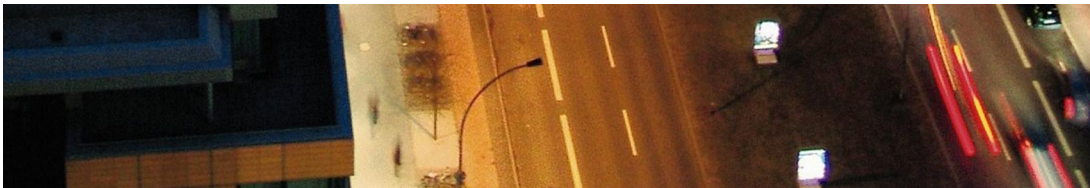
Sitraffic sX

Service manual, controller technology 1c
A001a

Intelligent Traffic Systems

SIEMENS



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Safety notice

The devices/systems are only to be employed for their intended use in accordance with the product documentation; the warning labels and product documentation are to be adhered to. The installation and initial startup of the devices may only be performed by authorized professional personnel (electrically qualified persons with the appropriate training for these devices/systems through the Siemens Academy, Traffic Systems Segment).

If not sufficiently trained personnel are working on the devices, substantial bodily damage and property damage can come as a consequence.

The devices/systems are to be tested regularly by authorized professional personnel. The test intervals and the checks to be performed can be found in the specifications of the product standards. If there are no product standards with information about regular checks for the devices, then the tests are to be performed in accordance with the standards IEC 60364-6, EN 50110 Row, HD 60364-6: 2007 article 62 and EN 50556 table 2.

Occupational safety, environmental protection

It goes without saying that all legal regulations regarding occupational safety and environmental protection are to be complied with during the course of production. We design our products (parts, devices, systems) in such a way that these present no health hazards to the user or hazards the environment according to the current state of information if properly and predictably used.

Recycling, disposal

The information above makes it possible to assess to a large extent the possible potential for hazards to people and the environment, even at the end of the product's life cycle. The regulations for recycling and disposal procedures must be observed here.

All information has been given to the best of our knowledge and belief. It is in accordance with the current state of the art. The information does not constitute a guarantee in the legal sense of a warranty.

1. Technical concept

Concentration on the essentials—with aspiration Siemens has developed a new generation of traffic control technology. Here, the focus is perfection of the commonplace and in connection with this the facilitation of handling with the usual functionality. The result is the innovative traffic controller, the Siemens Sitraffic smartX (sX).

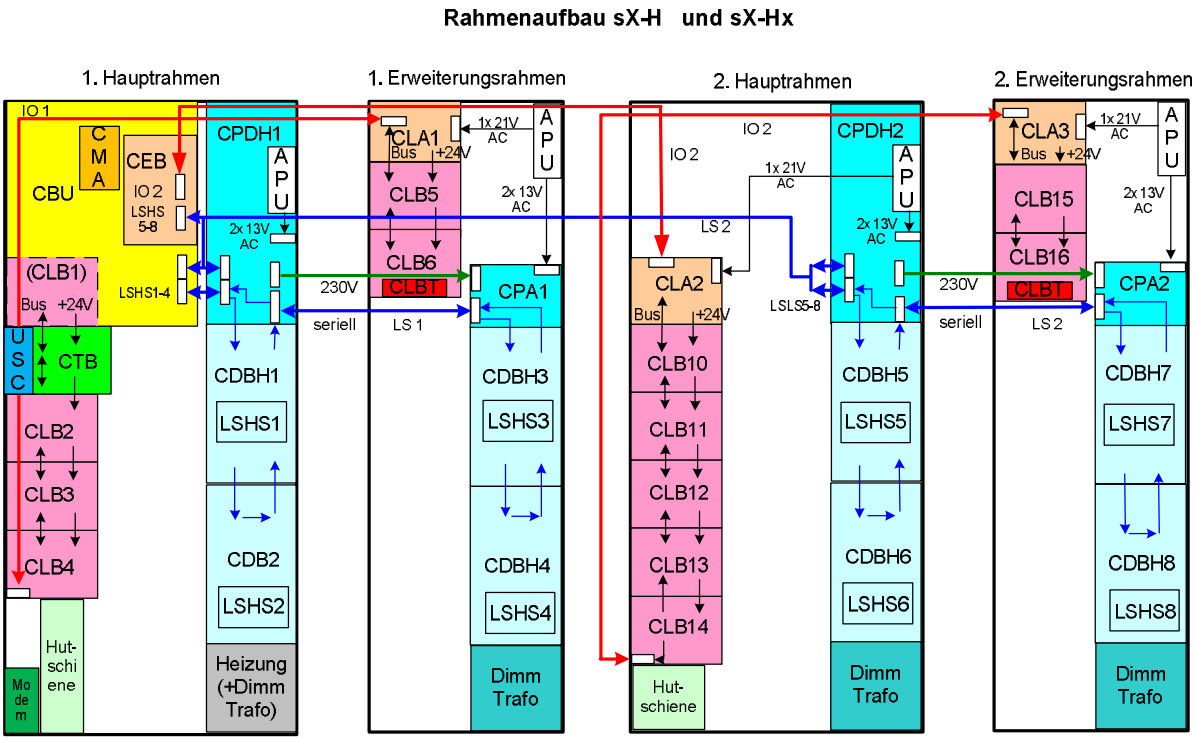
1.1. The modular hardware concept

For the new Sitraffic sX, an entirely new concept was developed for both the hardware as well as the software and its tools. The idea of the modular frame concept is that depending on requirements the basic frame can be supplemented with additional add-on chassis.

sX for up to 16 signal groups

sX for up to 32 signal groups

Fig. 1: Main chassis (left), main chassis with add-on chassis (right)



German	English
Rahmenaufbau	Frame construction
Hauptrahmen	Main frame
Erweiterungsrahmen	Add-on frame
Seriell	serial
Hutschiene	Top-hat rail
Heizung	Heating
Dimm Trafo	Dimming transformer

Fig. 2: Frame structure for sX-H and sX-Hx

The sX-H consists only of the first main chassis/first add-on chassis in the first cabinet.

For the sX-Hx controller, in the second cabinet there is also another second main chassis and if necessary the second add-on chassis.

1.2. Sitraffic sX

sX is a controller for traffic signaling devices. A motherboard with the name CBU forms the core of the controller. On the motherboard there are modules of the plug-in type, which are used for signal monitoring and the detection of vehicles and pedestrians. There are LED switch modules (LSHS) for 230 V LED plug-in signal head.

The version of the sX controller with 230V LED switches is called sX-H.

In order to construct a small controller, the following components are built into the sX-H controller:

- Motherboard CBU equipped with the following components:
  - Processor module OMC and processor module CBC for signal control
  - Processor modules CHX and CMU for signal monitoring
  - Mode module CMD for the selection of the operating mode for signal monitoring
- Backplane CTB with spring terminals for connecting request keys and confirmation devices to the CBU.
- Power supply for CBU, CMD and OMC.
- Backplane CBDH with multipin sockets for receiving an LED switch LSHS and with spring terminals for the connection of the signal heads.
- LED switch LSHS
- Power supply APU for the logic of the LED switch
- Power supply and monitoring CPDH for the LED signal heads of the outdoor system

All modules are directly plugged into each other via plug connections. No drop cables are needed in the basic version.

With this construction for a small controller the status of the 8 request keys can be monitored; moreover, 8 confirmation devices and 8 signal groups can be activated.

If two detector modules SLD4 are plugged into the two installation locations intended for them X39 and X40 of the CBU, 8 additional induction loops can be monitored. Alternatively, IO modules can be inserted into these installation locations in order to be able to connection additional request keys or confirmation signals. Contact of the CBU signals to the outdoor system is established via spring terminals on the CTB module.

The CBU installation locations X39 and X40 are connected to the microprocessor module CBC on the CBU via a serial IO bus. All IO and detector modules that were developed for the sX controller have an interface for this IO bus. There are 2 identical IO busses, called IO1 and IO2. The IO busses are RS422 busses for which all the bus participants are switched in parallel. By attaching CLB backplanes to the CTB backplane, the IO1 bus can be extended. Up to 8 CLB can be connected to the IO1 bus, one after another. In the basic version, only the IO1 bus is present. An optional IO2 bus allows another 8 CLB modules in another cabinet. Therefore, a total of up to 16 CLB modules can be reached.

Each CLB has two installation locations for IO modules or detectors. For connecting the outdoor system the necessary spring clips are available on the CLB.

Also the LED switches have a serial RS 422 bus. It is called LS1 and LS2. Up to 4 LED switches can be connected per LS bus. Only LS1 is available in the basic version. The LS busses have a point-to-point connection.

Both the LS bus as well as the IO2 bus requires the interface expansion module CEB. It is not included in the basic version.

1.3. Key data for cabinets

The main frame and the expansion frame can be installed in the similar design cabinets manufactured by

- Orlite (O) and
- NKT (N)

from the factory and mounted to known standard bases. Depending on whether only the main frame or multiple frames are required, cabinets are available with different dimensions and with one or two doors.

1O/N cabinet for one main frame (incl. EVU)

2O/N cabinet for main and expansion frames (incl .EVU)

Fig. 3: Cabinets for Main and Expansion frames

A main frame can be installed in a 1O/N cabinet together with the standard EVU component (for power supply). This has the following dimensions, depending on the manufacturer

- 806 x 380 x 1100 mm³ (W x D x H) for type 1N or
- 785 x 380 x 1100 mm³ (W x D x H) for type 1O.

The combination of a main and expansion frame can be installed in a 2O/N cabinet with the dimensions

- 1136 x 380 x 1100 mm³ (W x D x H) for type 2N or
- 1115 x 380 x 1100 mm³ for type 2O.

A second main and expansion frame can be installed in an additional cabinet. This combination results in a 3O/N cabinet (see Fig. 4) with the dimensions

- 1902 x 380 x 1100 mm (W x D x H) as type 3N or
- 1900 x 380 x 1100 mm³ (W x D x H) as type 3O.

Fig. 4: 3O/N cabinet

Additionally, all variants feature a small operating door in one of the cabinet doors behind which an operating and display unit is located.

Assembly tools
For all parts of the controller you must use Torx screws. Suitable tools must be used.

1.4. Frame

For housing the components of the sX controller a broad principle add-on chassis and a narrow add-on chassis were developed. This makes it possible to install the main chassis in a 1N or 1O cabinet. This way up to 16 signal groups can be handled in a 1O or 1N cabinet.
The following components are located in the main chassis:

- Power distributor with fuses
- Processors of the signal controller
- Processors of the signal monitor
- Vehicle detectors
- IO modules for detecting request signals
- IO modules for activating confirmation devices.
- 2 units of LED switch modules for 230-V LED modules
- Power supply

Two LED switch modules LSHS can be mounted in the main chassis. Up to 16 signal groups are possible this way.
Two additional LED switch groups LSHS are housed in the add-on chassis. Therefore, a total of 32 signal groups is possible.

Principle and secondary frames are screwed together. For installing them into the device cabinet, the frames are mounted onto the rear wall of the cabinet and screwed together with it.
The device cabinet is positioned on top of a slot. Through it all the ground cables are guided up from below into the principle and secondary frame. Spring terminals are provided for connecting the wires.
The IO modules and power supply add-ons have the same dimensions and can be installed in the same IO module locations.

The add-on chassis is mounted onto the main chassis at the right. The following parts are necessary for retrofitting:

- Expansion unit or door /C10 L24730-E800-A3
- Front door, large /C10 C24734-A16-B233

1.5. sX-H power supply connection/fuses/

Requirement	Standard
Power supply connection	Phase-to-null or phase-to-phase power grids
Rated voltage of connection (power supply connection)	230 V AC; - 20 %; +15 %; also covers 240 V –24 %, + 10 %; 50 Hz +/- 4 %
Power consumption of control section	max. 75 VA at 230 V typically 28 VA at 230 V
Max. permissible total load	2.76 kW at 230 V per cabinet
Max. continuous / switching power for each signal group or signal circuit	Per output: 72 W (4x 18 W) Per LSHS: 4 A (at 230 V) i.e. 920 W
Earth-leakage circuit breaker	30 mA for the outlet 300 mA for the device
Insulation monitoring	For the outdoor system
Controller fuse	Protected by a 25 A fuse in power supply company's compartment
Maintenance socket and fuse	German variant in power supply company's compartment for 10A
Fuse for lamp voltage	230 V / 16AB for 4 LSHSs 6.3 A per LSHS on the CPDH
Surge protection	Simple surge protection on the power-supply side optional: DIN EN 62305 (VDE 0815-305)
Power supply fuse for auxiliary power supplies	2 units of 4.0 A fuses for power supplies and add-ons
Power failure bridging time	> = 40 ms; briefer power supply faults do not cause the device to switch off

Tab. 1: sX-H power supply connection/fuses

1.6. Structure of Sitraffic sX-H

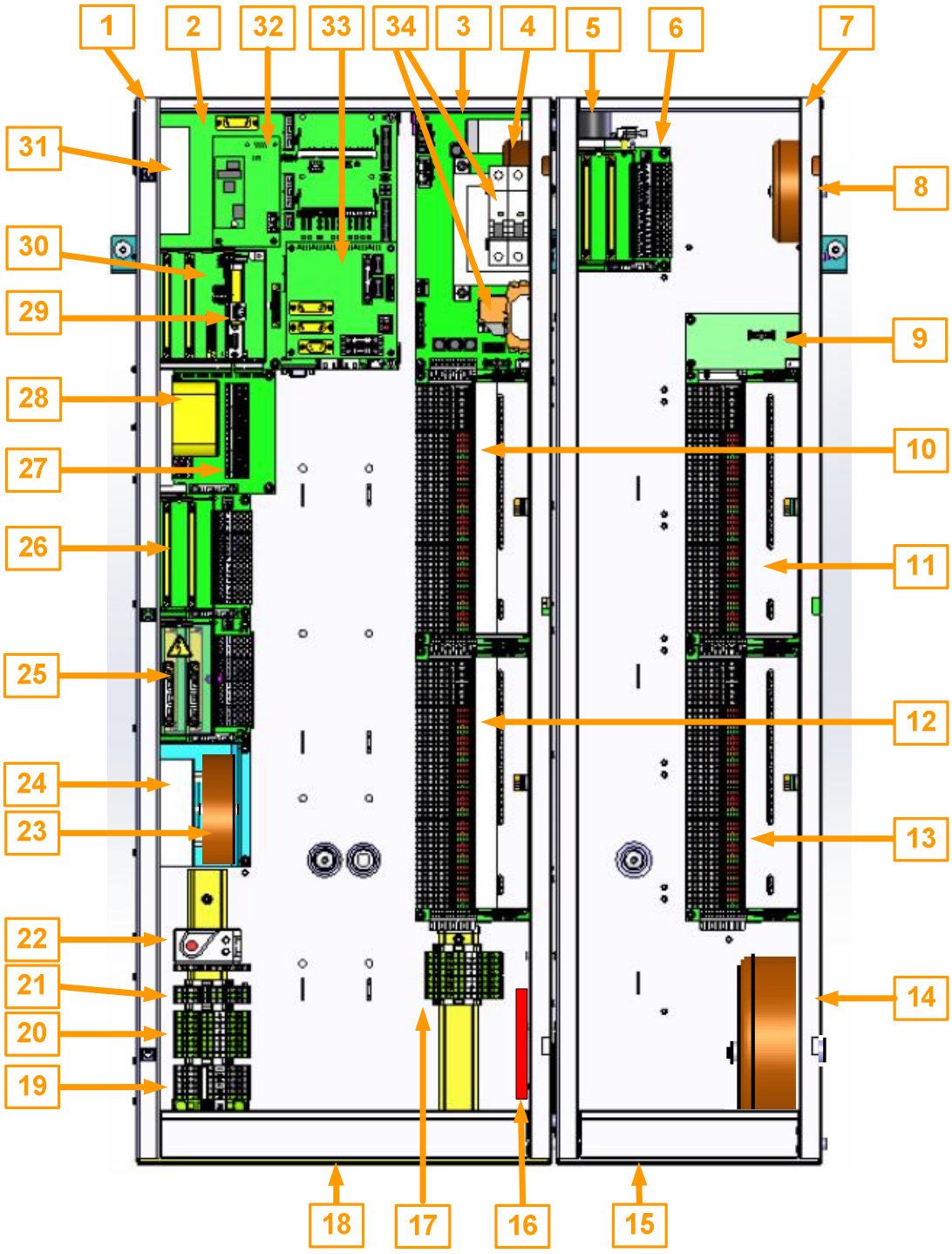


Fig. 5: sX Structure

No.	Name	Description
1	--	sX main chassis
2	CBU	CBU module
3	CPDH	Power supply for the LED switch LSHS
4	APUklein	Small transformer, in the main chassis for the logic of the LSHS
5	CLA	Voltage controller for IO modules in the add-on chassis
6	CLB	Backplane for detectors and IO modules
7	--	sX add-on chassis
8	APUgroß	Large transformer, in the add-on chassis for the logic of the LSHS
9	CPA	Adds power supply to the lamp switch bus.
10	CBDH	CDBH backplane and LED switch LSHS1
11	CBDH	CDBH backplane and LED switch LSHS3
12	CBDH	CDBH backplane and LED switch LSHS2
13	CBDH	CDBH backplane and LED switch LSHS4
14	--	Dimm transformer
15	--	Floor opening for ground cables
16	--	Cabinet heater
17	--	PE terminals for LED switches LSHS3 and 4
18	--	Floor opening for ground cables
19	--	0V terminals for outdoor system and PE16mm2
20	--	PE terminals for LED switches LSHS1 and 2
21	--	Terminals for telecommunication wires to the control center
22	--	Thermostat for heater
23	--	24 V AC add-on power supply for confirmation devices
24	--	24 V DC add-on power supply for modems, detectors
25	CIAB	Backplane for CIAC (IO module for alternating current)
26	CLB	Backplane for IO modules and detectors
27	CTB	Backplane with female multipoint connectors with IOs of the CBU
28	USC	UPS
29	OMC	OMC module
30	CMD	CMD module
31		24 V power supply for CBU and components
32	CMA	CMA module (modem)

No.	Name	Description
33	CEB	CEB module for IO expansion
34		Power distributor

Tab. 2: Components of the sX controller

1.7. Basic version sX-H

The basic version consists of the following components:

- Power distributor, power supply, APU transformer
- OMC (control module) Ethernet connections
- 2 USB ports
- 9 serial ports
- 1 GB flash (optionally up to 8 GB flash)
- CBU/ CMD (signal monitoring module, power supply)
- 8 touch button inputs 24 V DC, 8 confirmation outputs 24 V DC
- 2 installation locations on the CBU for IO modules such as SLD4 or CIE/CIO
- CEB installation location (interface expansion) on the CBU
- CTB (connection terminals of CBU module)
- CPDH (LED voltage monitoring and switch-off, fuse)
- up to 2 units of CDBH/LSHS (backplane with terminals and LED switches)
- 2 CLB installation locations for 2 IO modules each
- Tophat rail for PE-, 0 V terminals

The combinations shown give an idea of the variety of the configuration options that the Sitraffic sX offers. Further numerous combinations are of course possible so that the controller can be aligned specifically to individual requirements.

1.8. Additions

Possible additions:

- Add-on chassis
- up to 2 units of CDBH/LSHS (backplane with terminals and LED switches)

  (altogether up to 32 controllers in a 2O/N cabinet)
- BAZ (command unit)
- GPS receiver
- SLD4 (4x loop module)
- Video detectors
- Wimag detectors
- CIE/CIO (I/O module for 24 V DC confirmation device and touch button)
- CIAB/CIAC (/O module for 230 V AC confirmation device and touch button)
- Uninterruptible power supplies (UPS)
- Cabinet heater
- Centralized control
- Additional power supplies (24 V DC, 24 V AC)
- CUA (universal adapter for special modules)
- Expansion to 64 controllers with 2nd cabinet. (This controller is called sX-Hx).

1.9. Schematic representation of main chassis

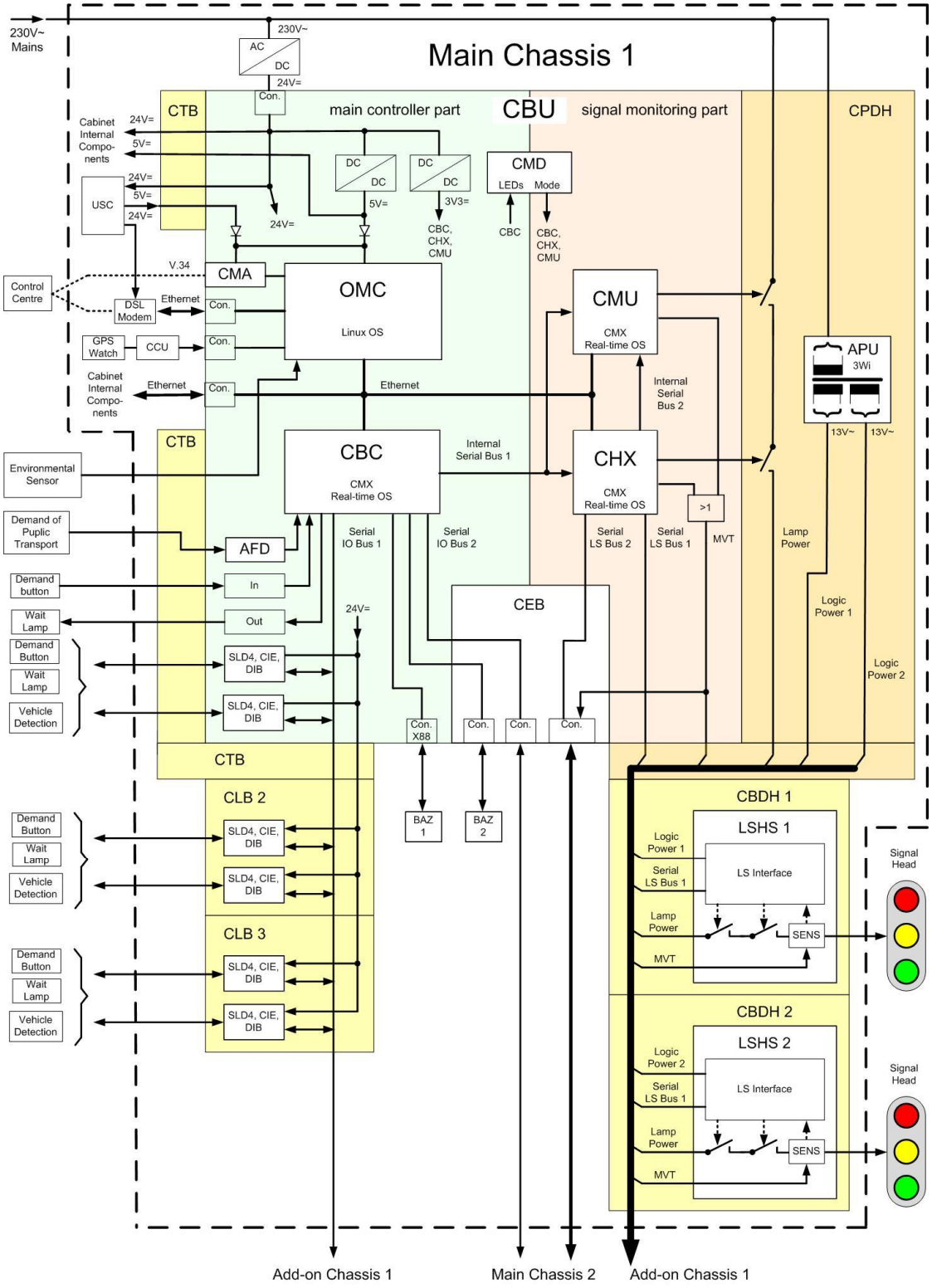


Fig. 6: Block diagram of main chassis 1

1.10. Schematic representation of add-on chassis

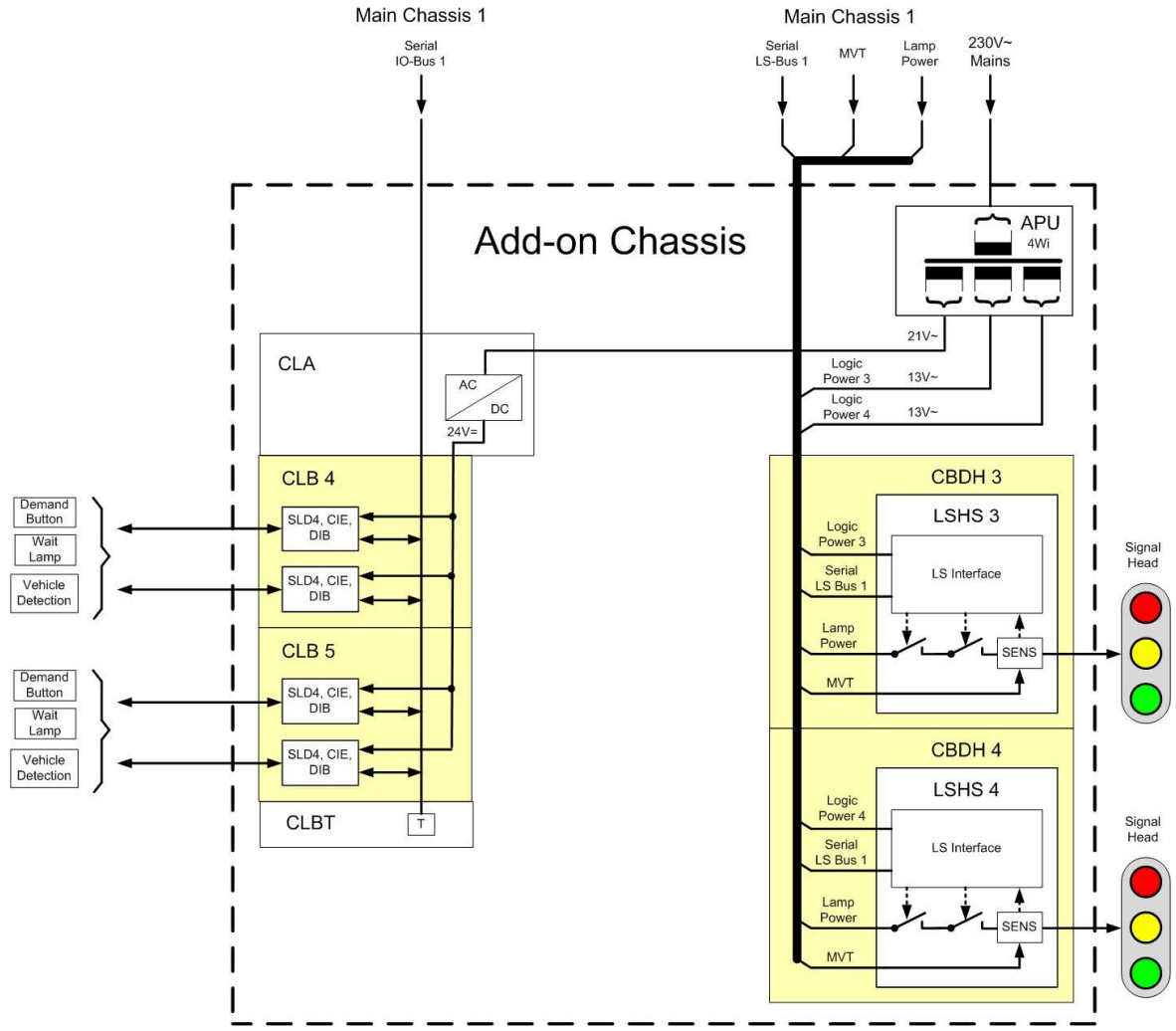


Fig. 7: Block diagram of add-on chassis 1 and 2

1.11. Switch-off route

There are five switch-off routes in the event of an error in the outdoor installation:

- Switching off with the triac (1-24) on the LED switch.
- Switching off each individual LED switch via the B relay on the LED switch.

- Switching off the 230 -V power supply via the SSR relay on the CPDH
- Switching off the 230 -V power supply via the A relay on the CPDH (mechanical).
- Emergency switch-off of the entire controller using the fault current circuit breaker by means of a fault current via the RCD relay of CPDH1 and possibly CPDH2.

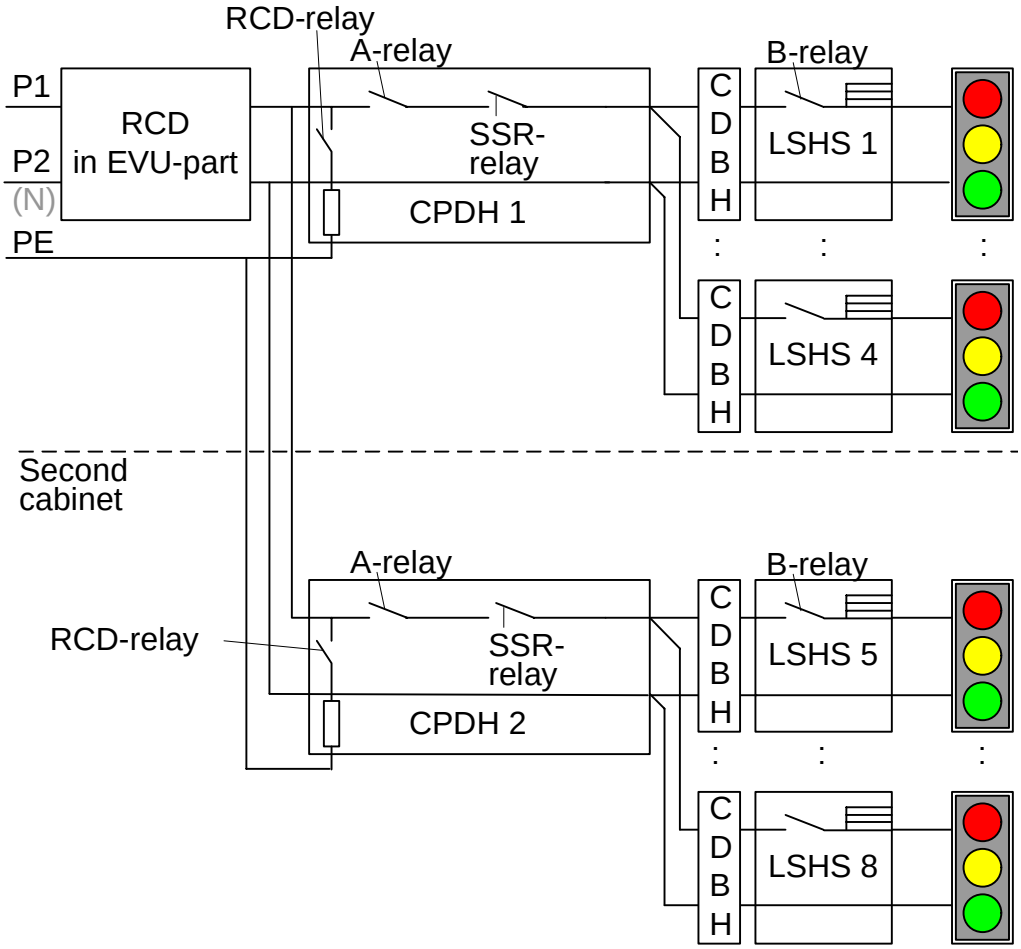


Fig. 8: Switch-off route

1.12. 230 -V distribution

Here the representation of the 230 -V distribution in the controller. It is broken down into the utility compartment and the components in the main chassis

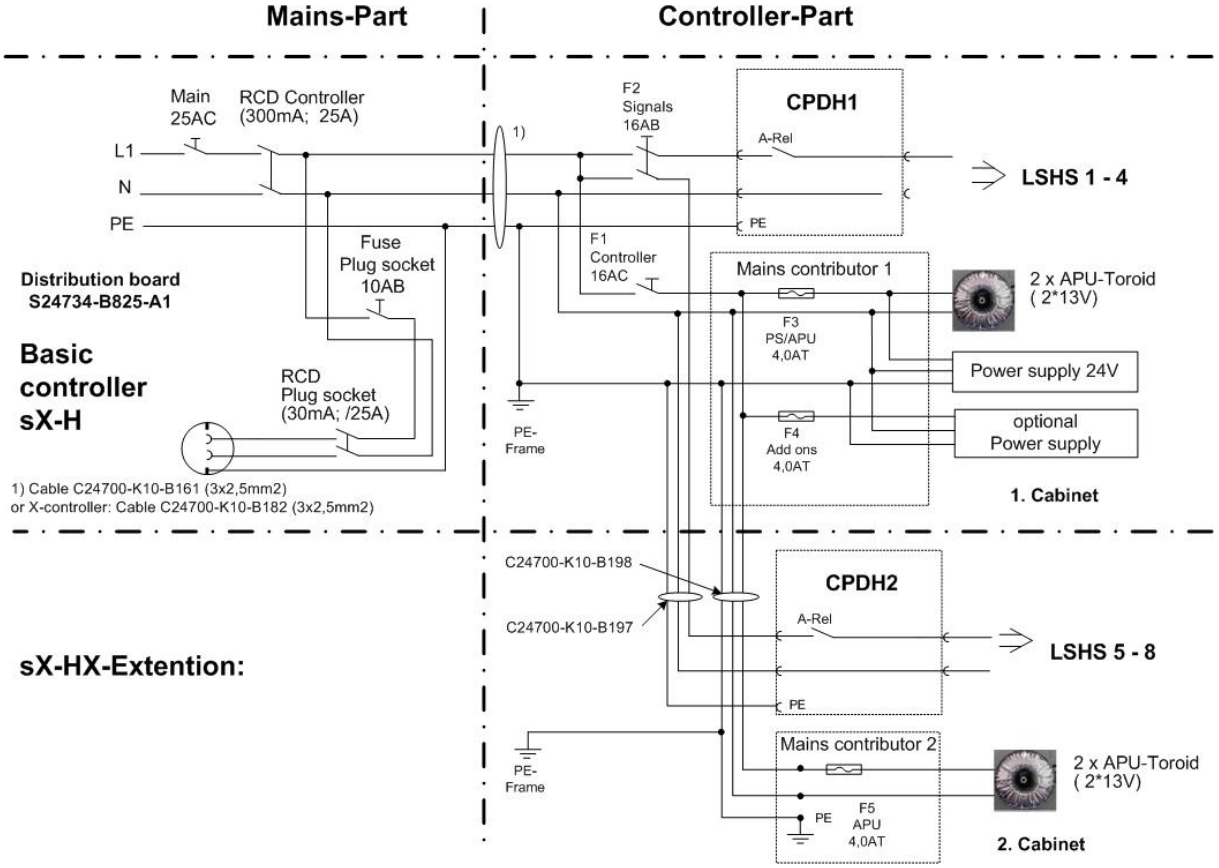


Fig. 9: 230 -V distribution

1.13. Utility compartment

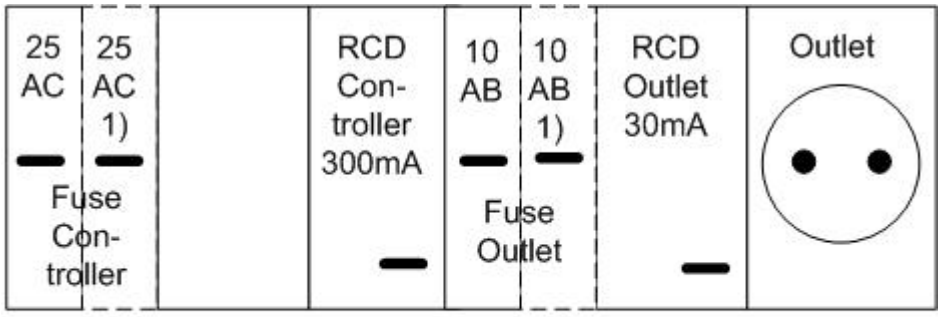
In the 2O/2N cabinet, in the "E compartment" there is place for:

- A service entrance box
- A metering box and

a power supply utility distribution box with fault current circuit breaker (300 mA), surge protection, fuse and 30mA fault current circuit breaker for separately fused service outlet.

