HHL

Installation Guide

HHL C Generation

Alarm System

HEDENGREN Security

V1.4

Contents

Oy Hedengren Security Ab | Lauttasaarentie 50 | 00200 Helsinki
www.hedengrensecurity.fi

1. Introduction

This installation guide provides information for installing the HHL-C32 and HHL-C256 alarm systems. The features and technical specifications, for example the number of loops, depend on the selected central unit model.

Read this document before installing the Hedengren Security alarm products.

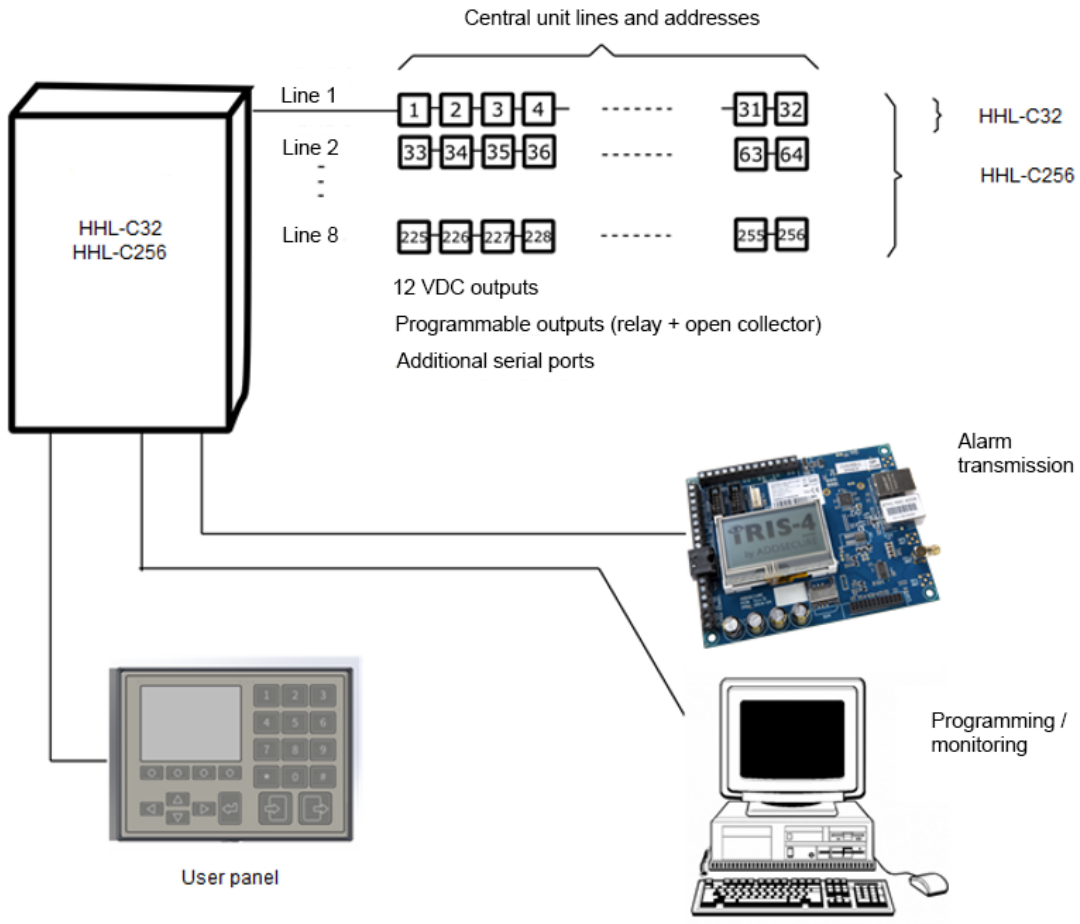

Figure 1 HHL System

1.1 Documentation Symbols

Warning! This marking warns of a serious hazard. If ignored, there is a risk of serious injury or even death.

Caution! This marking warns of a potential hazard. If ignored, there is a risk of minor injury or damage to the equipment.

Note! This marking gives additional information for installing or using the product.

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2. Requirements

2.1 Certifications

The system is approved to be compliant with the EN50131, EN55022 and EN50131-4 standards, when adhering to this installation guide. The system is compliant with the EMC directive 2014/30/EU, low voltage directive 2014/35/EU and RoHS directive 2011/65/EU.

The product has CE marking.

The HHL-C32 and HHL-C256 central units are compliant with the environmental conditions class I. The HHL-CKP user panel and the MW-9432 and MW-9532 address units are compliant with the environmental conditions class II.

2.2 Compliance with Grade 3 and 4 Requirements

In its standard assembly, the system complies with security grade 2 requirements. To comply with security grades 3 and 4, the central unit must be equipped with an HHL-TAMPER tamper switch. Specify your security grade requirements when you order the product.

Install the tamper switch in series with the tamper contact. The pin header is located next to the tamper contact.

2.3 Cables and Cable Sheaths

The cable type to be used must be braided dual cables equipped with protective sheath. All of the calculations in this guide use a 0.5 mm wire diameter.

The system has been tested and approved using MHS cable type:

- conductor diameter 0.5 mm
- conductor pair loop resistance 188 Ω / km
- conductor pair capacitance 60nF / km).

The insulation resistance between the conductors and the earth potential must be > 500 kΩ. If the insulation resistance is less than that, uncontrolled ground currents transfer into the system and cause interference. There may be problem situations with metal doors, where the cable sheath or magnetic contact creates a ground connection. There may also be problems when a cable sheath is connected to a metallic installation box, and the mountings screws of the box become grounded to the framework of the building.

All cable sheaths must be connected to the central unit enclosure. In the same manner, connect the cable sheath in the user panel to pin **S**.

The cable type to be used between the transformer and the central unit must be MSK 2x1mm. The cable must be less than 1 m long. The cable is delivered with the enclosure.

The following cable types are recommended for the detector and user panel busses. All cable types have multiple variants and manufacturers. The cable performance class is typically Dca s2d2a2.

- MHS
- KLMA
- PTS LSZH
- VMOHBU

2.4 Installation Environment

When you select the installation site, consider the certification of the central unit and the components.

3. Central Unit Enclosure

3.1 Central Unit Enclosure HHL-C32

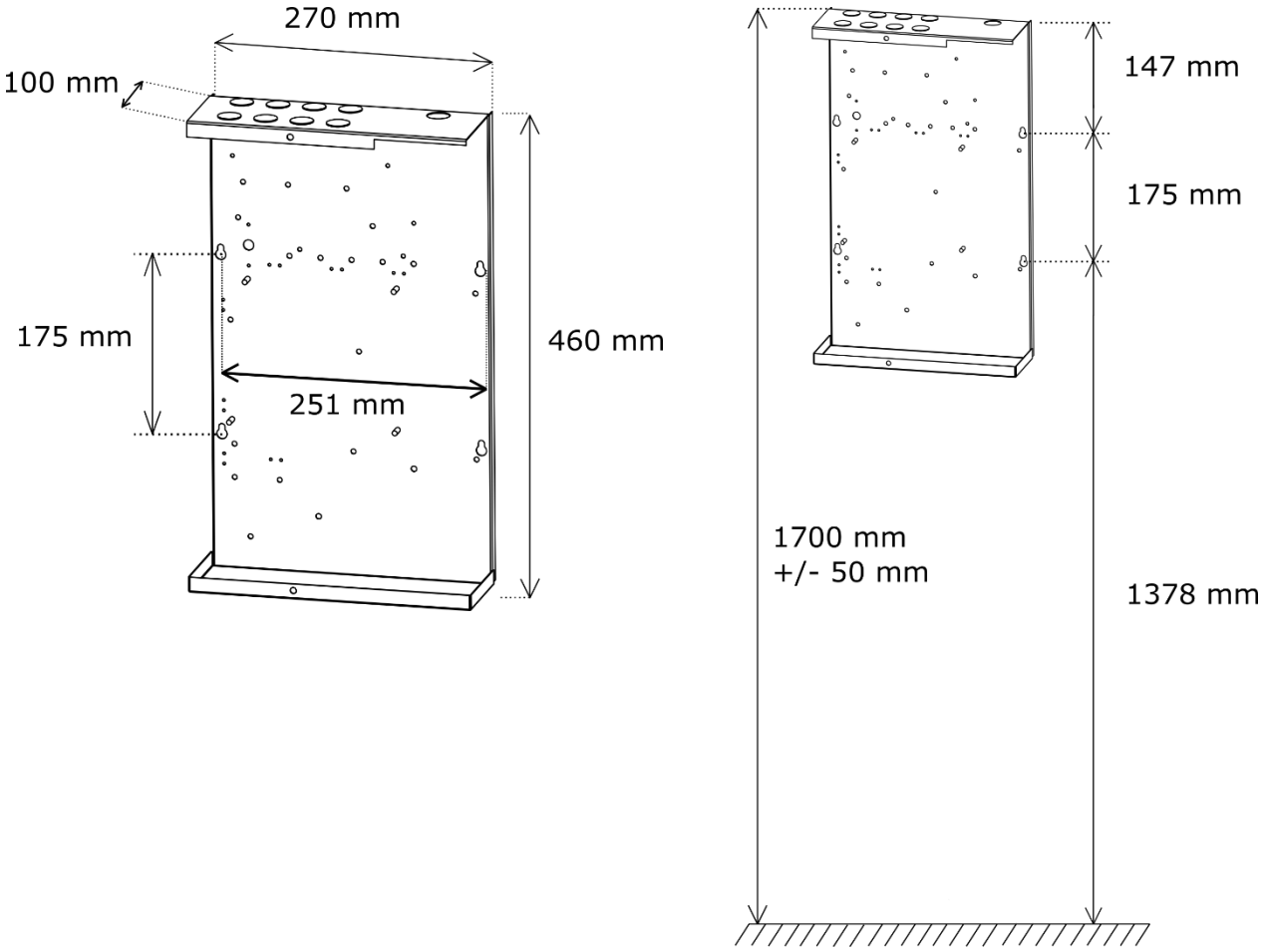

Figure 2 Dimensions and Installation Height of Central Unit Enclosure HHL-C32

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Muuntaja PSS40 /22 VAC

Additional card slots (various options):

- HEDRING.NET
- Relay card
- Routing delay card

Tamper switch

Motherboard:
HHL-C32
HHL-C256

Battery options:
1 x 7 Ah

Secure the batteries with the metallic mounting brackets, which are delivered with the central unit.

