The LEDs RC and FLT or FLB are switched off as soon as the test is aborted
7. Move elevator car into into the safety space (max. 0.63m/s)
8. Car must stop using the safety gear.
   Check that there is enough space left in the head/pit according to EN 81-20 5.2.5.7 / 5.2.5.8
9. Test completed. The features deactivated for the test are now active again. FLT or FLB is on, depending which limit has been overrun.

Restoring normal operation:

1. Ensure EOP is active (IOP must be deactivated).
2. Perform a reset, SCC is closing.
3. Move elevator car out of the safety space and the extended inspection limit and pull out the safety gear from its mechanical engaged position. LED FLT or FLB is switched off.
4. Deactivate EOP.
5. Reset/deactivate the extended inspection limits and safety spaces.

SAFETY ADVICE

- It is the authorized and instructed operator's responsibility to ensure that nobody is inside the safety spaces during the test.

16. Communication with elevator controller

For the communication with the elevator controller iDiscovery features a CANopen interface with data transmission according DS417 position supervisor unit (PSU). The enable signal and target floor for leveling and re-leveling with open doors have to be sent from the elevator controller to the iDiscovery over this channel.
iDiscovery also transmits status information to the controller.

The position supervisor unit includes the car position unit and the virtual input group 1. The car position unit transmits the position and velocity data from APS with TPDO 263. The default setting of the TPDO is event based which means that position and velocity is only transmitted if values have changed. It can be changed to cyclic transmission (multiple of 5 ms).

The description of all the supported CANopen objects are listed in the CEDES iDiscovery CANopen Object Directory.

NOTICE

- iDiscovery can only receive 1 CAN message each 5 ms, 1 additional message can be buffered. If to many messages are sent to iDiscovery within this time, they might be lost.
- iDiscovery is capable to send maximal 3 CAN messages each 5 ms. The message are buffered internally and no message will be lost, but it might be that the timing is not correct.

SAFETY ADVICE

- Information transmitted via CANopen interface must not be used for safety-related functions.

16.1 Virtual input group 1 (0×6100)

The following virtual inputs are supported by iDiscovery. They can be enabled / disabled in object 0x6120.
To safe these settings, write magic “save” to object 0x1010 sub index 3 while iDiscovery is in configuration mode.

Sub Index	Description	Basic function	Sub function
1	Emergency operation panel (EOP) is active	0x13	0x09
2	Correction switch top Offset can be set in object 0x2015 sub index 0x02	0x15	0x01
3	Correction switch bottom Offset can be set in object 0x2015 / 0x01	0x15	0x02
4	Pre-limit switch top Offset can be set in object 0x2015 / 0x04	0x15	0x09
5	Pre-limit switch bottom Offset can be set in object 0x2015 / 0x03	0x15	0x0A
6	Car door closed, side 1 (CDI 1)	0x16	0x05
7	Car door closed, side 2 (CDI 2)	0x16	0x05
8	Shaft door locked, side 1 (SDI 1)	0x16	0x06
9	Shaft door locked, side 2 (SDI 2)	0x16	0x06
10	Inspection operation panel car (IOP_{CAR}) is active	0x13	0x01
11	Inspection operation panel car (IOP_{PIT}) is active	0x13	0x05

16.1.1 Correction and pre-limit switches

The virtual inputs are active as long as the car is above the corresponding top switches or below the bottom switches. The position of these switches is defined in object 0x2015.

SAFETY ADVICE

- These switches are not used in any safety related function and must not be used as safety related information.

16.2 Emergency messages and error text information

Some of the safety features are not part of the PSU status (object 0x63E1) and therefore only the fault is indicated but no further information is available.
For this reason iDiscovery supports EMCY messages with additional and detailed error information. All EMCY messages are sent with error code 0xFF04 (application error).

Detailed plain text information for a specific EMCY message can be requested in object 0x6021. Write the received EMCY textual error code into sub index 1 and read out the text on sub index 2 (short message) or sub index 3 (detailed message). If the text is not available in the requested language the English text is returned.

See CIA 417, Part 1, chapter 8.4 for detailed information about EMCY messages
See CIA 417, Part 4, chapter 4.3.11 for detailed information about error info and emergency text

NOTICE

- If a EMCY message is generated iDiscovery has already triggered the safety related reaction. The EMCY messages are only for additional information.

17. Initial and periodic examinations and tests

This chapter describes checks to approve the iDiscovery functionality after each teach run and for the initial and periodic examinations and tests.