The utility compartment parts for sX-H and SH-Hx(max 2760 VA) are called:

- Utility compartment 230 -V sX-H single-phase S24734-B825-A1
- Utility compartment for sX-H two-phase S24734-B825-A2



1) 2-pin fuse design for ph-to-ph (S24734-B825-A2)

RCD = Fault-current circuit breaker

Fig. 10: Utility compartment of sX-H (single-phase/2-phase)

Optionally, extended lightning protection can be installed.

1.14. Power distributor

In the main chassis the power distributor is positioned at the top right. Here there are 2 automatic circuit breakers with the following function:

- Left: Fuse F1, 16 A C labeled "Contr." for control and power supplies.
- Right: Fuse F2, 16 A B marked "Signals" for the LED signal heads.

  For phase-to-phase controllers these fuses can be designed as 2-pin. (For this another mounting angle is required).

  Below this the power distributor terminal block is located. In it there are the fuses F3 and F4. To replace the fuse, it is to be swung downward. Then the hatch can be opened and the fuse is accessible. In it there are 2 microfuses F3 and F4 with 4.0 AT each.

- F3 for power supply, APU1 transformer and APU2 transformer
- F4 for additional power supply, cabinet heater.

  The replacement fuse set is as follows:
  Set 20x fuse 4AT 250 V L24730-A899-A4
  Here is the terminal assignment of the power distributor.

Row	KI_F3	KI_F4	F3	F4	PE1	PE2	N1	N2	N3
A	APU1	Add. PS. (24V_AC)	F2	F2	CPDx_X12	CPDx_X1	APU1	Add. PS. (24V_AC)	CPDx_X1
B								Add. PS. (24V_DC)	EVU
C	APU2	Add. PS. (24V_DC)	RS100	Heating	Add. PS. (24V_DC)	RS100	APU2	RS100	Heating

Add. PS. = Additional power supply
RS100 = Basic power supply 24V DC

Tab. 3: Power distributor assignment

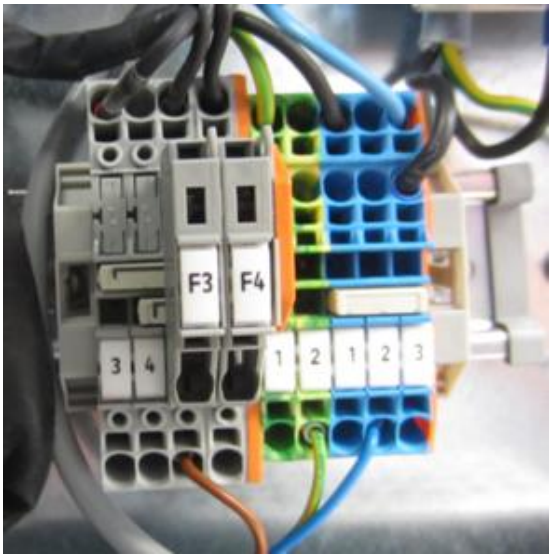


Fig. 11: Pattern of power distributor

1.15. Power consumption of sX-H

	Power con-sumption (mA)			Sample device	
	5 V	13V	24 V	Number	Comment
OMC	700		0	1	Controller
CMA	150		0	0	Modem
CBU	0		260	1	VDE SIMO
CPDH	60		50	1	LED power supply
SLD4	0		60	2	Loop detector
AFD+FEE	500		0	0	PT receiver
CIE/CIO/CED	0		50	0	24V IO boards
DIB-E	0		50	0	Video
CIAC	0		50	0	230V IO boards
GPS	20		0	1	GPS receiver
BAZ2	0		70	1	BAZ
ext. manual panel (+24V Man. P.)	0		250	0	Ext. command unit (+24V Man. P.)
24V (+24V_IO)			200	0	24V
Modem (+24V_MOD)	0		150	1	Modem
CEB (IO-Extension)	200		0	0	CEB (Optional interfaces extension)
LSHS	0	700	0	1	LED switch

	I (mA)	P (W)
Total 5V	780	3,9
Total 13V	700	9,1
Total 24V	650	15,6
	Total	28,6

Tab. 4: Power consumption

2. Components

2.1. Power connection

- Fuses
- Fault current circuit breaker
- Electrical outlet
- Fuses of main chassis
  left F1, controller,
  right F2, LED signal head, CPDH

In the power distributor, fold-out fuse retainer (F3 and F4)

F3 (at F1) 24 -V power supply unit, APU

F4 (at F1) add-ons.

2.2. Power supplies

- A switched-mode power supply 230 V /24 V (V24069-Z8043-A1) for CBU and modules of the IO1 bus that are located in the main chassis.
- APU1 transformer for the supply of the internal logic of the two LED switch modules in the main chassis via plug connections of the CPDH.
- APU2 transformer for the supply of the two LED switch modules in the add-on chassis via plug connections of the CPA.
  Additionally, supply of the modules of the IO1 bus that are located in the add-on chassis above the AC/DC transformer on the CLA.
- CPDH supply for the LED signal heads via LED switch
- Additional power supply 24 VDC/48 W for additional devices such as modems or cameras.
  For this additional power supply there is an adapter to be installed in a CLB installation location.

- Toroidal transformer for supply to demand buttons and confirmation devices for 24 -V alternating current.

2.3. CBU

2.3.1. Operating principle of the CBU

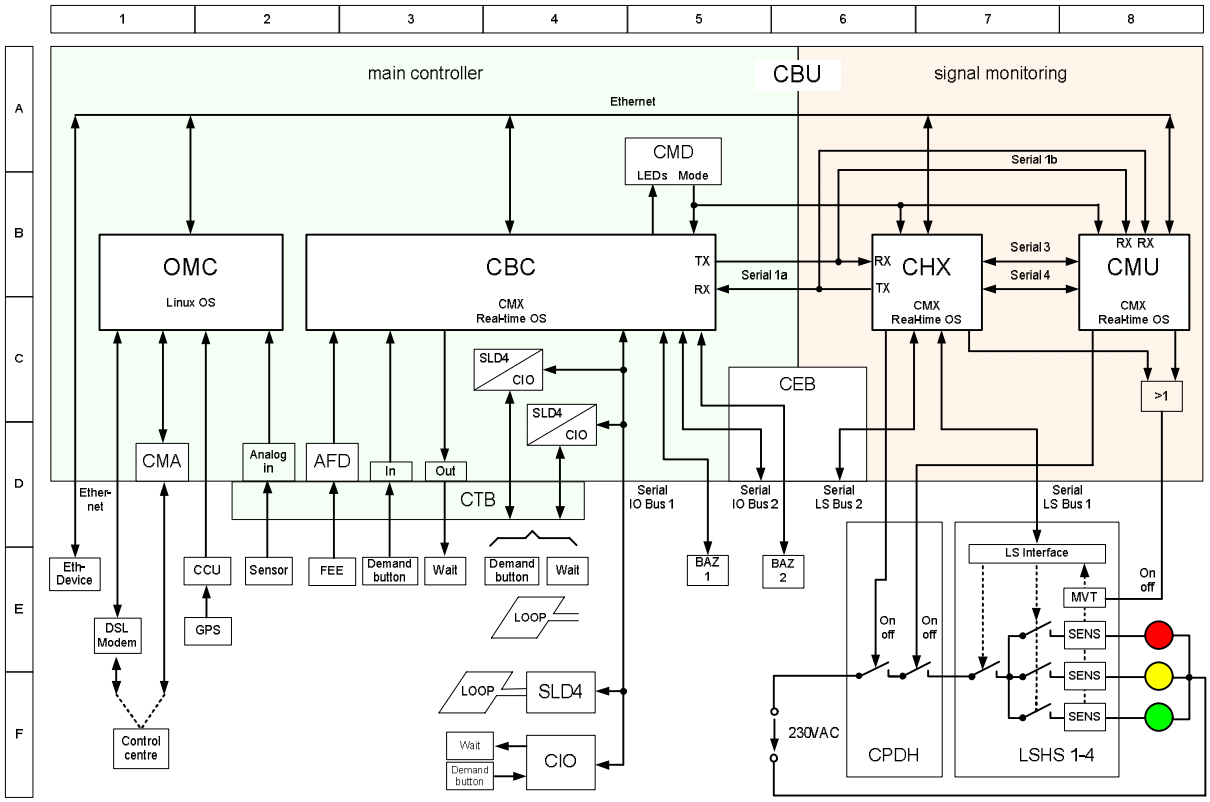


Fig. 12: Block diagram of the CBU

For the CBU (S24734-A870-A10) a control unit and a signal monitoring unit of an intersection controller are built in onto one module. In the figure, the area of the control unit is marked green (at the left) and that of the signal monitoring unit red (at the right). Assemblies and modules that are to be plugged into the CBU are highlighted white.

The control unit processes the signal plan and depending on the traffic situation that is identified by the detectors generates switch requests for the LED signal heads.

The signal monitoring unit sets the LED signal heads in accordance with the switch requests if—after having checked them—it has been determined that no hazardous conditions result in the intersection.

The signal monitor can operate 230-V LED modules with the LED switches of type LSHS.

If the signal monitor identifies that the outdoor system is functioning with faults, it can switch off its operating power supply in order to prevent hazardous signal monitoring conditions. Switching off takes place with a relay on the CPDH. Both processor modules of the signal monitor can switch off the operating power supply independent of each other.

Name	Description	Position in the block diagram
AFD	Module for evaluating request signals from PT	D3
BAZ 1	First command unit	E5
BAZ 2	Second command unit	E6
CBC	Processor module with real-time processing system for the processing of time-critical interfaces of the OMC	B4
CCU (CCUE)	GPS-controlled clock	E2
CEB	Expansion module necessary for second BAZ, second I/O bus and second LED switch bus	C6
CHX	Signal monitoring processor 1 for the activation and monitoring of the signal sensors.	B7
CIO	I/O module with 8 inputs and 8 outputs. In the CBU only the 8 inputs can be used.	C4, F4
CMA	V.34 modem for control center connections (PPP)	D1
CMD	Module for setting the operating mode of CBC, CHX and CMU	B1
CMU	Signal monitoring processor 2 for monitoring the functioning of signal monitoring processor 1.	B8
Control center	Traffic control computer (control center)	F1
CPDH	Energy distribution unit for up to four LSHSs.	F6
CTB	Backplane with spring terminals for connecting the interfaces	D3

Name	Description	Position in the block diagram
Demand button	Demand button (8-piece connectable)	E3, E4, F3
DSL Modem	Digital modem for control center connections (TCP/IP)	E1
Eth. device	Local device with Ethernet connection (e.g. detector)	E1
FEE	Radio receiver for request signals from PT	E2
GPS	GPS receiver with antenna	E2
In	8 parallel inputs can be used for demand buttons.	D3
LOOP	Loop	E4, F4
LSHS	230 -V LED switch	F8
MVT	Changeover switch for the sensors for test mode of CHX and CMU, can be activated independently of one another.	E8
OMC	Control module for Linux operating system	B1
OUT	8 parallel outputs can be used for confirmation devices.	D3
SENS	Sensors for LED voltage and LED current	F8
Sensor	Environment sensor, 2 inputs are provided (e.g. for temperature and humidity)	E2
SLD4	Loop detector for 4 loops	C4, D4, F4
Wait	Confirmation lamp (8-piece connectable)	E4, F4

Tab. 5: Explanations for block diagram of the CBU (see Fig. 12)

2.3.2. Control unit

The processor module OMC and the processor module CBC form the control unit of the intersection device.

2.3.2.1. OMC processor module

The processor of the OMC has a Linux operating system and assumes the following tasks:

- Evaluation of detectors and demand buttons
- Traffic-actuated signal plan processing
- Submission of the signal pattern to the CBC via the network connection
- Evaluation of the GPS time
- Communication with the control center via Ethernet (TCP/IP)
- Communication with the control center via RS232 (PPP)
- Support of remote maintenance of CBC, CHX and CMU from the control center
- Detection by a maximum of two environment sensors
- Switching off the UPS after a power failure message to the control center

Additionally, the OMC delivers battery power to the real-time clock on the CBU.

2.3.2.2. CBC processor module

The processor of the CBC has a CMX real-time operating system and processes the following tasks:

- Acquisition of the detector information (SLD4, DIB-E) via the busses IO1 and IO2
- Detection of the parallel inputs on the CBU

- Setting the parallel outputs on the CBU
- Detection of the parallel inputs of the IO modules (e.g. CIE, CIO, CIAC) via the busses IO1 and IO2
- Setting the parallel outputs of the IO modules (e.g. CIE, CIO, CIAC) via the busses IO1 and IO2
- Measuring of assignment times and assignment pauses for the detectors and parallel inputs.
- Controlling the two BAZ interfaces
- Evaluating the requirements of PT that are received from the AFD interface via radio.
- Communication with the OMC processor module via Ethernet
- Fail-safe function, if the OMC is not ready for use because of failure or update of the firmware.

2.3.3. Signal monitoring unit

The signal monitoring unit is redundantly structured for the two processor modules CHX and CMU.

2.3.3.1. CHX processor module

The processor of the CHX has a CMX real-time operating system and processes the following tasks:

- Receipt of a new signal pattern from the CBC via the Serial 1a connection.
- Examination based on the signal monitoring configuration for whether the specifications of the control unit do not pose a risk to safety.
- Setting the LED signal heads in the signal heads according to the specification of the control unit. For this purpose, transmission of control commands to the LED switches LSHS via the LS bus.

- Obtaining sensor information concerning the operating statuses of the LED signal heads via the LS bus.
- Transmission of sensor information via the Serial 3 connection to the CMU module for parallel examination.
- Examination of whether the outdoor system is functioning without faults (LED module failure, fault currents, short circuits)
- In the presence of hazardous conditions, switch off the outdoor system via triac of the LED lamp switch or via relay of the CPDH.
- Briefly generating faults that the CMU processor must identify by activating the "monitor validation test" (MVT). If this is not the case, switch off outdoor system via relay of the CPDH.

2.3.3.2. CMU processor module

The processor of the CMU has a CMX real-time operating system and processes the following tasks:

- Parallel receipt of a new signal pattern from the CBC for the CHX via the Serial 1b connection.
- Examination based on the signal monitoring configuration for whether the specifications of the control unit do not pose a risk to safety.
- Examining sensor information that was received by the CHX module via the Serial 3 connection for whether it matches the specifications of the control unit.
- Examining whether the outdoor system functions free of faults (LED module failure, fault currents, short circuits) on the basis the sensor information in parallel with the CHX
- In the presence of hazardous conditions, switch off the outdoor system via relay of the CPDH.
- Briefly generating faults that the CHX processor must identify by activating the "monitor validation test" (MVT). If this is not the case, switch off outdoor system via relay of the CPDH.

Safety:

The two processors CHX and CMU constantly check each other for proper functioning.

Via the relay of the CPDH they can switch off the operating power supply for the signal heads independently of each other.

The "monitor validation test" (MVT) can be activated by each processor module independently of the other. For this, both processors produce cyclically artificial brief faults in order to test the other processor. The outdoor system is switched off if the processor to be tested does not identify a fault. If a processor notices that these faults do not occur anymore, it switches off the outdoor system here too.

2.3.4. Plug connector and interfaces of the CBU

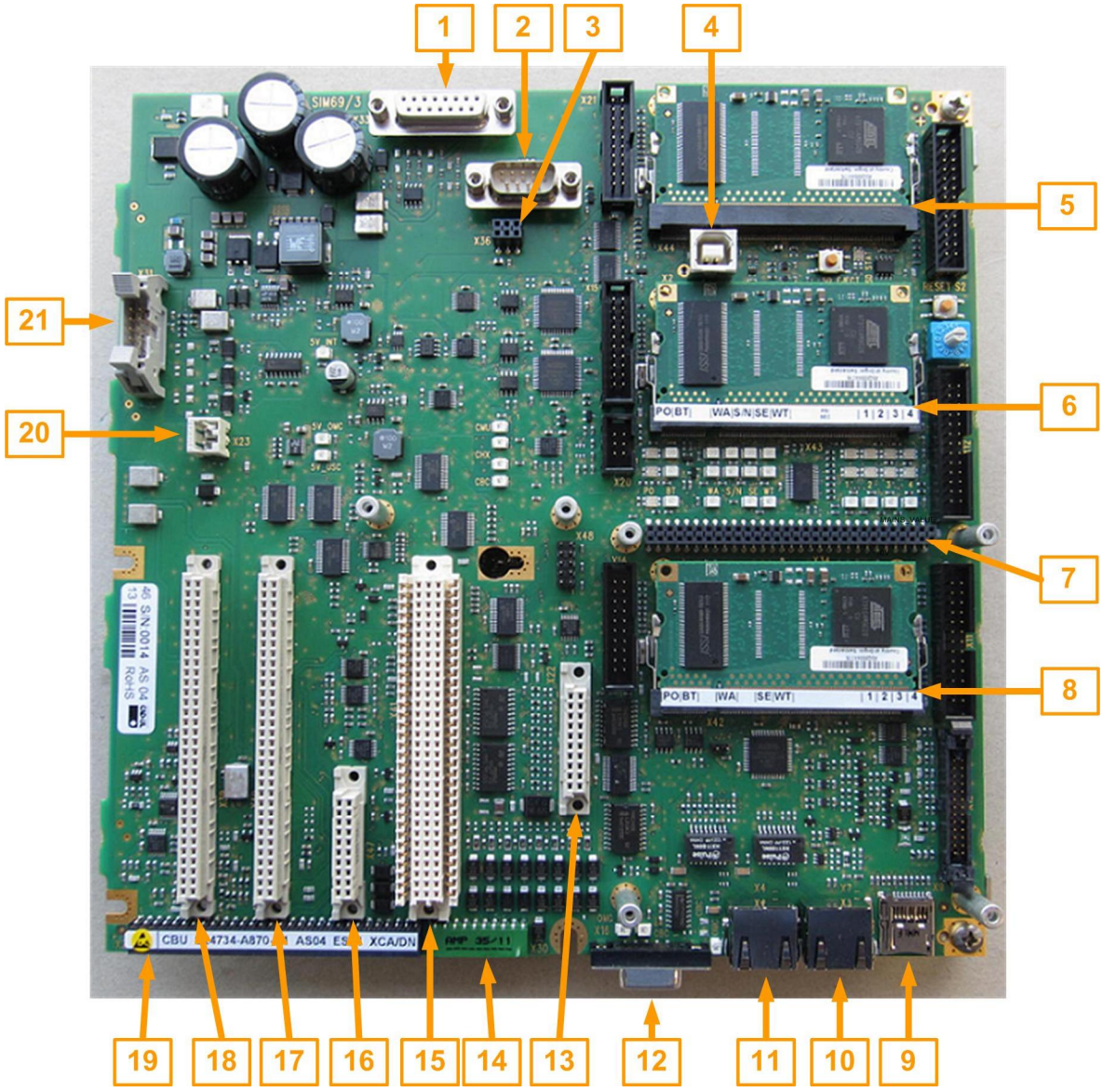


Fig. 13: Plug connector of the CBU

No.	Ref.	Plug Name	Description
1	X33	BAZ1	Connection for first BAZ controller
2	X35	CMA data	RS232 connection for CMA modem module
3	X36	CMA-SV	Power supply connection for CMA modem module
4	X2	USB device	USB device plug
5	X44	CMU	Slot for processor module CMU (SIMO)
6	X43	CHX	Slot for processor module CHX (SIMO)
7	X34	CEB	Slot for interface expansion CEB for second controller BAZ2, second IO bus and second LS bus.
8	X42	CBC	Slot for processor module CBC (controls)
9	X9	Micro SD Card	MicroSD card holder
10	X7	Ethernet Internal	Ethernet for device-internal accessories (e.g. detectors)
11	X4	Ethernet Central device	Control center connection (e.g. DSL modem)
12	X16	Debug_SIMO	Service PC connection for CHX Troubleshooting for SIMO through service PC
13	X22	AFD	Slot for AFD Evaluation module for request telegrams from PT
14	X30	CTB2	Second plug connection for CTB
15	X41	OMC	Control module OMC
16	X47	CMD	Module for operating the CBU
17	X40	Serial IO 2	Plug 2 for an I/O expansion card (SLD4, CIO)
18	X39	Serial IO 1	Plug 1 for an I/O expansion card (SLD4, CIO)
19	X29	CTB1	First plug connection for CTB
20	X23	SV-In	24V power supply connection of the CBU
21	X31	CCU	Drop cable connection for GPS clock CCU

Tab. 6: Description of the plug connector of the CBU, see Fig. 13

2.3.5. Display and control elements of the CBU

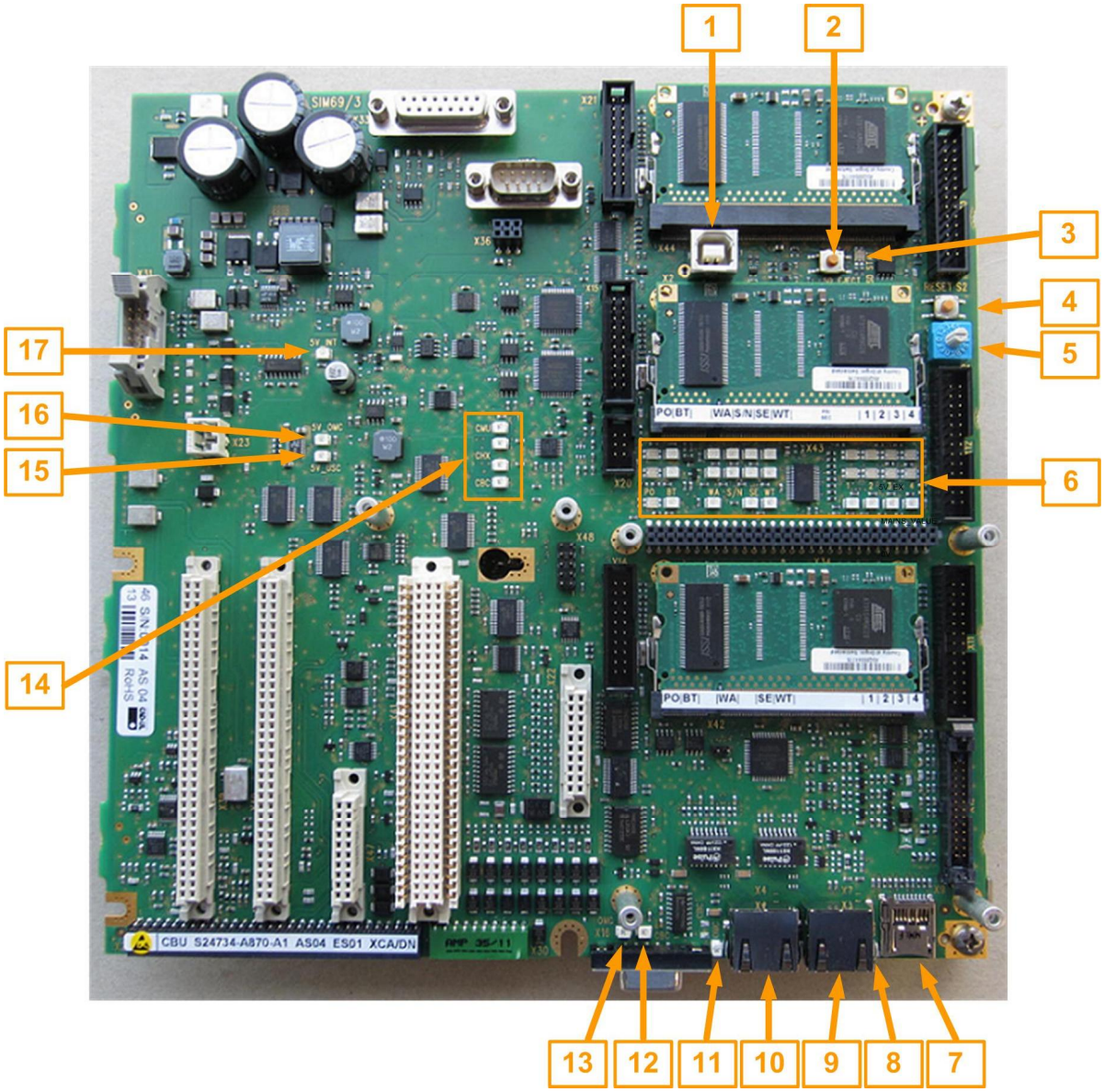


Fig. 14: Display and control elements of the CBU

No.	Ref.	Description
1	X2	USB device plug
2	S3	Eject button for MicroSD card holders
3	H25	Eject LED for MicroSD card holders
4	S2	Reset button of the CBU

No.	Ref.	Description
5	S1	Mode selector switch for CBU (CBC, CHX and CMU Must be in position "0" if a CMD is plugged in.
6	--	LED array for CBC, CHX and CMU (see Fig. 15)
7	X9	MicroSD card holder
8	H16	Power indicator for device-internal LAN
9	X7	Ethernet for device-internal accessories (e.g. detectors)
10	X4	Control center connection (e.g. DSL modem)
11	H6	Link/activity LED for Ethernet for control center connection
12	H3	Link/activity LED: CBC → OMC
13	H8	Link/activity LED: OMC → CBC
14	H14 H10 H12 H2	Link/activity LEDs for CBU-internal LAN connections CMU → CHX CHX → CMU CHX → CBC CBC → CHX
15	H48	LED "USV_OK" 5V operating voltage of USC for OMC is okay
16	H1	LED "CBU_5V_OK" 5V operating voltage of CBU for OMC is okay
17	H47	LED "CPD_Relay_Driver_OK" 5V operating voltage for components of the CBU is okay

Tab. 7: Description of the display and control elements of the CBU (see Fig. 14)

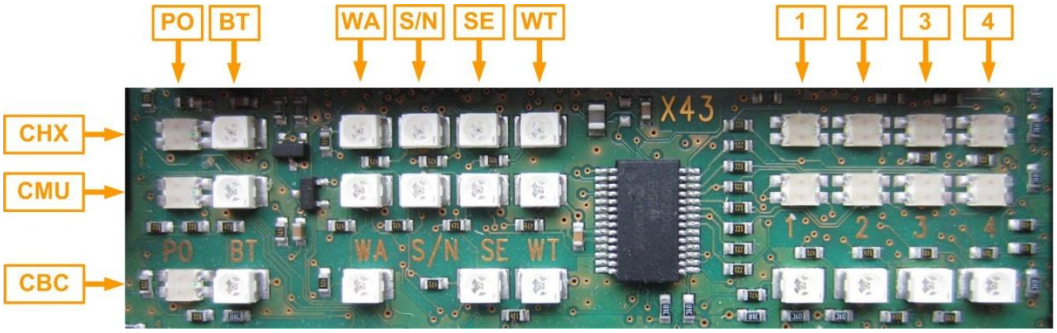


Fig. 15: LED array of the CBU

LED	CHX	CMU	CBC
PO	Power	Power	Power
BT	Boot	Boot	Boot
--	--	--	--
WA	Watchdog alarm	Watchdog alarm	Watchdog alarm
S/N	New signal pattern	New 100ms Slot	--
SE	System error	System error	System error
WT	Watchdog Trigger	Watchdog Trigger	Watchdog Trigger
--	--	--	--
1	Primary Alarm PI1	Secondary Alarm PI1	TBD
2	Primary Alarm PI2	Secondary Alarm PI2	TBD
3	Primary Alarm PI3	Secondary Alarm PI3	TBD
4	Primary Alarm PI4	Secondary Alarm PI4	TBD

Tab. 8: Identification of the LEDs of the processors CBC, CHX and CMU

LED	LED function	LED Status	Meaning
PO	Power	Green Red off	Operating voltage is okay Operating voltage is too low Operating voltage is off
BT	Boot	Red	Firmware is booting
--	--	--	--
WA	Watchdog alarm	Red	Watchdog fault
S/N of CHX	New signal pattern	Flashes green	A new signal pattern was detected by the LED switches.
S/N of CMU	New 100ms Slot	Flashes green	A new signal pattern is transmitted from the controls (CBC) to the signal monitoring (CHX, CMU).
SE	System error	Red	The firmware has identified a malfunction (hardware-internal or firmware-internal).
WT	Watchdog Trigger	Flashes green	Watchdog is triggered
--	--	--	--

LED	LED function	LED Status	Meaning
1-4	Primary alarm partial intersection 1-4		Controlled by CHX software see Tab. 10
1-4	Secondary alarm partial intersection 1-4	Off yellow	Controlled by CMU software see Tab. 11
1-4	TBD	--	Controlled by CBC software

Tab. 9: Meaning of the LEDs of the processors CBC, CHX and CMU

Primary Alarm LEDs PI 1-4		Partial intersection characteristics	
Color	Status	Status / outdoor system	SIMO
Off	Off	Not present	--------
Green	On	Active, OMC controls the signal pattern	Live
Green	1Hz	Active, fail-safe mode, CBC controls the signal pattern	Live
Red+green	On	OMC switches on or OFF (on/off pattern proceeds)	Not live
Red+green	1Hz	Off, free of faults (off-flashing, off, etc.)	Not live
Red+green	2Hz	OFF with network fault (fault flashing)	Not live
Red	On	switches off ("all yellow" pattern proceeds)	Not live
Red	1Hz	Faulty (fault flashing)	Not live
Red	2Hz	Faulty, system fault (off)	Not live

Tab. 10: Meaning of the LEDs for primary alarm

Secondary Alarm LEDs PI 1-4		Partial intersection characteristics	
Color	Status	Status / outdoor system	SIMO
off	Off	No secondary alarm	No effect
Red+green	On	Secondary Alarm	No effect

Tab. 11: Meaning of the LEDs for secondary alarm

2.4. CMD

The operating mode of the three processors on the CBU is selected with the CMD (S24734-A899-A1).
Furthermore, the three processors on the CBU can be reset.

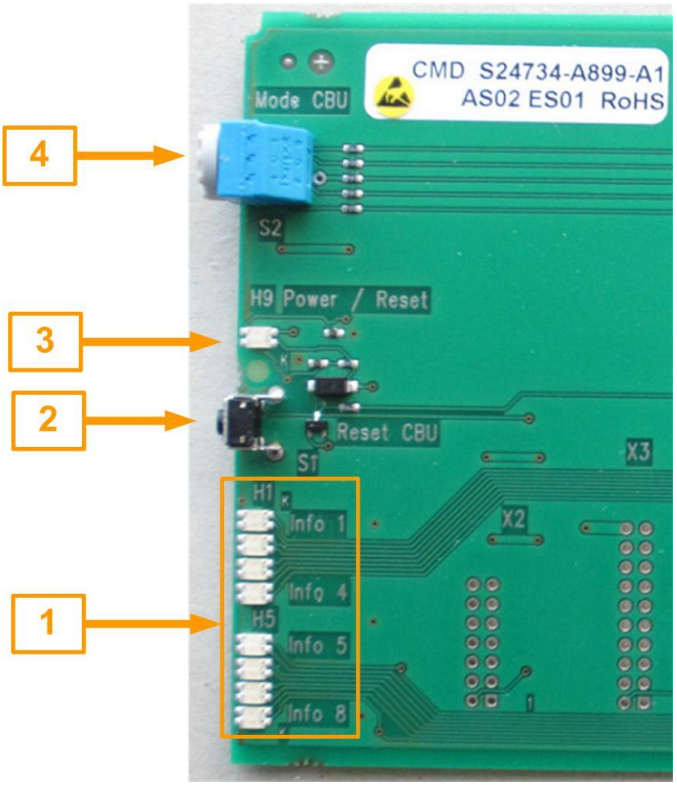


Fig. 16: Display and control elements of the CMD

No.	Ref.	Description
1	H1 - H8	LEDs controlled by the CBC
2	S1	Reset button for CBU (CBC, CHX and CMU) Works in parallel to the reset button S2 of the CBU. The OMC does not receive a reset signal.
3	H9	Power and reset LED ■ Green — Operating power supply is present ■ Green + red — Reset button is pressed
4	S2	Mode selector switch for CBU (CBC, CHX and CMU). Rotary switch S1 of the CBU must be in position "0"

Tab. 12: Meaning and function of the display and control elements of the CBU

2.4.1. Reset of the CBU

The CBU attains a hardware reset if the reset button of the CMD is pressed (see Fig. 16, detail no. 2).

The reset affects the process modules CBC, CHX and CMU.

The OMC is not reset due to this.

If the button S2 is present on the CBU, it works in parallel with the reset button on the CMD. The CBU can be reset with both buttons.

2.4.2. Setting the operating mode of the CBU

The operating mode for the processor modules CBC, CHX und CMU is selected with the rotary switch of the CMD (see Fig. 16, detail no. 4). The operating mode of the OMC is not affected by this.

Selection of the operating mode of the CBU
The signals of the rotary switch of the CBU and of the CMD are connected in parallel. If the operating mode should be set with the rotary switch of the CMD, the rotary switch of the CBU must be set to the "0" position and vice versa.