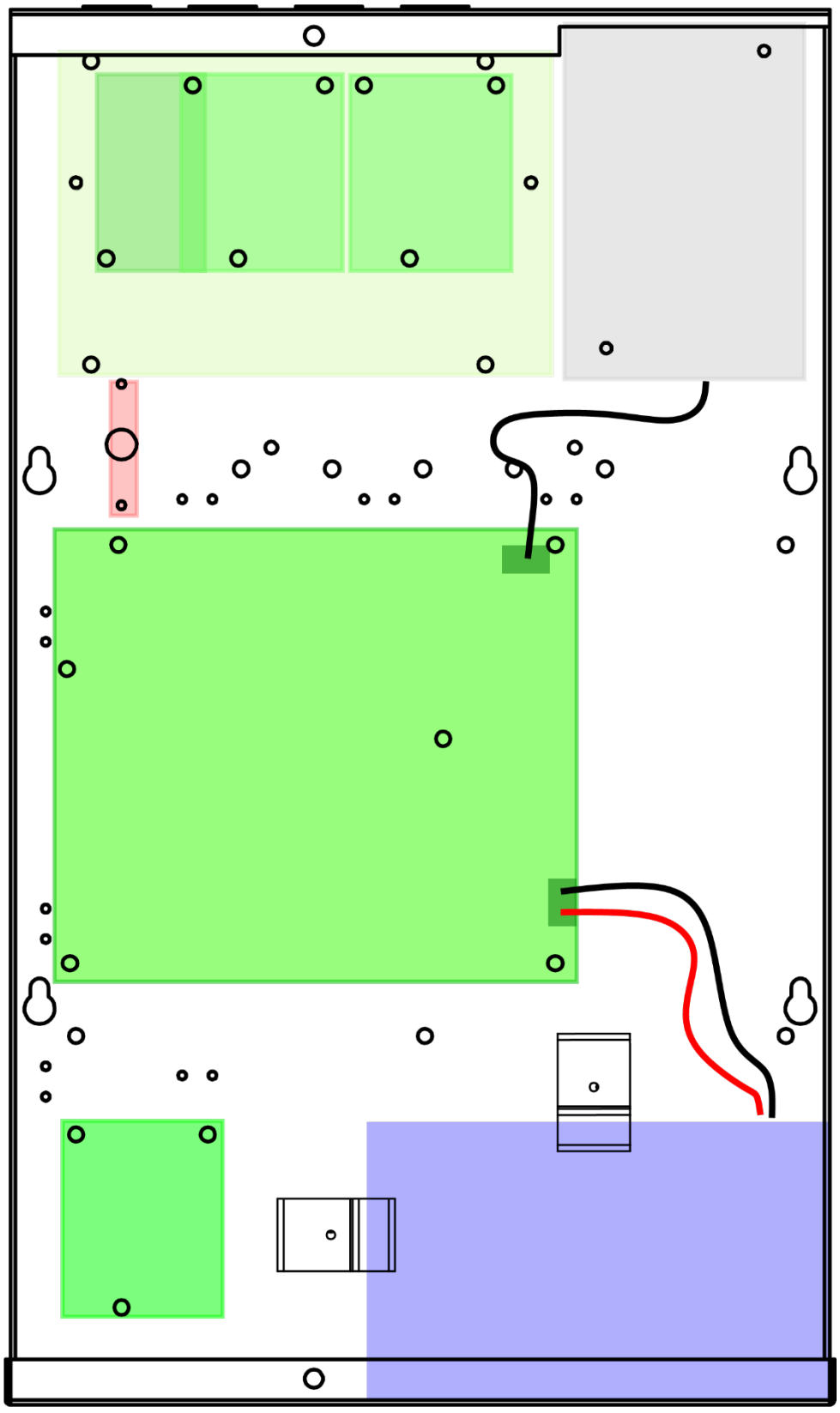

Figure 3 Components of Central Unit Enclosure HHL-C32

3.2 Central Unit Enclosure HHL-C256

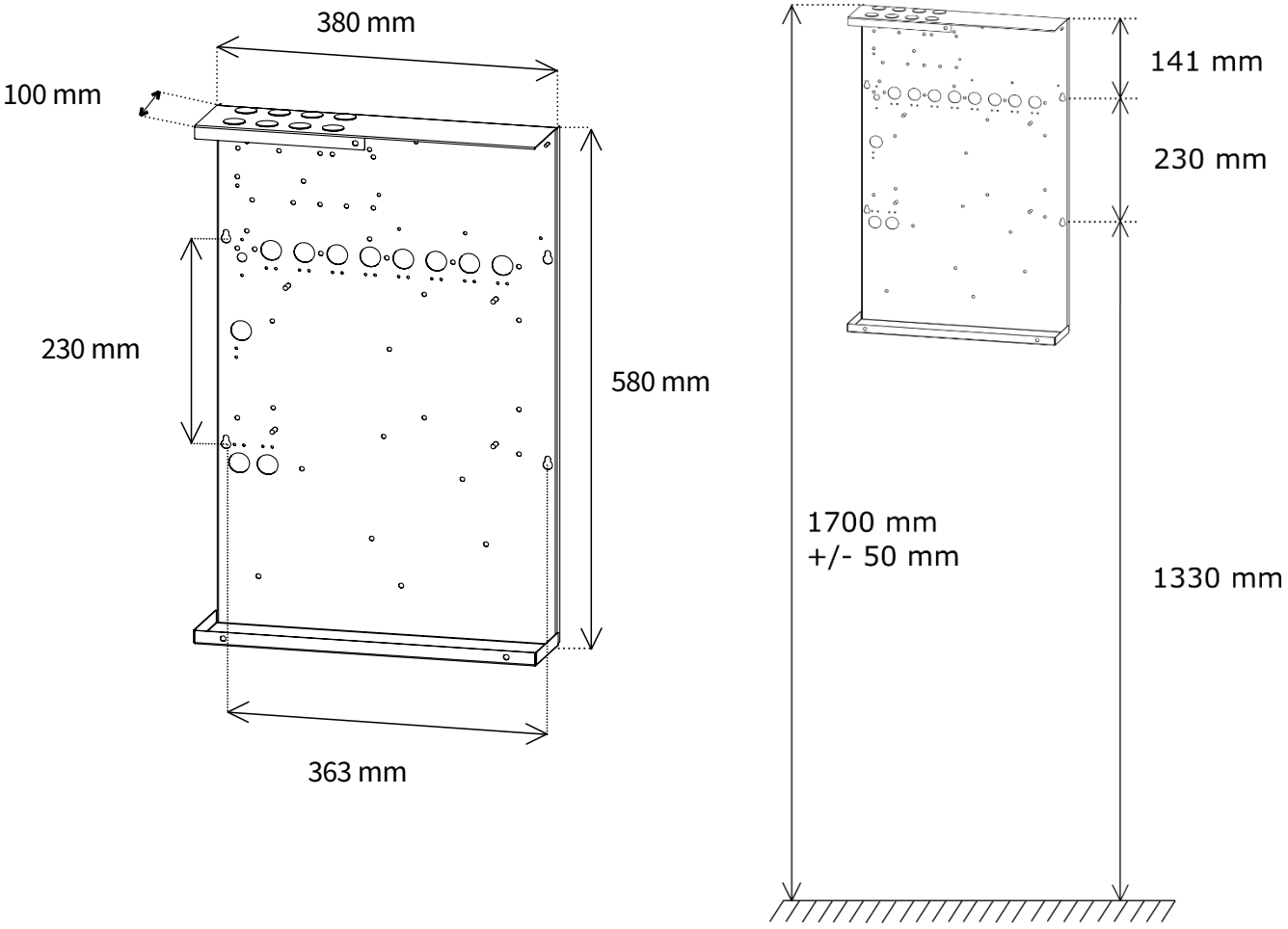

Figure 4 Dimensions and Installation Height of Central Unit Enclosure HHL-C256

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Additional card slots (various options):

- HEDRING.NET
- Relay card
- Routing delay card

Tamper switch

Motherboard:
HHL-C256
HHL-C32

Battery options:
2 x 20 Ah
1 x 20 Ah
2 x 7 Ah
1 x 7 Ah

Install multiple batteries parallel to each other.

Secure the batteries with the metallic mounting brackets, which are delivered with the central unit.

In the illustration, all the possible battery options and mounting methods overlap each other.