SAFETY ADVICE

- The functionality must be approved in initial and periodic examinations and tests as well as after each teach run. When performing the checks the local safety regulations and measures and in particular the regulations of EN 81 must be followed. It is the operators responsibility to ensure the safety of persons while performing the checks. It is the notified body's responsibility to define if it is required to perform all the checks described below annually or if it is sufficient to perform certain checks only during the initial examination. The following description of the checks shall be regarded as examples. The operator or the notified body can apply other means to test the functionality.
- The checklist 25 Appendix A, Checklist shall be used to approve the functionality.

WARNING

- Test in Chapter 17.1 to 17.9 shall be done in pre commissioning mode before teach procedure is started.

17.1 Check iDiscovery type

Check that the correct type is in use (see Chapter 3.3 Types).

17.2 Check door wiring

The door wiring check depends on the used wiring type.

17.2.1 Recommended wiring

Wiring according Chapter 6.1 Recommended wiring

Ensure EOP or IOP is active, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

1. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.
2. Open shaft door on side 1, check if LED SD1 is on. CD1, SD2 and CD2 must be off, SAC must be open.
3. Open car door on side 1, check if LED CD1 and SD1 are on. SD2 and CD2 must be off, SAC must be open.
4. Close car and shaft doors side 1, and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.

If the second side is used the same test procedure must be performed for side 2:

1. Open shaft door on side 2, check if LED SD2 is on. CD2, SD1 and CD1 must be off, SAC must be open.
2. Open car door on side 2, check if LED CD2 and SD2 are on. SD1 and CD1 must be off, SAC must be open.
3. Close car and shaft doors side 2, and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.

17.2.2 Alternative wiring

Wiring according Chapter 6.2 Alternative door wiring

Ensure EOP or IOP is active, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

1. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.
2. Open shaft door on side 1, check if LED SD1 and CD1 are on. SD2 and CD2 must be off, SAC must be open.
3. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.
4. Open car door on side 1, check if LED CD1 and SD1 are on. SD2 and CD2 must be off, SAC must be open.
5. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.

If the second side is used the same test procedure must be performed for side 2:

1. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.
2. Open shaft door on side 2, check if LED SD1 and CD1 are on. SD2 and CD2 must be off, SAC must be open.
3. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.
4. Open car door on side 2, check if LED CD1 and SD1 are on. SD2 and CD2 must be off, SAC must be open.
5. Close all doors and check if LEDs SD1/2 and CD1/2 are off, SAC must be closed.

17.3 Check door wiring type

If recommended wiring is not used (see Chapter 3.7 Door contact wiring options), check that the safety feature “check doors are not bridged” is implemented externally.

17.4 EOP and IOP function

Ensure EOP or IOP is active, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed. Ensure iDiscovery is in pre commissioning or teach mode.

1. Deactivate EOP, IOP_{CAR} and IOP_{PIT}, SAC must be open.
2. Activate EOP (IOP_{CAR} and IOP_{PIT} not active), SAC must be closed
3. Deactivate EOP, SAC must be open.
4. Activate IOP_{CAR} (EOP and IOP_{PIT} not active), SAC must be closed.
5. Deactivate IOP_{CAR}, SAC must be open.
6. Activate IOP_{PIT} (EOP and IOP_{CAR} not active), SAC must be closed.
7. Deactivate IOP_{PIT}, SAC must be open.

17.5 Check SAC wiring

Ensure EOP or IOP is active, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

1. Check if both SAC contacts (SAC A and SAC B) are wired in series.
2. Check if SAC contact is closed (SAC LED on), and traveling using EOP or IOP is possible.
3. Deactivate EOP and IOP and check if SAC contact is open (SAC LED off) and safety chain is open.
4. Check if AAC and SCC contacts are closed (AAC and SCC LED on).

17.6 Check SCC and SGR wiring

Ensure IOP is active (EOP not active), all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

1. Check if safety gear is retracted and SGR is closed (SGR LED on).
2. Manually activate safety gear (see Chapter 13.1 Activating Safety Gear manually).
3. Check if safety gear is not retracted any more (safety gear is triggered) and SGR is open (SGR LED off).
4. Check if SCC and SAC are open (SCC and SAC LED off).
5. Check if AAC is closed (AAC LED on).

17.7 Check AAC wiring

1. Check if both AAC contacts (AAC A and AAC B) are wired in series.
2. Ensure AAC contact is closed (AAC LED on).
3. Check if auxiliary braking device is not triggered (not braking).
4. Unplug AAC connector and check if auxiliary braking device is triggered (braking).

17.8 Check mounting position and operation of presence/elongation switch

1. Check if the code tape presence respectively code tape presence and elongation switch is wired in series into the safety chain and the safety chain is opened if the safety interlock switch is triggered (actuator pulled out / sled at the end position).
2. Check if code tape presence and elongation switch is used if travel length is > 100 m.