Selector switch position	Function
0	Normal operation (without lamp switches)
1	Simulation mode
2	Operation without outdoor system (only LSHS LED display)
3	Reserved for lamp assignment test
4	Signal monitor test
5	Load configuration
6	Firmware update mode
7	Relay ON, lamp power supply on for test purposes
8	Update mode for LSHS

Selector switch position	Function
9	Update mode for CPDH
A	Reserved
B	Reserved
C	Reserved
D	Reserved
E	Reserved
F	Reserved

Tab. 13 Rotary switch functions

2.4.3. Display of operating statuses of the CBC

The firmware of the CBC operating statuses can display via 8 LEDS on the front of the CMD (see Fig. 16, detail no. 1). The LEDs are two-colored (red/green).

2.5. CTB

The terminal blocks of the CBU are transferred to the CTB (S24734-A871-A1). The CTB is connected to the CBU with the plug connections. This way the wiring does not have to be reconnected when replacing the CBU.

2.5.1. Assignment of CTB_X5

The IN and OUT signals of the CBU are applied on terminal block X5. The +24 V for the OUTs must be supplied by the additional power supply. :

- 8 external +24 -V parallel inputs of the CBU (X5, IN1 to IN8) can be used for connecting demand buttons (for plug connector X5 see Tab. 14: Assignment of the X5 terminal *block of the CTB*).
- 8 external +24 -V parallel outputs of the CBU (X5, Out1 to Out8) can be used for connecting confirmation devices (for plug connector see Tab. 14: Assignment of the X5 terminal block of the CTB).
- Power supply feed for OUT1 - OUT8 (+24V_PED_IN)

X5 Row/ Contact	c	a	Function
1	IN1	IN1	Inputs for +24-V signals (demands buttons) 0V active
2	IN2	IN2	
3	IN3	IN3	
4	IN4	IN4	
5	IN5	IN5	
6	IN6	IN6	
7	IN7	IN7	
8	IN8	IN8	
9	Out 1	Out 1	Outputs for +24-V signals (confirmation devices) High Side Switch 24V active
10	Out 2	Out 2	
11	Out 3	Out 3	
12	Out 4	Out 4	
13	Out 5	Out 5	
14	Out 6	Out 6	
15	Out 7	Out 7	
16	Out 8	Out 8	
17	+24V_PED_IN	+24V_PED_IN	Power supply for high side switch (OUT1-OUT8)

Tab. 14: Assignment of the X5 terminal block of the CTB

2.5.2. Assignment of CTB_X4

Operating power supplies and the connections of the CBU installation locations CBU_X39, CBU_X40 and CBU_X22 (AFD) are present at X4. The following signals can be connected:

- UPS for OMC and CMA
- 24 -V output for ext. modem
- External command unit BAZ2 (only 24V output and emergency-off signal)
- Receiver for PT request

- 2 analog inputs (X4, AL1 and AL2)
- 2 x 8 terminals for SLD4 detectors (max. 2) for connecting 4 loops each (X4 LOOP1 to LOOP8).
  or
  2 x 8 terminals for CIE modules (max. 2) for connecting 8 parallel inputs each (X4 IN1 to IN8 and IN1' to IN8').
- 24 V operating power supply for the parallel IO of the CIE modules (+PED_IN, -PED_IN-).

X4 Row/ Contact	c	b	a
1	LOOP1A	LOOP1B	NF+
2	LOOP2A	LOOP2B	NF-
3	LOOP3A	LOOP3B	+12V_FFE
4	LOOP4A	LOOP4B	0V_FFE
5	LOOP5A / IN1	LOOP5B / IN2	PE (shield)
6	LOOP6A / IN3	LOOP6B / IN4	TFI+
7	LOOP7A / IN5	LOOP7B / IN6	TFI-
8	LOOP8A / IN7	LOOP8B / IN8	Analog IN1
9	IN1	IN2	Analog IN2
10	IN3	IN4	+24V_EXT_OUT
11	IN5	IN6	RCD-L
12	IN7	IN8	PF_USC_L
13	+5V_USC_IN	+5V_USC_IN	USC_OFF_L
14	GND	GND	+24V_USC_OUT
15	GND	GND	+5V_EX_OUT
16	+PED_IN	+PED_IN	+24V_MOD_OUT
17	-PED_IN	-PED_IN	+24V_IO1_OUT

Tab. 15: Assignment of the terminal block X4 of the CTB

Optionally, the installation locations X39 (LOOP1-4) and X40 (Loop5-8) of the CBU can be equipped with loop detectors SLD4 or IO modules CIE.

In the case of mixed equipment, installation location X39 is intended for the SLD4 and installation location X40 for the CIE because there are 2 contact points for the signals here. This way the induction loops can be

connected for the terminals 1 to 4. Two terminals per input are available for the demand buttons in this case. Contacts 5 to 8 for the first buttons and contacts 9 to 12 for the second buttons.

Name	Volt-age /V	Max. contin uous current /A	Terminal CTB X4	Use for
24V_EXT	+24	0,15	A10	External command unit
24V_USC_OUT	+24	0,50	A14	Charging current USC
+5V_EX_OUT	+5V	0,30	A15	Add-ons
24V_MOD_OUT	+24	0,25	A16	Modem
24V_IO1_OUT	+24	0,60	A17	Add-ons IO1 bus (1)

Tab. 16: Load capacity of the power supply outputs of the CTB

(1) The power supply "24V_IO1" can have a maximum of 0.6A applied to it. It is to be noted that "24V_IO1" also supplies power to all the modules of the IO1 bus that are built in to the main chassis. This includes the two installation locations X39 and X40 on the CBU and the installation locations on the CLB modules that are plugged in directly below the CTB.
For power consumption of the modules see
Tab. 4.The sum of the current for all the modules of the IO1 bus in the main chassis and the current taken from terminal 24V_IO1_OUT may not exceed 0.6A.

Since the signals on the CLB terminals cannot be sufficiently labeled, the terminal assignment plan is attached to the chassis. See indicator plate Fig. 17.

X4	c	b	a
1	LOOP 1	LOOP 1	NF+
2	LOOP 2	LOOP 2	NF-
3	LOOP 3	LOOP 3	+12V_FEE
4	LOOP 4	LOOP 4	0V_FEE
5	LOOP 5 / IN 1	LOOP 5 / IN 2	SHIELD
6	LOOP 6 / IN 3	LOOP 6 / IN 4	TFI +
7	LOOP 7 / IN 5	LOOP 7 / IN 6	TFI -
8	LOOP 8 / IN 7	LOOP 8 / IN 8	Analog_IN1
9	IN 1	IN 2	Analog_IN2
10	IN 3	IN 4	+24V_EXT_OUT
11	IN 5	IN 6	RCD_L
12	IN 7	IN 8	PF_USC_L
13	+5V_USC_IN	+5V_USC_IN	USC_OFF_L
14	GND	GND	+24V_USC_OUT
15	GND	GND	+5V_EX_OUT
16	+PED_IN	+PED_IN	+24V_MOD_OUT
17	-PED_IN	-PED_IN	+24V_IO1_OUT

X5	b	a
1	IN 1	
2	IN 2	
3	IN 3	
4	IN 4	
5	IN 5	
6	IN 6	
7	IN 7	
8	IN 8	
9	OUT 1	
10	OUT 2	
11	OUT 3	
12	OUT 4	
13	OUT 5	
14	OUT 6	
15	OUT 7	
16	OUT 8	
17	+24V_PED_IN	

Fig. 17: Indicator plate for CTB module

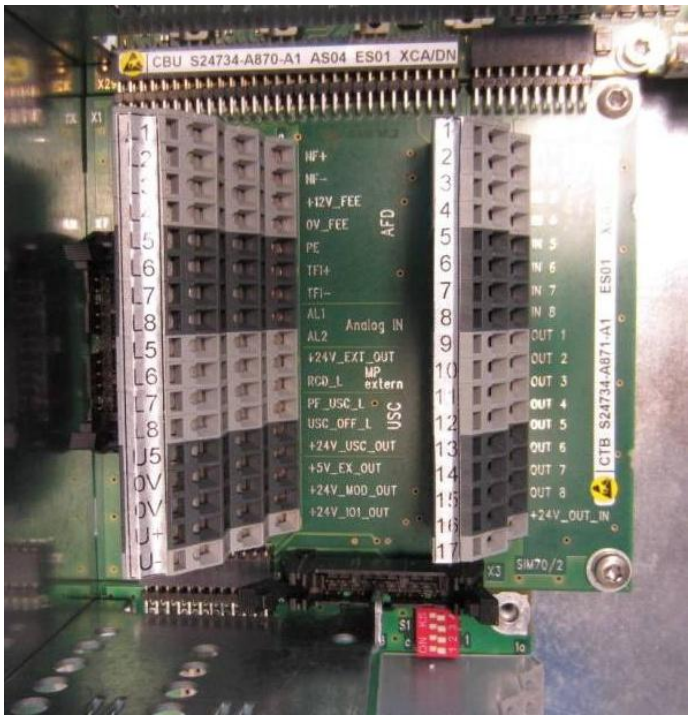


Fig. 18: View of CTB module

2.6. CEB

The CEB (S24734-A875-A1) is an interface expansion card that can optionally be plugged into the CBU.

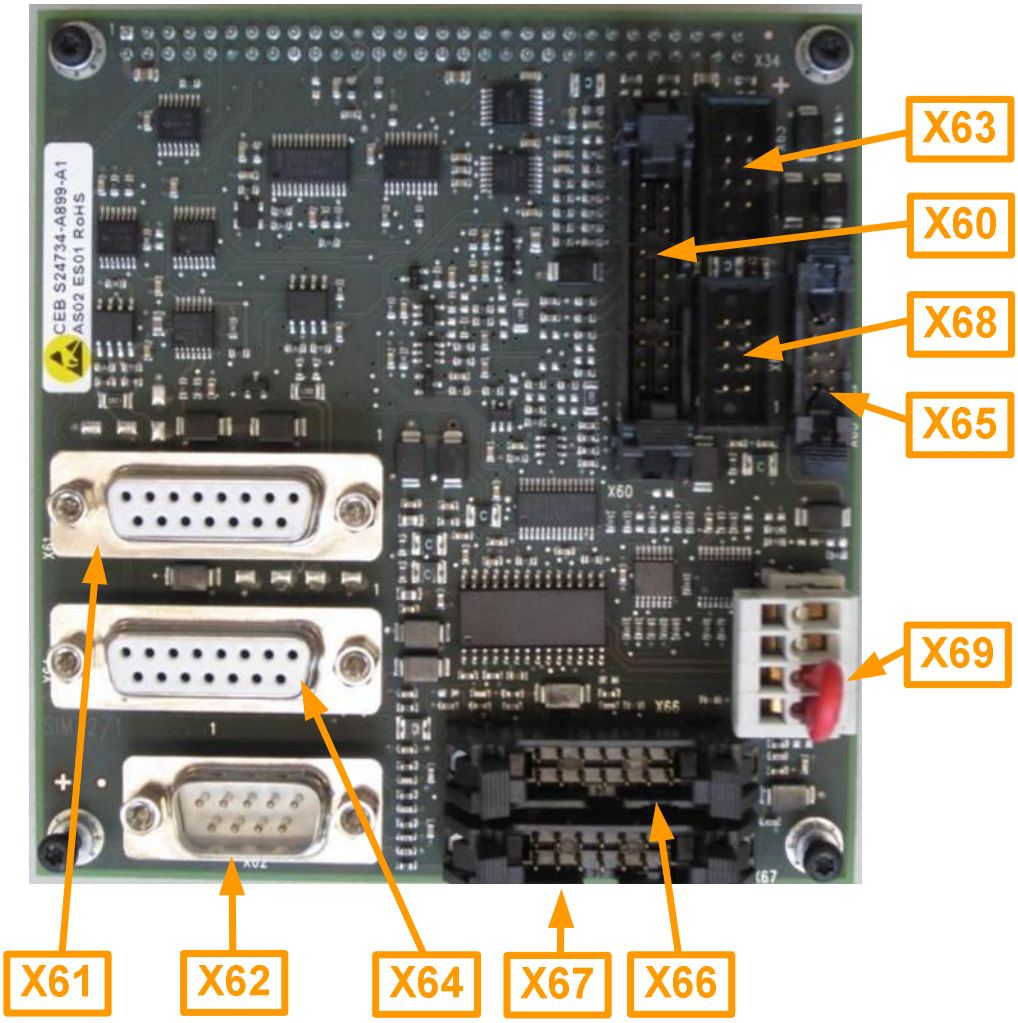


Fig. 19: CEB view

Connector	Function	Level	Software for interface present
X60	I/O2 Bus	CMOS, serial	yes
X61	2. BAZ (external)	RS485	yes
X62	9 pin D-Sub	RS232	

Connector	Function	Level	Software for interface present
X63	SPI	CMOS	
X64	3. BAZ	RS485	yes
X65	LS2 bus (LSxS5-8)	RS422	yes
X66	UART	TTL	
X67	UART	TTL	
X68	SPI	CMOS	
X69	24V power supply	24V	

Tab. 17: CEB connector

2.7. OMC-U

Tasks:

- Controls the procedure of the signal plans.
- Buffer battery for real-time clock and SRAM of the OMC and the CBU.
- Dongle
- Control center connection via Ethernet or RS 232
- Operating mode switch
- LEDs (for display of operating mode)
- Service PC connection
- USB connection for power supply

The part number/replacement part of the OMC is: S24777-A3534-A20.

The dongles are not labeled. The enabled functions could be displayed with the WEB GUI. In addition, with Canto P the required certificate is stored there.
For an order the required functions must be indicated.
See Manual 1g section 3.3.1

The following CF cards are available:

Part number	Description
A8D00000174	CF Card 1GB (Standard)

Tab. 18: CF card part numbers

Warning
The Dongle and the CF card must be ordered separately

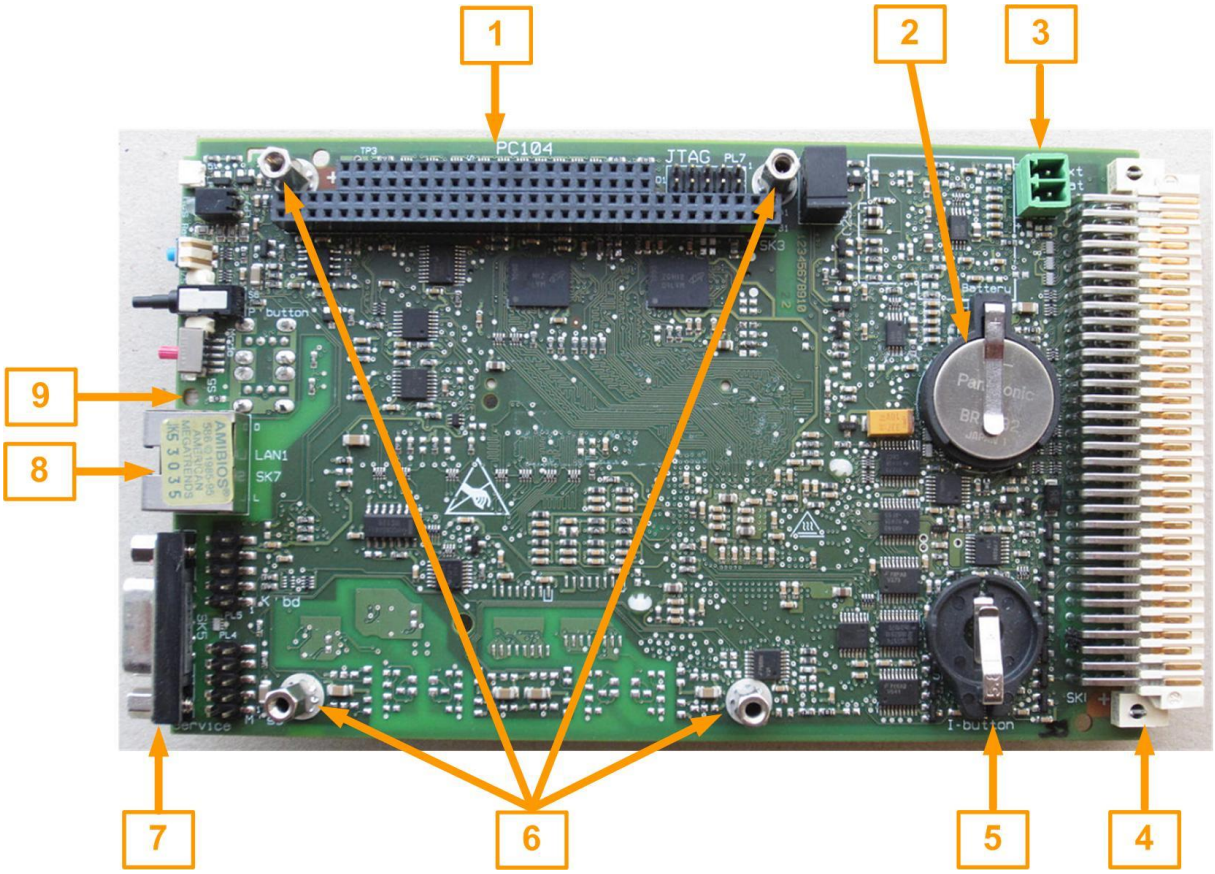


Fig. 20: OMC-U top side

No.	Ref.	Description
1	SK4	Multipole socket connector for connecting a PC104 module
2	B1	Battery in its retainer (plus pole up)
3	PL6	Connection for alternative battery
4	SK8	Basic multipole connector
5	SK6	Retainer for dongle (broad side of the dongle facing up, see Fig. 25)
6		Bolt for fastening a PC104 module
7	SK5	Connection for service PC
8	SK7	LAN RJ45 10/100MBit with diagnostics LEDs
9	--	Module slot

Tab. 19: Description of OMC-U top side (see Fig. 20)

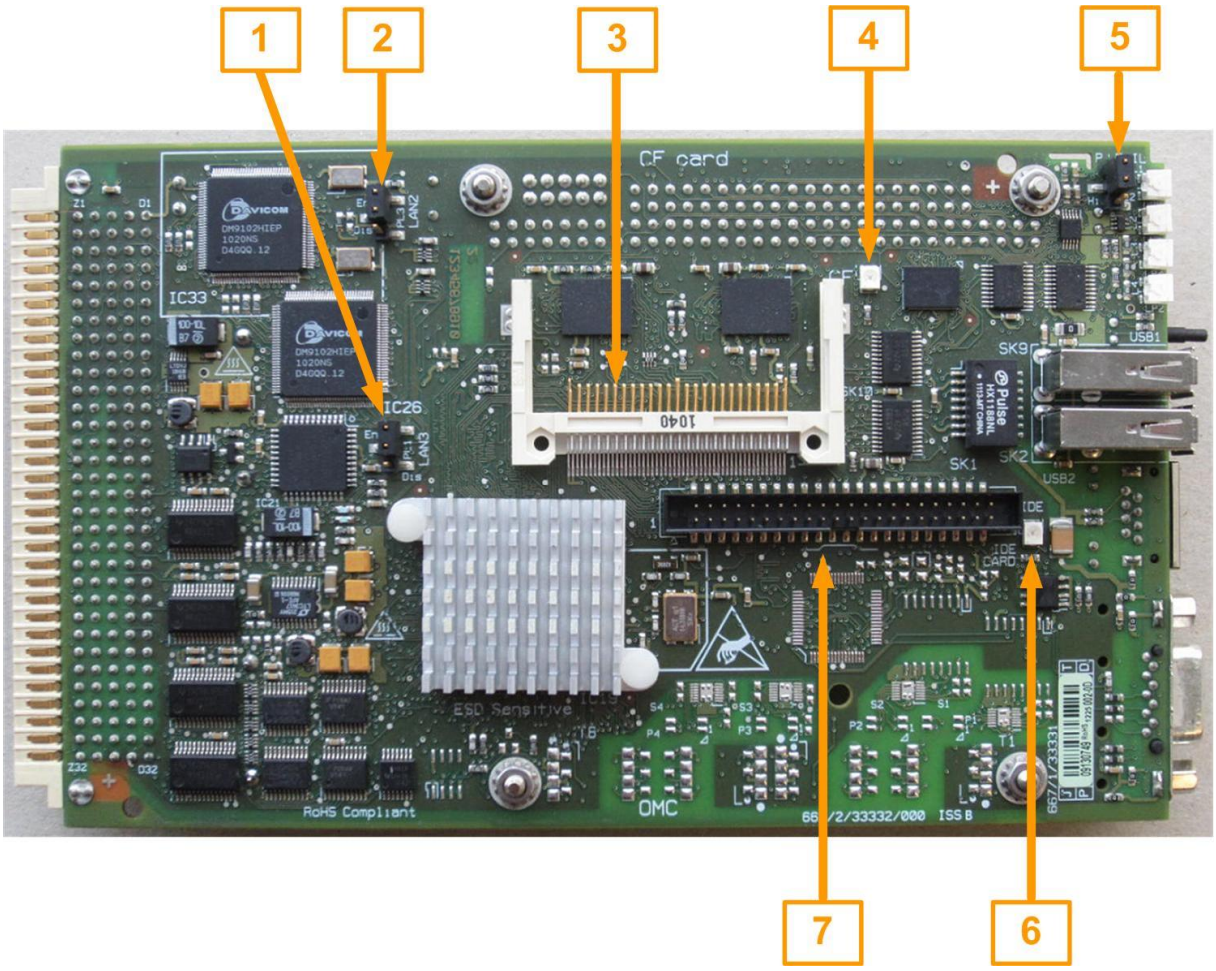


Fig. 21: OMC-U bottom side

No.	Ref.	Description
1	PL1	Jumper for switching on of LAN 3 for the CBU
2	PL2	Jumper for switching on of LAN 2 for the CBU
3	SK10	Slot for compact flash
4	LP3	Operation LED for compact flash
5	PL3	Jumper for selecting the logic of the power-fail signal
6	LP1	Operation LED for IDE interface
7	SK1	Slot of the IDE interface for flash cards / HD

Tab. 20: Description of OMC-U bottom side (see Fig. 21)

Usually a battery, "Panasonic BR2032", is built in (-30°C to 80°C)

Battery replacement
The battery is to be changed every 5 years. Only a "Panasonic BR203" is to be used as a replacement. The replaced battery is to be disposed of properly.

The plug "PL6" is used for connecting an external battery. The external battery is used for increasing the battery capacity (battery on "B1" + "PL6"). It furthermore serves to maintain the specified temperature range for -40°C requirements.
When using the modules in the temperature range of -40°C to+80°C, an external battery, e.g. TADIRAN Model TL-5242/W (-55°C to 85°C), must be used. The battery built in to the OMC (Panasonic BR2032) is only for -30°C to 80°C.

Pin no.	Signal name
1	+3.6 V
2	0V

Tab. 21: Pinout OMC_PL6

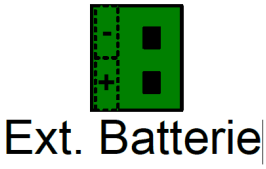


Fig. 22: PL6 assignment

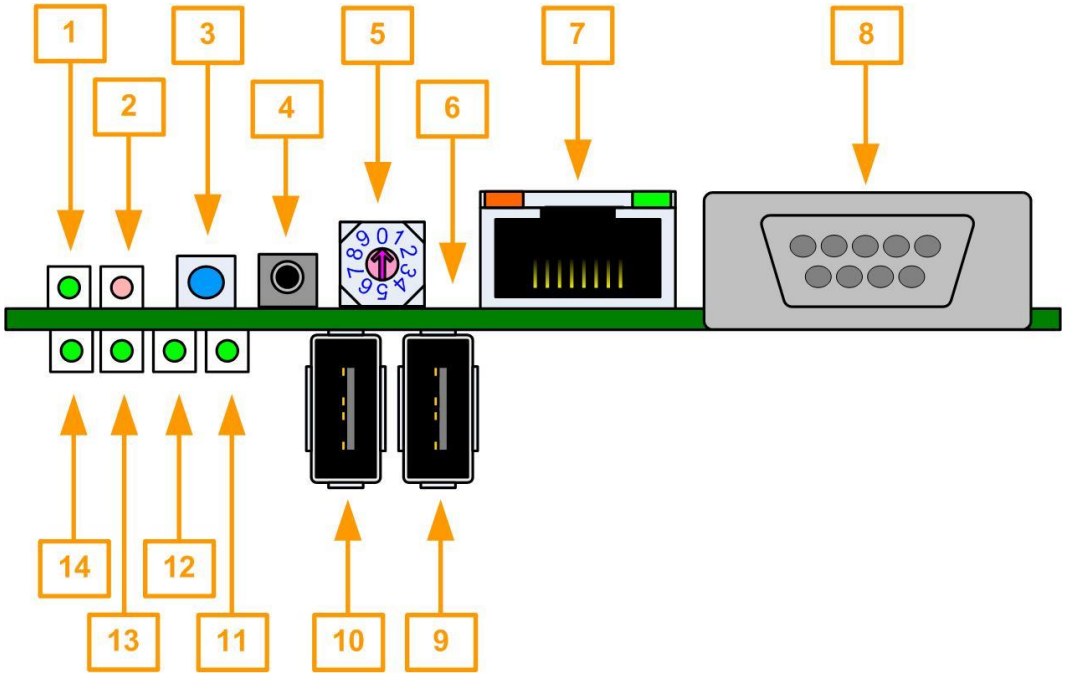


Fig. 23: OMC-U front side

No.	Ref.	Description
1	LP8	Status LED for logic voltage 5VDC
2	LP7	Status LED for reset
3	S7	Reset button
4	S6	Button, used by software
5	S5	Operating mode switch
6	--	Module slot
7	SK7	LAN RJ45 10/100MBit with diagnostics LEDs

No.	Ref.	Description
		Data (orange) and link (green)
8	SK5	RS232 Interface for service (COM1)
9	SK2	USB host plug 2
10	SK9	USB host plug 1
11	L1 / LP6	Diagnostics for LED L4, controlled by software
12	L2 / LP5	Diagnostics for LED L3, controlled by software
13	L3 / LP4	Diagnostics for LED L2, controlled by software
14	L4 / LP2	Diagnostics for LED L1, controlled by software

Tab. 22: Description of OMC-U front side (see Fig. 23)

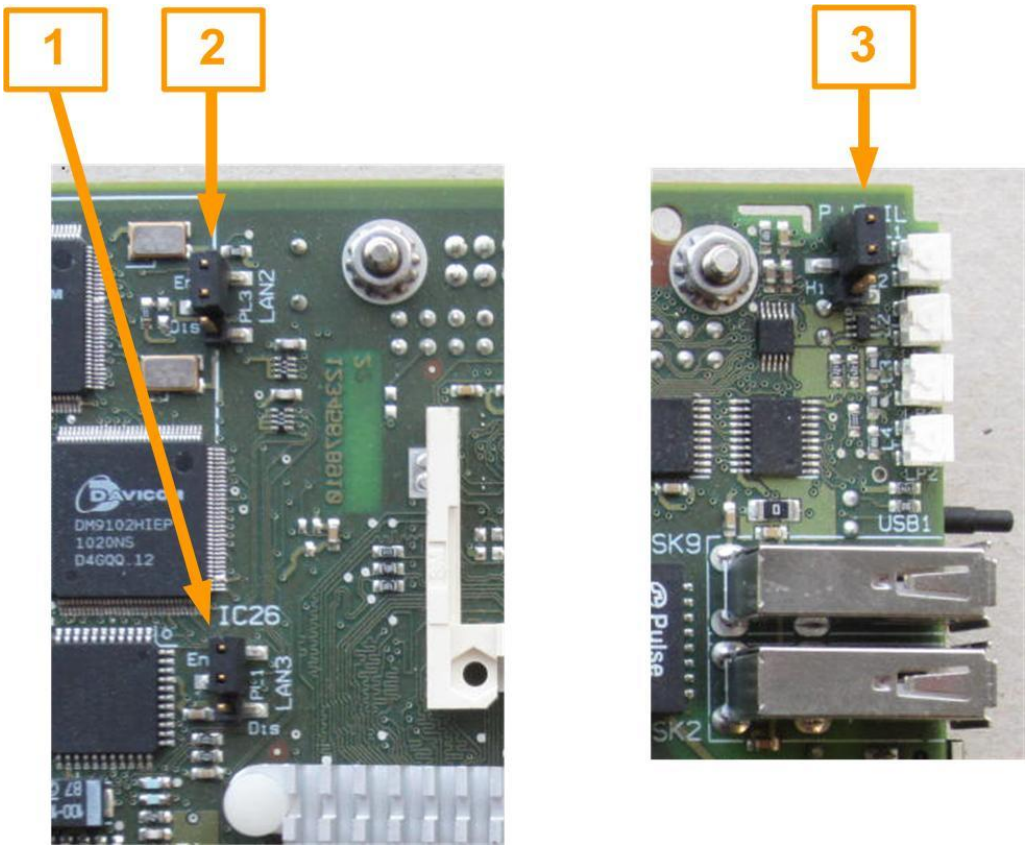


Fig. 24: Position of the jumpers on the OMC

No.	Ref.	Position	Description
1	PL1	1-2, En	LAN 3 to components of the CBU is activated
2	PL2	1-2, En	LAN 2 to the control center via CBU X4 is activated
3	PL3	1-2, Lo	Power-fail signal is low active

Tab. 23: Jumper setting for OMC

The jumpers must be in the position shown in Fig. 24.

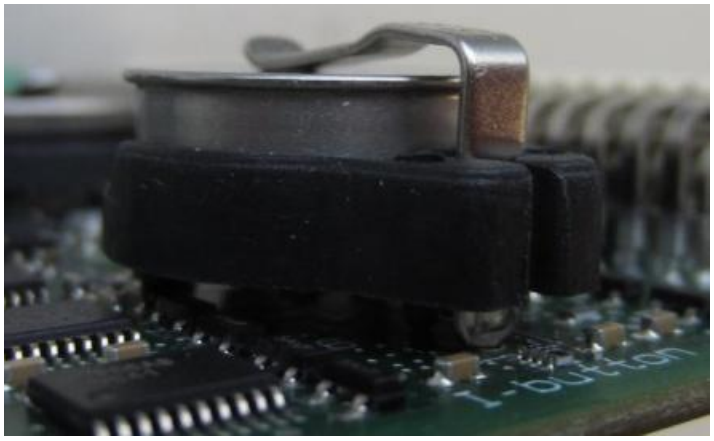


Fig. 25: Placing the dongle in the retainer of the OMC

The dongle is to be placed in such a way that the broad circumferential edge faces upward (see Fig. 25).

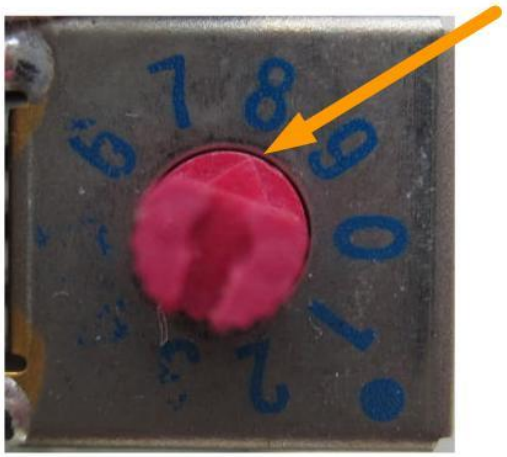


Fig. 26: Identification of the rotary switch position of the OMC

The flattened side of the rotary switch marks the number of the selected operating mode. In Fig. 26 operating mode 8 is selected.

The rotary switch functions of the OMC are described in Manual 1g

2.8. CPDH

For sX- H controller the CPDH (S24734-A884-A1) provides the 230 VAC for the LSHS together with the associated monitors.
The CPDH has A relays, SSR relays with which the feed of the LED power supply for the LSHSs of the processors of the signal monitoring system can be switched independently of each other.
The CPDH is at the top right of the chassis. The first LED switch Backplane(CDBH) is attached from below. The second CDBH is to be attached to the first. For adding on a third and fourth CDBH there are appropriate connectors available on the CPDH. All the control signals come from the control module CBU via a ribbon connector from the left side. The CPDH should be slid upward for repairs. For this, only the left lower screw is to be undone.

Note
So that no components are damaged, the module is not to be touched at the components. Removal is to be performed with a small screwdriver between CPDH and CDBH in the X9-X14 area. To insert it, only the top edge of the circuit board is to be pressed

The following is needed for installation.