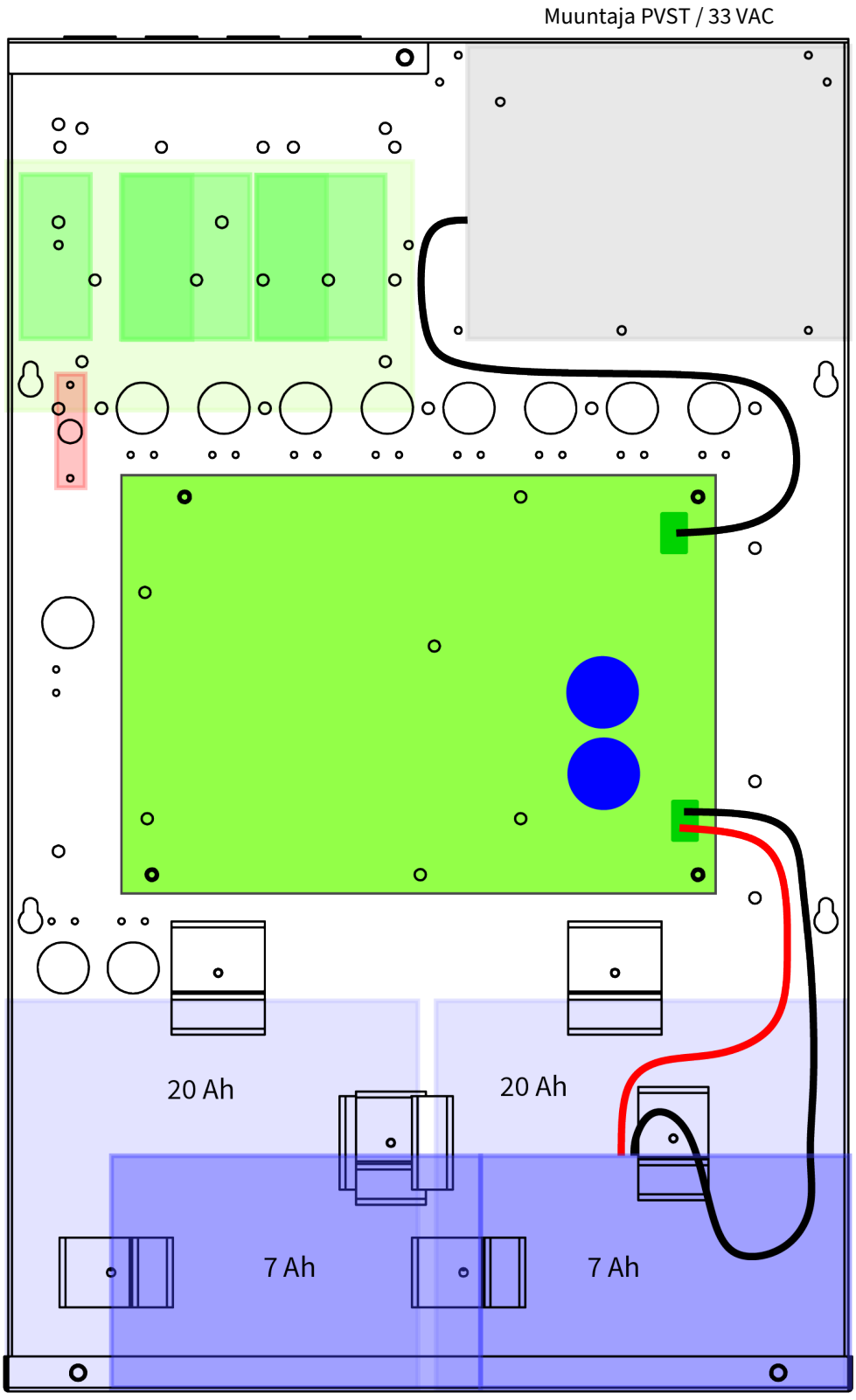


Figure 5 Components of Central Unit Enclosure HHL-C256

3.3 Installing the Central Unit Enclosure

1. Drill 2-4 x Ø 6 mm holes for the wall anchors. The depth of the hole must be 20-25 mm. For the exact location of the holes, see the enclosure illustrations.
2. Attach the wall anchors.
3. Insert and fasten 2-4 x M5 screws in the anchors.
4. Lift the enclosure on the wall and guide the holes in the back of the enclosure on the screws.

Warning! When installing on the wall, note the weight of the enclosure. The enclosure including the motherboard, transformer, and maximum battery capacity weighs about 7 kg (HHL-C32) / 20.5 kg (HHL-C256).

5. Lower the enclosure on the screws.
6. Tighten the screws.
7. Install the transformer in its place and attach it with screws.
8. Place the batteries in the bottom of the enclosure and attach them by screwing the battery brackets in the appropriate holes in the enclosure.

Note! Install the additional batteries in a separate battery box under the enclosure. The weight of the battery box depends on the number of additional batteries.

9. Place the motherboard on the standoffs and attach it in place with screws.
10. Pull the cables from between the wall and the enclosure. Bring the cables to the enclosure using the feedthroughs.

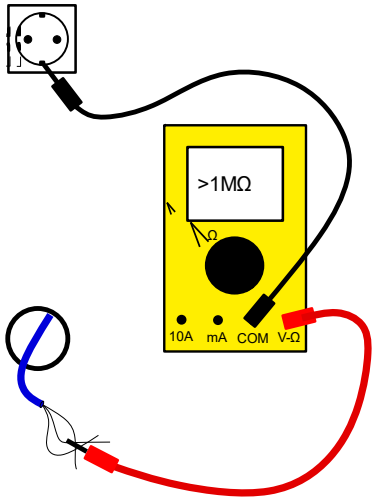
Note! The cable feedthrough on the bottom of the enclosure is for the transformer cable. The cable feedthroughs on the top of the enclosure are for other cables.

11. Shorten the cables to suitable length for installation.

Note! The cable between the HHL-C32 and HHL-C256 enclosure and the transformer must be less than 1 m long. The cable is delivered with the enclosure.

12. Strip the wires for connecting.

13. Measure the insulation resistance before connecting the cables.



Measure the insulation resistance from each wire, including the cable sheath, against the protective ground. The insulation resistance must be > 1 MΩ.

14. After this, connect the cable sheath to the connection point.

4. Address Line, Address Unit and Detector Line

Various types of detectors are used to monitor the premises. These include PIR motion detectors, magnetic contacts, proximity switches, smoke detectors, heat detectors, and humidity detectors.

The alarm contact of the detector (relay) must be potential-free.

To uniquely identify each detector used with the central unit, you must assign addresses to the detectors. Use a MW-9x32 address unit or, alternatively, a KMW-SP8 loop hub as the address units.

To function, many detector types need electrical current. If your installation site requires long cable lengths, which results in significant voltage losses, use local power sources. These local power sources must be fault-protected and backed up with a battery.

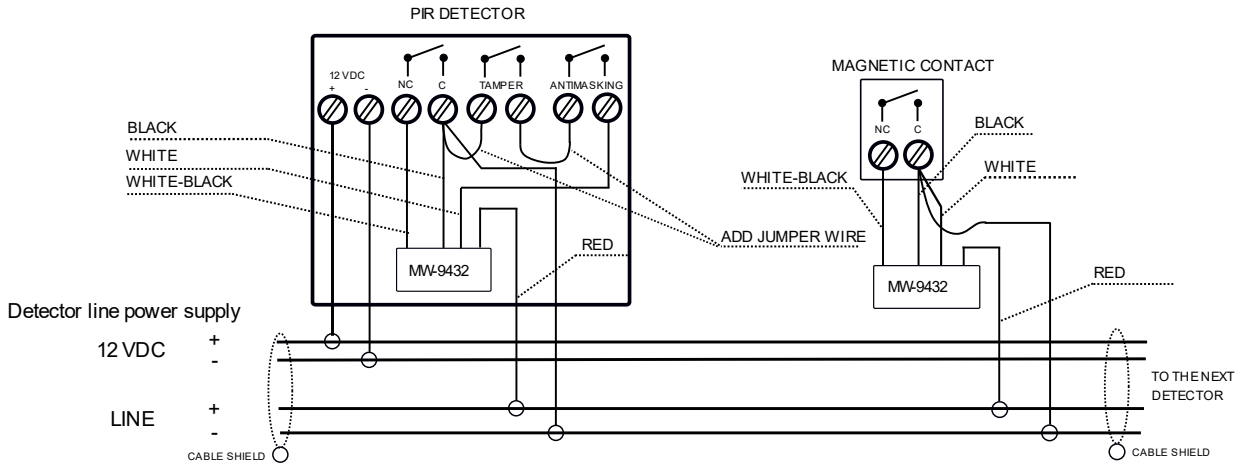
Do the following when you create a new HHL-C installation:

- Let the central unit learn the rest states through the OLED display, according to instructions.
- If the detector supports antimasking: white-black = alarm, white = antimasking
- If the detector does not support antimasking or you are installing, for example, a magnetic contact: white-black = alarm, connect the white and black conductors together to the minus.

Do the following when there is a pre-existing HHL installation:

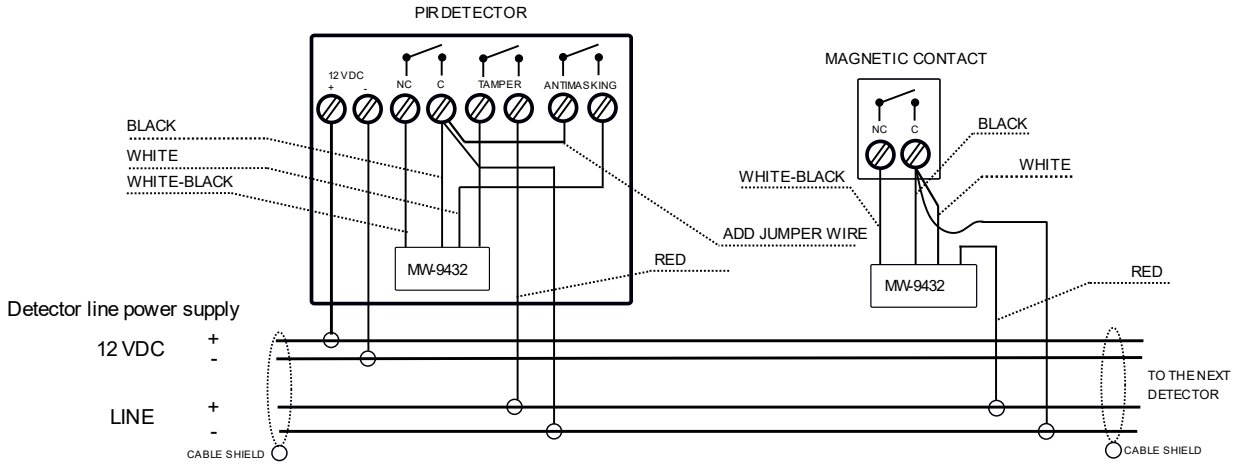
- Import the address data and level settings from the HHL+-project or let the central unit learn the rest states one address at a time by copying the correct rest state from the address data.
- Move the detector line and address connections to go directly to the HHL-C central unit.
- Deactivate the antimasking functionality for each address.
- If you want an individual address to support the antimasking functionality, connect the address the same way as above for a new HHL-C installation.

4.1 Detector Line



NOTE! Maximum length of the line 2.5 km.
Alarm dry contact max. 25 m from the address unit with interference free cable.

Figure 6 Connecting Detector Line (Compliant with EN50131)



NOTE! Maximum length of the line 2.5 km.
Alarm dry contact max. 25 m from the address unit with interference free cable.

Kuva 7 Alternative Detector Line Connection (Not Compliant with EN50131 in Terms of Sabotage)

4.1.1 Connecting Detectors

Use three wires to connect the detectors (the black wire functions as the shared alarm connection).