17.9 Check mounting position of bottom and top floor clip

The top and bottom floor clips must be mounted at floor level position not at the final limit position.

17.10 Check rated speed(s)

Ensure iDiscovery is taught and in normal mode.

1. Read out the rated speed(s) using LEDs as described in Chapter 12.6 Read out rated speed and check whether it matches with the specified rated speed(s) of the elevator.
2. Check if tripping speed is written to the type plate.

17.11 Check security seals

1. Check if the rated speed down clip, if applicable rated speed up clip, and the teach button are sealed and the seals are not destroyed or manipulated.
2. If clearance head and/or pit clip(s) are used, check that they are sealed and the seals are not destroyed or manipulated.
3. Check that the IDs of the seals are recorded in the elevator's logbook 25 Appendix A, Checklist.

17.12 Check final limits

Ensure iDiscovery is taught and in normal mode, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

1. Move the elevator into the final limit top/bottom using EOP (IOP not active) and check if FLT/FLB LED starts to blink as soon as the final limit is over traveled.
2. Check if the offset from top/bottom floor to the corresponding final limit matches the offset configured with the top/bottom floor clip.

Alternative:

1. Move the elevator into the final limit top/bottom while EOP is not active (make sure speed is below 1 m/s otherwise ETSL will be triggered).
2. Check if SAC is opened.
3. Check if the offset from top/bottom floor to the corresponding final limit matches the offset configured with the top/bottom floor clip.

17.13 Check floor level positions, number of floors and shaft side assignment

Ensure iDiscovery is taught and in normal mode, all door are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

Elevator without CANopen functionality (leveling and re-leveling with open doors not possible):

1. Move from floor to floor (every floor) and check if floor level indicator on iDiscovery is set each time the car is correctly leveled on the floor (LEVEL LED on, DO1.2 high). Ensure that the floor level indicator is not set between the floors.

Elevator with CANopen functionality (leveling and re-leveling with open doors applicable):
In case of overlapping door zones the shaft side must be assigned.
1. Move from floor to floor (every floor) with “leveling with open doors” active. This must be done in both, upwards and downwards, direction.
2. Check if the car is leveling with open doors and SAC stays close (check on every floor).

NOTE: Due to the fact that leveling is only allowed when the correct target floor is set by the elevator controller, it can be assumed that the number of floors is correct.

17.14 Check unintended car movement protection

1. Before the UCM protection is tested, check that the door zone size and the re leveling size is set to maximal size (see Chapter 10.5 Detection of unintended car movement (UCM) for detailed information).
2. Move the elevator car out of the door zone with door over bridging active. UCM must be triggered as soon as the door zone is left.
3. Check that SAC, AAC and SCC are opened depending on the used iDiscovery type, see Chapter 10.14 Safety feature matrix.

17.15 Check buffers

Perform buffer test as described in Chapter 15.1 Buffer test.

17.16 Check overspeed governor

1. Check for correct rated speed as described in Chapter 17.10 Check correct rated speed(s).
2. Check which tripping speed has to be considered, based on the contacts which must be opened
   - See Chapter 10.1.1 Overspeed 108%.
   - See Chapter 10.1.2 Overspeed 125% / 120%.
3. Move the elevator car faster than the tripping speed.
4. If the electrically triggered safety gear shall be triggered at a slower speed it can be activated manually as described in Chapter 13.1 Activating Safety Gear manually.

17.17 Check electrically triggered safety gear

The electrically triggered safety gear can be manually activated as described in Chapter 13.1 Activating Safety Gear manually.
If the electrically triggered safety gear is controlled using external contactors, iDiscovery with option 28, the external contactors must be checked. Check that the contractors work as expected by performing the safety gear test routine (see Chapter 13.3.2 iDiscovery type with option 28 external safety gear contactors).

17.18 Check ascending car overspeed protection

Same procedure as described in Chapter 17.16 Check overspeed governor.

17.19 Check supply type / wiring

1. Supply must be SELV/PELV (see Chapter 3.10.1 Power supply).
2. Supply minus shall be connected to PE.

17.20 Check wiring and type of the additional door switches for the safety spaces

Only if iDiscovery type with option 30 Inspection is used.