Material	Part number	1. MC	2nd MC
CPDH module	S24734-A884-A1	1	1
CPDH accessories /C10	L24730-E821-A100	1	0
CPDH-X accessories /C10	L24730-E821-A110	0	1
Transformer set 25 VA /C10	L24730-E810-A41	1	1

Tab. 24: CPDH configuration

1. MC means 1st main chassis

2. MC means 2nd main chassis

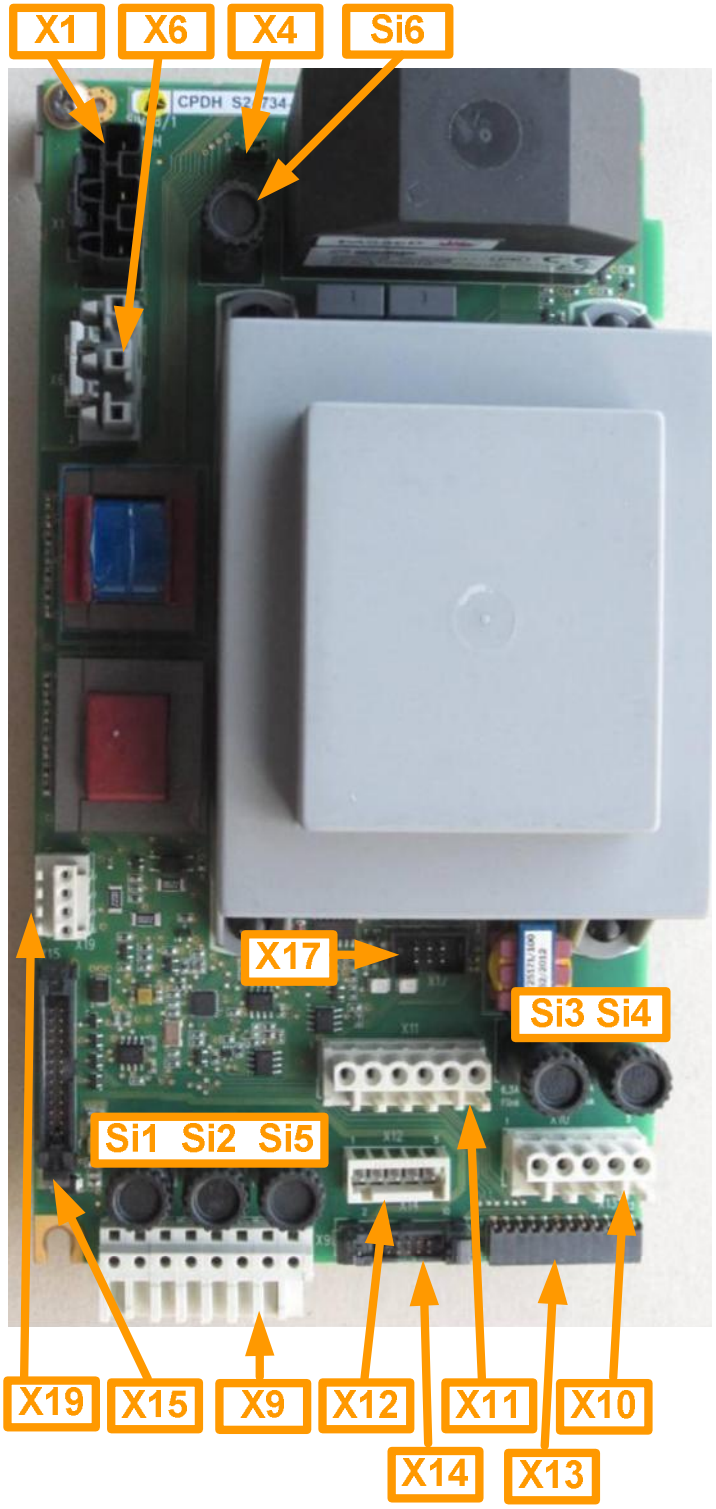


Fig. 27: CPDH assignment

Connector/fuse	Function
X1	Power supply input
X4	Enable/disable emergency off
X6	Dimming transformer
X9	Connection to CDBH
X10	Connection to CDBH3
X11	Connector L_PED, PE
X12	Connection for APU transformer
X13	Connection for LSHS bus CDBH1
X14	Connection for LSHS bus CDBH3
X15	Connection for CBU CPDH (CPDH2)
X17	Programming connector CPDH
X19	Light-sensitive switch
Si1	Fuse LSHS1 (6.3AF) 1)
Si2	Fuse LSHS2 (6.3AF) 1)
Si3	Fuse LSHS3 (6.3AF) 1)
Si4	Fuse LSHS4 (6.3AF) 1)
Si5	Fuse L_PED (6.3AF) 1)
Si6	Fuse for dimming transformer (10AT)

Tab. 25: CPDH connector/fuse

1) Replacement fuse set with 20 pieces:
set 20 x micro fuse 6.3 A CPDH /C10 L24730-A899-A1

Pinouts:

Pin X1	Signal	Function
1	L_F2	Power_Supply_In
2	PE	PE
3	N	Power_Supply_In

Tab. 26: Pinout CPDH_X1

Information
The maximum connectable LED total output is 2760 W per CPDH

X4: Here the EMERGENCY OFF function is enabled or disabled.

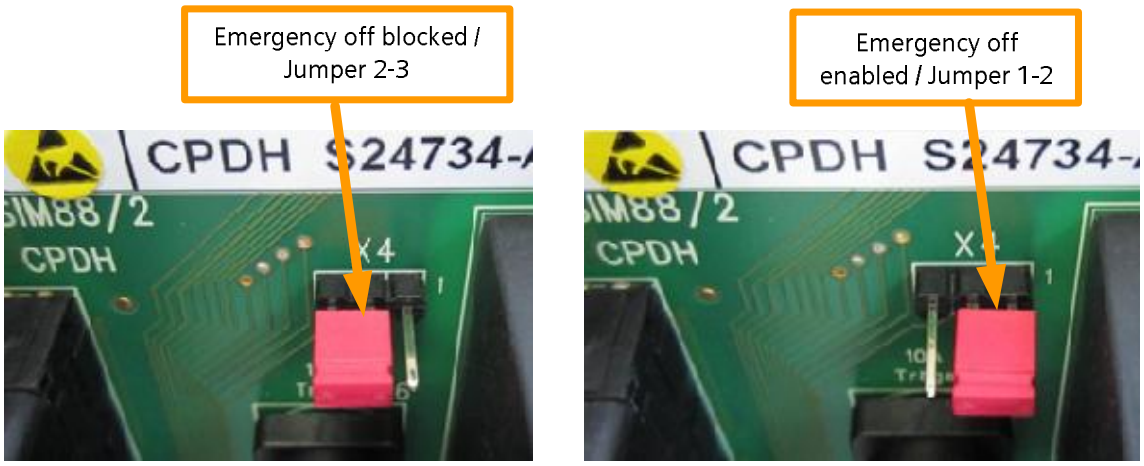


Fig. 28: CPDH_X4 EMERGENCY OFF setting

Note
Usually the EMERGENCY OFF function is enabled (setting 1-2)

Pin X6	Signal	Function
1	L_230V	L dimming transformer
2	Dimm_160V	Dimming voltage
3	N_230N	N dimming transformer

Tab. 27: Pinout CPDH_X6

in X10	Signal	Function
1	L_LSHS3	L for LSHS3
2	N_LSHS3	N for LSHS3
3	L_LSHS4	L for LSHS4
2	N_LSHS4	N for LSHS4
3	----------	

Tab. 28: Pinout CPDH_X10

The L_PED and N_PED power supply is needed for the connection of 230 V confirmation devices. The L_PED power supply is protected on the CPDH with the fuse Si5 and is accessible at connector X11. For activation see 2.22.9.

Pin X11	Signal	Function
1	Emergency off	(optional emergency off activation with contact to 0V)
2	------	unoccupied
3	L_PED	Power supply for confirmation device.
4	L_PED	Power supply for confirmation device.
5	N_PED	Return conductor for confirmation device.
6	N_PED	Return conductor for confirmation device.

Tab. 29: Pinout CPDH_X11

The auxiliary power supply for LSHS1 and 2 is attached at X12. The 5-pin connector is present on the APU transformer.

Pin X12	Signal	Function
1	13VAC1	Auxiliary power supply LSHS1
2	13VAC1	Auxiliary power supply LSHS1
3		
2	13VAC2	Auxiliary power supply LSHS2
3	13VAC2	Auxiliary power supply LSHS2

Tab. 30: Pinout CPDH_X12

The dimming sensor can be connected to connector X19. The dimming function is currently not supported.

Connection of the dimming switch:

Pin X19	Signal
1	+24V
2	GND
3	SEN_IN
4	+24V

Tab. 31: Pinout CPDH_X19 DIMM connector

The remaining connectors are connected directly. For this one no description of the pinout is required.

If a software update on the CPDH becomes necessary, the following cable (CPDH Notebook) is necessary:

PDU/ CPDH charging cable, 6-pin. 2m /Cx40ES/C10 C24700-K10-B97

The cable is to be connected to CPDH_X17.

2.9. LED switch LSHS

The serial high-voltage LED switch is called LSHS (S24734-A887-A1) because it can activate and monitor 230 -V LED signal heads. The LSHS has the following functions:

- has an integrated B relay.
- Offers redundant current and voltage monitoring.
- operates 24 Triac outputs (230 V). (8 signal groups)
- Connection of 230 -V LED signal heads from 5W to 18W
- Up to 72- W per color output (corresponds to 4 LED heads at 18 W each).
- up to 36 W per Red 1 and Red 2 output.
- Fuse of every triac output with 1 A
- has an LED with which the signal head color can be red, yellow and green for each switch. (LED 1 corresponds to CDBH output 1, LED 2 output 2, etc. up to LED 24).
- Control/monitoring is supplied with 13V AC power potential-free.
- is activated serially via a potential-free RS422 interface.
- has an additional RS422 interface for activating additional LSHS in serial mode.

- has 4 electrically-isolated digital inputs via optocouplers.
- Optional electronic load (CEW) on LSHS can be plugged in.

Warning
Connecting incandescent bulbs is not possible

The LSHS assembly set is called:

LSHS Set /C10 L24734-A887-A10

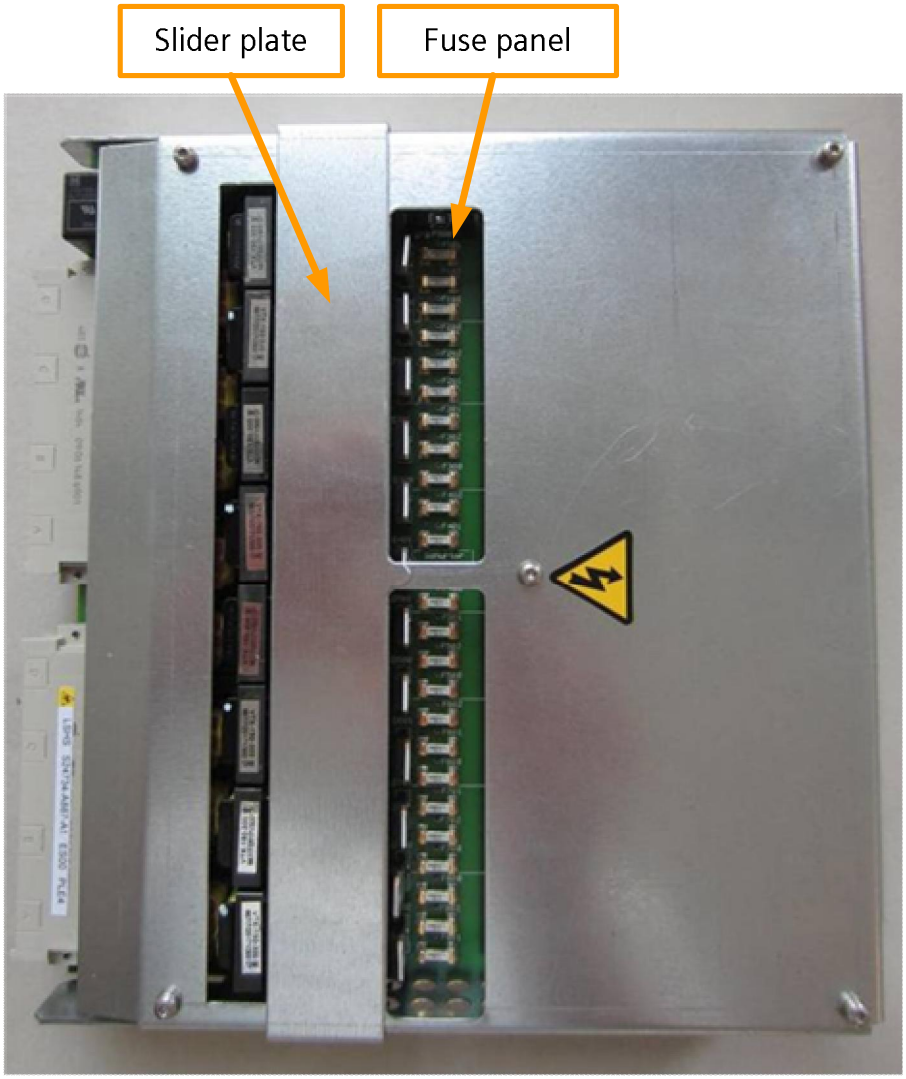


Fig. 29: View of LSHS fuses

The LSHS module has 24 LED switches / with 32 outputs (Red1, Red2, Yellow and Green). In each case three outputs for the colors red, yellow and green are permanently assigned to a signal group.
For each LSHS module a CDBH backplane is required, on which the terminals for the connection of the LED signal heads including the return conductors are located. The CDBH is also used for carrying the control signals and power supply to the LSHS module. For the sX controller two CDBH/LSHSs can be installed in the main chassis and two CDBH/LSHSs in the add-on chassis.
The CBU communicates with the LSHS modules 1-4 via the LS1 bus. This is an RS422 bus with a transmission speed of approx. 600 kBit/s. The master is the CHX processor on the CBU that asks for the status of the LSHS modules (slaves) every network cycle. The LS1 bus is guided across the CPDH and the backplane CDBH1 to the LED switches LSHS1. Here, the information concerning LSHS1 is coupled and decoupled. The bus is guided in amplified form to the next LSHS. (The LSHS modules are thus connected in series at the LS bus.
The LED switches need a potential-free alternating current of 13 V AC for their internal logic. For this an APU transformer is provided which feeds the LED switches in the main chassis via CPDH and CDBH over two separate windings.
A second APU transformer, which feeds the LED switches, is provided in the add-on chassis. For structure see Fig. 2: Frame structure for sX-H and sX-Hx.
The fuses of the LSHS can only be accessed if the module is removed. Then the slider plate can be slid back and fuse device is accessible. When plugged in the slider plate is closed
Set 20 x SMD fuse 1 A LSHS/C10 L24730-A899-A2

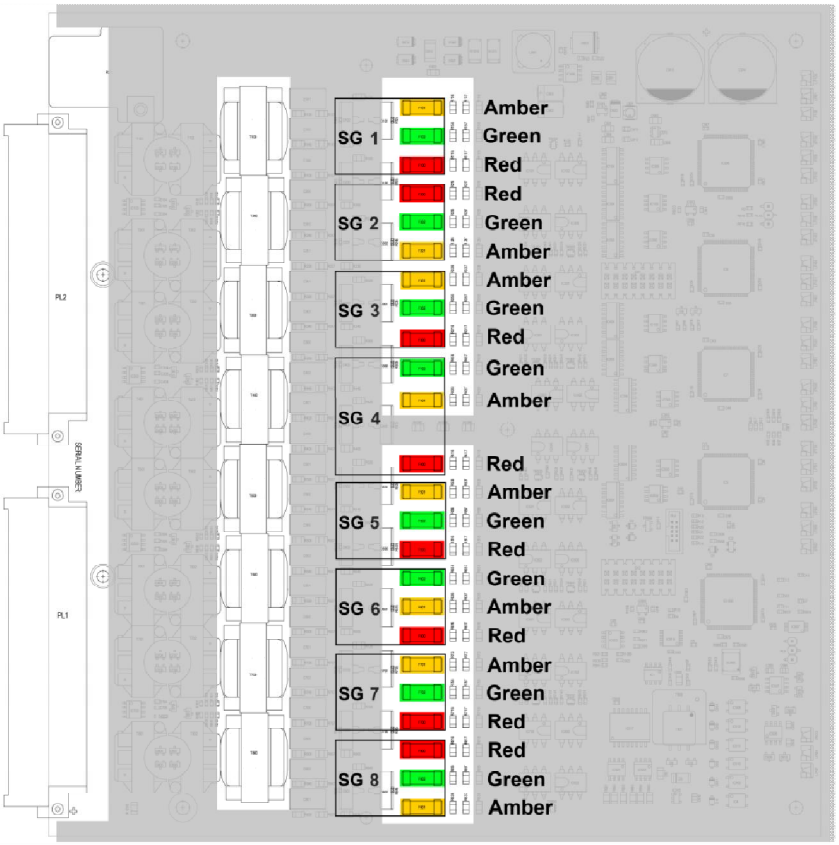


Fig. 30: LSHS fuse assignment

Note
The fuse arrangement is not sequential

The fuse labels are coded as follows:

Fx0y. Where:

- x is the number of the signal group
- y is the color.
  The color code is:
  0 ➔ red
  1 ➔ yellow
  2 ➔ green

Example: F101 is signal group 1, yellow

2.10. CEW module

The CEW (S24734-A898-A1) is an electronic load module for the LSHS. This can be if necessary in some cases, if external power supplies appear due to capacitive linking of wire to wire in the outdoor system. The module affects all outputs. This module is to be mounted on the rear side of the LSHS. For this, the multipoint male connectors of the CEW are to be carefully plugged into the LSHS and fastened with 3 screws (CEW component side to the LSHS).
The CEW assembly set is as follows:

CEW 230 V Set L24730-E821-A2

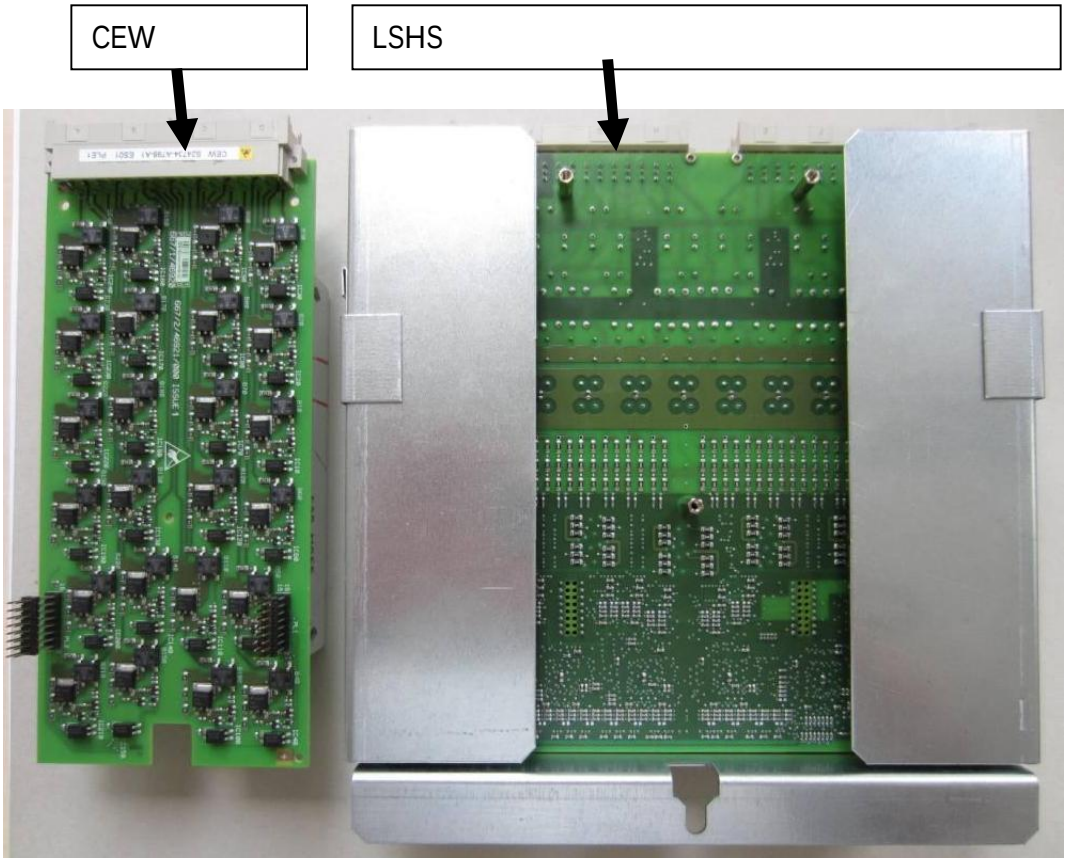


Fig. 31: CEW next to LSHS

2.11. CDBH

The CDBH (S24734-A872-A1) is the backplane for the LSHS. It establishes the connection from the LSHS module to the outdoor system.

The CDBH has the following functions:

- Connection of controllers 1-4: Red1, red2, red unmonitored, yellow, green
- Connection of controllers 5-8: Red1, red2, yellow, green
- 3 spring terminals are present for each color signal.
- On the return conductor block (dark gray in the CDBH) 24 return conductors can be connected. Up to 4 A per return conductor block.
- For each CDBH a PE block with 16 terminals is to be installed onto the top-hat rail. For CDBH 1 and CDBH 2 this takes place at the bottom left in the main chassis. See, Fig. 2, no. 20. The PE block of CDBH 3 and CDBH 4 is to be installed onto the right top-hat rail in the main chassis, sees Fig. 2 no. 17.

The CDBH assembly set is as follows:

CDBH accessories /C10 L24734-A872-A10

For correct addressing of the LSHS modules, the address must be set on the CDBH. For this there is an address field (X15) with ADDR0 to ADDR3 in the top area. Here the appropriate address must be scratched. The signals to be scratched are shown with an X.

LSHS number	ADDR3	ADDR2	ADDR1	ADDR0
1				X
2			X	
3			X	X
4		X		
5		X		X
6		X	X	
7		X	X	X
8	X			

Tab. 32: CDBH address setting

Fig. 32: Photo CDBH X15 (here address 5 set)

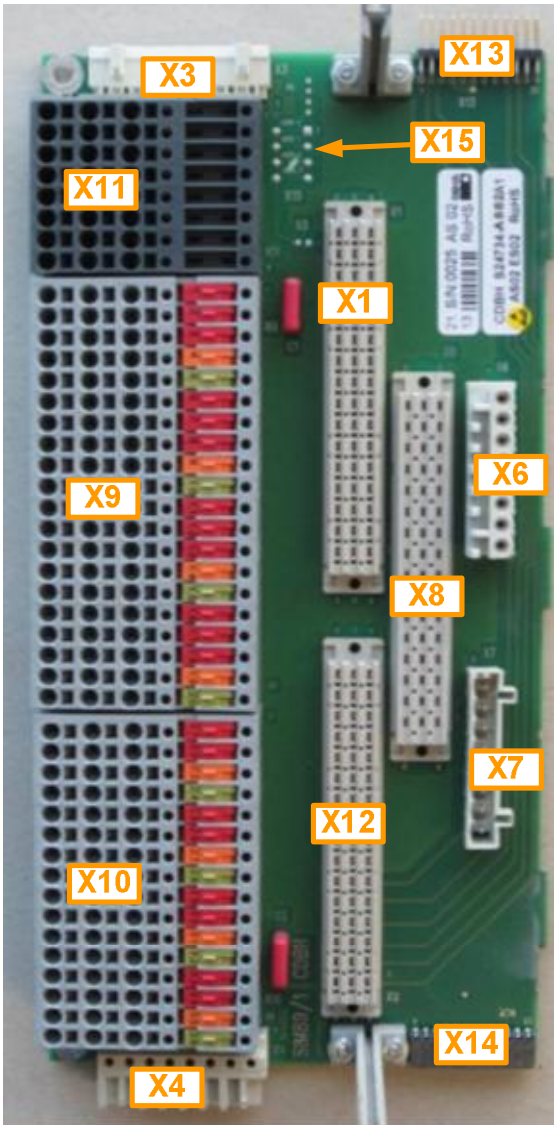


Fig. 33: CDBH view

Connector	Connector function
X1	LSHS module
X2	LSHS module
X3	Power supply
X4	Power supply redirection
X6	Analog inputs (not in level 2)
X7	Digital inputs (not in level 2)
X8	CEW module
X9	Terminal block for controllers 1-4 with unmonitored red output (3 x red)
X10	Terminal block for controllers 5-8 with unmonitored red output (2 x red)
X11	Return conductor block N_LED
X13	Serial LS bus
X14	Serial LS bus
X15	Address patch field

Tab. 33: CDBH view

X6 Pin	Signal
1	Torroid1
2	Torroid1
3	Torroid2
4	Torroid2
5	Torroid3
6	Torroid3
7	Torroid4
8	Torroid4

Tab. 34: CDBH X6 assignment

Up to four external switches or buttons can be connected to the X7.

X7 Pin	Signal
1	DIG_IN1+
2	DIG_IN1-
3	DIG_IN2+
4	DIG_IN2-
5	DIG_IN3+
6	DIG_IN3-
7	DIG_IN4+
8	DIG_IN4-

Tab. 35: CDBH X7 assignment

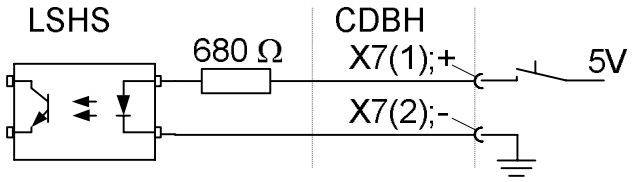


Fig. 34: Sample wiring of the digital inputs

2.12. CPA module

In the add-on chassis the CPA (S24734-A883-A1) is necessary for the coupling of the 3rd or 7th CDBH including the corresponding LED switches. The CPA is a small printed circuit board with three plug connectors which provides the CDBH (and therefore the LED switches) with an interface electrically and mechanically identical to the CPDH. For the power supply to the LED switches in the add-on chassis the large APU transformer is necessary.

2.12.1. Installation for sX-H and sX-Hx

The CPA is used for 230-V devices with CDBH.
For this there is the following installation set:

For installation the following is necessary:

- CPA Power Distribution Adapter high/C10 L24730-E821-A210
- Transformer Set 50VA /C10 L24730-E810-A45

If only three LSHSs are used in the device, the 3rd LSHS with CPA can also be installed on the installation location of the 4th LSHS, (the same applies for the 7th LSxS with CPA). The existing connecting cables and the mechanics are appropriate for both installations. In this case, additional CLB installation locations are available on the left side.

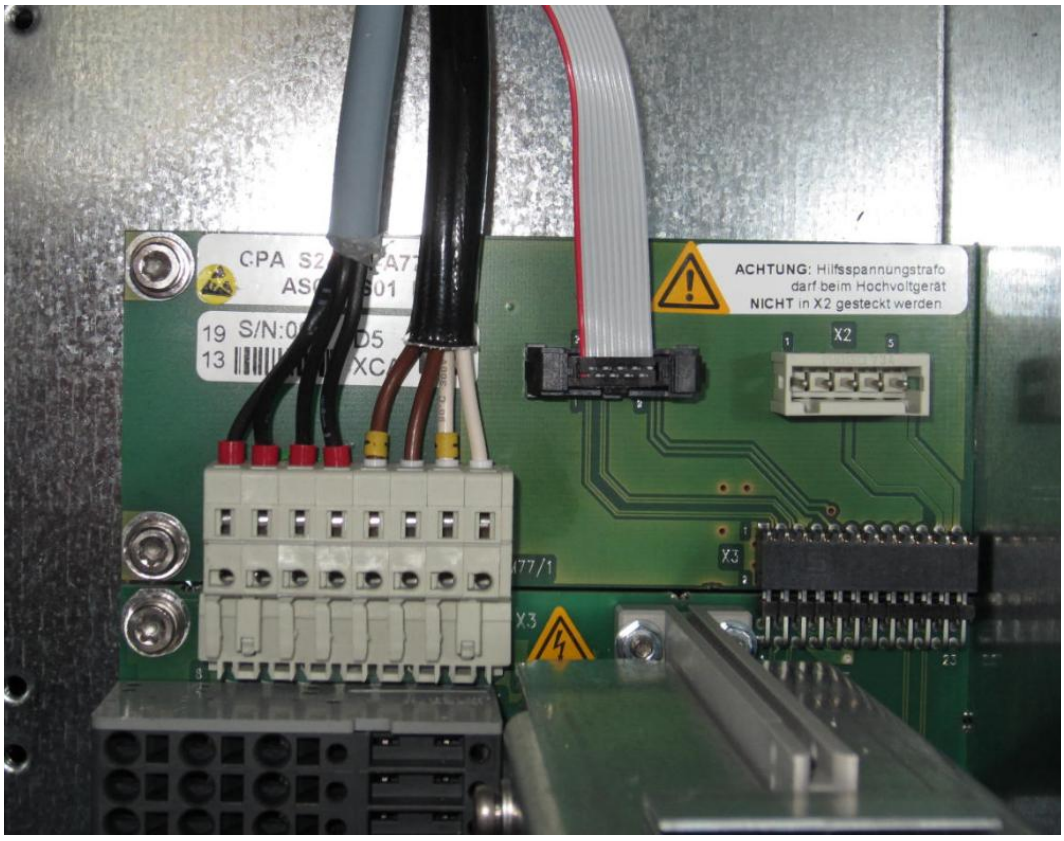


Fig. 35: Photo CPA CDBH connection

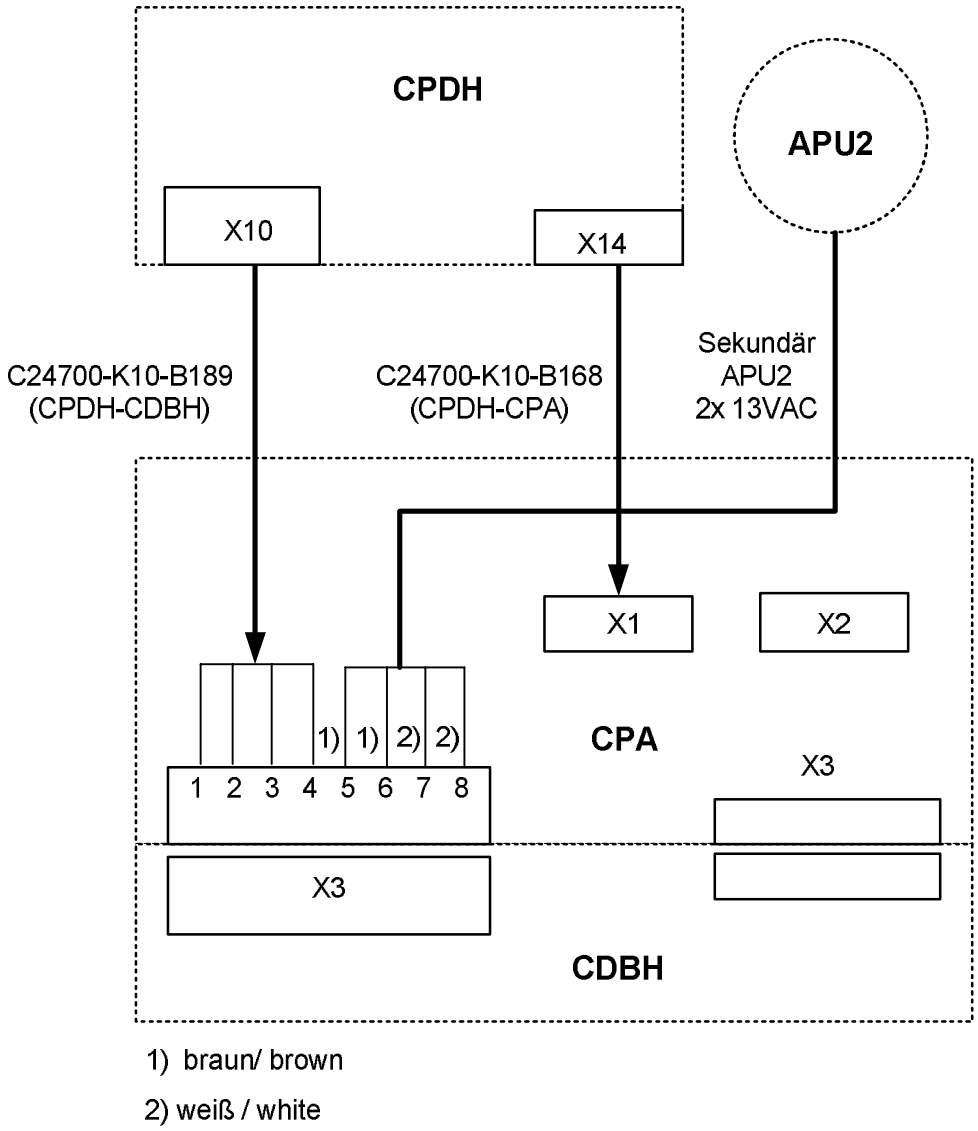


Fig. 36: Activation of CPA-CDBH

Warning

WARNING: The connector of the auxiliary power supply transformer may NOT be connected to CPA_ X2 for the high-voltage device (sX-H).

- For the activation the 5-pin connector must be removed from the APU2 transformer.
- The wires are to be connected at the X3 connector of the CDBH as shown.

2.13. sX-Hx device

For more than 32 controllers you will need a second cabinet. This way up to 64 controllers are possible. This device is known as sX-Hx.

See the following overviews:

- For the mechanical structure see Fig. 2
- For 230 -V distribution see Fig. 9

Then the 2nd cabinet contains:

- Main/add-on chassis
- The 2nd CPDH
- LSHS 5-8
- APU transformer
- Power distributor
- Additional CLB places
- The maximum total output of the system may not exceed 2760 W, so that the same utility compartment can be used.

The modules CPDH/CDBH/LSHS/CLB are to be installed in the same places as in the 1st cabinet. At the CTB location it can already be started with one CLB.

Changes in the main chassis:

- In the 1st main chassis the LED signal head fuse (F2) for the 2nd CPDH is to be changed from single-pin 16AB to 2-pin 16AB.
- For the 2nd LS bus (LSHS5-8) the CEB module is to be plugged into the CBU.