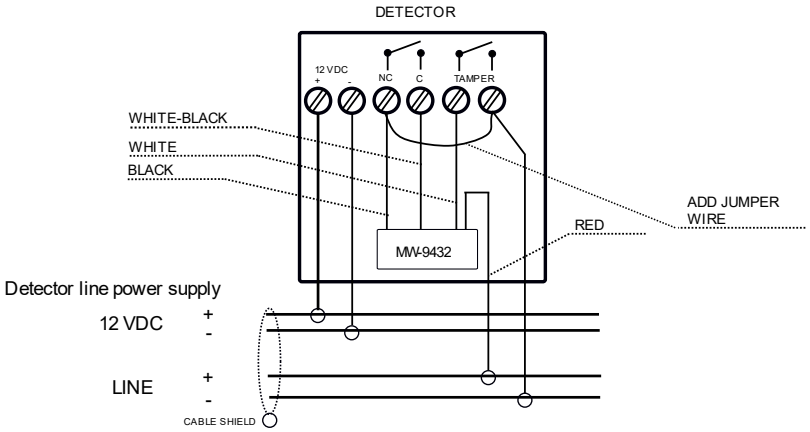


Figure 8 Connecting Detectors

4.1.2 Connecting Magnetic Contacts

Use three wires to connect the magnetic contacts (the black wire functions as the shared alarm connection).

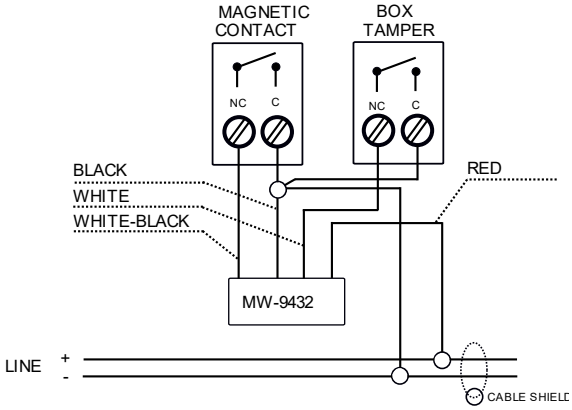


Figure 9 Connecting Magnetic Contacts

4.2 Address Units MW-9432 and MW-9532

Connect address units MW-9432 and MW-9532 to the central unit's address line. The address units are numbered from 01 to 32. You can allocate the addresses on the line without a particular order, but each address can appear only once on the line. Multiple address units with the same address results in operational or level malfunctions.

Address units MW-9432 and MW-9532 support antimasking. Address units MW-9132 and MW-9232 do not support antimasking.

The address unit type is **MW-9432/xx tai MW-9532/xx**.

Connect the address units with four conductors.

Wire Colour	Description
Red	Address line +
Black	Address line −, shared with alarm contact
White	Tamper contact
Various colours	Alarm contact, the colour depends on the product: MW-9413 = Pink MW-9414 = Green MW-9416 = Yellow MW-9432 = White, black stripe MW-9532 = White, black stripe

The alarm contact (relay) should be set to normally closed (NC). When the contact opens, the detector signals an alarm or the bypass terminal overrides the group. You can program the address terminal operation to normally open (NO).

Use a separate conductor pair to feed the current to the detectors which need power.

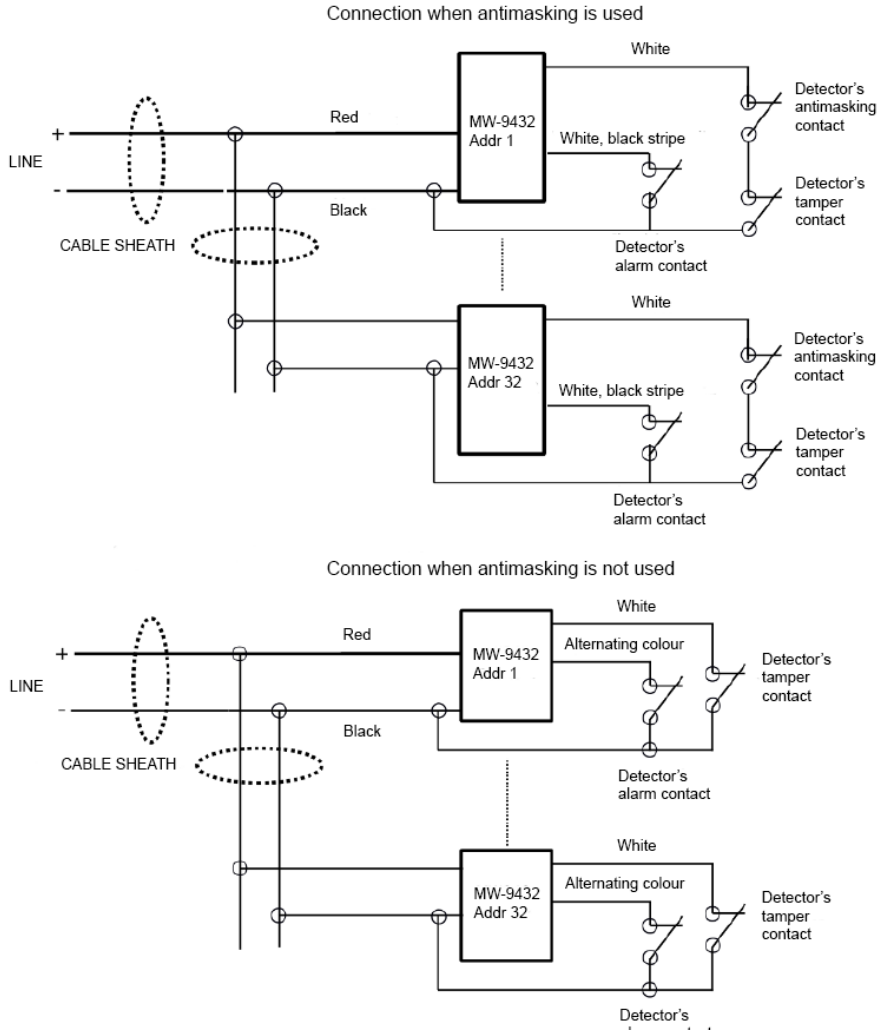
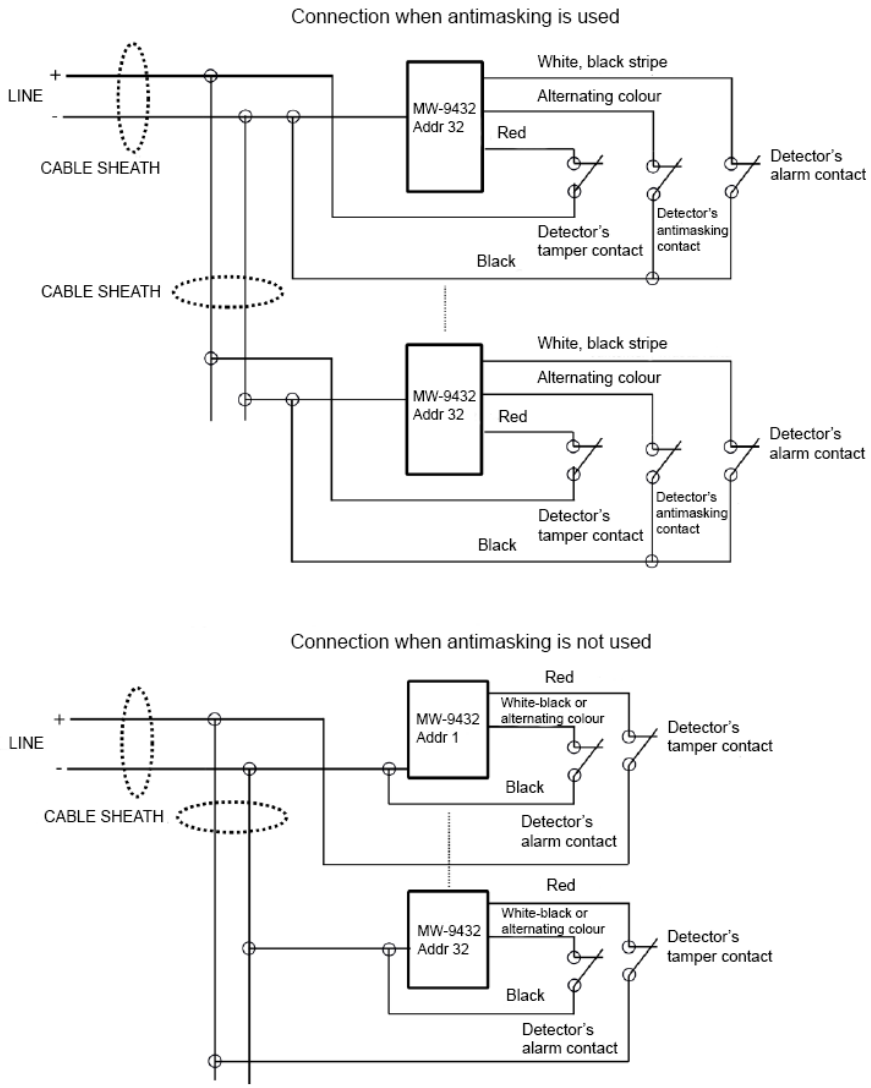


Figure 10 Connecting Address Unit MW-9432

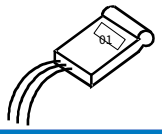


Kuva 11 Alternative Address Unit Connection (Not Compliant with EN50131 in Terms of Sabotage)

4.3 Address Unit MW-9232

Connect the address unit MW-9232 to the address line of the central unit. The address units are numbered from 01 to 32. You can allocate the addresses on the line without a particular order, but each address can appear only once on the line. Multiple address units with the same address results in operational or level malfunctions.

The address unit type is **MW-9232/xx**.



Connect the address unit with three conductors.

Wire Colour	Description
Red	Address line +
Black / brown	Address line −, shared with alarm contact
Yellow	Alarm contact

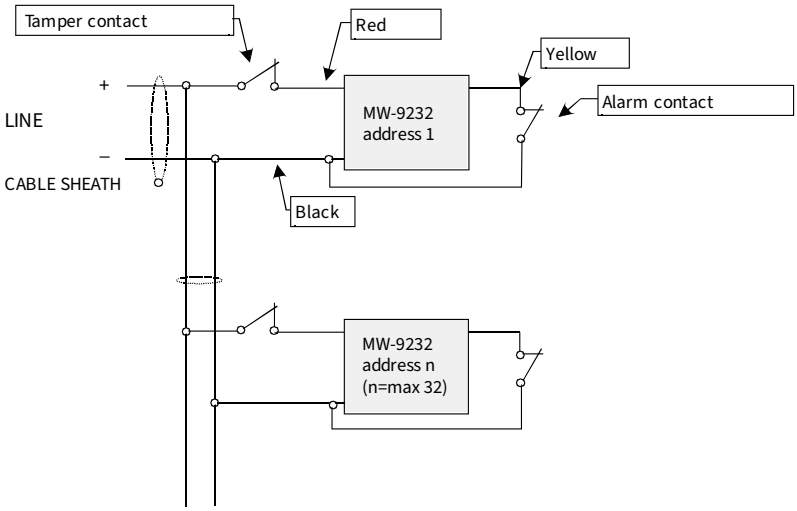


Figure 12 Connecting Address Unit MW-9232

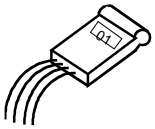
The alarm contact (relay) should be set to normally closed (NC). When the contact opens, the detector signals an alarm or the bypass terminal overrides the group. You can program the address terminal operation to normally open (NO).