If extended inspection limit / safety space in the headroom is required:

1. Check if all additional door switches of doors which give access to the car roof are wired in series.
2. Open a door manually which gives access to the car roof and check if LED AD_{HEAD} is ON.
3. Count the short LED OFF pulses to check if the configured switch type matches the type of the installed switches.
   - 1 pulse = monostable switches configured
   - 2 pulse = bistable switches configured
   - 0 pulse = not configured, safety space functionality head not available

If extended inspection limit / safety space in the pit is required:

1. Check if all additional door switches of doors which give access to the pit are wired in series.
2. Open a door manually which gives access to the pit and check if LED AD_{PIT} is ON.
3. Count the short LED OFF pulses to check if the configured switch type matches the type of the installed switches.
   - 1 pulse = monostable switches configured
   - 2 pulse = bistable switches configured
   - 0 pulse = not configured, safety space functionality pit not available

NOTICE

- Alternatively the door can be closed directly after step 2. In this case LED AD_{HEAD} / AD_{PIT} is OFF and only short ON pulses as described in step 3 are shown.

17.21 Check extended inspection limits

Only if iDiscovery type with option 30 Inspection is used.
Ensure EOP and IOP are not active, all doors are closed and all errors are cleared. SAC, AAC, SCC contacts must be closed.

If extended inspection limit / safety space in the headroom is required:

1. Activate extended inspection limit top by opening and closing a door which gives access to the car roof manually. SAC must stay open after the door is closed.
2. Enable EOP (SAC is closing) and travel upwards (max 0.63m/s) until the car stops (only SAC open).
3. Check if the car has stopped at the position of the clearance top clip.
4. Check if it is not possible to travel again in upwards direction, SAC must stay open.
5. Check if it is possible to travel in downwards direction, SAC is closing.
6. Reset / disable the extended inspection limit top and safety space head. Check that reset is not possible if the stopping devices according EN 81-20 5.12.1.11.1 a), c), d) are in STOP position. Each stopping device shall be checked individually and in combination.

If extended inspection limit / safety space in the pit is required:

1. Activate extended inspection limit bottom by opening and closing a door which give access to the pit manually. SAC must stay open after the door is closed.
2. Enable EOP (SAC is closing) and travel downwards (max 0.63 m/s) until the car stops (only SAC open).
3. Check if the car has stopped at the position of the clearance bottom clip.
4. Check if it is not possible to travel again in downwards direction, SAC must stay open.
5. Check if it is possible to travel in upwards direction, SAC is closing.
6. Reset / disable the extended inspection limit bottom and safety space pit. Check that reset is not possible if the stopping devices according EN 81-20 5.12.1.11.1 a), c), d) are in STOP position. Each stopping device shall be checked individually and in combination.

17.22 Check safety spaces

Perform the test for the safety spaces as described in chapter 15.4 Test of safety spaces in case of reduced headroom and/or pit for each configured safety space.

LED		ERR LED*	Fault	Action	Fault output*	CANopen
APS	ON or blinks irregularly	Blinking 1x	No communication between APS and iDiscovery.	• Check if the APS is powered. • Check the connection and wiring to the APS. • Check if data A and B wires are not interchanged. • Check the APS type (see chapter 3.3.1 Required APS Type).	1 pulse	0x2150:0 bit 20 0x2150:0 bit 21 0x2130:4
	Blinking 5 Hz		Received bad or invalid data from APS sensor.	• Check that the code tape is mounted. • Clean the optical window of APS. • Clean the code tape and/or the configuration clip (dry or soapy water). • Check the alignment between the APS and the code tape. • Check that the code tape respectively the APS is not upside down. Ensure that the "LEFT" reference on the code tape is on the left side of the code tape. • Check that the configuration clips are not upside down. Ensure that the "LEFT" reference on the clip is on the left side. • Check that the configuration clips have not changed (type and/or mounting position). • Check if APS was replaced by a new unit after teach in. → New teach run is required.		
	Blinking 1 Hz		Safe state triggered due to APS error.	• Check the actions for APS listed above. • Reset iDiscovery.		
UCM	ON	Blinking 4x	Safety feature UCM triggered.	• Check if all required safety measures, defined by the system integrator, have been performed before resetting iDiscovery. • Reset iDiscovery	4 pulses	0x63E1:1 bit 9 0x2150:0 bit 13 0x2150:0 bit 17
			Safety feature temporary door zone triggered.			
		Blinking 6x	Safety feature UCM (DDZS) triggered.	• Check if all required safety measures, defined by the system integrator, have been performed before resetting iDiscovery. • Reset iDiscovery.	6 pulses	0x63E1:1 bit 9 0x2150:0 bit 14