  For the serial connection of the 2nd CPDH the wire C24700-K10-B181 is necessary.
  It connects CBU.X19➔1st CPDH.X15 ➔ CEB.X65 ➔2nd CPDH.X1

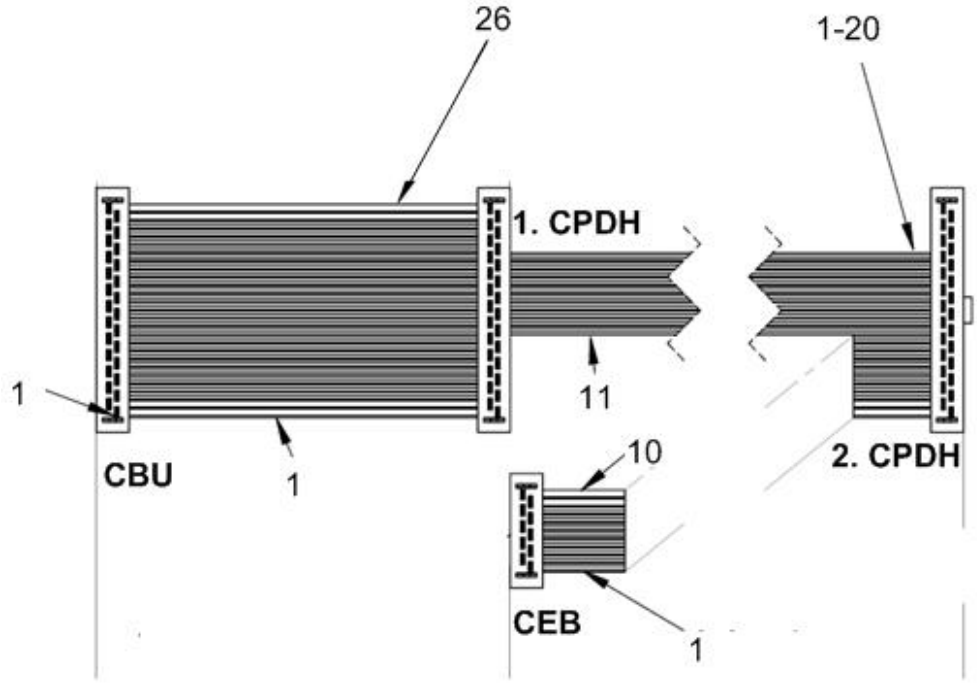


Fig. 37: Wire C24700-K10-B181

Fig. 38: Fuse connection sX-Hx

No.	Part number	Connection
1	C24700-K10-B198	F1 ➔2nd power distributor F5/F6
2	C24700-K10-B179	F1 ➔ F3/F4
3	C24700-K10-B188	F2.1 ➔ 1st CPDH.X1
4	C24700-K10-B197	F2.2 ➔.2nd CPDH.X1

Tab. 36: Fuse connection sX-Hx

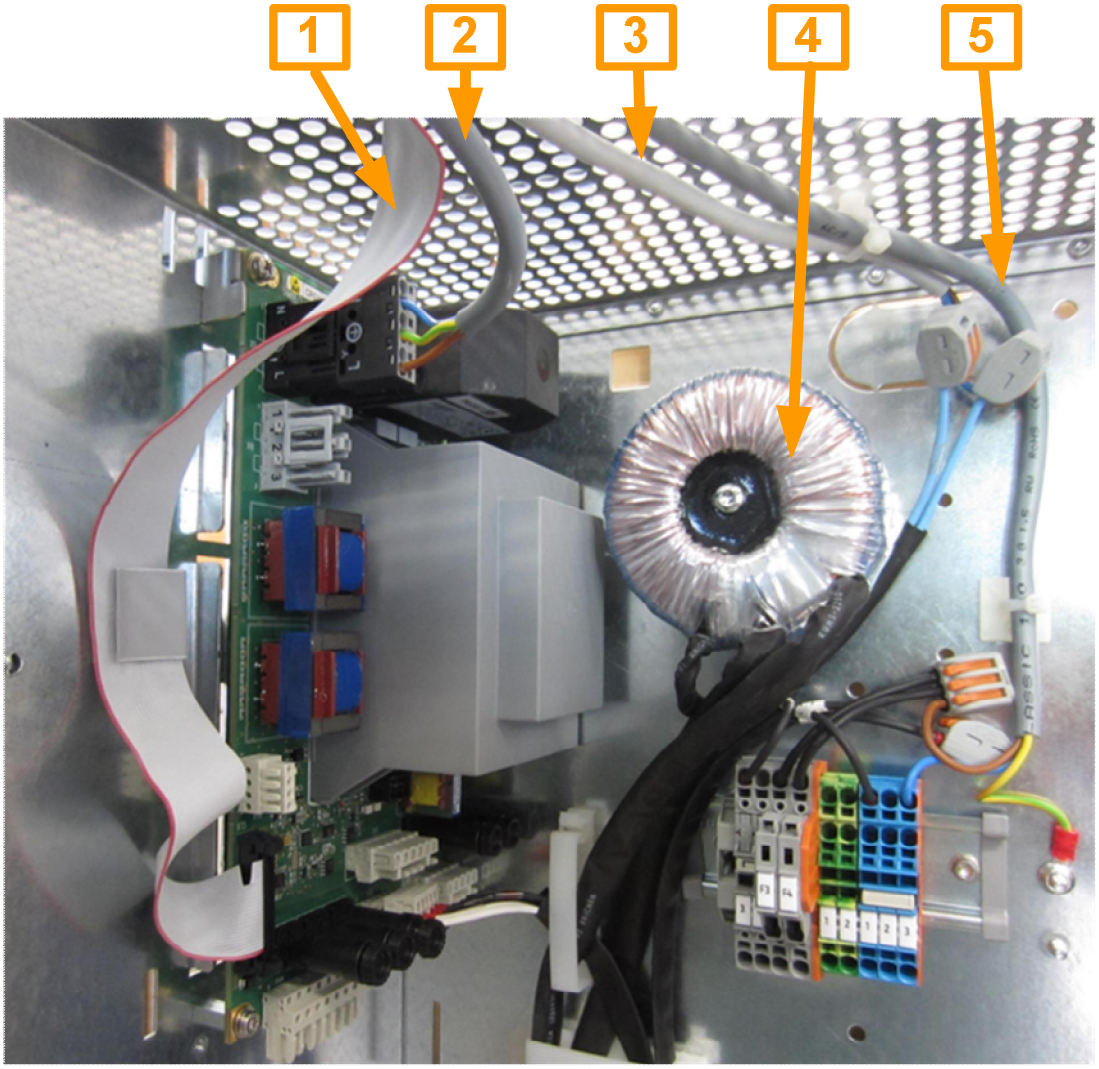


Fig. 39: Installation of 2nd CPDH

No.	Part number	Connection
1	C24700-K10-B181	CBU ➔ CPDH1 ➔ CPDH2 ➔ CEB
2	C24700-K10-B197	F2.2 ➔ CPDH2
3	C24700-K10-B185	Optional: APU ➔ CLA2
4	V24068-Z5045-A1	Transformer CPDx2_X1
4	C24700-K10-B198	F1 ➔ Power distributor 2

Tab. 37: Installation of 2nd CPDH

2.14. CLB installation locations

The IO add-on locations available in the chassis are called CLB installation locations. These can however be equipped with different functions, but not all functions are attached at the IO bus.

Function	IO Bus
IO add-on with CLB backplane (for SLD4, CIE,CIO, DIB-E)	yes
IO extension with CIAB backplane (for CIAC)	yes
Add-on for auxiliary power supply (24V DC, 48 V DC, 24V AC)	No
Add-on for the special adapter CUA	No

Tab. 38: CLB installation locations

The I/O add-on in sX takes place from below at the module that can be connected to the CTB. Here, the modules that are connected to the IO bus (CLB and CIAB) are to be attached first. The modules are connected via the IO bus to the CBU. For the modules CLB/CIAB there is a case that holds the relevant backplanes and modules. Each backplane can hold 2 modules.

Installation of the modules not connected at the IO bus (power supply and CUA) takes place toward the end of the installation locations.

2.15. CLB

The size of a CLB installation location for the chassis of the sX device is determined by the dimensions of the CLB (S24734-A879-A1).
In the first main chassis there are 3 CLB installation locations if counting the two installation locations for detector and IO modules on the CBU. In

the first add-on chassis there is room for a maximum of 7 CLB installation locations.

Altogether there are thus 10 CLB installation locations.
Actually, a total of 18 modules can be operated in the main and add-on chassis together. CLB installation locations not assigned CLBs/CIABs cannot be assigned accessories such as auxiliary power supplies.
When planning it is to be noted that the CLB installation locations overlap with the LED switch installation locations in the add-on chassis. Depending upon number and affixing location of the LED switch backplane the number of available CLB installation locations may be reduced.
For the second main chassis as well 3 CLB installation locations are available because a CLB can already be installed there at the CTB location.
Modules up to a current consumption of 60 mA are supplied from the CBU via the backplane.

Modules with higher current consumption must be supplied via the spring terminals X6. When using the CIE/CIO the terminals have the designation U+ and U-.

All modules that are to be plugged into a CLB are connected via IO bus 1 or IO bus 2 to the master bus (processor CBC) on the CBU. Each module that is connected to an IO bus needs a unique address. The setting of the DIP switch on the CLB specifies the addresses of both plug-in locations. The left plug-in location (X4) receives the even address and the right plug-on location (X5) the odd address.

When making the setting, proceed as follows:
For both installation locations X39 and X40 on the CBU the addresses 14 and 15 are permanently set. The designation CLB1 is assigned to these two installation locations. For the CLBs connected via the CTB the addresses are set in sequentially increasing order. Tab. 39: Setting of the addresses with IO bus 1 shows the setting of the addresses in the first main and add-on chassis. The setting for the second main and add-on chassis is described in Tab. 40: Setting of the addresses with IO bus 2. Because the modules in the second chassis communicate via IO bus 2, the same physical addresses are used as with the first chassis. For the use of IO bus 2 a CEB module is necessary. See 0.

Warning

The address 0 is used for broadcasts and therefore may not be modified!

Address assignment in the 1st main and add-on chassis for IO bus 1							
Module address	Backplane	Address setting CLB				Plug-in location	Phys. Addr.
		S1-4	S1-3	S1-2	S1-1		
0	CBU /CLB1	--	--	--	--	X39	14
1						X40	15
2	CLB2	Off	On	On	On	X4	16
3						X5	17
4	CLB3	Off	On	On	Off	X4	18
5						X5	19
6	CLB4	Off	On	Off	On	X4	20
7						X5	21
8	CLB5	Off	On	Off	Off	X4	22
9						X5	23
10	CLB6	Off	Off	On	On	X4	24
11						X5	25
12	CLB7	Off	Off	On	Off	X4	26
13						X5	27
14	CLB8	Off	Off	Off	On	X4	28
15						X5	29
16	CLB9	Off	Off	Off	Off	X4	30
17						X5	31

Tab. 39: Setting of the addresses with IO bus 1

When installed the plug-in locations X4 (CLB) and X39 (CBU) are at the left and the plug-in locations X5 (CLB) and X40 (CBU) at the right.

The 10th CLB installation location is intended for special installations such as power supply and cannot be addressed at the bus and is not included in bus addressing.

Address assignment in the 2nd main and add-on chassis for IO bus 2							
Module address	Back plane	Address setting CLB				Plug-in location	Phys. Addr.
		S1-4	S1-3	S1-2	S1-1		
18	CLB10	Off	On	On	On	X4	16
19						X5	17
20	CLB11	Off	On	On	Off	X4	18
21						X5	19
22	CLB12	Off	On	Off	On	X4	20
23						X5	21
24	CLB13	Off	On	Off	Off	X4	22
25						X5	23
26	CLB14	Off	Off	On	On	X4	24
27						X5	25
28	CLB15	Off	Off	On	Off	X4	26
29						X5	27
30	CLB16	Off	Off	Off	On	X4	28
31						X5	29
32	CLB17	Off	Off	Off	Off	X4	30
33						X5	31

Tab. 40: Setting of the addresses with IO bus 2

When installed the plug-in locations X4 (CLB) are at the left and the plug-in locations X5 (CLB) at the right.

The 9th and 10th CLB installation location in the 2nd main chassis is intended for special installations such as power supply and cannot be addressed at the bus and is not included in bus addressing.

For CLB module and case the following sets are required:

- CLB bracket set /C10 L24730-E811-A100
- CLB C10 Loop Detector Backplane S24734-A879-A1

The CLB installed with housing has the following appearance:

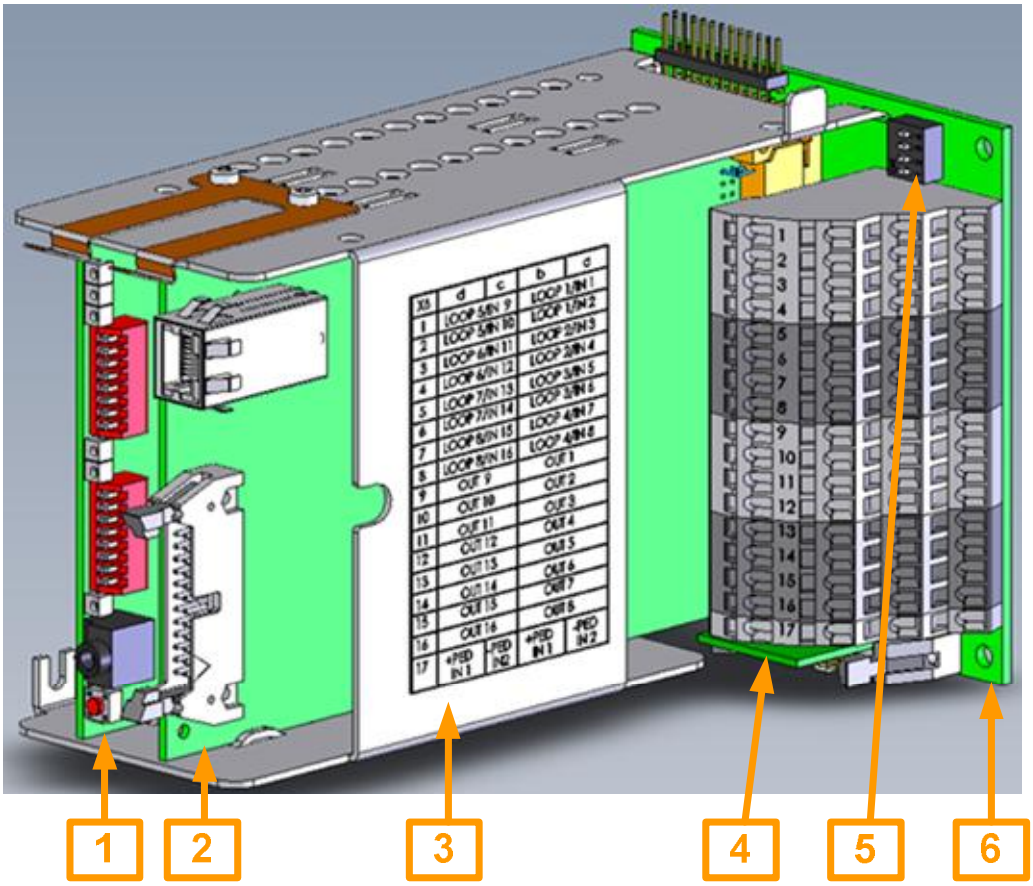


Fig. 40: CLB housing (configuration example)

No.	Description
1	e.g. SLD4 module
2	e.g. CIE/CIO module
3	CLB housing with inscription
4	CLBT module [1)]
5	CLB address switch
6	CLB module

Tab. 41: CLB with configuration example

[1)] The CLBT module (S24734-A891-A1) is to be plugged in once per I/O bus and with the last module there.

X6	d	c	b	a
1	LOOP 5 / IN 9		LOOP 1 / IN 1	
2	LOOP 5 / IN 10		LOOP 1 / IN 2	
3	LOOP 6 / IN 11		LOOP 2 / IN 3	
4	LOOP 6 / IN 12		LOOP 2 / IN 4	
5	LOOP 7 / IN 13		LOOP 3 / IN 5	
6	LOOP 7 / IN 14		LOOP 3 / IN 6	
7	LOOP 8 / IN 15		LOOP 4 / IN 7	
8	LOOP 8 / IN 16		LOOP 4 / IN 8	
9	OUT 9		OUT 1	
10	OUT 10		OUT 2	
11	OUT 11		OUT 3	
12	OUT 12		OUT 4	
13	OUT 13		OUT 5	
14	OUT 14		OUT 6	
15	OUT 15		OUT 7	
16	OUT 16		OUT 8	
17	+PED IN2	-PED IN2	+PED IN1	-PED IN1

Tab. 42: CLB inscription

Since the terminal assignment cannot be represented on the CLB, a sticker with the terminal assignment is affixed to the housing. The sticker is included in the CLB assembly set. In the CLB the items a/b and c/d, respectively, are connected in parallel (except +PED/-PED) in order to have 2 terminals when activating buttons and confirmations.
the left plug-in location (X4) goes to the terminals a/b.
The right plug-in location (X5) goes to the terminals c/d.

In the CLB the following modules can be plugged in:

- SLD4 (loop detector)
- CIE (I/O module)
- CIO (variant CIE module)
- DIP-E (video activation)
- DIB-P (video activation being prepared

Any combinations of these modules can be plugged in the CLB. For the modules to be plugged in the following material is necessary.

Funktion	Material.	Erläuterung
C10 CIE	S24734-A877-A1 L24730-E814-A2 C24700-K10-B215	CIE module 24 V power supply Cable
C10 CIO	S24734-A890-A1 L24730-E814-A2 C24700-K10-B215	CIO module 24V Power supply Cable
C10 SLD4	S24763-A82-A6	SLD4 module
C10 DIB-E	L24730-E814-A1 ZNX:DET-089-000151 L24730-E814-A2 L24730-E814-A14	Assembly set DIP-E DIB-E module 24 V power supply SV mounting brackets

Tab. 43: CLB configuration

2.16. CLBT module

Die CLBT module (S24734-A891-A1) must be plugged in to the last CLB/CIAB module in the IO bus. See Fig. 40: CLB housing, number 4.

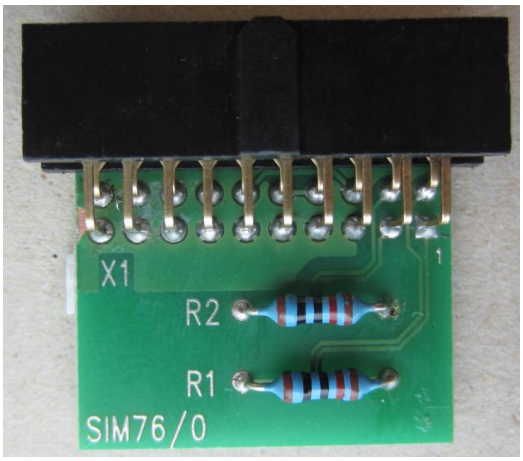


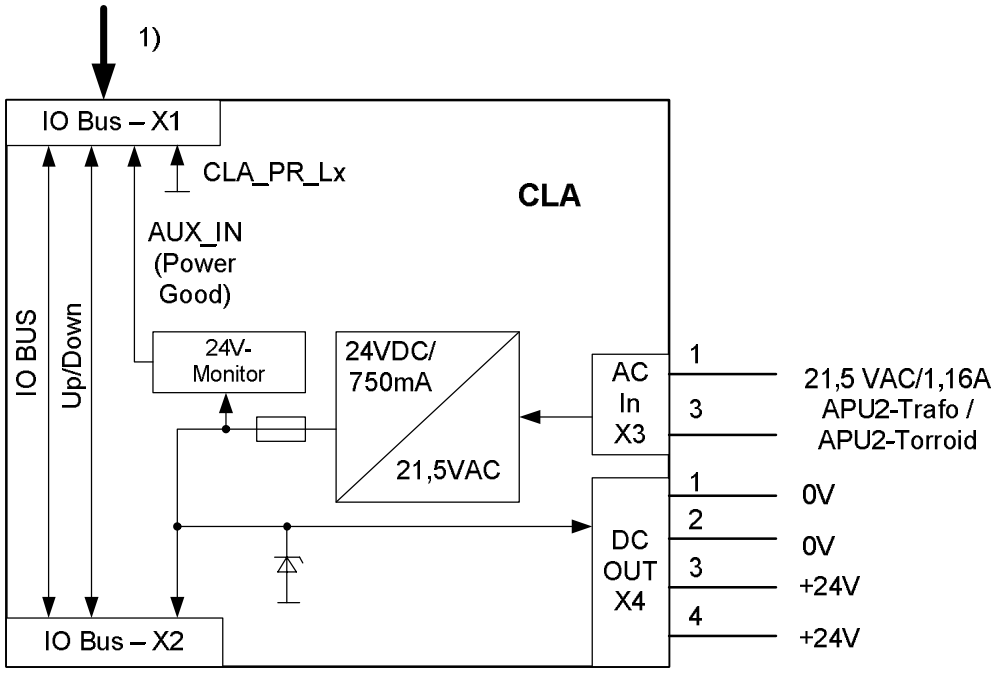
Fig. 41: CLBT module

2.17. CLA module

The CLA (S24734-A878-A1) module serves to couple the I/O bus from above to the CLB modules in the add-on chassis and to generate the 24V for the add-on chassis. The CLA module is to be attached at the top on the CLB cage. When attaching, pressure can only be applied to the plastic pin. Depending upon installation there may be 2 sets with accessories:

C10 CLA1 set L24730-E812-A3
(connection main chassis CLBx-X1 to the add-on chassis CLA_X1)

C10 CLA2 Set L24730-E812-A
(connection 1st main chassis CEB_X60 to 2nd main chassis CLA_X1. The required CEB module is not included in the set)



1)
CLA1 Set: Leitung / Cable C24700-K10-B183; 2030mm, (CLB-CLA1)
CLA2 Set: Leitung / Cable C24700-K10-B185; 2800mm; (CEB-CLA2)

Fig. 42: CLA structure

The CLA produces +24V/750mA for the plugged-in modules. The 24V are monitored and reported to the CBU. The current consumption amounts to 60mA for each SLD4, CIE; CIAC module. Unused current can be removed at X4 (VOUT) and used internally. For a power supply for generation of 24V DC, 21.5VAC is needed from the large APU transformer (V24068-Z5045-A1). This is already available with a device with 3 or 4 LSHSs. Otherwise the transformer set is necessary:

Transformer set 50 VA /C10 L24730-E810-A45

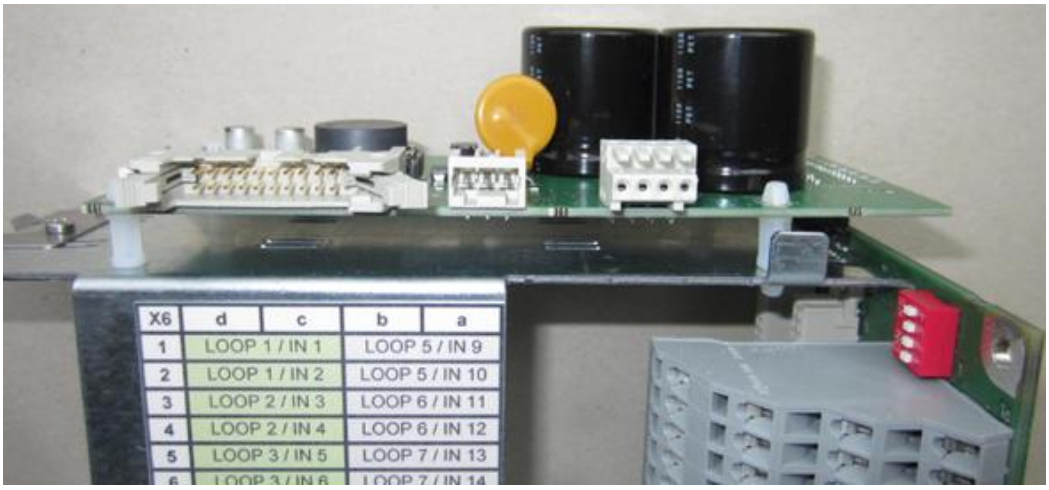


Fig. 43: CLA module installed

2.18. SLD4 loop detector module

The loop module SLD4 (S24763-A82-A6) can be plugged into the CLB and CBU
At the SLD4 4 detection loops can be connected.

For details see SLD4 description.

Here there is the description of the SLD4 installation in the CLB. There are 2 SLD4 modules the can be plugged in per CLB.

Installation location on CLB assigned SLD4	X5		X4	
Terminal block X6 no. / row	d	c	b	a
1	Loop 5a		Loop 1a	
2	Loop 5b		Loop 1b	
3	Loop 6a		Loop 2a	
4	Loop 6b		Loop 2b	
5	Loop 7a		Loop 3a	
6	Loop 7b		Loop 3b	
7	Loop 8a		Loop 4a	
8	Loop 8b		Loop 4b	
9	--		--	
10	--		--	
11	--		--	
12	--		--	
13	--		--	
14	--		--	
15	--		--	
16	--		--	
17	--		--	

Tab. 44: Terminal assignment of the CLB when SLD4 equipped

The connection of SLD4 modules in the CBU is described for the CTB. See Tab. 15

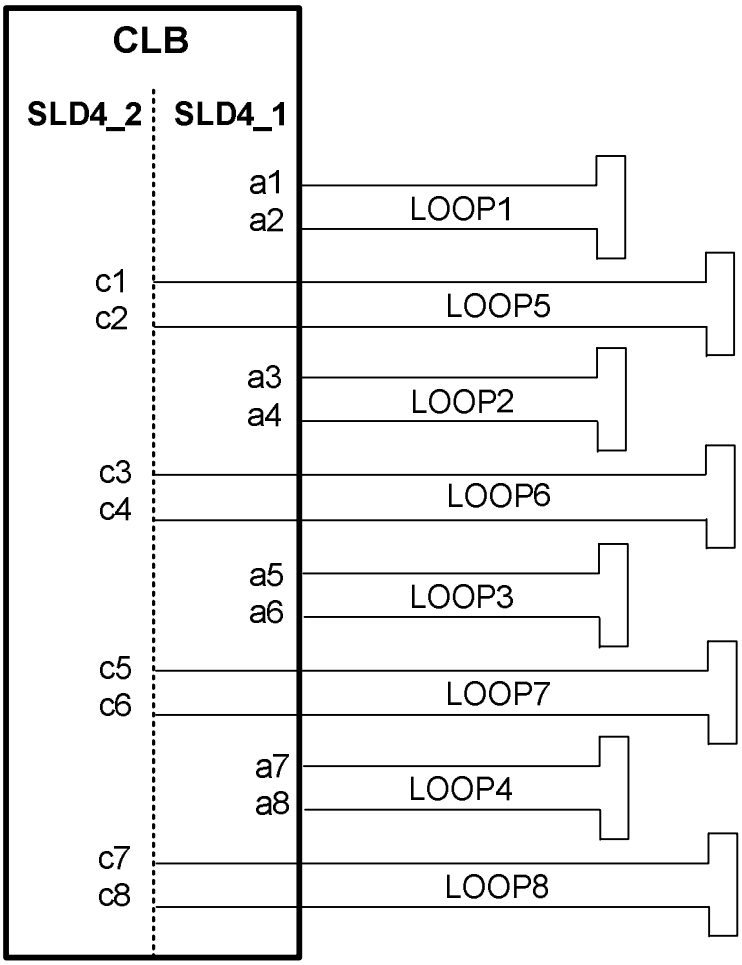


Fig. 44: Loop activation

2.18.1. UPLINK/DOWNLINK

Besides their IO bus (to the CBU) the SLD4 modules have an additional communication interface which allows the SLD4 modules to communicate with one another. This is accomplished without the help of an external processor and is carried out automatically by the loop detector modules. Via this detector connection the following functions are implemented:

- Automatic frequency selection of the loops. This allows the master SLD4 module to set the optimal frequency for all loops.

- All SLD4 can be reset by pressing the reset button on the master module and all LEDs turn on/off.
- The PC SLD4 tool can communicate with all SLD4s (if the SLD4 master is connected to the PC). This allows simultaneous collection of log files, car data and car simulation for all detectors.

For this, it is important that the SLD4 modules can communicate with one another. This requires that the UP and DNLINK signals are not disrupted. As you can see in Fig. 45 the IO modules have to be plugged in consecutively to each mounting slot (the detector link is a point-to-point connection and not a bus). In this case the first module on the UPLINK bus takes the master role; all other modules are slaves which can be controlled by the master.

It is not mandatory to insert only SLD4 modules consecutively; other modules suited for the IO slot like CIE, CIO and DIB-E also connect the respective signals correctly and loop through the bus.

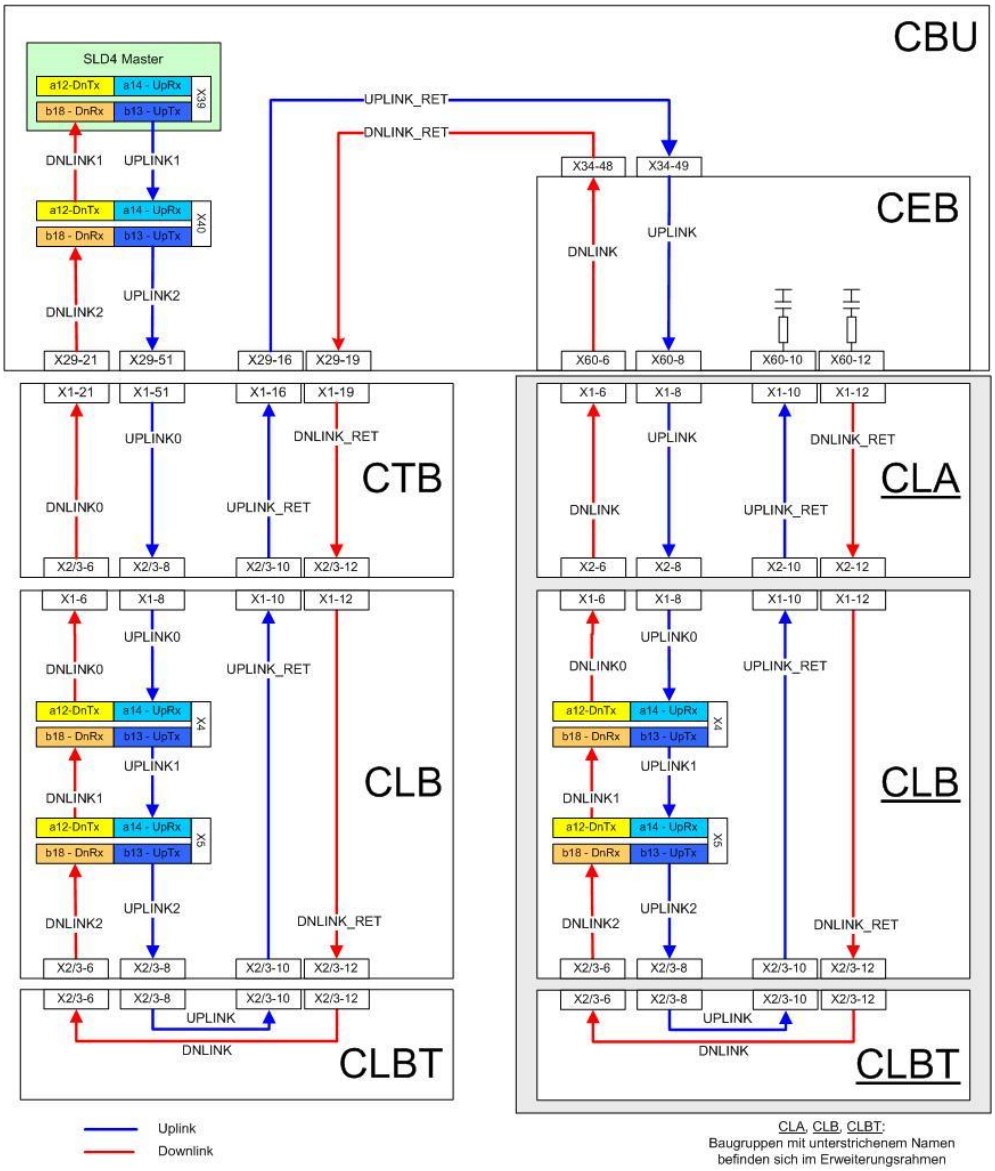
Disruption UPLINK/ DOWNLINK

If a SLD4/CIE/CIO/DIB-E module is not set, UPLINK and DOWNLINK are disrupted and the functionality is not available. Thus, another or several other modules are set as master.

The same applies to the IO backplanes; here alternative backplanes like the CIAB also can replace a CLB at any position without constraining the functionality of the detector link. In the CIAB backplane the loopthrough of the UPLINK and DOWNLINK signals is already available in the CIAB making the CIAC redundant.

CLB slot change in mounting a power supply

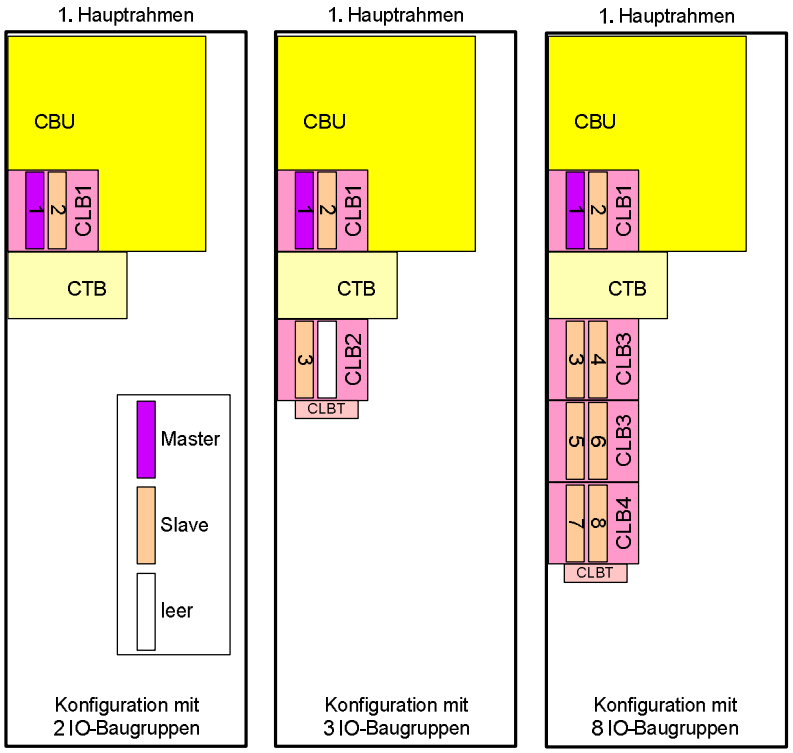
If you mount a power supply in the CLB4 slot the CLB4 slot moves to the add-on chassis and is there the top level module.



German	English
Baugruppen mit unterstrichenem Namenbefinden sich im Erweiterungsrahmen	Modules with underlined names are located in the add-on frame

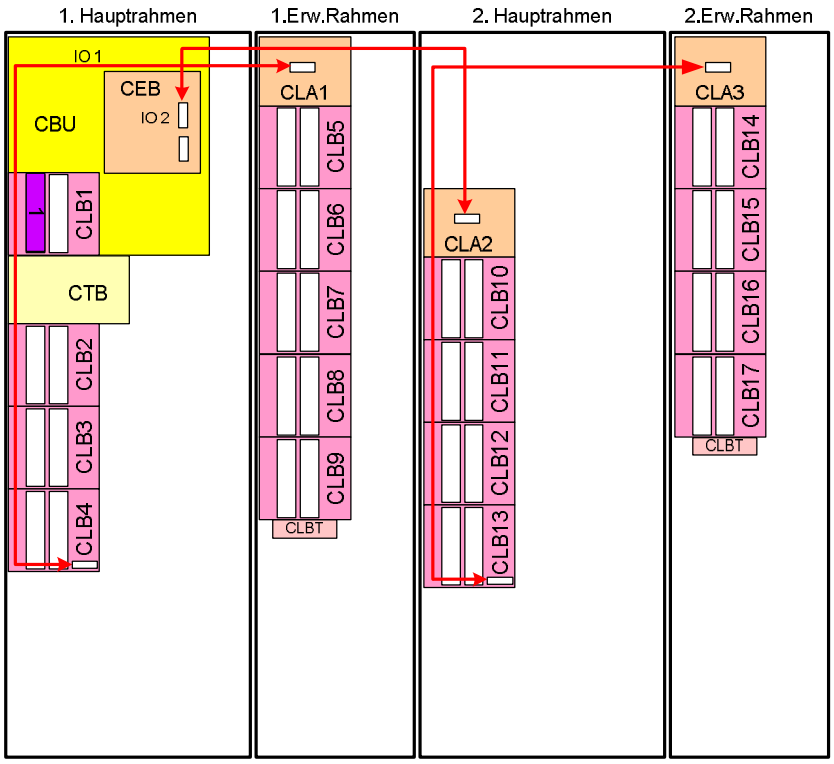
Fig. 45: Schematic structure uplink / and downlink

Schematic structure of the UPLINK and DNLINK wiring in the sX; the SLD4 master is marked green.