Use a separate conductor pair to feed the current to the detectors which need power.

4.4 Address Unit MW-9132

Connect the address unit MW-9132 to the address line of the central unit. The address units are numbered from 01 to 32. You can allocate the addresses on the line without a particular order, but each address can appear only once on the line. Multiple address units with the same address results in operational or level malfunctions.

The address unit type is **MW-9132/xx**.



Connect the address unit with four conductors.

Wire Colour	Description
Red	Address line +
Black / brown	Address line –
Blue	Alarm contact (with the same potential as - line)
Orange	Alarm contact

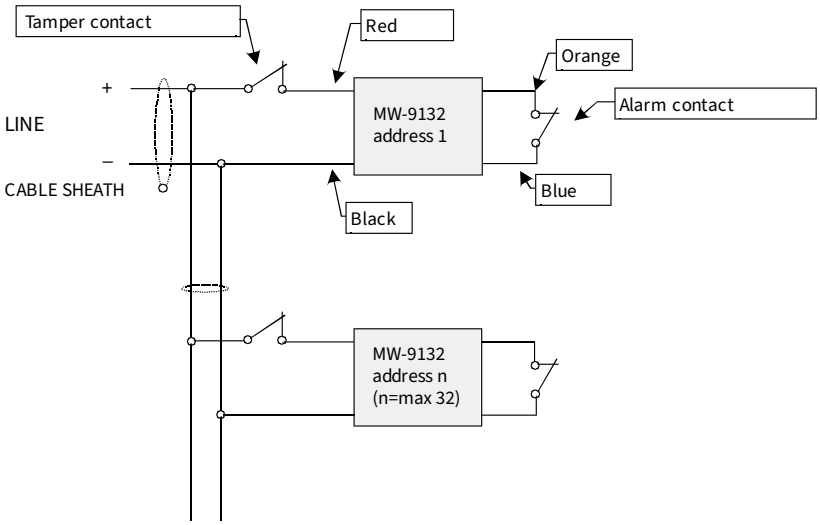


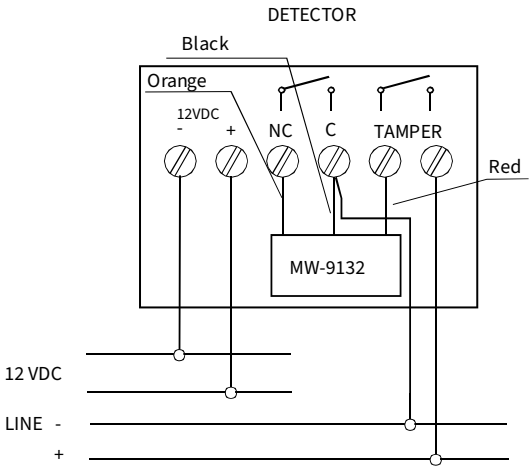
Figure 13 Connecting Address Unit MW-9132

The alarm contact (relay) should be set to normally closed (NC). When the contact opens, the detector signals an alarm or the bypass terminal overrides the group. You can program the address terminal operation to normally open (NO).

Use a separate conductor pair to feed the current to the detectors which need power.

4.4.1 Connecting Detectors

Connection with three conductors (isolate the blue wire)



Connection with four conductors

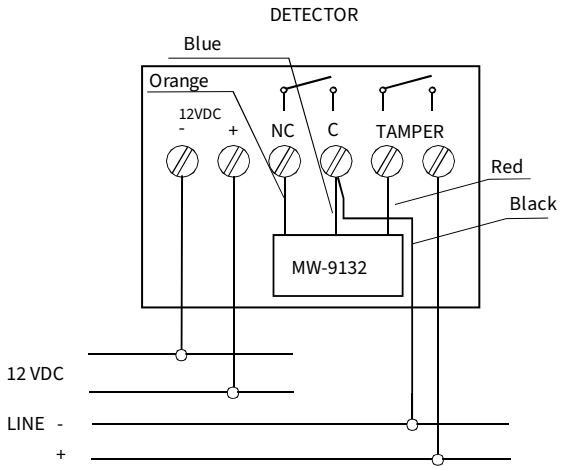
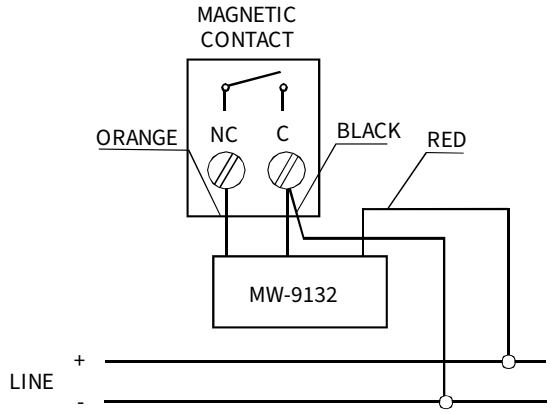


Figure 14 Connecting Detectors with Address Unit MW-9132

4.4.2 Connecting Magnetic Contacts

Connection with three conductors (isolate the blue wire)



Connection with four conductors

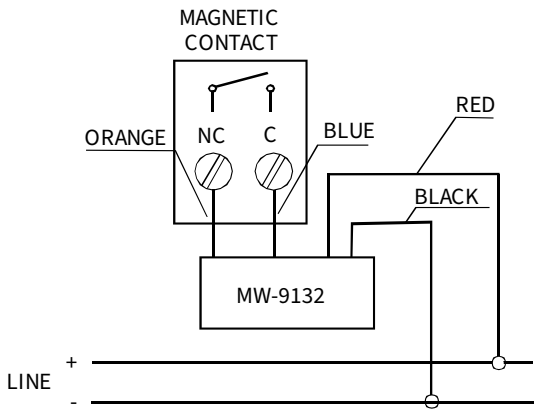


Figure 15 Connecting Magnetic Contacts with Address Unit MW-9132

5. User Panel HHL-CKP

To control and use the system, you need one or more HHL-CKP user panels.

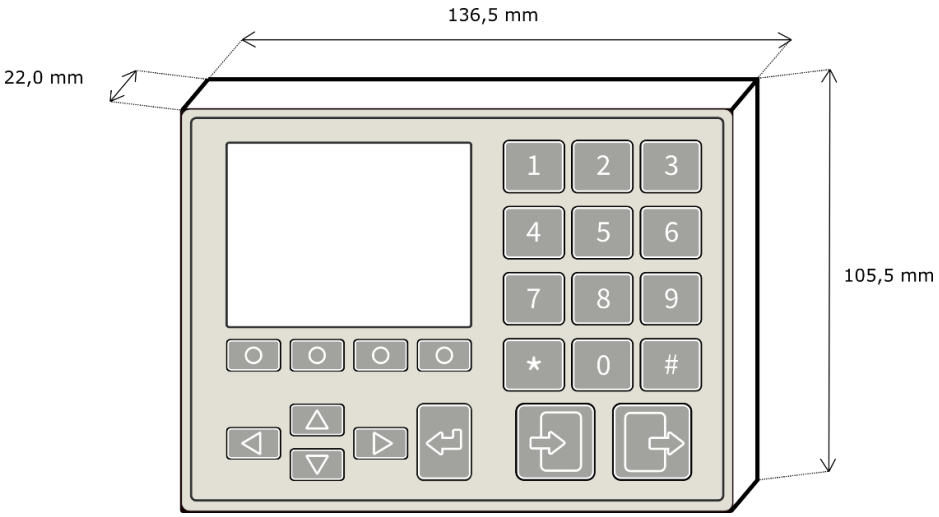


Figure 16 Dimensions of HHL-CKP User Panel

You can connect a maximum of 8 user panels to the system. Connect the user panels directly to the PANEL serial data port on the motherboard.

Connect the user panel to the central units with a cable which has at least 2 conductor pairs (4 wires) and cable sheath. The number of conductor pairs needed to feed power depends on the cable length. If the cable length becomes unfavourable, and the power loss gets too high, you can use a local power source to feed power to the user panel. The power source must be double insulated (without protective ground) and backed up with a battery.

Connect the user panels in parallel to the serial data line. You can do the cabling using a star network or bring the cable through every user panel. You can freely set the addresses of the user panels.

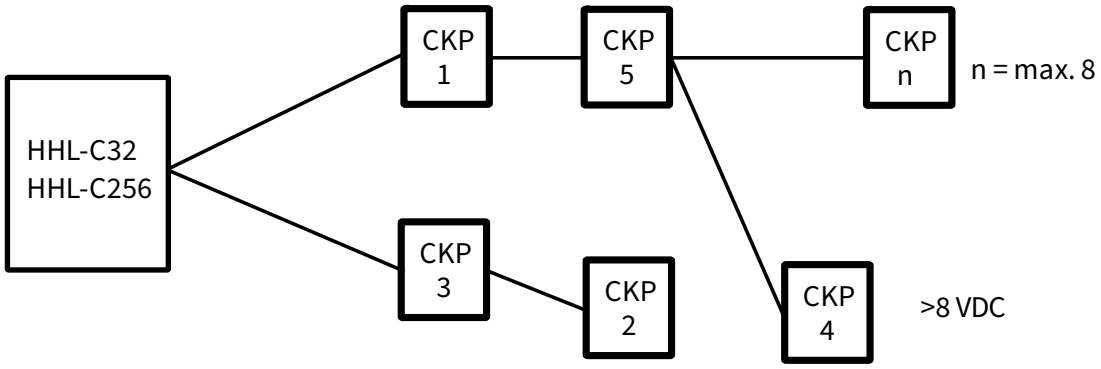


Figure 17 Connecting HHL-CKP User Panels

Note! The maximum length of the data line is 500 m.