LED		ERR LED*	Fault	Action	Fault output*	CANopen
OS	ON	Blinking 3x	Safety feature OS 125% / 120% triggered.	• Check if all required safety measures, defined by the system integrator, have been performed before resetting iDiscovery. • Reset iDiscovery.	3 pulses	0x63E1:1 bit 10 0x2150:0 bit 4 0x2150:0 bit 7
			Safety feature OS MNT 1.25m/s triggered.			
	Blinking 5 Hz	Blinking 4x	Safety feature OS 108% triggered.	• Wait for 10 seconds. The fault is automatically cleared.	4 pulses	0x63E1:1 bit 10 0x2150:0 bit 5 0x2150:0 bit 9
		Blinking 7x	Safety feature OS MNT 0.63m/s triggered.		7 pulses	
RC	ON	Blinking 5x	Safety feature RC/ETSL 1 triggered.	• Check if all required safety measures, defined by the system integrator, have been performed before resetting iDiscovery. • Reset iDiscovery.	5 pulses	0x63E1:1 bit 11 0x2150:0 bit 10 0x2150:0 bit 11
		Blinking 4x	Safety feature RC/ETSL 2 triggered.		4 pulses	
FLT / ILT	Blinking 5 Hz	Blinking 5x	Safety feature final limit triggered.	• Check if all required safety measures, defined by the system integrator, have been performed. • Move car out of the final limit using EOP.	5 pulses	0x63E1:1 bit 4 0x2150:0 bit 0 0x2150:0 bit 2
FLB / ILB						0x63E1:1 bit 3 0x2150:0 bit 1 0x2150:0 bit 3
FLT / ILT	ON	Blinking 4x	Safety feature safety space top triggered	• Check if all required safety measures, defined by the system integrator, have been performed before resetting iDiscovery. • Reset iDiscovery. • Move car out of the safety space using EOP.	4 pulses	0x63E1:1 bit 8 0x2150:0 bit 24
FLB / ILB			Safety feature safety space bottom triggered			0x63E1:1 bit 7 0x2150:0 bit 24
FLT / ILT		Blinking 5x	Safety feature inspection limit top triggered	• Move out in downwards direction using EOP or IOP	5 pulses	0x63E1:1 bit 6 0x2150:0 bit 23
			Safety feature extended inspection limit top triggered			0x63E1:1 bit 8 0x2150:0 bit 23
FLB / ILB			Safety feature inspection limit bottom triggered	• Move out in upwards direction using EOP or IOP		0x63E1:1 bit 5 0x2150:0 bit 24
			Safety feature extended inspection limit bottom triggered			0x63E1:1 bit 7 0x2150:0 bit 24

LED		ERR LED*	Fault	Action	Fault output*	CANopen
CD1/2 SD1/2	ON	Blinking 7x	Corresponding door loop is open.	• Check door status and door contact. • Check wiring and connectors.	7 pulses	0x63E1:1 bit 14 0x2150:0 bit 12 0x2128:2
	Blinking 2.5 Hz	on	Interface failure.	• Check wiring (short circuit to high/low or between contacts).	Always low	0x2130:11 bit 14
AAC/ SAC/ SCC	Blinking 2.5 Hz	on	Relay failure detected or relay test not performed.	• Perform relays test (can only be performed when relays can be closed). • Reboot iDiscovery (this can be the case if the relays test has failed too many times).	Always low	0x2136:0
SGR	OFF	Blinking 5x	Safety gear not retracted.	• Check if safety gear is retracted. • Check wiring and connectors.	5 pulses	0x2150:0 bit 15
	Blinking 2.5 Hz	ON	Interface failure.	• Check wiring (short circuit to high/low or between contacts).	Always low	0x2130:12 bit 14
SGE	ON	–	Safety gear is fully extended.	• Check if safety gear is extended. • Check wiring and connectors.	–	0x2128:3 bit 1
	Blinking 2.5 Hz	ON	Interface failure.	• Check wiring (short circuit to high/low or between contacts).	Always low	0x2130:12 bit 14
AD_{HEAD} AD_{PIT}	ON	–	Corresponding contact is open.	• Check wiring and connectors.	–	0x2128:3 bit 8 0x2128:3 bit 9
	Blinking 2.5 Hz	ON	Interface failure.	• Check wiring (short circuit to high/low or between contacts).	Always low	0x2130:12 bit 14
	OFF/ON with 1 or 2 short pulses every 4s	–	The corresponding safety space is active.	• Disable safety spaces, see chapter 10.13.3 Safety spaces EN 81-21 / Working space EN 81-20 for details.	–	0x63E1:1 bit 28/29 0x2161:0 bit 7/8
All LED	Blinking 5 Hz	Blinking 5 Hz	System configuration not valid.	• Wait for 10 seconds. • Perform a power cycle.	–	–

* In case more than one error is active at the same time, the error with the highest priority is shown.