German	English
Hauptrahmen	Main chassis
Leer	empty
Konfiguration mit IO-Baugruppen	Configuration with IO modules

Fig. 46: CLB method of counting in main chassis



German	English
Hauptrahmen	main chassis
Erw.Rahmen	Add-on chassis

Fig. 47: Maximum CLB assembly

2.19. IO module CIE//CIO

These 2 modules differ in their configuration and their function.
The module CIO is a minimal-configuration CIE module.

Function / module	CIE	CIO	Number of I/Os
Internal I/Os	X	X	16 I/O Ports (head connector)
External Input/Output	X	X	8 IN (F buttons) 8 OUT (F confirmations) base connector/terminal block

Function / module	CIE	CIO	Number of I/Os
XPort	X		20 requests/ 20 fault messages (for Wimag/Video)

Tab. 45: CIE/CIO breakdown

2.19.1. Status LEDs

The message "Initial" appears during switch-on on for approx. 40 seconds and should change to the status "Running" afterwards.

Status	LED Fault	LED SYS	SW RUN
Initial	Off	On	Off
Initial Fault	On	On	Off
Running	OFF	Flash	On
Running Fault	ON	flash	On

Tab. 46: CIE/CIO LED Information

2.19.2. Head connector (CIE/CIO)

At the head connector 16 units of 24 -V I/O ports are available.
The signals may be used only within the device.

Technical data:

- Input: +24V input, requires contact to 0V, (24 V/2 mA switching)
- Output: Selector switch to 0V, max. 30 V /50 mA
- The signal assignment of Pin 1-16 is identical to the head connector of the BFD module of the C8x0/C9x0 controller.

Pin	Signal X2	Signal X2	Pin
1	GND	IO1	2
3	GND	IO2	4

Pin	Signal X2	Signal X2	Pin
5	GND	IO3	6
7	GND	IO4	8
9	GND	IO5	10
11	GND	IO6	12
13	GND	IO7	14
15	GND	IO8	16
17	IO9	IO10	18
19	IO11	IO12	20
21	IO13	IO14	22
23	IO15	IO16	24

Tab. 47: CIE/CIO assignment for head connector

2.19.3. Base connector/terminal block (CIE/CIO)

At these, for the modules CIE and CIO, external 24- V DC buttons or 24 V DC confirmation devices can be connected.
For each module the following inputs and outputs are possible:

- 8 Inputs (labeled "INx").
- 8 Outputs (labeled "OUTx")

The operating power supply is to be fed individually for each module at the points labeled "+PED" and "- PED". Since usually 2 pedestrian buttons and 2 pedestrian conformations are there, there are 2 terminals available for each signal on the CLB. For the operating power supply for the sX-H an additional 24 V DC power supply is needed.

2.19.3.1. Values of external input

Input switching is designed for connection of touch buttons or normal buttons.
For each input 2 touch buttons/buttons can be connected.
The connected "+PED"/"-PED" power supply is voltage-monitored. If it fails or is missing, all internal inputs will be set to occupy.
The return conductors of the outdoor system are connected to the grounded 0V block at the bottom of the device.

Technical data for input

Function	Value
Rating operating voltage	+24 V ; +40 V; or -24V /-40 V
Maximum voltage	20-48 V
Input Isolation	1500 V
Surge protection	yes
Button pressed (Input=1)	> 8 mA
Button not pressed (Input=0)	< 6 mA
Maximum input current	10 mA
Short-circuit-resistant	yes
Missing U_PED voltage < 16V	Sets all inputs to 1
Terminals per input	2

Tab. 48: CIE/CIO input data

2.19.3.2. Values of external outputs

Output switching designed for the connection of confirmation devices.
For each output 2 confirmation devices can be connected.
Max 150mA together.
The 0V return conductors of the outdoor system are connected to the grounded 0V block at the bottom of the device.

Technical data for output

Function	Value
Rating operating voltage	+24 V ; +40 V; or -24 V /-40 V
Maximum voltage	20-48 V
Input Isolation	1500 V
Surge protection	yes
Technology	Plus side switching
Maximum continuous current	150 mA
Overcurrent shutdown	350 mA
Short-circuit-resistant	yes
Reset status	Output disabled
Terminals per input	2

Tab. 49: CIE/CIO Output data

2.19.3.3. Connection button/confirmations with +24V

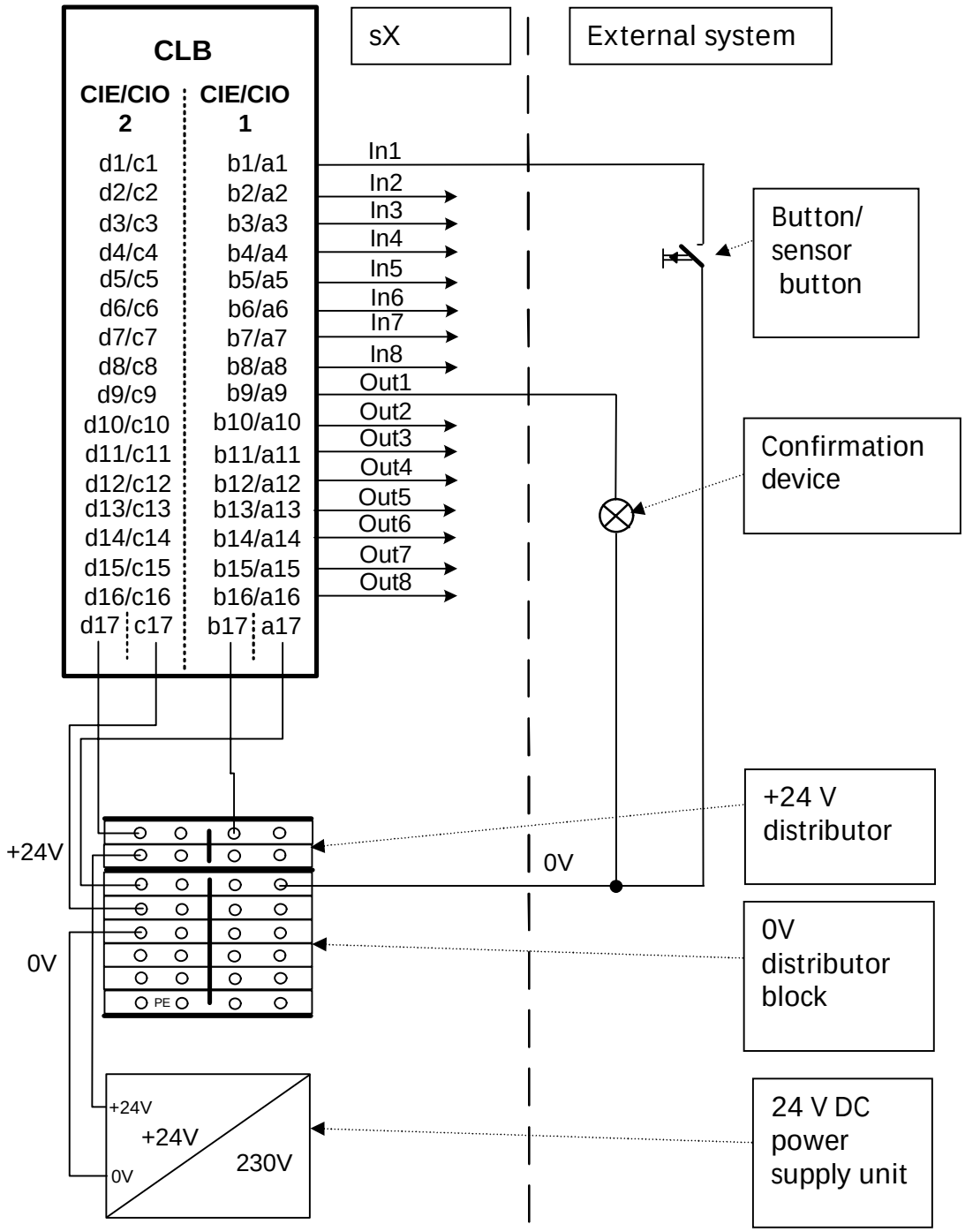


Fig. 48: Confirmation devices and buttons with +24V

2.20. Wimag activation

For the activation of WIMAG detectors a CIE must be used. With an LAN cable the connection is established from the PoE switch to the front-side LAN connector of the module.
The associated WIMAG set is as follows:

C10 WIMAG basic set L24764-Z2000-A112

For description of the WIMAG function see BVD manual

For installation of the 24 V DC power supply see 2.28.

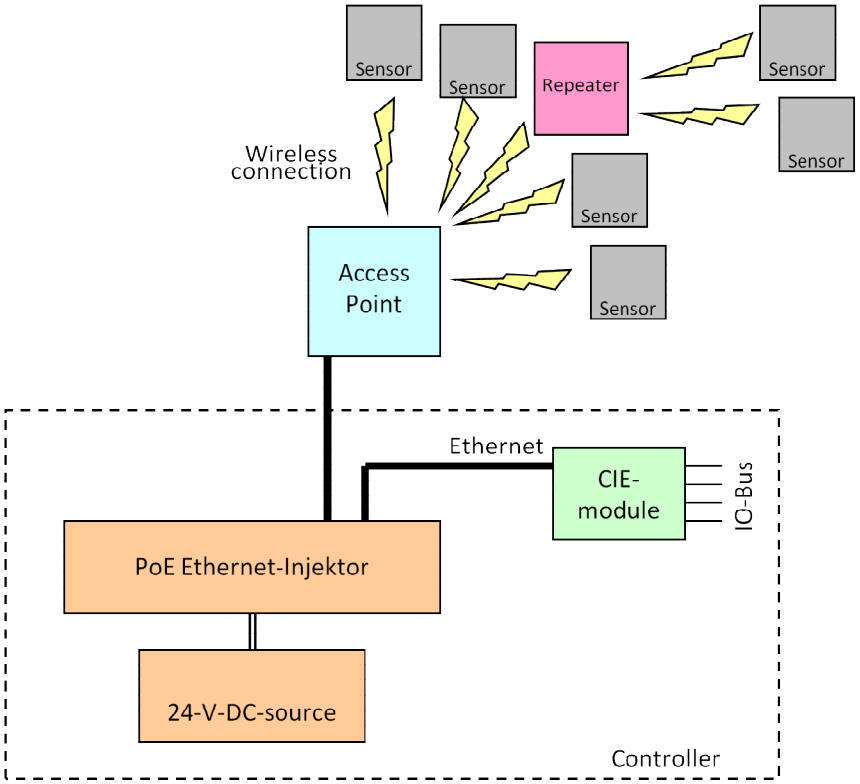


Fig. 49: WIMAG activation

2.21. Video detectors

For the connection of video detectors, adapter cards with the designation DIB-E and DIB-P are being prepared.

2.21.1. DIB-E

The DIB-E (ZNX: DET-089-000151) is an interface module for the connection of 6 video detectors (SIVICAM) to a Siemens intersection controller. The DIB-E may be plugged into all SLD4 locations. In the sX controller the data transmission is made via the serial I/O bus. Contrary to the predecessor module DIB, the DIB-E has an interface for this serial IO bus of the sX controller. Therefore the DIB cannot be used in an sX controller. For function details on the SIVICAMs see "SIVICAM I-2 integrated video detector user manual"

Note
A DIB cannot be plugged in to the sX controller because it has no IO bus

For required materials see Tab. 43.

2.21.1.1. Setting DIB-E address in the CLB

Here is to be proceeded exactly the same as with the CLB. See 2.15.

2.21.1.2. DIB-E Front

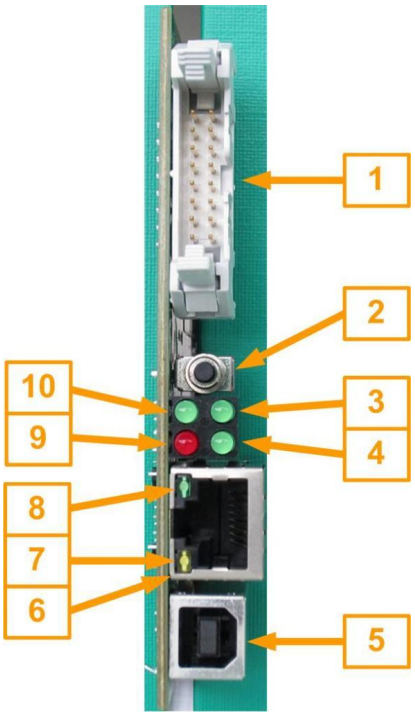


Fig. 50: DIB-E front side

No.	Description
1	Front connectors for the detection outputs 5 to 12, is not used for operation in the sX controller
2	Reset button
3	COM LED1 flickers during communication with the SIVICAMs
4	COM LED2 flickers during communication with the CBU via the IO bus
5	USB device connector for the connection of a service PC
6	Ethernet connector for the connection of a service PC (Patch cable)
7	Ethernet LED is illuminated if a connection exists and flickers if data is being transmitted.
8	Ethernet LED is illuminated if a 100 Mbit/s connection exists
9	ERRORLED flashes, if at least one SIVICAM is faulty
10	POWERLED

Tab. 50: Description of DIB-E front side (see Fig. 50

2.21.1.3. Head connector

In addition to the signals at the serial bus, the detection signals 5-12 are present at the head connector. (Normally not used in sX).
The output switches:

- Max 35 V
- Max 40 mA
- Switches to 0 V

Here the assignment of the head connector:

Pin	Signal
1	GND
2	Detection output 5
3	GND
4	Detection output 6
5	GND
6	Detection output 7
7	GND
8	Detection output 8
9	GND
10	Detection output 9
11	GND
12	Detection output 10
13	GND
14	Detection output 11
15	GND
16	Detection output 12

Tab. 51: DIB-E front connector

2.21.1.4. USB port

In order to be able to use the DIB-E with the service PC, the "TrafiCam® PC Tool" must be installed on it.
With the PC tool up to 8 zones on the roadway can be defined for each SIVICAM. For each zone the SIVICAM supplies information for whether it is assigned a vehicle.
The information concerning the up-to-48 zones of the CBU is requested via the serial IO bus. Thus the assignment of the zones to the hardware outputs of the DIB-E is done away with, which is needed for the other intersection controllers.
For settings see "TrafiCam - 4TI ETH or 1TI" USER GUIDE

2.21.1.5. Ethernet port

The DIB-E can alternatively be operated by the "TrafiCam® PC Tool" via the Ethernet port. The same commands as with the USB port are available. In order to be able to use the Ethernet port, the IP address of the DIB-E must be set via the USB port.
Usually the following addresses are used:

192.168.178.1	Setting with the service PC
255.255.255.0	Subnet mask
192.168.178.200	Setting with the DIB-P

2.21.1.6. LED description

LED	DIB-E is booting	Normal operation	
POWERLED	is illuminated	is illuminated	Operating voltage is okay
ERRORLED	is illuminated	Off flashing	No fault Communication problems with
COM LED1	Off	Off	No communication with a Communication with at least
COM LED2	Off	Off	No communication with the CLB Communication with the CLB (CBU)

Tab. 52: DIB-E LED meaning

2.21.1.7. Connection of the SIVICAMs

For connection of the cameras protected ground cables (STP) with 5 wires (0.5 qmm (AWG20)) are needed. The two wires for communication and for the power supply must be twisted. The maximum cable length is 250 m.

SIVICAM terminal	Signal	For connection points see section:	Designation of the connection points with sX in this description
+	+ Power supply	2.21.1.9	24V
-	- Power supply	2.21.1.9	0V
⏚	PE / shield	2.21.1.9	Ground connection
A	RS-485A	2.21.1.10 and 0	Vxa (x = 1 to 12)
B	RS-485B	2.21.1.10 and 0	Vxb (x = 1 to 12)

Tab. 53: Assignment of the connecting cable for the SIVICAMs

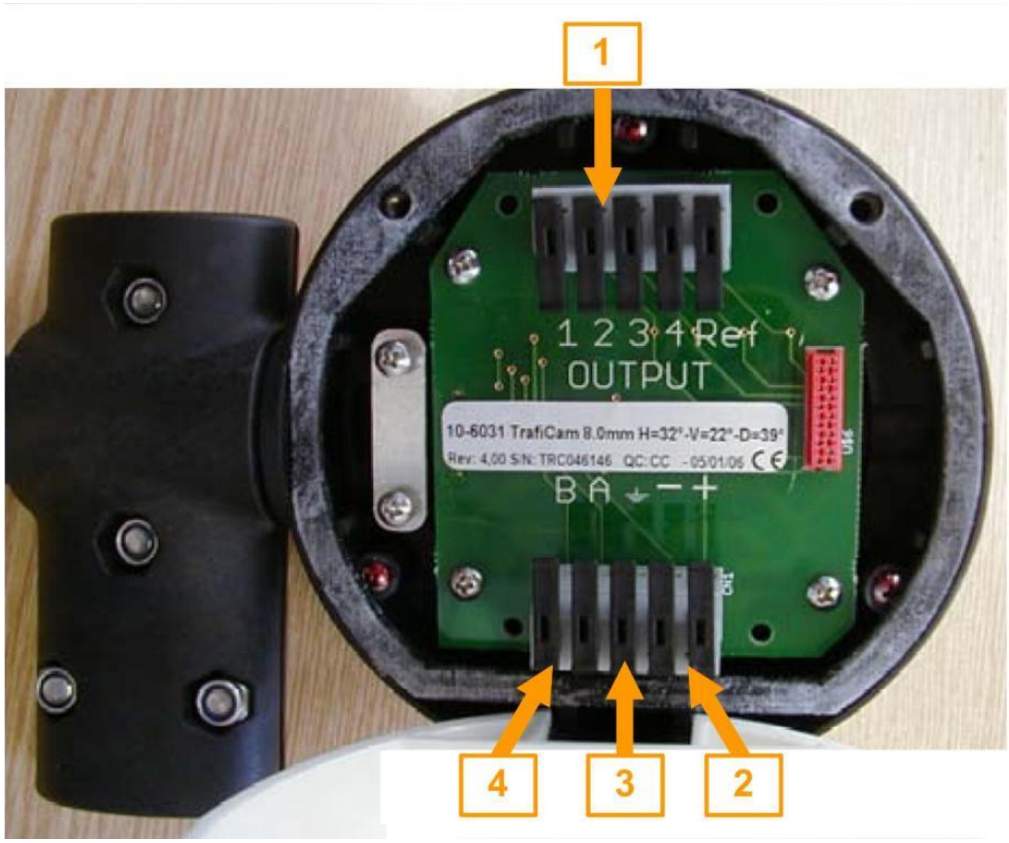


Fig. 51: Connector terminals of the SIVICAM

No.	Description
1	Terminals for the detection outputs are not used with the sX controller because the information is transmitted serially via the IO bus.
2	Terminals for the power supply lines (twisted) "+" is to be connected with 24V "-" is to be connected with 0V.
3	Terminal for the ground connection of the SIVICAM. The wire attached here is to be grounded in the intersection controller.
4	Terminals for the communication lines (twisted) "A" is to be connected with a connection point Vxa for CLB and CTB "B" is to be connected with connection points Vxb for CLB and CTB

Fig. 52: Description of the connection terminals of the SIVICAM

2.21.1.8. Topologies of the networks to be connected to the SIVICAMs

The cameras can be connected with the connection terminals of the DIB-E by star networks or linear networks. A combination of star networks and linear networks is also possible.

Definition of the possible network topologies for SIVICAMs	
Star network	Each SIVICAM is directly connected with the DIB-E. Per SIVICAM a set of connection terminals (RS485+, RS485, +24V, 0V and PE) is needed.
Linear network	One SIVICAM is directly connected with the DIB-E, all other SIVICAMs are connected in parallel in a line. For all attached SIVICAMs only one set of connection terminals is needed.
Combined star network / linear network	Individual SIVICAMs and lines are each turned on at a set of connection terminals of the DIB-E.

Tab. 54: Network topologies for SIVICAMs

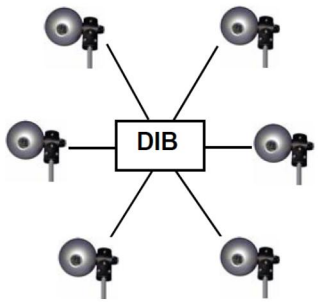
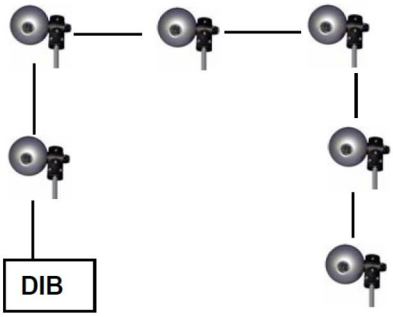
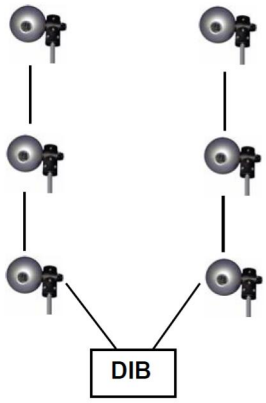
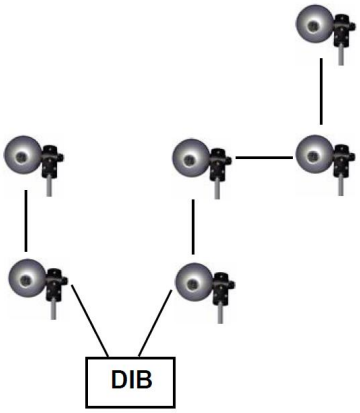
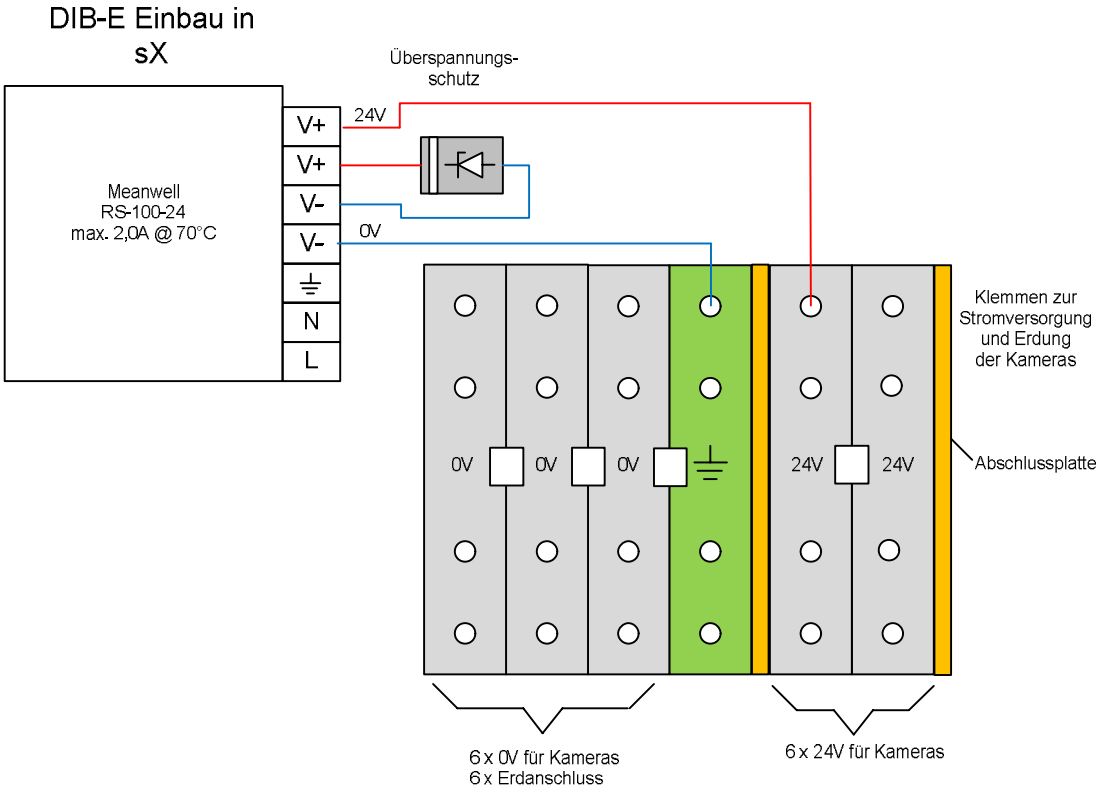
Star network with 6 cameras	Linear network with 6 cameras
	
Networks with a combination of star and linear network (max. 6 cameras)	
	

Fig. 53: Possible topologies for the connection of the cameras

2.21.1.9. Power supply of the cameras



German	English
DIB-E Einbau in sX	DIB-E installation into sX
Überspannungsschutz	Overvoltage protection
Klemmen zur Stromversorgung und Erdung der Kameras	Terminals for power supply and grounding of the cameras
Abschlussplatte	Termination board
6 x 0V für Kameras 6 x Erdanschluss	6 x 0V for cameras 6 x ground connection
6 x 24V für Kameras	6 x 24V for cameras

Fig. 54: DIP-E power supply for cameras

The two wires (0V and 24V) that lead to one camera must be twisted. The shield of the ground cable is to be attached at the grounding connection terminal of the camera and grounded in the intersection controller.
Per SIVICAM current consumption of 50mA at 24V is to be expected. Because the auxiliary power supply can have up to 2.0A applied, up to 40 SIVICAMs can theoretically be operated.

2.21.1.10. DIB-E activation at the CLB

Up to 2 DIB-Es can be plugged in to the CLB module. For each DIB-E, 6 cameras can be connected. Connection point for each camera on the CLB ist Vxa and Vxb.
the cameras V1 to V6 are attached to the DIB-E in the left installation location X4. The cameras V7 to V12 are attached to the DIB-E in the right installation location X5. Thus the following terminal assignment results.

X6	d	c	b	a
1	V8a	V7a	V2a	V1a
2	V8b	V7b	V2b	V1b
3	V10a	V9a	V4a	V3a
4	V10b	V9b	V4b	V3b
5	V12a	V11a	V6a	V5a
6	V12b	V11b	V6b	V5b
7	--	--	--	--
Up to 17	--	--	--	--

Tab. 55: DIB-E connection assignment CLB

Since an RS485 bus is concerned here, the signal wires of the camera must be twisted. A and B wires may not be mixed up.

Note on connecting the RS485 bus

If the 24V operating power supply of the SIVICAM is supplied, a voltage of 2 to 3V can be measured between the A wire and B wire while idle. Here, the A wire leads the positive voltage.
If a DIB-E is plugged in, this voltage also can be measured between the terminals Vxa and Vxb, where Vxa is more positive than Vxb.
The A wire of the camera is connected to Vxa and the B wire to Vxb.

2.21.1.11. DIB-E activation at the CBU

Here the following is to be considered:
The cameras are connected via terminal block X4 to the CTB.
For the DIB-E at the left installation location (X39) the CBU provides connection options for only four cameras (V1x-V4x). If the cameras V6 and V7 are to be attached, they are to be attached in parallel to connection terminals for the cameras V1 to V4.
For the DIB-E at the right installation location (X40) of the CBU there are connection options for six cameras (V7x-V12x) available.

Connection point for each camera on the CLB is Vxa and Vxb.

X4	c	b	a
1	V1a	V1b	--
2	V2a	V2b	--
3	V3a	V3b	--
4	V4a	V4b	--
5	V7a	V7b	--
6	V8a	V8b	--
7	V9a	V9b	--
8	V10a	V10b	--
9	V11a	V11b	--
10	V12a	V12b	--
11	--	--	--
Up to 17	--	--	--

Tab. 56: DIB-E connection assignment CTB

For the connection of the cameras to the terminals the requirements of section 2.21.1.10 apply.

2.21.1.12. Additional Information

SIVICAM I-2
user manual A001 / 2006-05-04

TrafiCam - 4TI ETH or 1TI
USER GUIDE 10-6090/91 (Flir, previously Traficon)

2.22. 230 V pedestrian request / pedestrian confirmation CIAC/CIAB

For the connection of AC confirmations/requests the CIAB backplane (S24734-A897-A1) and the CIAC module (S24734-A896-A1) is needed. The CIAB module has the format of a CLB module and is built in to the CLB housing. Thus it can be installed in all CLB locations. The same housing as for the CLB is used. Up to 2 CIAC modules can be plugged into the CIAB backplane. For each CIAC module, 6 inputs and 6 outputs are available. (There are thus 12 inputs and 12 outputs possible per CIAB).

For this the following is required:

- 1 x CIAB bracket set /C10 L24730-E810-A40
- 1x CIAB Backplane /C10 L24730-E811-A200
- CIAC assembly set 117/230 V /C10 L24730-E811-A21
- 1-2x CIAC C10 I/O AC 24V/230 V /C10 S24734-A896-A1

The CIAC/CIAB module is designed for the following voltages and currents:

Range	Minimal Voltage in V AC	Maximum Voltage in V AC	Operating voltage in V AC	Maxi-mum Current In A	Max. number of sensor buttons
INPUT Sensor button/ Button	80	265	117 230	0,05	2
OUTPUT (Confir mation)	18	265	24 40 117 230	0,3	

Tab. 57: Technical limit values

Note:

- The maximum connectable cable length is 250 m.
- It is not possible with this module to connect DC buttons/touch buttons and DC confirmation devices.

- For special cases with more than 0.3 A AC confirmation current, the BFU module (S24734-A621-A1) is to be installed in the in the special adapter CUA (L24730-E815-A1).

- The inputs and output can be operated with different voltages. But the inputs of module 1 and module 2 have the same voltage within a CIAB. Also the outputs of module 1 and module 2 have the same voltage within a CIAB. (Common power supply).

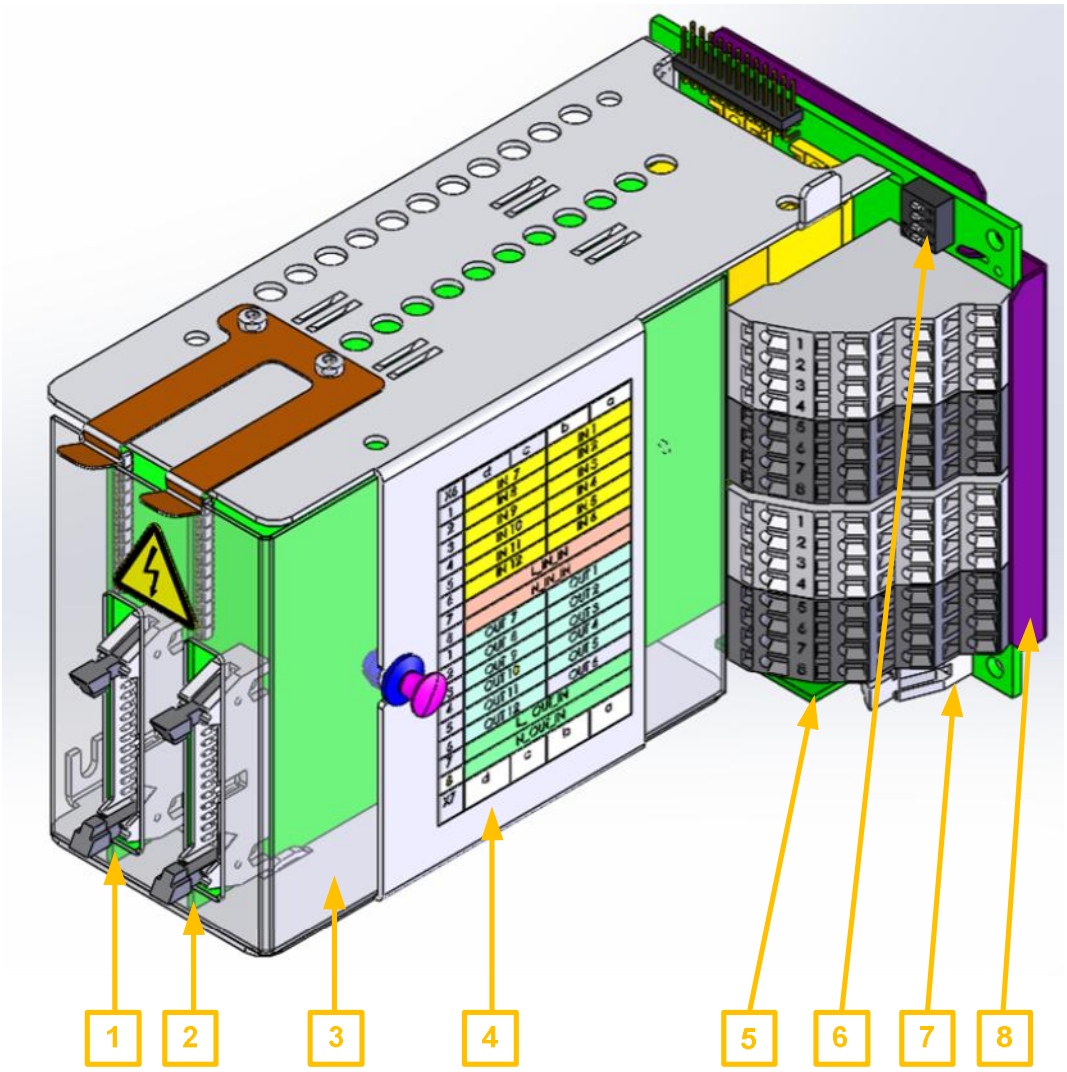


Fig. 55: CIAB/CIAC structure

No.	Description
1	CIAC 1
2	CIAC2
3	Contact protection CIAC (transparent)
4	CLB housing with inscription
5	CLBT module
6	Address switch CIAB
7	CIAB module
8	Contact protection CIAB

Tab. 58: Structure of CIAB/CIAC

2.22.1. Setting CIAB address

Here is to be proceeded exactly the same as with the CLB. See 2.15.