When you calculate the number of conductor pairs needed to feed the power, use the user panel's maximum power consumption, which may be affected by a connected card reader.

5.1 Installation Height

Install the user panel at the height of 1500 + (200) mm from the floor. This corresponds with the shoulder height of an average-sized person.

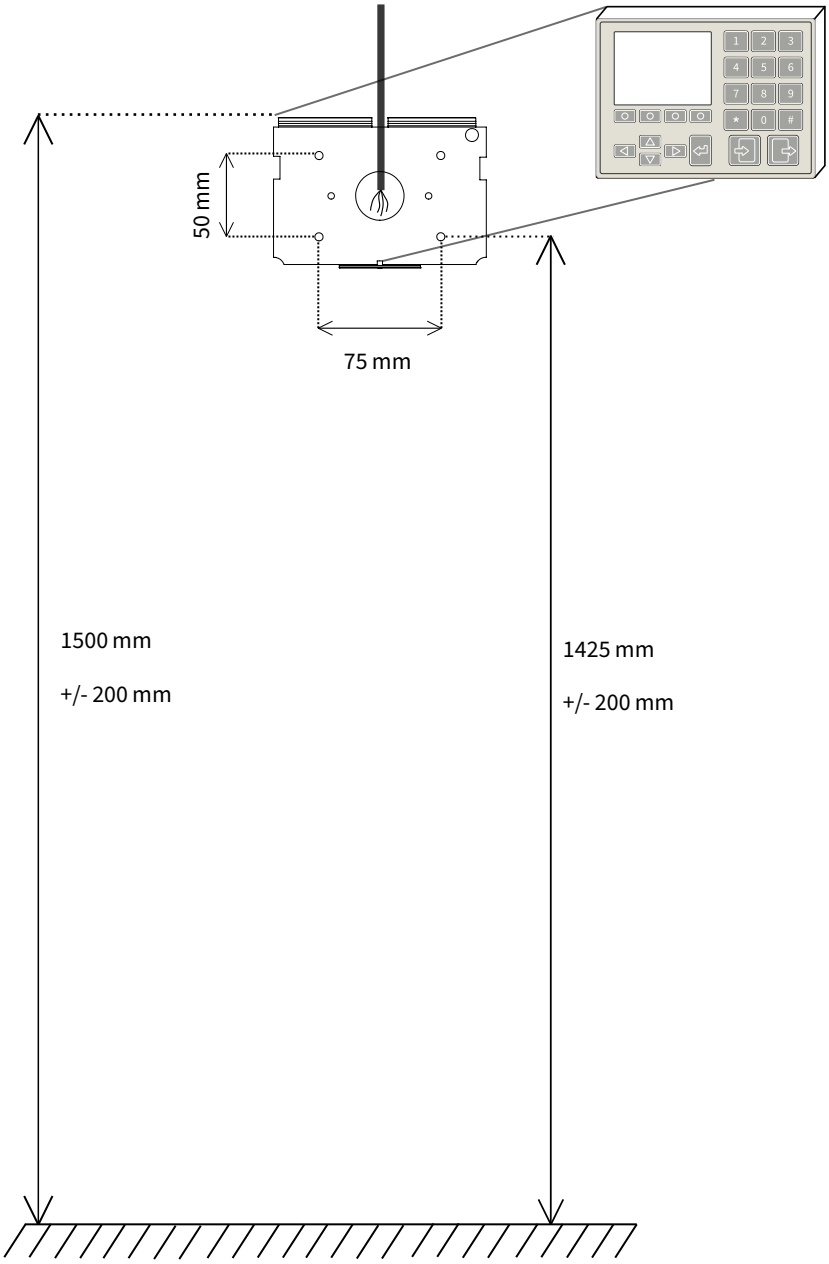
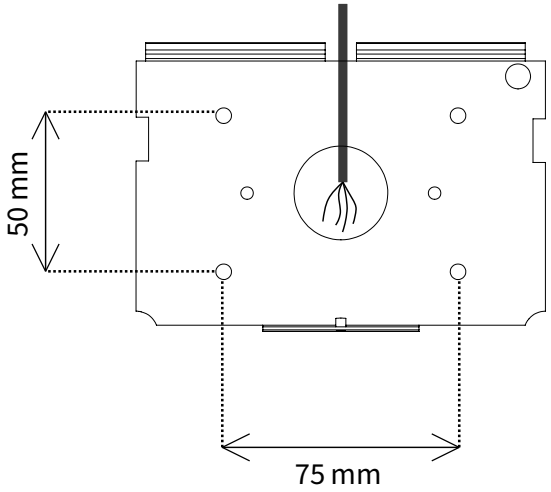


Figure 18 Installation Height of the User Panel

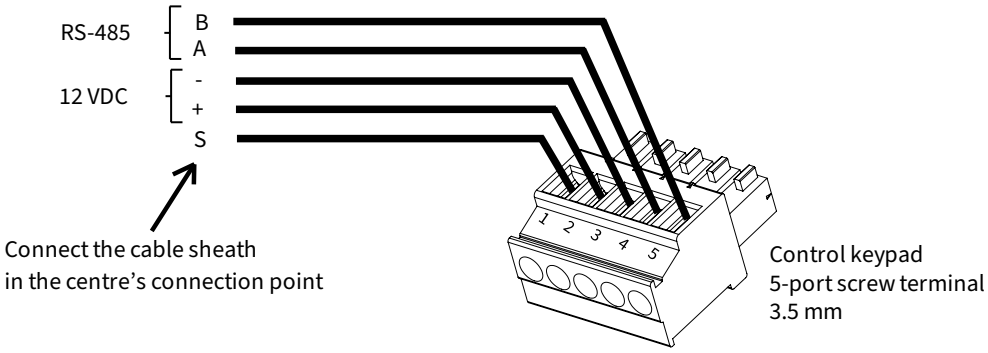
5.2 Installing User Panel

1. Make sure the wall surface is smooth, the tamper switch may not work correctly if there is a dent in the wall.
2. Drill 4 holes for the wall anchors. The holes should be 20–25 mm deep. For details, see the following figure.



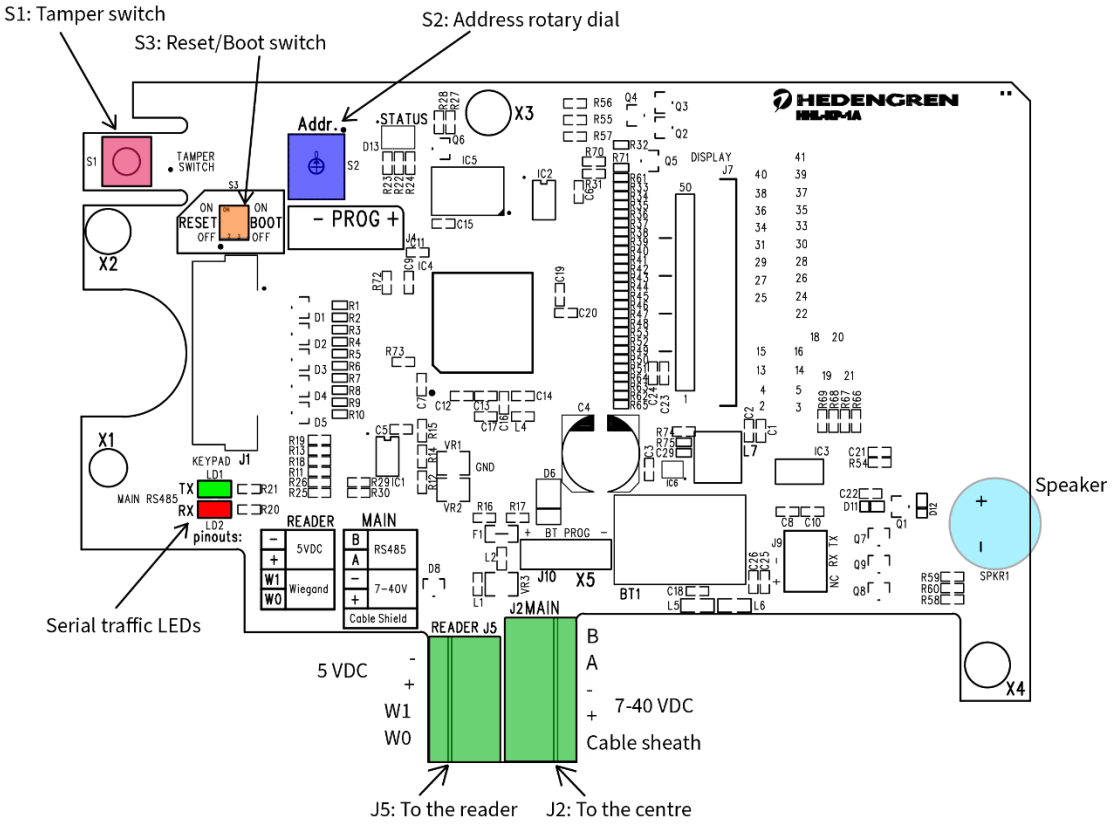
3. Insert the anchors in the holes.
4. Thread the cable through the wall mounting plate. For surface installation, the top of the user panel housing features ridges, which you can file off.
5. Attach the mounting plate with 4 x 3.9 mm countersunk screws.
6. Shorten the cables to suitable length for installation. Strip the wires for connecting.
7. Connect the wires in the 5-port screw terminal.

PANEL port
HHL-C32, HHL-C256

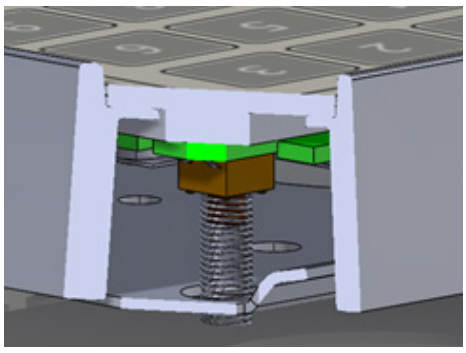


Description	HHL-C32 / HHL-C256	HHL-CKP, J2
Cable sheath	Connection point for the cable sheath in the central unit enclosure	Cable sheath
Voltage + 12VDC	PANEL (J2), +	+
Voltage –	PANEL (J2), –	–
Data RS-485 A	PANEL (J2), A	A
Data RS-485 B	PANEL (J2), B	B

8. Connect the cable to the central unit, as instructed.
9. Set the address with the S2 rotary dial.
    - Positions 1 to 8 on the dial correspond with the addresses 1 to 8.
    - The dial positions 0 and 9-F are not in use.