18.1 Error LED / Fault output

ERR LED*	Fault	Action	Fault output*	CANopen
Blinking 1x	APS error	• See actions defined for APS LED	1 pulse	0x2150:0 bit 20 0x2150:0 bit 21 0x2130:4
Blinking 2x	Not used		2 pulses	
Blinking 3x	Safety feature OS 125% / 120% triggered. Safety feature OS MNT 1.25m/s triggered.	• See actions defined for OS LED	3 pulses	0x63E1:1 bit 10 0x2150:0 bit 4 0x2150:0 bit 7
Blinking 4x	Safety feature OS 108% triggered.	• See actions defined for OS LED	4 pulses	0x63E1:1 bit 10 0x2150:0 bit 5
	Safety feature RC/ETSL 2 triggered.	• See actions defined for RC LED		0x63E1:1 bit 11 0x2150:0 bit 11
	Safety feature UCM triggered.	• See actions defined for UCM LED		0x63E1:1 bit 9 0x2150:0 bit 13 0x2150:0 bit 17
	Safety feature Temporary DZ triggered.			
	Safety feature safety spaces triggered	• See actions defined for FTL / FLB LEDs		0x63E1:1 bit 7 0x63E1:1 bit 8 0x2150:0 bit 24
Blinking 5x	Safety feature RC/ETSL 1 triggered.	• See actions defined for RC LED	5 pulses	0x63E1:1 bit 11 0x2150:0 bit 10
	Safety feature final limit triggered.	• See actions defined for FTL / FLB LEDs		0x63E1:1 bit 4 0x63E1:1 bit 3 0x2150:0 bit 0-3
	Safety gear not retracted.	• See actions defined for SGR LED		0x2150:0 bit 15
	Stuck at high on test input	• Check if test input is high		0x2127:0 bit 2
	Inspection limits triggered	• See actions defined for FTL / FLB LEDs		0x63E1:1 bit 5 0x63E1:1 bit 6 0x2150:0 bit 22 0x2150:0 bit 23
	Extended inspection limits triggered	• See actions defined for FTL / FLB LEDs		0x63E1:1 bit 7 0x63E1:1 bit 8 0x2150:0 bit 22 0x2150:0 bit 23

ERR LED*	Fault	Action	Fault output*	CANopen
Blinking 6x	Safety feature UCM (DDZS) triggered.	• See actions defined for UCM LED	6 pulses	0x63E1:1 bit 9 0x2150:0 bit 14
Blinking 7x	Safety feature OS MNT 0.63m/s triggered.	• See actions defined for OS	7 pulses	0x63E1:1 bit 10 0x2150:0 bit 9
	Corresponding door loop is open.	• See actions defined for CD1/2, SD1/2 LEDs		0x63E1:1 bit 14 0x2150:0 bit 12 0x2128:2
	Faulty door contact detected	• Check if door contacts are not bridged. • Check if the additional door closed signal is correct. See chapter 10.8 Check if door contacts are faulty (bridged) (OVB)		0x2150:0 bit 26
Blinking 8x	Test is active	• Perform or abort the desired tests. See chapter 15.1 Buffer test See chapter 15.4 Test of safety spaces in case of reduced headroom and/or pit	8 pulses	0x3001:2 0x3001:3
Blinking 9x	No valid configuration (iDiscovery is in teach or pre commissioning mode).	• Teach iDiscovery. See chapter 12 Configuration and teach process	9 pulses	0x2130:1/2 bit 11 - 15
1 Hz	Boot up failed.	• Perform a power cycle.	1 Hz	
5 Hz	MNT must be activated to travel.	• Activate EOP and/or IOP	–	0x2150:0 bit 16
ON	Internal error. Relay test pending or failed. Safety gear test active or failed.	• Perform a power cycle. • Start or repeat relays test. • Check power supply (voltage range). • Check safety inputs (SDx, CDx, SGR...). • Wait until safety gear test is finished or repeat safety gear test.	Always low	0x2130 0x2132 0x2135

* In case more than one error is active at the same time, the error with the highest priority is shown.

19. Replacement of components

Worn and/or defective components must be replaced by ORIGINAL spare parts only.
The replacement of a safety component must be recorded in the elevator's logbook.
After the replacement of iDiscovery, APS, code tape, configuration clips and floor position indicator clips a new teach procedure must be performed.

If the code tape presence and elongation switch is replaced, it must be ensured that the sled is in centered position and a new teach procedure must be performed.

If the code tape presence switch is replaced, it is not necessary to perform a new teach procedure.

SAFETY ADVICE

- After each replacement of any component of the system the functionality has to be approved according 17 Initial and periodic examinations and tests.

20. Disposal

Disposal should be done using the most up-to-date recycling technology according to local regulations and laws. There are no harmful materials used in the design and manufacture of iDiscovery. Traces of such dangerous materials may be found in the electronic components but not in quantities that are harmful.