2.22.2. Structure of CIAB

Since the terminal assignment cannot be represented on the CIAB, a sticker with the terminal assignment is affixed to the housing. The sticker is included in the CIAB assembly set. In the CIAB the items a/b and c/d, respectively, are connected in parallel (except Lxx and Nxx) in order to have 2 terminals when activating buttons and confirmations.
the left plug-in location (X4) goes to the terminals a/b.
The right plug-in location (X5) goes to the terminals c/d.

2.22.3. Terminal assignment for CIAB

X6	d	c	b	a
1	IN 7		IN 1	
2	IN 8		IN 2	
3	IN 9		IN 3	
4	IN 10		IN 4	
5	IN 11		IN 5	
6	IN12		IN6	
7	L_IN_IN			
8	N_IN_IN			
1	OUT 7		OUT 1	
2	OUT 8		OUT 2	
3	OUT 9		OUT 3	
4	OUT 10		OUT 4	
5	OUT 11		OUT 5	
6	OUT 12		OUT 6	
7	L_OUT_IN			
8	N_OUT_IN			
X7	d	c	b	a

Tab. 59: Terminal inscription CIAB/CIAC

2.22.4. CIAC breakdown

The CIAC module is attached to the serial I/O bus. For the correct assignment, therefore, the setting of the address is necessary in the CIAB. The CIAC consists of 3 functional parts:

- 16 non-isolated head connector I/Os for internal applications.
- 6 isolated AC inputs (only accessible on the CIAB).
- 6 isolated AC outputs. (Only accessible at the CIAB).

Each external output and the input voltage are protected with a 1.0A fuse (F1-F7).
All fuses are monitored and a failure is reported.

Set replacement fuses 1.0AT/230 V with 20 units L24730-A899-A3

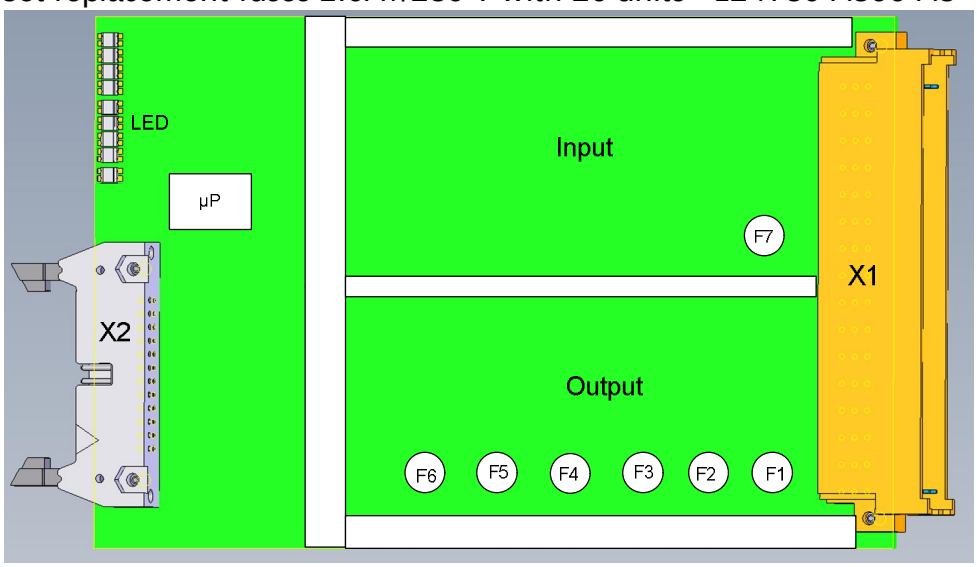


Fig. 56: CIAC breakdown

No.	Description
F1	Fuse Out1
F2	Fuse Out2
F3	Fuse Out3
F4	Fuse Out4
F5	Fuse Out5
F6	Fuse Out6
F7	Fuse IN

Tab. 60: CIAC Fuses

2.22.5. CIAC LED meaning

The LEDs are arranged from top to bottom in the following sequence at the front side of the module:
IN voltage
OUT voltage
IN1/OUT1
IN2/OUT2
IN3/OUT3
IN4/OUT4
IN5/OUT5
IN6/OUT6

FAULT
SYS Run
SW

The LEDs have the color green and to show the presence of the IN voltage and the OUT voltage.

LED function	LED ON	LED OFF
IN voltage	INPUT voltage present	INPUT voltage missing or F7 defective
OUT voltage	OUTPUT voltage present	OUTPUT voltage missing

Tab. 61: CIAC LED Function1

All input (INx) and output signals (OUTX) are represented on 2-colored LEDs.
The indicator information then looks as follows:

INx	OUTx	LED color
OFF	OFF	Off
ON	OFF	RED
OFF	ON	GREEN
ON	ON	YELLOW

Tab. 62: CIAC LED Function2

The LEDs FAULT, SYS-RUN and SW have the same meaning as on the CIE. See 2.19.1

2.22.6. CIAC head connector (X2)

The CIAC head connector has the same technical data and assignment as the CIE head connector. See 2.19.2.

2.22.7. External input

2 touch buttons or 2 buttons can be connected at each external input. The connection points are accessible only in the CIAB.

Technical data for INPUT

Function	Value
Rating operating voltage	115V AC 230 V AC
Maximum voltage	80-265 V AC
Input Isolation	3000 V AC
Surge protection	Yes, integrated
Button pressed (Input=1)	U_INx < 9 V AC
Button not pressed (Input=0)	U_INx > 14 V AC
Maximum input current	50 mA AC
Short-circuit-resistant	yes
Missing L_IN voltage < 16V	Sets all inputs to 1
Terminals per input	2

Tab. 63: CIAC input data

2.22.8. Output

At each output 1-2 confirmation devices can be attached.
The confirmation devices are permanently connected to N_OUT and receive the switched L_OUT voltage.

The holding current of the triac may be up to 15mA. Each triac is protected with a 1.0A fuse.

Technical data for OUTPUT

Function	Value
Rating operating voltage	24 V, 40 V, 115 V, 230 V
Maximum voltage	18-265 V AC
Input Isolation	3000 V AC
Surge protection	Yes, integrated
Technology	Triac switch
Maximum continuous current	0.3 A
Fuse	1.0 A
Minimum current	15 mA
Reset status	Output disabled

Function	Value
Terminals for each output	2

Tab. 64: CIAC output data

2.22.9. CIAB activation internally 230 V

For the 230-V connection the PED_L and PED_N voltage is removed from the CPDH at connector X11.

X6	d	c	b	a
1	IN 7		IN 1	
2	IN 8		IN 2	
3	IN 9		IN 3	
4	IN 10		IN 4	
5	IN 11		IN 5	
6	IN12		IN6	
7	L_IN_IN			
8	N_IN_IN			
1	OUT 7		OUT 1	
2	OUT 8		OUT 2	
3	OUT 9		OUT 3	
4	OUT 10		OUT 4	
5	OUT 11		OUT 5	
6	OUT 12		OUT 6	
7	L_OUT_IN			
8	N_OUT_IN			
X7	d	c	b	a

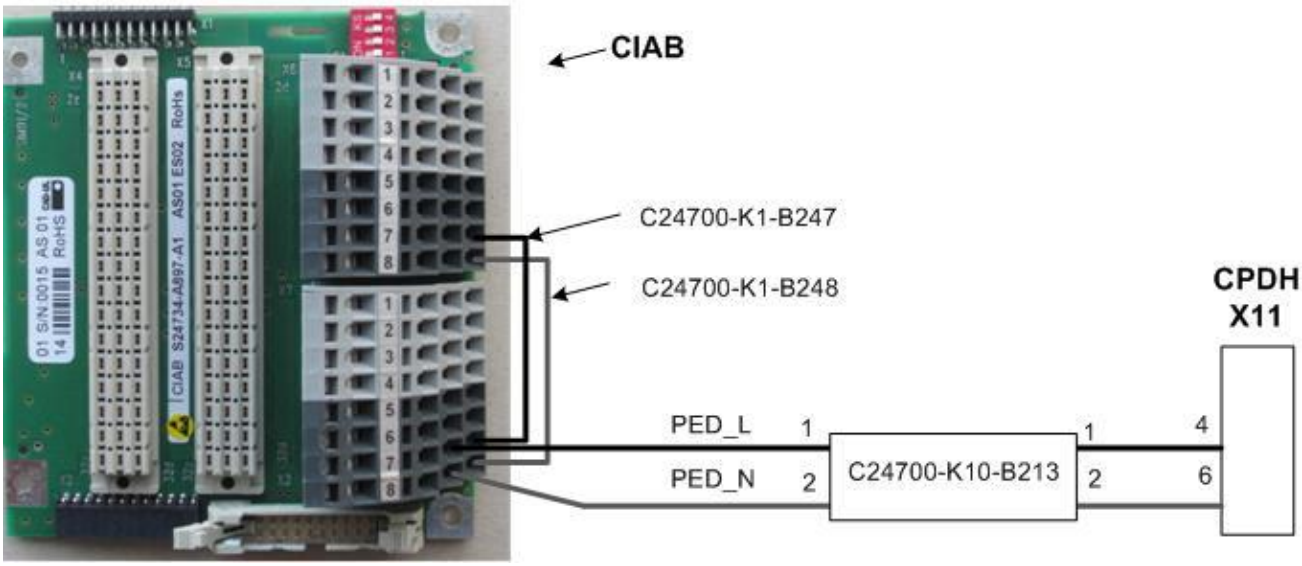


Fig. 57: CIAB activation, internal

2.22.10. Activation button for confirmation devices 230 V

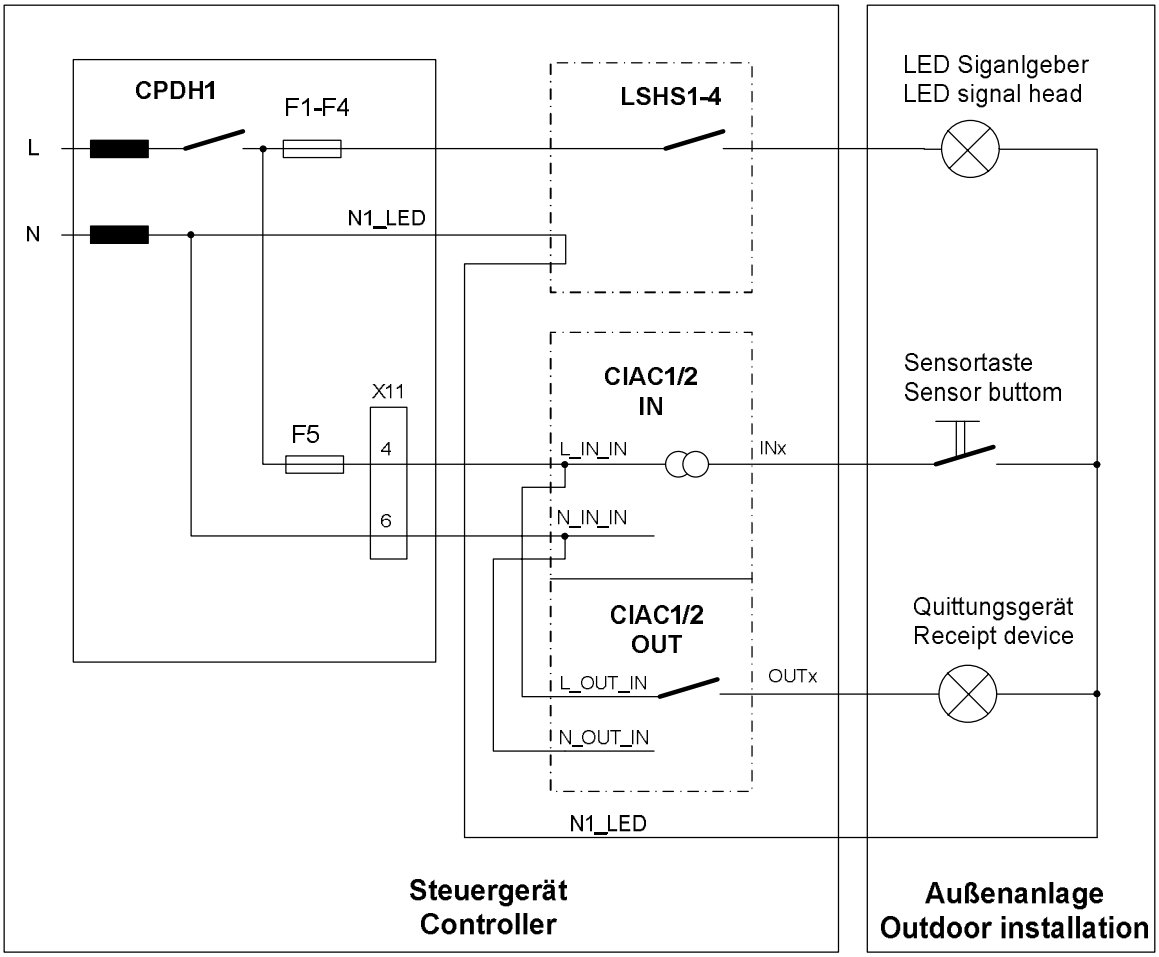


Fig. 58: Connection button/confirmations

2.22.11. CIAB connection, internal for signal heads for the visually impaired

For the activation of the signal heads for the visually impaired, the following terminal set is also needed:

SX CIAB terminal set L24730-E811-A4

The terminals for the operating power supply for the signal heads for the visually impaired are available with this terminal set. (PED_L to orange, and PED_N to red).

The activation looks as follows in this case:

X6	d	c	b	a
1	IN 7		IN 1	
2	IN 8		IN 2	
3	IN 9		IN 3	
4	IN 10		IN 4	
5	IN 11		IN 5	
6	IN12		IN6	
7	L_IN_IN			
8	N_IN_IN			
1	OUT 7		OUT 1	
2	OUT 8		OUT 2	
3	OUT 9		OUT 3	
4	OUT 10		OUT 4	
5	OUT 11		OUT 5	
6	OUT 12		OUT 6	
7	L_OUT_IN			
8	N_OUT_IN			
X7	d	c	b	a

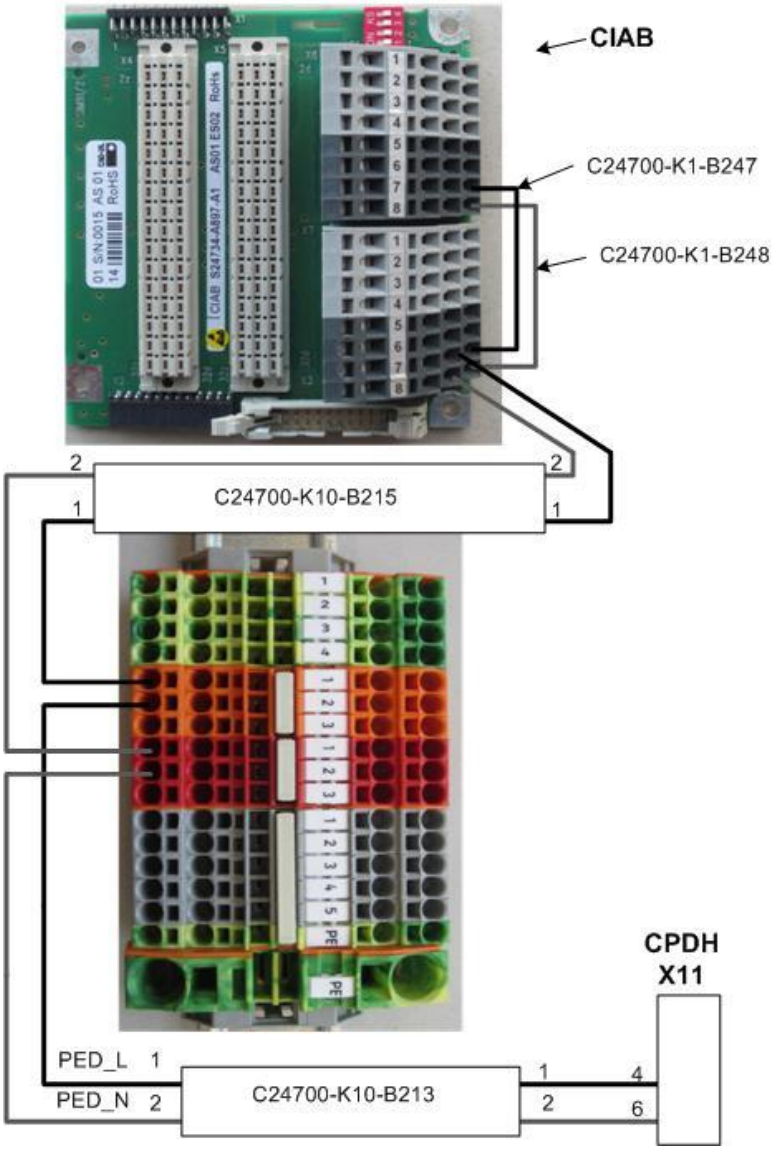


Fig. 59: Activation of signal heads for visually impaired, internal

2.23. BAZ operating unit

A display and command unit (BAZ2, L24734-F655-A5) is provided on all devices as standard, meeting DIN 50556 functionality requirements. The control element has a membrane keypad with an LED display for each key and for additional function displays. Further information is indicated by an illuminated LCD display with 4x20 characters.

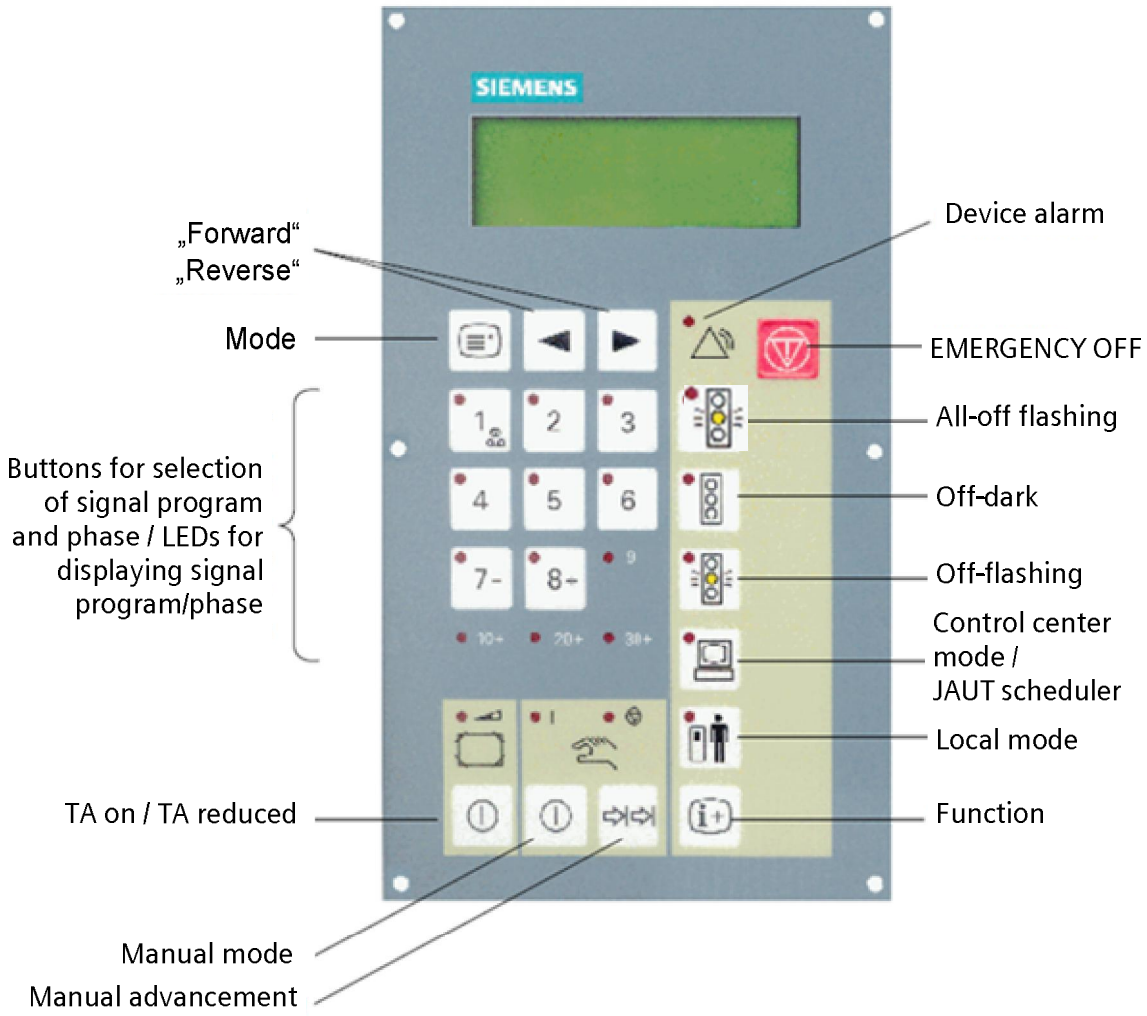


Fig. 60: BAZ

For description of the function see manual 1g section 5.1.2

2.23.1. BAZ installation, internal

The internal command unit is accessible via a separately lockable door from the outside. Installation is possible in the device door as well as in the left-side or right-side parts. This means that the basic version of each device has a display for all important information.

The BAZ is connected to the 15-pin X33 connector of the CBU as a standard. With the cable 24-V power supply, serial data transmission and emergency off button are connected to their intended interfaces on the CBU.
The required materials for this are:

BAZ 2 Module Cxx0	L24734-F655-A5
CBU-BAZ /C10 cable	C24700-K10-B180
Accessory kit for BAZ 2 module /CXX	C24734-A16-B999

2.23.2. External BAZ

Up to 3 BAZ interfaces are possible in the sX controller. These are: CBU_X33 or CEB_X61 or CEB_X64.
For activating the external BAZs a TEB module is required in the sX controller for electrical isolation. The installation set additionally includes:

C10 BAZ externally prepared L24730-E810-A35.

The CEB module must be ordered separately.

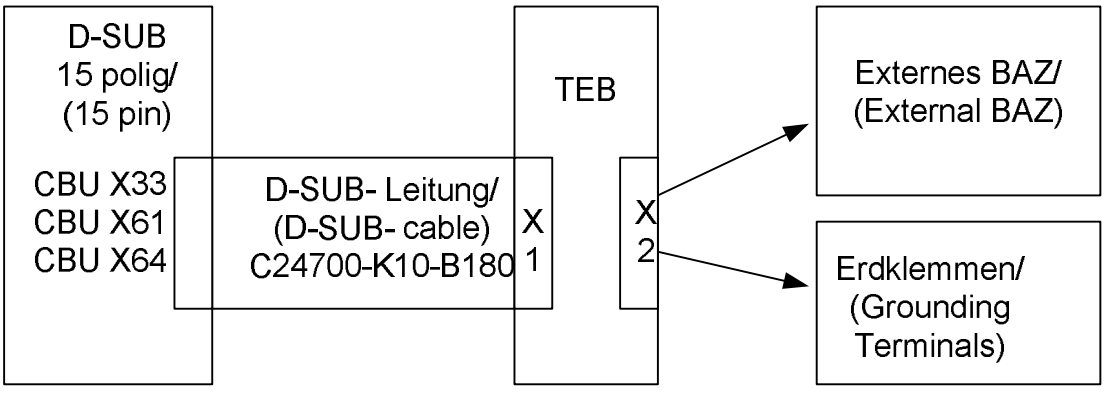


Fig. 61: Block diagram BAZ external

TEB Terminal	BAZ Connector	Signal name	Comment
X2.a1	X1.7	24V_TA1	1)
X2.b1	X1.7	24V_TA1	1)
X2.a2	X1.1	0V_TA1	1)
X2.b2	X1.2	0V_TA1	1)
X2.a3	X1.5	0V_TA2	0V return from the BAZ
X2.b3	X1.9	FLSMST.L	EMERGENCY OFF
X2.a4	X1.8	SRTA1.A	Line A
X2.a5	X1.3	SRTA1.B	Line B
X2.a8	---	PE	PE for overvoltage conductor ➔PE rail in the controller
X2.b8	----	PE	Grounding of 0V_TA1 ➔PE rail in the controller

Tab. 65: Activation of BAZ external

1) Wires connected pairwise in parallel because of voltage drop on the power supply.

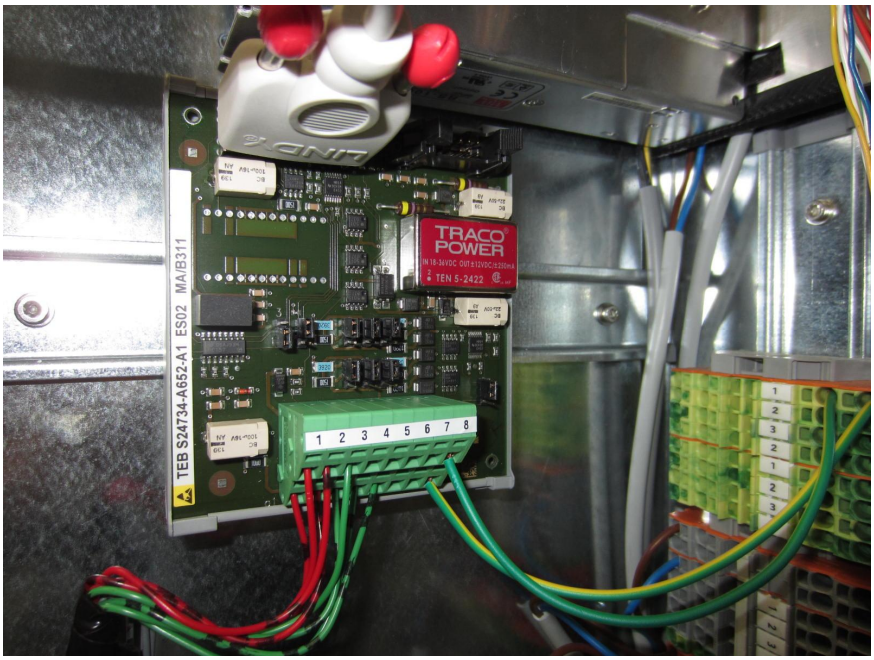


Fig. 62: Installation TEB_BAZ_external

2.24. Alternative command device

Signal CBU	Signal direction CBU	Imax / mA	Terminal X4 CTB	Application
24V_EXT_Out	Output	150	10a	Power supply command device
RCD	Input	--	11a	Emergency off for LED switch voltage
0V	--	--	14b, c	0V device
0V	--	--	14b, c	0V device

Tab. 66: Connection terminals for alternative command device.

If another command device is used that cannot be operated for the BAZ at the serial interface of the CBU, the connection of the operating power supply and of the emergency off button may take place on terminal block X4 of the CTB. The associated signals are: "24V_EXT" and "RCD_L".

2.25. CCU GPS internal

For determining the time a GPS receiver (CCU, V24734-Z894-A1) is connectable. Thus world-wide receipt of time is possible. This is built in to the exterior of the metal chassis in the cabinet. The CCU has a magnet on the back side and is to be affixed to the non-perforated surface of the chassis. The line is attached for the CBU_X31. After switching on it takes approx. 2 minutes for the GPS time to be available.

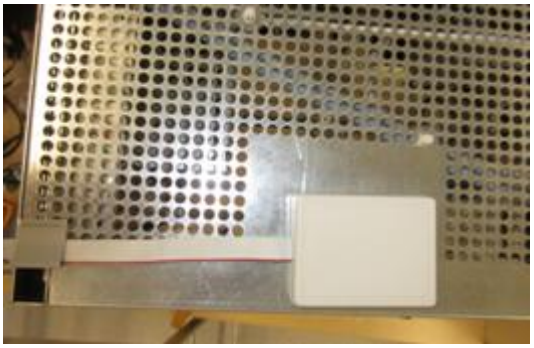


Fig. 63: CCU assembly

2.26. CCUE GPS External

If at the place of assembly no GPS reception is possible (e.g. under bridges, in buildings, under large trees) an external GPS receiver (CCUE, V24734-Z895-A1) can be used. This is installed on a pole. In the sX controller a driver module TEB must be installed for this.

The set for the installation in the sX controller is called:

CCUE prepared /C10 L24730-E810-A61

Upon delivery of the TEB all jumpers are in the position 2-3. For correct operation of the TEB with the CCUE, only jumper X4 is to be changed to 1-2 (bottom). The TEB is to be installed at the bottom left onto the horizontal top-hat rail in the main chassis.

The CCUE set for the external pole assembly including fasteners is called:

CCUE Set GPS ext. /C10 L24730-E810-A60

(The same housing and attachment are used as for the DCF receiver).

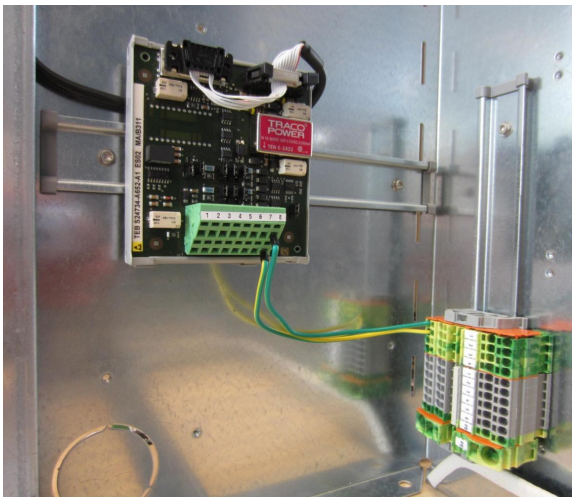


Fig. 64: CCUE_TEB installation

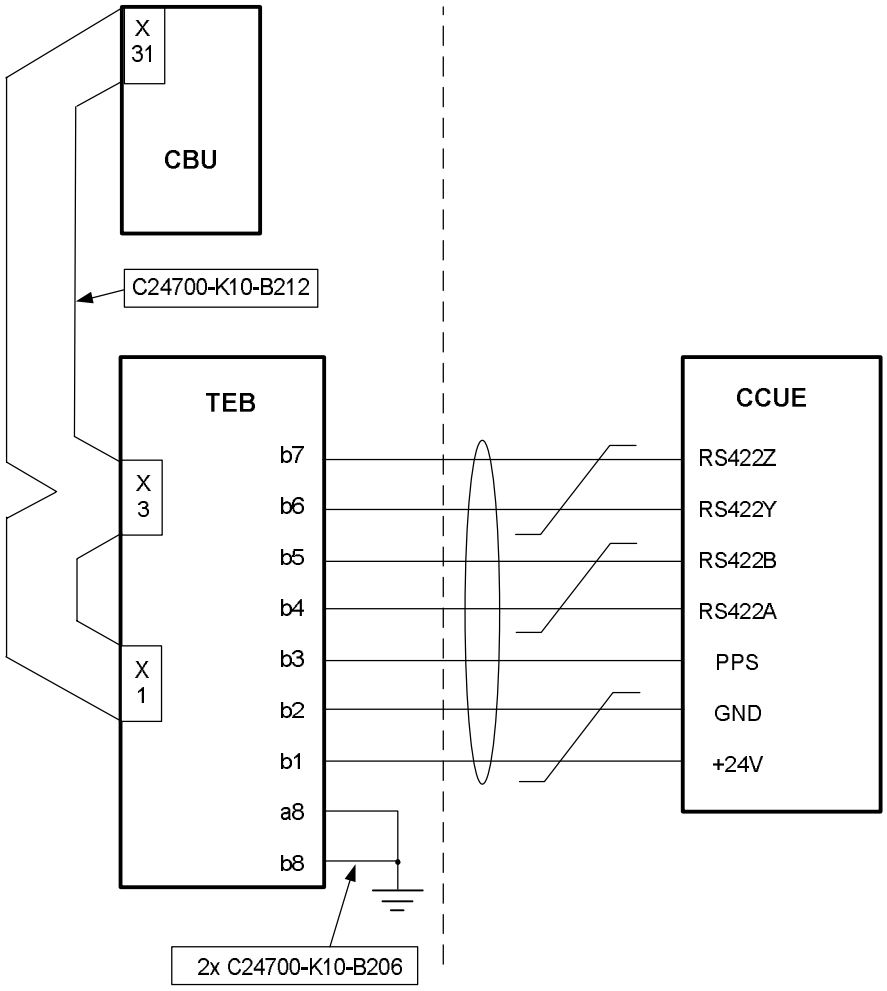


Fig. 65: CCUE_TEB activation

2.27. PT preference (AFD)

This function is only implemented and described in a later stage.

2.28. Supplementary power supply 24V DC

For this function there is the following set:
C10 power supply Set 24 V DC 48 W L24730-E814-A2
These sets include the power supply unit and the mounting material (without mounting brackets). Only one DC power supply can be installed on the mounting bracket. The mounting bracket is the size of a CLB module and is to be installed on the last CLB location. (On the right side of the mounting bracket the AC power supply can be installed).

The mounting bracket
Mounting bracket power supply set /C10 L24730-E814-A14 during retrofitting: must also be ordered, unless the
power supply Set 24 V AC 60 VA L24730-E814-A1 is already built in.

Note

The maximum permitted load of the RS100-24 is 48 W (2.0 A)

The replacement part number for the 24 V power supply is: V24069-Z8043-A1.

Activation:
The 0V block in the device already in place is to be used and is not included in the set.
For the plus voltage there are 2 terminals included in the set.
The auxiliary power supply is to be installed onto the mounting bracket.
Standard installation location is the lowest CLB location in the main chassis.
See Fig. 5, no. 2
The mounting bracket can also be mounted on other CLB installation locations on site. Then the line lengths are to be examined and if necessary have the lines replaced by longer lines.
It must however always be the last installation location in the row because no CLB/CIAB modules can be attached at the mounting bracket.