10. Attach the 5-port screw terminal to connection point J2.
11. If you use a card reader, connect it through a HEDSAM-DOOR card to connection point J5.
12. Attach the user panel to the wall mounting plate with a round-headed 3 mm screw.
13. Note that the spring connected to a switch on the circuit board comes through the hole in the top right corner of the mounting plate and presses against the wall so that the spring presses the switch down (see the cross-section below).



5.3 Powering on the User Panel

When the user panel starts up (voltage connected or restarted), the screen displays 4 squares.

If the user panel has a data connection to the central unit, the screen displays the main menu.

If the user panel has no data connection to the central unit, the screen displays the text **Offline**. This continues until there is data connection.

For data connection problems, see Troubleshooting.

6. Motherboards

6.1 HHL-C32 Motherboard

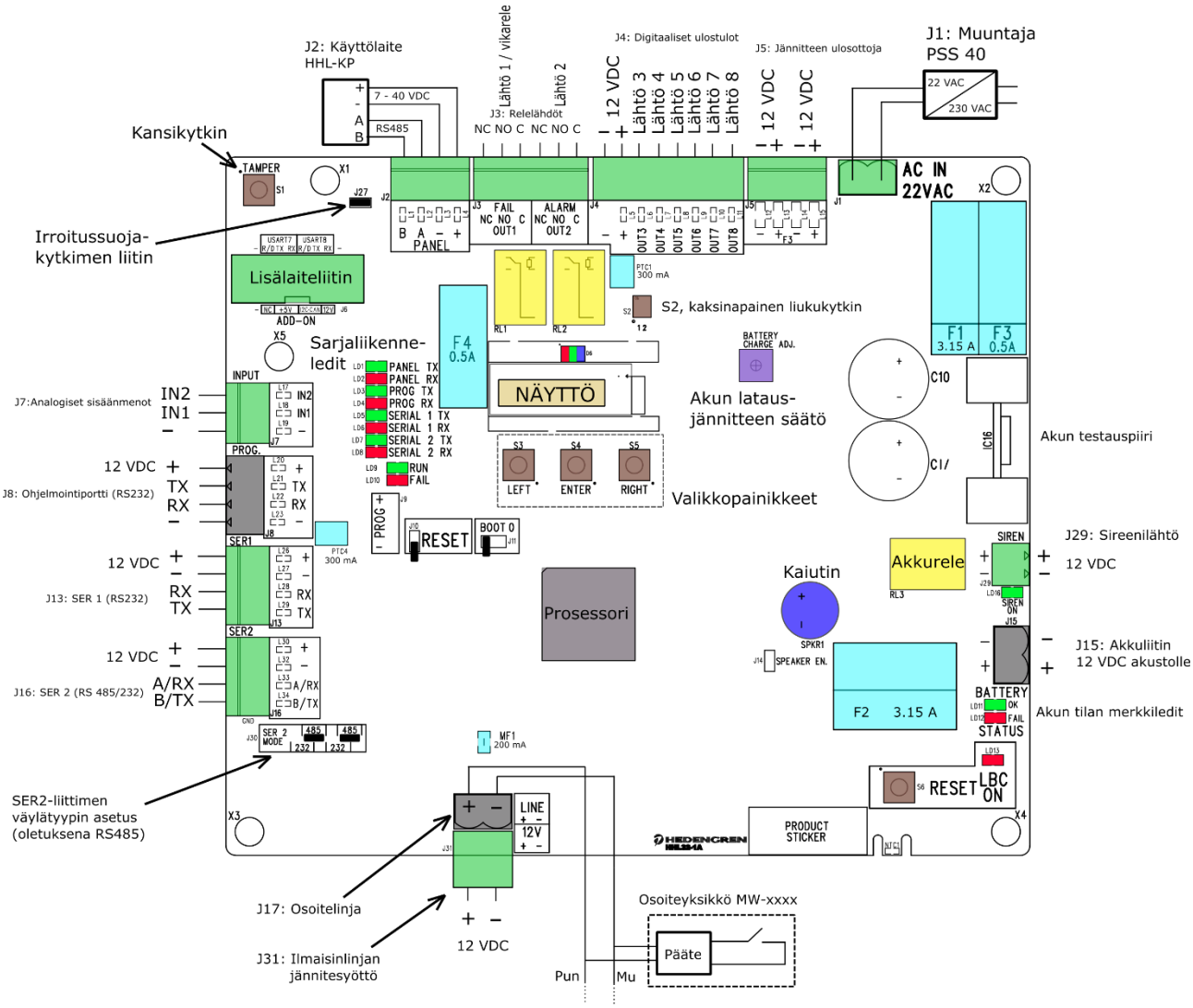


Figure 19 HHL-C32 Motherboard

6.1.1 Fuses of HHL-C32 Central Unit

Function	Fuse	Rating	Points	Connector
22 VAC	F1 (5x20T)	6.3 A	1, 2	J1
Batteries 12 VDC	F2 (5x20T)	6.3 A	1 (+), 2(-)	J15
Power for external devices	F3 (5x20T)	0.5 A	1,3(+), 2, 4(-)	J5
Power for user panel	F4 (5x20T)	0.5 A	1 (+), 2(-)	J2
Power for external devices	PTC1	0.3 A (automatic fuse)	7(+), 8(-)	J4
Power for address line	MF1	0.2 A (automatic fuse)	1, (+), 2(-)	J31
Power for a device connected to the PROG port	PTC4	0.3 A (automatic fuse)	1(+), 4(-)	J8
Battery cable	(5x20T)	4 A	-	-

6.1.2 Programmable Outputs of HHL-C32 Central Unit

The HHL-C32 central unit has 8 programmable outputs.

- RL1 is a fault relay, which switches position if the software stops or there is another fault.
- RL2 is a programmable alarm relay, which you can set to normally open (NO) or normally closed (NC).
- The remaining 6 are open collector outputs with current. When activated, you can measure minus from them.

Output	Function	Load Capacity	Points	Connector
Output 1	Relay: C	1 A	3	OUT1 (J3)
Output 1	Relay, NO	1 A	4	OUT1 (J3)
Output 1	Relay, NC	1 A	5	OUT1 (J3)
Output 2	Relay: C	1 A	1	OUT2 (J3)
Output 2	Relay, NO	1 A	2	OUT2 (J3)
Output 2	Relay, NC	1 A	3	OUT2 (J3)
Output 3	Open collector	0.1 A	6	OUT3 (J4)
Output 4	Open collector	0.1 A	5	OUT4 (J4)
Output 5	Open collector	0.1 A	4	OUT5 (J4)
Output 6	Open collector	0.1 A	3	OUT6 (J4)
Output 7	Open collector	0.1 A	2	OUT7 (J4
Output 8	Open collector	0.1 A	1	OUT8 (J4)

Note! The total maximum load for outputs 3+4+5+6+7+8 is 0.5 A (500 mA).