21. Standards

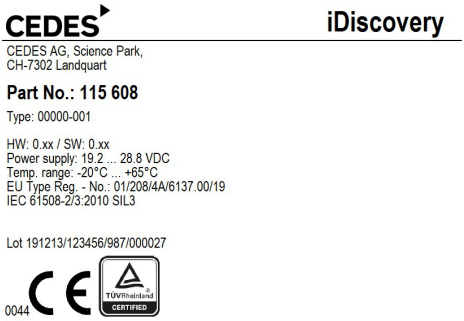
EMC emission	EN 12015:2014
EMC immunity	EN 12016:2013
Vibration	EN 60068-2-6
Shock	EN 60068-2-27
RoHS	2011/65/EU
Certificates	Lifts Directive 2014/33/EU
	Electromagnetic Compatibility Directive 2014/30/EU
Safety category	EN 61508:2010, SIL3
	EN 81-20/50:2020
	EN 81-21:2009+A1:2012
	(EN 81-21 references in this safety manual refer to EN 81-21:2018)

22. Type plate

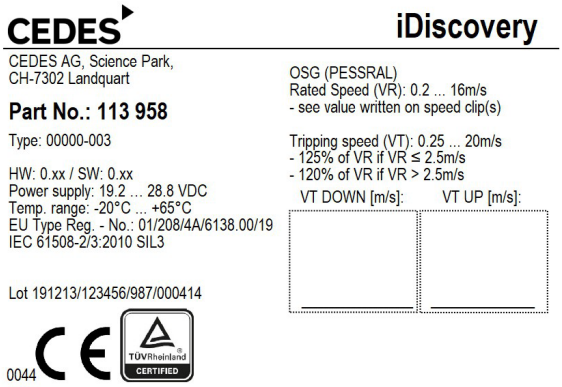
Each iDiscovery is labeled as below. The type plate is located on the bottom side of the housing. It contains the following information:

NOTICE

- The shown type plates are examples, some of the numbers might be changing (part number, type, HW and SW Version ...).



Type plate iDiscovery type 00000 - 001



Type plate iDiscovery type 00000 - 003

SAFETY ADVICE

- The instructed and authorized technician must write the tripping speed(s) into the corresponding field (s) on the type plate (a permanent marker must be used) after the rated speed clip(s) are sealed.

23. Safety parameters (PFH)

The following safety parameters must be taken into consideration:

PFH iDiscovery full system without APS	4.85E-09 @ operating temperature 65°C (ambient)
PFH APS IDI	1.74E-09 @ operating temperature 65°C (ambient)
Proof test interval T1	30 years

23.1 Response time / Process safety time (PST)

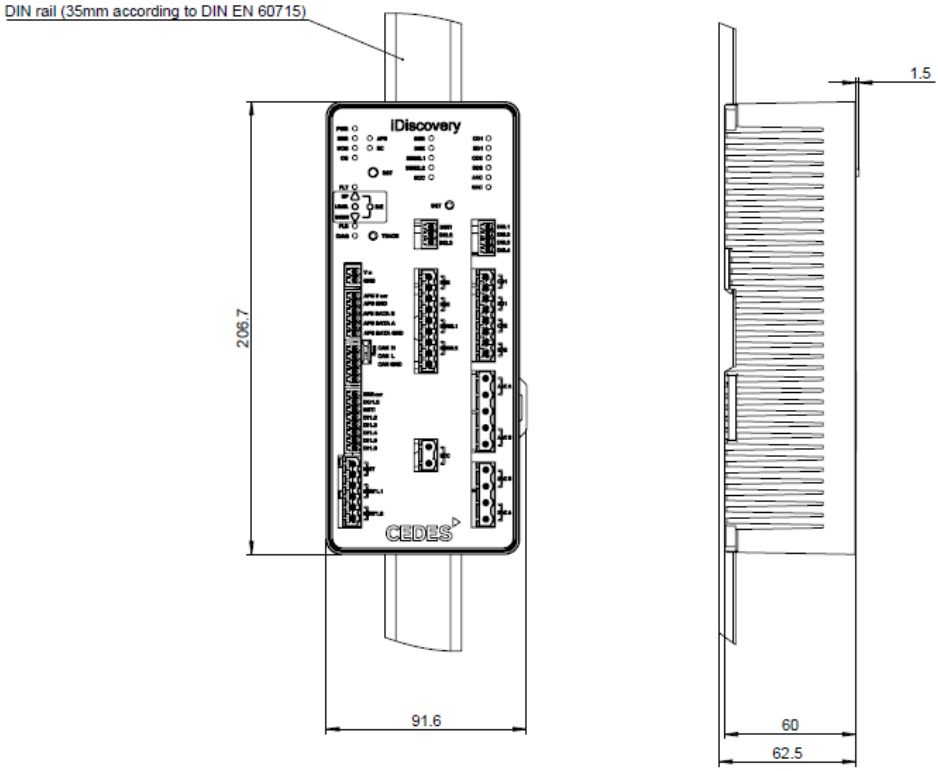
The following response times / process safety time values must be taken into consideration by the system integrator for the integration into the elevator system. For details about the safety features see Chapter 10 Safety features / functions and the overview in Chapter 10.14 Safety feature matrix.