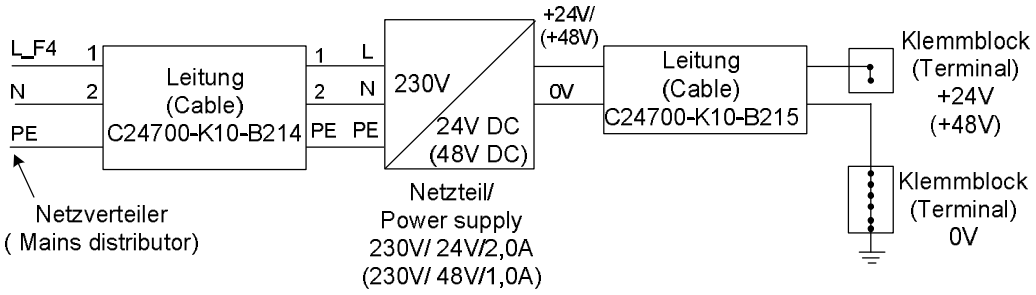


Fig. 66: Activation of DC power supply

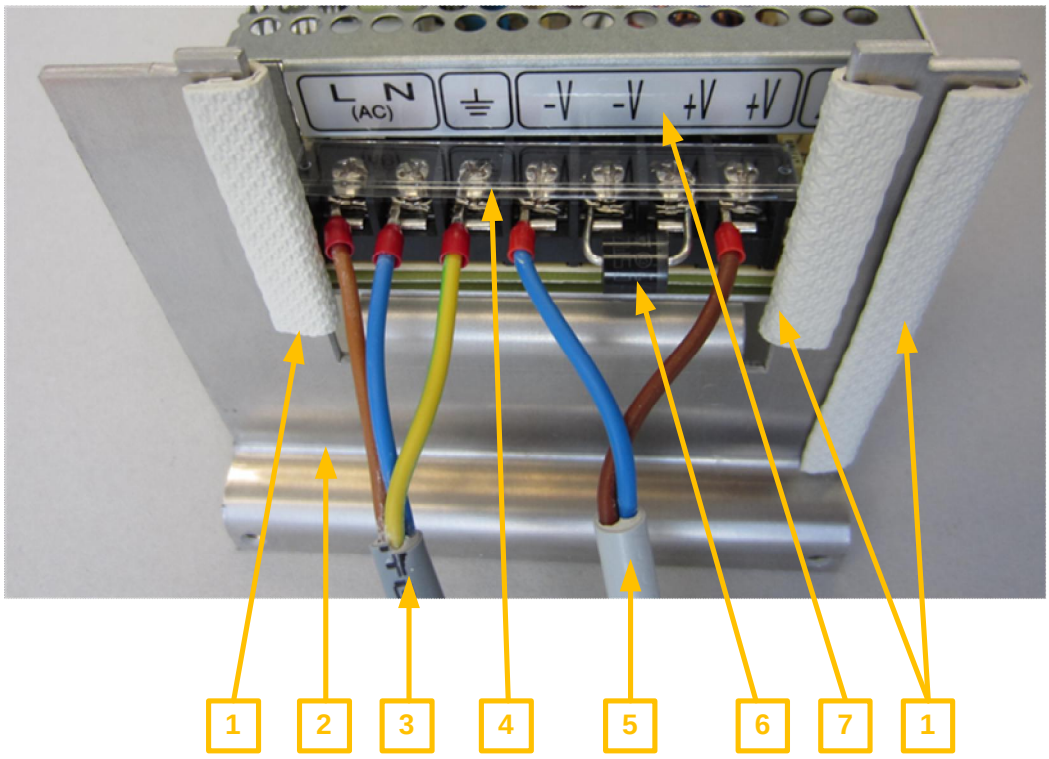


Fig. 67: Mounting power supply

No.	Description
1	Edge protection
2	Power supply retainer bracket
3	C24700-K10-B214 line
4	Contact protection RS100 (transparent)
5	C24700-K10-B215 line
6	Overvoltage protection diode (1)
7	RS100

Tab. 67: Mounting parts for power supply

(1) The connection of the protection diode marked with the white ring is to be connected with the positive voltage of the power supply.

Fig. 68: Installation of the DC power supply

2.29. Supplementary power supply 24V AC

For this function there is the following set:
C10 power supply Set 24 V AC 60 VA L24730-E814-A1
This set is needed for 24 V AC confirmations, for example. The transformer is installed onto the right side of the mounting bracket. The connecting leads are so long that they reach all the way to the power distributor.
The maximum permitted load of the transformer is 60VA (2.5 A).)
Replacement part number for 24 V AC transformer is: V24068-Z5050-A1.

2.29.1. Activation

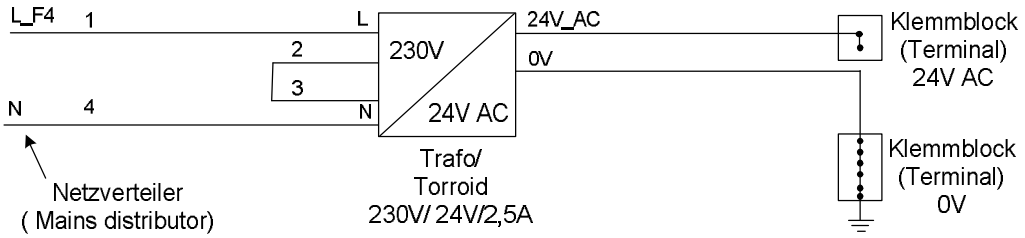


Fig. 69: Activation of AC power supply

Fig. 70: Installation of the AC power supply

2.30. Cabinet heater

The cabinet heater is a panel heater, it is to be mounted at the bottom right on the side wall in the main chassis. The thermostat sits at the left on the rear wall on the bottom left top-hat rail. The thermostat should be set to approximately +5°C
The heater set for this is as follows:

Heater set 230 V 40W /C10 L24730-E810-A31

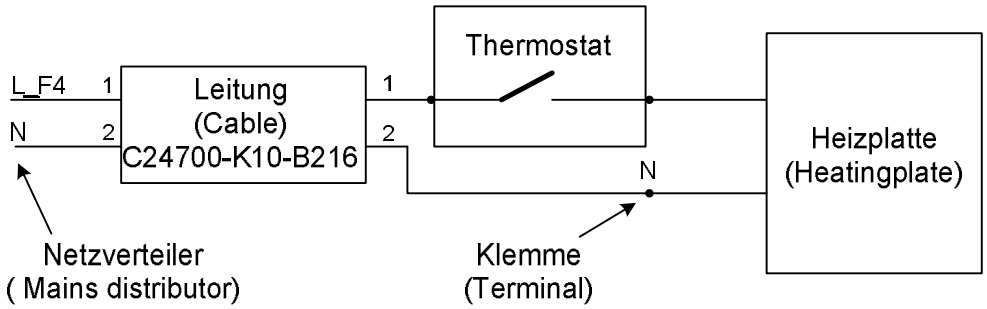


Fig. 71: Activation of heater set

Fig. 72: View of cabinet heater

2.31. Control center activation

2.31.1. UMTS Router

For installation of the Canto P function in the sX there is the following functional unit.

C10 Modem UMTS Set L24730-E813-A15.

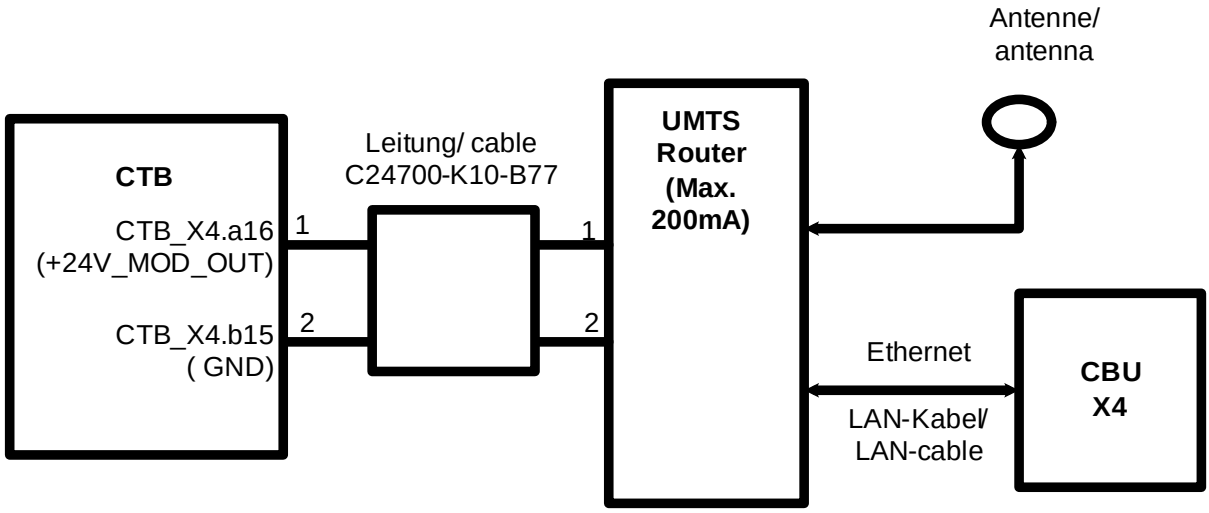


Fig. 73: Activation of UMTS Router

The router is to be attached to the CTB: +24V_MOD_OUT. The current consumption is 200mA max. That router could be connected to the UPS module (USC).

Fig. 74: UMTS router installation

Mounting of antenna:
The antenna is to be affixed to the roof with double-sided adhesive tape. Here, take care to position the Velcro tape parallel to the longitudinal axis of the roof curvature of the NKT cabinet. The thickness of the Velcro tape thereby ensures the necessary adhesion of the entire surface.

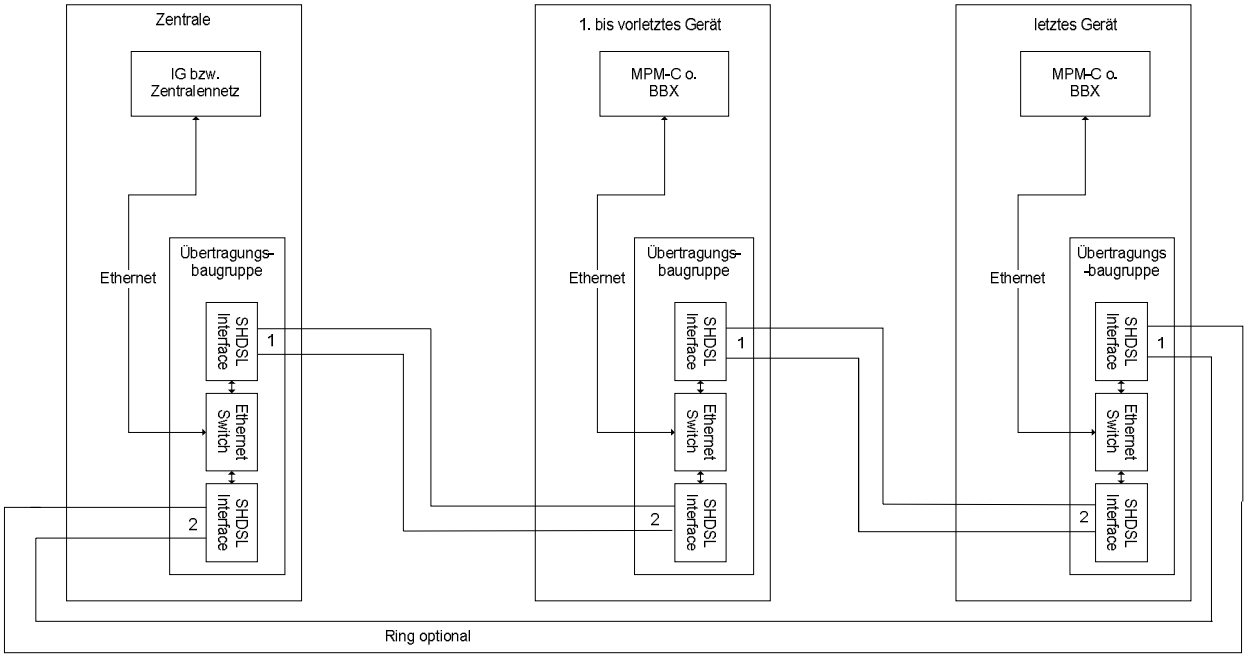
Fig. 75: Mounting UMTS antenna

2.31.2. Canto P (DSL activation)

For Canto P with DSL, the modem with the name "Mini-Flex DSL Modem" (item number A2B00095255) shall be used.

With a rising number of devices, the package delay increases. We therefore presently only suggest up to 16 devices. Depending on the project, however, larger loops can be tried out.

Moreover, using a loop (double spur line) the package delay can be cut in half. For the arrangement of the loop, see Canto P description section 2.2.



German	English
Zentrale	Control center
1. bis vorletztes Gerät	1st to pre-last device
letztes Gerät	Last device
Übertragungsbaugruppe	Transmission module

Fig. 76: Canto P modem configuration

For installation in the sX, there is the following functional unit.

C10 modem Canto P set L24730-E813-A33.

The necessary mounting parts are present in the set. The modem shall be mounted on the left top-hat rail. Overvoltage protection is included in the modem. For this reason, the PE wire absolutely must be connected. The PE terminal is directly next to the modem.
After that, the Ethernet interface designated ETH1 shall be connected with the Control Center-Ethernet interface of the CBU module using a crossover patch cable (A2B00089079). (Connector CBU_X4).

Line 1 shall be connected with the ground cable leading to the field device.

Line 2 shall be connected with the ground cable leading to the control center.

The maximum cable length between 2 modems is 6.3 km for 0.8mm wires and 4.9 km for 0.6mm wires.
The modem is to be connected to the CTB: +24V_MOD_OUT. The current consumption is 200mA max. That modem could be connected to the UPS module (USC).

Fig. 77: Installation of Mini-Flex modem

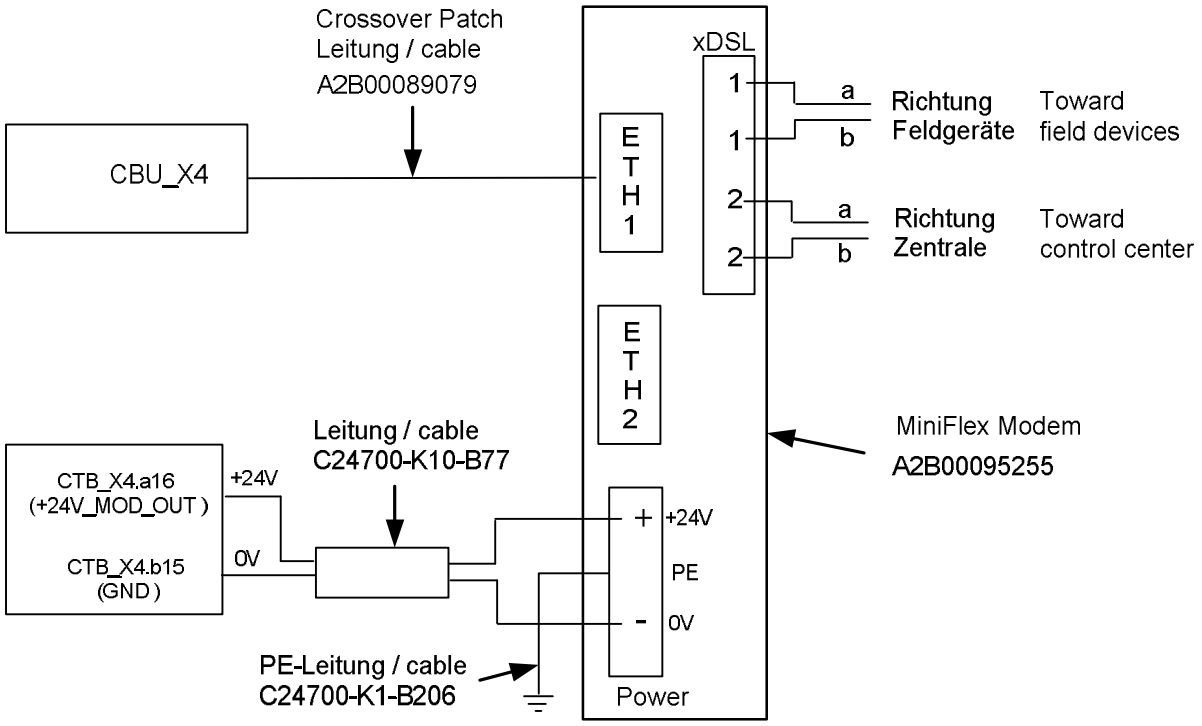
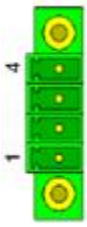


Fig. 78: Mini Flex connection in the device

SHDSL plug specifications



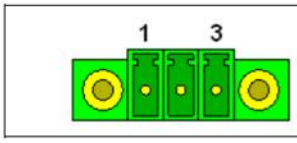
Pin No	Beschreibung
4	SHDSL Interface 2
3	SHDSL Interface 2
2	SHDSL Interface 1
1	SHDSL Interface 1

Description

Fig. 79: SHDL pinout for Mini Flex modem

Pinout for power supply

Type – Phoenix Mini Combicom MC 1,5/3-GF-3,5 (female), 3 pins.



Pin No.	Description
1	-PWR (Negative power supply terminal)
2	FPE, GND (Functional Protective Earth / GND)
3	+PWR (Positive power supply terminal)

Matching Type for the cable: MC1,5/3-STF-3,5
For AWG 16-28
Area 0.08–1.5 mm^2 or Diameter 0.32-1.4 mm

Fig. 80: Pinout for power supply of Mini Flex modem

Warning

For overvoltage protection, the PE absolutely must be connected.

Connector	LED	RED	GREEN	AMBER	OFF
xDSL 1 (DSL No 1)	1	DSL not working	DSL normal operation		
xDSL 2 (DSL No 2)	2	DSL not working	DSL normal operation		
Ethernet 1 and 2	Left		Blinking = Data		Connection not active
Ethernet 1 and 2	Right			100 Mbit/s data rate	10 Mbit/s data rate

Fig. 81: Meaning of the LEDs with the Mini Flex modem

2.32. UPS (USC is optional)

In order to be able to maintain operation of the OMC control module and of a control center modem/router for several minutes in case of a power failure, the sX controller can be equipped with a UPS of the type USC (S24734-A633-A1). The USC makes it possible, if necessary, to transmit a power failure message to the control center and properly shut down the operating system. The USC is to be installed on the left side beside the CTB.

X4 Row/ Contact	c	b	a
12	--	--	PF_USC_L
13	+5V_USC_IN	+5V_USC_IN	USC_OFF_L
14	GND	GND	+24V_USC_OUT

Tab. 68: Terminals of the CTB connection to the USC

Signal	Signal direction with reference to CBU	Meaning
+24V_USC_OUT	Output	Charging current for the battery of the USC
PF_USC_L	Input	Warning signal indicates that the USC has taken over as the power supply.
USC_OFF_L	Output	With this signal the USC can be switched off if the operating system has been shut down.
GND	--	0V
+5V_USC_IN	Input	Power supply for OMC and control center modem CMA, if available.

Tab. 69: Meaning of the signals for the connection of a USC.

Independent of the terminals for connecting the CBU the USC has a +24V output for the connection of CBU-external modems.
The required material is as follows:

- USC assembly set/C10 L24730-E810-A110
- USC complete L24730-E810-A100

2.33. Special adapter CUA

With this adapter up to 2 system-external Europe cards can be installed. The special adapter CUA is the size of a CLB cage and can be installed on any CLB location. Furthermore, the CUA contains an FKA adapter for the conversion of wrap technology to flat-belt technology as well as 16 connection terminals. The part number is:

C10 universal adapter CUA L24730-E815-A1

Fig. 82: Figure of CUA e.g. with 1x BFU module

3. Diagnostics

Further fault diagnostics are possible with the following tools:

- With the WEB GUI with the notebook contained in the controller
- With the supply and service tool SIEMENS Sitraffic core.
- With devices with control center via the control center.

4. Technical data

4.1. Standards

Requirement	Standard
Requirement for traffic systems	DIN EN 50556 With the classes required for Germany from table 11 of the DIN VDE V 0832-110
Requirements for software traffic systems	DIN EN 0832-500
Functional security	Developed according to EN 61508 SIL3
Guidelines for light signal systems	RiLSA
Controllers for traffic signal systems Functional safety	DIN EN 12675
Electromagnetic compatibility (EMC)	DIN EN 50293
Safety of persons (EMF)	DIN EN 62479
Safety, low-voltage directive	DIN EN 60950-1:
Safety of transformers, power supply units	DIN EN 61558-1:
Environmental tests	VDE 0832-100 [1)] Climatic test in accordance with the classes: AB3 (= + 60°C AE4 (= - 40°C AK2 (humid warmth 40°C/93% r.h 2x (12+12h) Vibration test [2)] (according to EN60068-2-64 test Fh in accordance with class AM2
Rohs	Directive 2002/95/EC
The battery directive BattG	Directive 2006/66/EC
REACH	EU Regulation 1907/2006
EP standard	EP standard no.1

Tab. 70: Standards

1) The listed values are better than required in VDE 0832-100
2) The listed values are better than required in DIN EN60068-2-64.

4.2. Characteristics of hardware and general

Installation in old cabinets	Apart from the O cabinet, the sX-H can only be installed in the N cabinet. Other cabinets are not possible.
Mains power connection:	230 V -20 %, +15 % Also covers 240 V , -24 %, +10 %
Phase-to-zero mains connection	Standard mains connection Other fuses are needed for phase-to-phase mains connections.
Mains connection components:	
Fault current-actuated circuit-breaker device 300mA	Controller On/Off and Emergency OFF
Controller fuse	25 A fuse in the power supply company's compartment
Maintenance socket and fuse 10A and 30 mA fault-current circuit breaker	Standard German type
Fuse for controller	Power distributor: 16 A, type C 2x fuse 4 AT sX-Hx power distributor2: 4 AT
Fuse for LED power supply	Power distributor: 16 A, type B - on the CPDH 6.3A per LED switch (LSHS) - 1 A per color output of the LSHS
Basic surge protection	Simple surge protection on the mains supply line as standard. Increased surge protection possible optionally.
Fuse for traffic signs and other devices operated with mains voltage.	1*4safety fuses for the power distributor (for higher loads you will need to retrofit a fuse in the power supply company's compartment).
Local mains connection peculiarities	The preferred size 2O/2N cabinet provides the familiar installation space.
Internal power supply:	

24 V DC/ 2 A	Sufficient to power all system modules in the preferred configuration. An additional power supply will be needed for pedestrian acknowledgment lamps.
2*13 V AC	APU transformer for the LSHS supply voltage
LED voltage	230 V AC
Power supply voltages 230 V (Ph or Ph-to-Ph)	Yes
LED switch technology:	
Electronic load switches	Only electronic LED switches are used
230 V LED switches in the device	An LED switch module (LSHS) covers 24 load switches, divided into 8 signal groups (2x red current monitors, yellow + green, unmonitored red is also accessible for signal group 1-4. (=> 4 * 8 = 32 +4 = 36 outputs) Maximum load per LSHS load switch: 72W. Maximum load per red1 and red2 output 36 W
Total current monitoring/ analog inputs	available available
LED types:	
230 V LED (5-18W)	The LED signal head type must have been technically released for operation on the sX-H controller.
Number of signal groups:	
Total	Max. 64
Number of LED switches	maximum 8, maximum 4 per cabinet
Total load for device	At 230 V: 2760 W (12 A)
Power rating of LSHS module:	Maximum 920 W (4 A)
Vibrating signals for the visually impaired for 230 V	Normal output
Limit values for red monitoring	5W

Minimum load per monitored output:	5W
Signal types:	Three possible connections for each output. Monitoring can be deactivated by software.
3-aspect:	
Combined signals (tactile + pedestrian)	Tactile and acoustic signal heads via CIAC module or via LSHS outputs
color-dependent minimum times	
Other:	230 V types (threshold relay)
Crossing signal for the visually impaired/	
Special signals	40V types direct via LSHS
Pedestrian acknowledgment 230 V	Via unused outputs from LSHS or via I/O module CIAB/CIAC
Pedestrian acknowledgment 24 V DC	Via additional IO module CIE/CIO
Tactile signals for the visually impaired.	Normal 230 V LSHS output
Inputs/Outputs :	
Maximum number of outputs that can be handled by the basic software: up to 250	8 high-side outputs 24 V/150 mA contained in the basic configuration
Maximum number of inputs that can be handled by the basic software: up to 250	8 inputs included in the basic configuration
Detection	In the 10ms grid Not electrically isolated, 24 V DC, overvoltage protection present
Loop detectors of type SLD4 that can be plugged into	2 SLD4 module in the basic configuration; the occupancy and fault outputs for each loop are recorded in series.
For every 4 loops	
Expansions for inputs / outputs	up to 17 CLB modules can be installed 8 loops possible for each CLB

IO expansion	16 inputs/16 outputs 24 VDC possible for every CLB 12 inputs/12 outputs 230 VAC possible for every CIAB
Video	DIB-E can be plugged into CLB/CBU
Wrap/ soldering installation part	CUA adapter
Serial interfaces:	Included on the basic module
Connection to GPS	for GPS receiver
Control center connection	Canto P DSL modem
	UMTS router
Control center connection	OCIT, CANTO
Connection to PC	For Sitraffic Core programs
Connection to display	For command unit BAZ with display 4x20 characters
Time generation:	
Real-time clock (battery buffered)	Time source for startup and after power interruption
GPS	Time synchronization with GPS receiver
Time server	Time alignment via synchronization with a time server (ntp)
Operation:	
Display and control panel BAZ	Functionality as per EN 50556
	Control panel with display (BAZ)
Full diagnostics facilities via an external PC	PC tool Sitraffic Service with extended function range
Diagnostics:	
LED displays for the principal functions	See description of modules
Built-in test functions	Memory test and consistency check of the supply data in main memory on booting and while in operation.
Extended diagnostics via switchable operator panels displays	Display of:
	Operating log/ SiMo log messages
	Device status, defective red lamps and detectors
	Other special displays (e.g TA, PT, etc.)
Full diagnostics facilities via an	PC tool Sitraffic Service with

external PC	extended function range
Features of the signal monitor	
Interfacing to outdoor installations:	
Ground cable goes to LED switch via isolating terminals, maximum wire diameter 2.5 mm2	Terminals on the LED switch backplane (CDBH) 3 terminals per output
Standard line length	up to 250m
Voltage monitoring:	Factory setting is -20 % to +15 % of the rated voltage
Undervoltage and overvoltage	
Signal groups:	Maximum number is 64
Switch-off time in the event of a fault:	<300 ms
Off-signaling:	The signal group status for each Off signaling can be supplied for each signal group.
Off-flashing pattern (secondary direction)	This can be selected by all operators (PC, command unit, control center)
All off	This can be selected by all operators except the control center.
All-yellow flashing	Can be selected from PC and command unit
Fault flashing	User-definable, e.g. fault flashing via "All yellow" after SiMo fault (fault occurrence)
Maintenance and diagnostics:	
Low-maintenance design, self-test of the principal functions	
Internal archive, information interface to controller	
Fast test of the configuration	SiMo test of the controller with the PC
Operating status displays	LEDs on modules, optional LCD on BAZ, PC

5. Part numbers, modules

Modules in alphabetical order

Name	Part number	Description
BAZ2	L24734-F655-A5	BAZ 2 Module Cxx0/C10
CBU	S24734-A870-A10	CBU compl HW with initial program loader /C10
CCU	V24734-Z894-A1	CCU set C10 GPS internal /C10
CCUE	V24734-Z895-A1	CCUE set C10 GPS external /C10
CDBH	S24734-A872-A1	CDBH C10 Power Distrib. Backp. 230 V /C10
CEB	S24734-A875-A1	CEB C10 Extension Board /C10
CEW	S24734-A898-A1	CEW C10 Electronic load LSHS /C10
CIAB	S24734-A897-A1	CIAB C10 CIAC Backplane /C10
CIAC	S24734-A896-A1	CIAC C10 I/O AC 24V/230 V /C10
CIE	S24734-A877-A1	CIE C10 IO Board-+Ethernet /C10
CIO	S24734-A890-A1	CIO C10 IO Board /C10
CLA	S24734-A878-A1	CLA C10 Loop Adapter /C10
CLB	S24734-A879-A1	CLB C10 Loop Detector Backplane /C10
CLBT	S24734-A891-A1	CLBT C10 CLB Termination /C10
CMD	S24734-A899-A1	CMD C10 Mode and Display /C10
CPA	S24734-A883-A1	CPA C10 Power Distribution Adapter /C10
CPDH	S24734-A884-A1	CPDH C10 Power Distrib. Unit 230 V /C10
CTB	S24734-A871-A1	CTB C10 Terminal Board /C10
DIB-E	ZNX:DET-089-000151	Video detector interface for Sivicam (Flir co.)
Dongle		Can only be ordered via function generator
LSHS	S24734-A887-A1	LSHS Lamp Switch 230 V Serial /C10
OMC-U	S24777-A3534-A20	Outstation Main Controller U-Version
SIVICAM I-2	ZNX:DET-089-000245	Integrated video detector with 3 mm lens
SIVICAM I-2	ZNX:DET-089-000246	Integrated video detector with 8 mm lens
SLD4	S24763-A82-A6	Serial Loop Detector
UMTS Router	A2B00097096	UMTS Router C9x0 /CANTO
USC	S24734-A633-A1	USC module
DSL Modem	A2B00095255	Mini Flex SHDSL Modem /CANTO
24V DC PS	V24069-Z8043-A1	24 V DC power supply
48V DC PS	V24069-Z8045-A1	48V DC power supply

Tab. 71: Module part numbers

6. Part numbers for installation sets

Part number	Description
L24730-E800-A3	Expansion unit or door /C10
C24734-A16-B233	Front door, large /C10
L24730-E810-A100	USC complete /C10
L24730-E810-A110	USC assembly set /C10
C24700-K10-B180	CBU-BAZ /C10 cable
C24734-A16-B999	Accessory kit for BAZ 2 module /CXX
L24730-E810-A31	Heater set 230 V 40W /C10
L24730-E810-A35	BAZ prepared externally /C10
L24730-E810-A41	Transformer set 25VA /C10
L24730-E810-A45	Transformer Set 50VA /C10
L24730-E810-A60	CCUE-Set GPS external complete /C10
L24730-E810-A61	CCUE prepared /C10
L24730-E810-A70	CCU GPS internal complete /C10
L24730-E811-A40	CIAB bracket set /C10
L24730-E811-A100	CLB angle set /C10
L24730-E811-A200	CIAB Backplane /C10
C24700-K10-B215	Line 700mm (2x1) /C10
L24730-E811-A4	CIAB terminal set /C10
L24730-E811-A21	CIAC assembly set 117/230 V /C10
L24730-E812-A3	C10 CLA1 set
L24730-E812-A4	C10 CLA2-HX set
L24730-E812-A12	C10 DIB-E-Set
L24730-E813-A15	Modem Set UMTS /C10
L24730-E813-A33	Modem Set Canto-P MiniFlex /C10
L24730-E814-A1	PS SET 24V AC 60VA /C10
L24730-E814-A2	PS SET 24V DC 48W /C10
L24730-E814-A3	PS SET 48V DC 48W /C10
L24730-E814-A14	Mounting bracket for power supply set /C10
L24730-E815-A1	Universal adapter CUA /C10
L24734-A872-A10	CDBH Set /C10
L24734-A887-A10	LSHS Set /C10
L24730-E821-A2	CEW 230 V set /C10

Part number	Description
L24730-E821-A100	CPDH accessories /C10
L24730-E821-A210	CPA Power Distribution Adapter high/C10
S24734-B825-A1	Power supply company unit C10-H 230 V/25A /C10
S24734-B825-A2	Power supply company unit C10-H Ph-to-Ph 230 V/25A /C10
L24764-Z2000-A112	Wimag Basis Set /C10
L24730-A899-A1	Set 20 x micro fuse 6.3A CPDH /C10
L24730-A899-A2	Set 20 x SMD fuse 1A LSHS/C10
L24730-A899-A3	Set 20x fuse 1AT CIAC /C10
L24730-A899-A4	Set 20x fuse 4AT power distributor C10
C24700-K10-B97	PDU/ CPDH charging cable 6pin 2m /Cx40ES/C10
C24407-Z7-C1	Modules for removal tool
Panasonic BR2032	Replacement battery OMC
Wago: 2009-309	Wago Top Jop tool (for the terminal blocks)

Tab. 72: Set part numbers

7. Abbreviations

AFD	General radio demodulator for PT
APU	Auxiliary Power Unit
BAZ2	Display and command unit
BFD	Bus interface for detectors Cxx0x
BFU	Pedestrian module Cxx0x
CBU	CBU compl HW with initial program loader /C10
CCUE Set	CCUE set C10 GPS external /C10
CCU Set	CCU set C10 GPS internal /C10
CDBH	CDBH C10 Power Distrib. Backp. 230 V /C10
CEB	CEB C10 Extension Board /C10
CEW	CEW C10 Electronic load LSHS /C10
CIAB	CIAB C10 CIAC Backplane /C10
CIAC	CIAC C10 I/O AC 24V/230 V /C10
CIE	CIE C10 IO Board-+Ethernet /C10
CIO	CIO C10 IO Board /C10
CLA	CLA C10 Loop Adapter /C10
CLB	CLB C10 Loop Detector Backplane /C10
CLBT	CLBT C10 CLB Termination /C10
CMD	CMD C10 Mode and Display /C10
CPA	CPA C10 Power Distribution Adapter /C10
CPDH	CPDH C10 Power Distrib. Unit 230 V /C10
CTB	CTB C10 Terminal Board /C10
DIB-E	Video detector interface for Sivicam (Flir co.) Cxx0V /C10
Dongle	Dongle
DPSK	Modulation mode (differential frequency shift keying)
EMC	Electromagnetic compatibility
ESB	Switch-on current limiter
EVU	Power supply
FEE	Radio receiver
FEU	Frequency changeover module (for AFD)
FFSK	Modulation mode (fast frequency shift keying)
FI	Fault current circuit-breaker
FKA	Ribbon adapter for connecting ribbon cable
GPS	Global Positioning System

HW	Hardware
IFB	Display and command unit interfaces
IO	Input/Output
KLZ	Terminal board control center
LED	Light emitting diode
TSS	Traffic signal system
LSHS	LSHS Lamp Switch High voltage (230 V) Serial /C10
OMC-U	Outstation Main Controller U-Version
PT	Public Transport
PSU	Power Supply Module
RILSA	Guidelines for light signal systems
SIMO	Signal monitoring
SLD4	Serial Loop Detector
SRAM	Static random access memory (not cyclically updated)
PS	Power supply
TEB	Drivers for an external display and command unit
PI	Partial intersection
UPS	Uninterruptible power supply
TA	Traffic-actuation logic
VDE	VDE standards/regulations
TCC	Traffic control computer

8. Index

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is available from:

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