Safety feature	PST	
	Typical	Worst case
Overspeed	56.5 ms	96.5 ms
Final limit	36.5 ms	61.5 ms
Inspection limits	36.5 ms	61.5 ms
Extended inspection limits	36.5 ms	61.5 ms
Safety spaces	36.5 ms	61.5 ms
ETSL	56.5 ms	96.5 ms
SGR *(filtered to prevent false triggering)*	228 ms	238 ms
Door monitoring; door open until SAC is open *(door open state is filtered to prevent false triggering)*	236.5 ms	261.5 ms
UCM (leaving door zone)	36.5 ms	61.5 ms
UCM (speed monitoring)	56.5 ms	96.5 ms
Temporary door zone	36.5 ms	61.5 ms

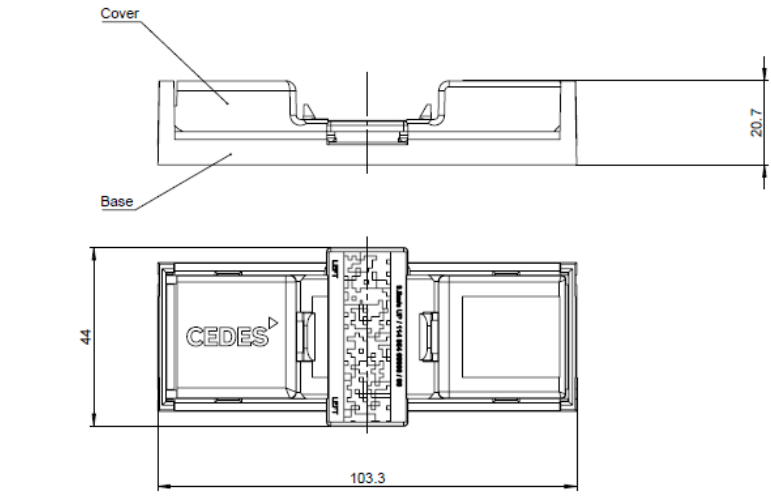
SAFETY ADVICE

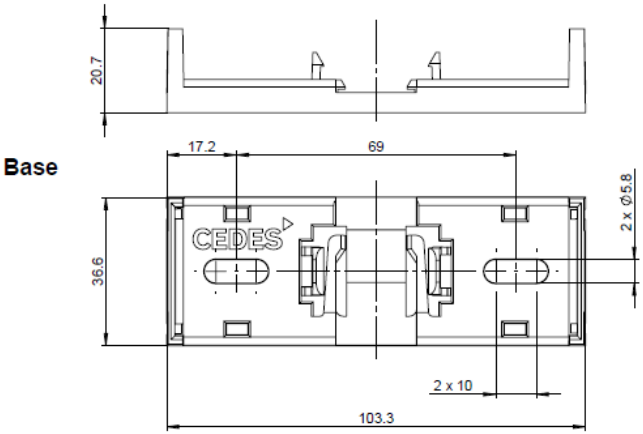
- The process safety time defines the response time from the occurrence of an unsafe event until the safety relevant relay contacts are guaranteed opened by the corresponding safety feature.
- The worst case value is relevant for safety calculation. The response times of externally connected additional devices (e.g. breaking devices) have to be added to the PST of iDiscovery for the overall response time.

24. Dimensions



iDiscovery on DIN RAIL





Base

Configuration clip

25. Appendix A, Checklist

After every teach in of iDiscovery, before releasing the elevator for public, the following checks have to be performed and confirmed. The seal ID of each rated speed configuration clip and teach button must be recorded below.

		Check 1	Check 2	Check 3	Check 4
Date					
iDiscovery type					
Door wiring					
Door wiring type					
EOP and IOP function					
SAC wiring					
SCC and SGR wiring					
AAC wiring					
Presence/ elongation switch					
Mounting pos. of top / bottom floor clip					
Rated speed(s)					
Final limits					
Floor level positions and number of floors					
Unintended car movement protection					
Overspeed governor					
Ascending car overspeed protection					
Door switches for reduced head/pit					
Extended inspection limits					
Safety spaces / Working space					
Security seals	**Rated speed down**				
	Rated speed up				
	Teach button				
Remarks					
Name					
Signature					

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