6.2 HHL-C256 Motherboard

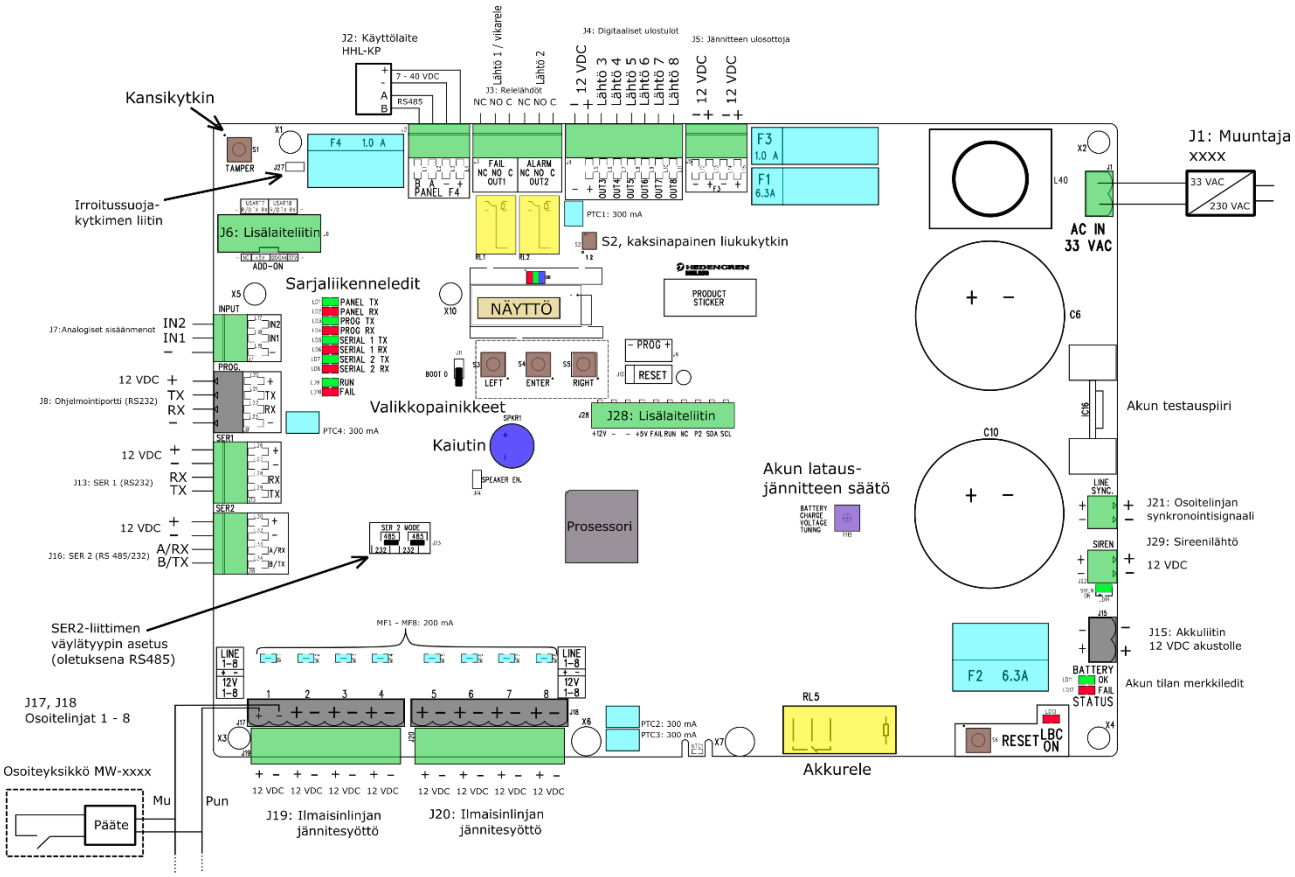


Figure 20 HHL-C256 Motherboard

6.2.1 Fuses of HHL-C256 Central Unit

Function	Fuse	Rating	Points	Connector
33 VAC	F1 (5x20T)	6.3 A	1, 2	AC IN (J1)
Batteries 12 VDC	F2 (5x20T)	6.3 A	1 (-), 2(+)	BATTERY (J15)
Power for external devices	F3 (5x20T)	1 A	1,3 (+), 2,4(-)	F3 (J5)
Power for user panel	F4 (5x20T)	1 A	1(+) 2(-)	PANEL (J2)
Power for external devices	PTC1	0.3 A (automatic fuse)	7 (+), 8(-)	OUT3-8 (J4)
Power for detector line	PTC2	0.3 A (automatic fuse)	1,3,5,7(-) 2,4,6,8(+)	12V (J19)
Power for detector line	PTC3	0.3 A (automatic fuse)	1,3,5,7(-) 2,4,6,8(+)	12V (J20)
Power for a device connected to the PROG port	PTC4	0.3 A (automatic fuse)	1(+) 4(-)	PROG (J8)
Power for address line 1	MF1	0.3 A (automatic fuse)	1 (+), 2(-)	LINE (J17)
Power for address line 2	MF2	0.3 A (automatic fuse)	3 (+), 4(-)	LINE (J17)
Power for address line 3	MF3	0.3 A (automatic fuse)	5 (+), 6(-)	LINE (J17)
Power for address line 4	MF4	0.3 A (automatic fuse)	7 (+), 8(-)	LINE (J17)
Power for address line 5	MF5	0.3 A (automatic fuse)	9 (+), 10(-)	LINE (J18)
Power for address line 6	MF6	0.3 A (automatic fuse)	11 (+), 12(-)	LINE (J18)
Power for address line 7	MF7	0.3 A (automatic fuse)	13 (+), 14(-)	LINE (J18)
Power for address line 8	MF8	0.3 A (automatic fuse)	15 (+), 16(-)	LINE (J18)
Battery cable	(5x20T)	6.3 A	-	-

6.2.2 Programmable Outputs of HHL-C256 Central Unit

The HHL-C256 central unit has 8 programmable outputs.

- RL1 is a fault relay, which switches position if the software stops or there is another fault.
- RL2 is a programmable alarm relay, which you can set to normally open (NO) or normally closed (NC).
- The remaining 6 are open collector outputs with current. When activated, you can measure minus from them.

Output	Function	Load Capacity [A]	Points	Connector
Output 1	Relay: C	1	3	OUT1 (J3)
Output 1	Relay, NO	1	4	OUT1 (J3)
Output 1	Relay, NC	1	5	OUT1 (J3)
Output 2	Relay: C	1	1	OUT2 (J3)
Output 2	Relay, NO	1	2	OUT2 (J3)
Output 2	Relay, NC	1	3	OUT2 (J3)
Output 3	Open collector	0.1	6	OUT3 (J4)
Output 4	Open collector	0.1	5	OUT4 (J4)

Output 5	Open collector	0.1	4	OUT5 (J4)
Output 6	Open collector	0.1	3	OUT6 (J4)
Output 7	Open collector	0.1	2	OUT7 (J4
Output 8	Open collector	0.1	1	OUT8 (J4)

Note! The total maximum load for outputs 3+4+5+6+7+8 is 0.5 A (500 mA).

6.3 Central Unit LEDs

The LEDs on the motherboard indicate functions and serial traffic.

LED	Description
RUN	Flashes green when everything is fine.
FAIL	Software fault, program stops running.
PANEL TX	Data sent from the **Panel** port (user panel).
PANEL RX	Data received in the **Panel** port (user panel).
PROG TX	Data sent from the **PROG** port.
PROG RX	Data received in the **PROG** port.
SERIAL 1 TX	Data sent from the **SER1** port.
SERIAL 1 RX	Data received in the **SER1** port.
SERIAL 2 TX	Data sent from the **SER2** port.
SERIAL 2 RX	Data received in the **SER2** port.

6.4 Resetting the Central Unit to the Starting Point

You can reset the starting point by sending a project with default settings to the central unit.

7. Connecting the Siren

Connector J22 in the central unit provides a separate output for the siren. The output has 12 V voltage and a maximum current of 2 A. To connect the siren or other equivalent device to the output, see the following figure.

Install a resistor alongside the siren so the central unit can monitor the siren line for short circuit or disconnection. The resistor must be rated for 680 Ω ± 20 %. The central unit is delivered with one 680 Ω / 1 W resistor.

The central unit activates and deactivates the voltage in the output. The green LED next to the connector is lit when the siren is connected and working normally.

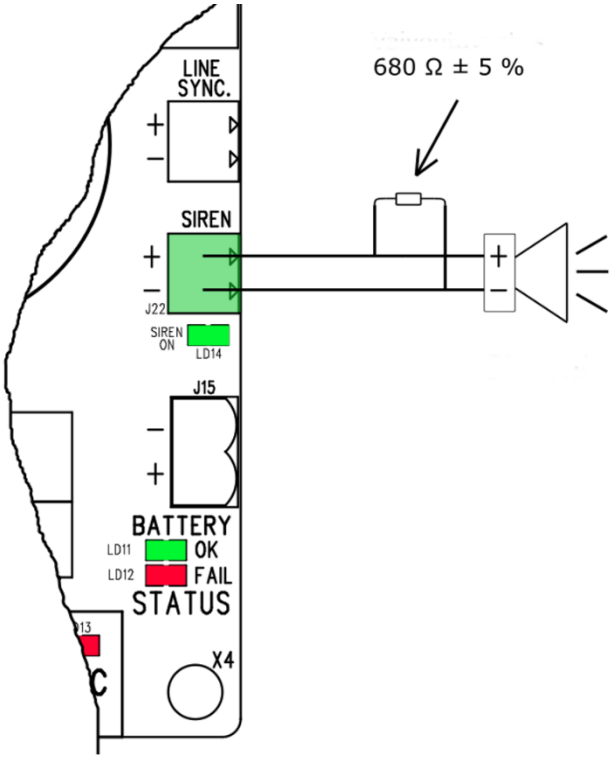


Figure 21 Connecting Siren

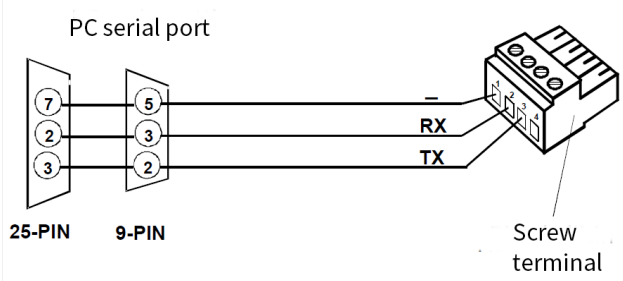
8. RS-232 Connectivity

8.1 Connecting to PC

The factory setting for the PC/modem port is 115200 bit/s.

To establish a connection, you need the central unit's maintenance code.

PC connector cable



Central unit's **PRG** connector for PC or modem

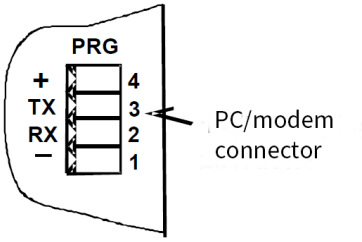


Figure 22 Connecting PC to the Central Unit

8.2 RS-232 Isolation Unit RS232-ISOL

When you connect the central unit's RS-232 outputs to devices which have protective grounding (that is, a grounded power supply), like a PC or a printer, there may be ground leakages in the connection. That is because the negative (-) wire in the RS-232 connection of these devices is usually connected to the protective ground.

Establish a connection using a local model or an RS-232-ISOL unit, if the RS-232 device and the central unit are not within the same electricity supply section. Usually this means the same room. The cable length, without a local modem, must never exceed 20 m.

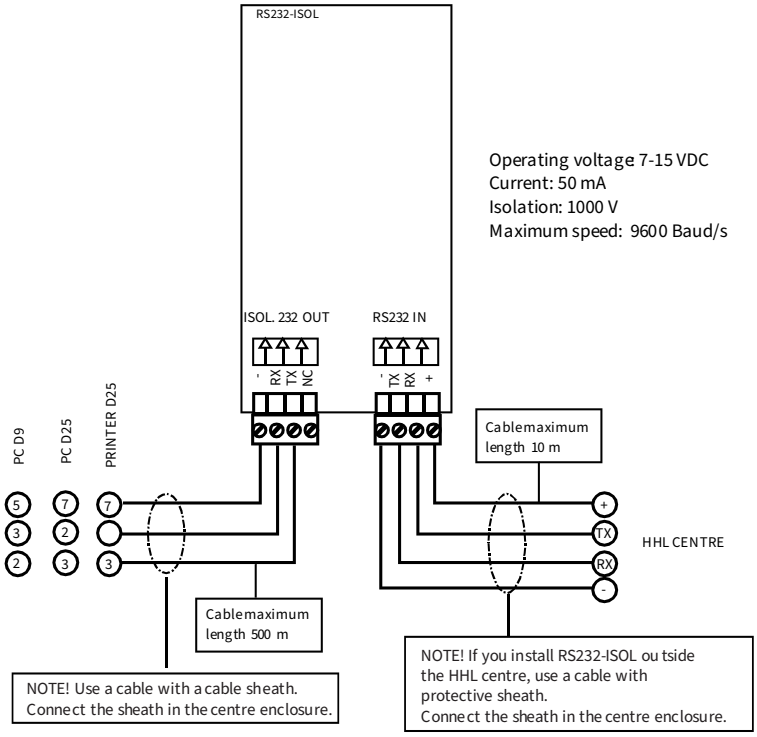


Figure 23 Connecting RS232-ISOL

8.3 Isolated Connection

Use an isolated connection for grounded devices and for devices which use a power supply with protective ground. Use this connection type also for devices, which use the cables of the HHL system to transmit the signal.

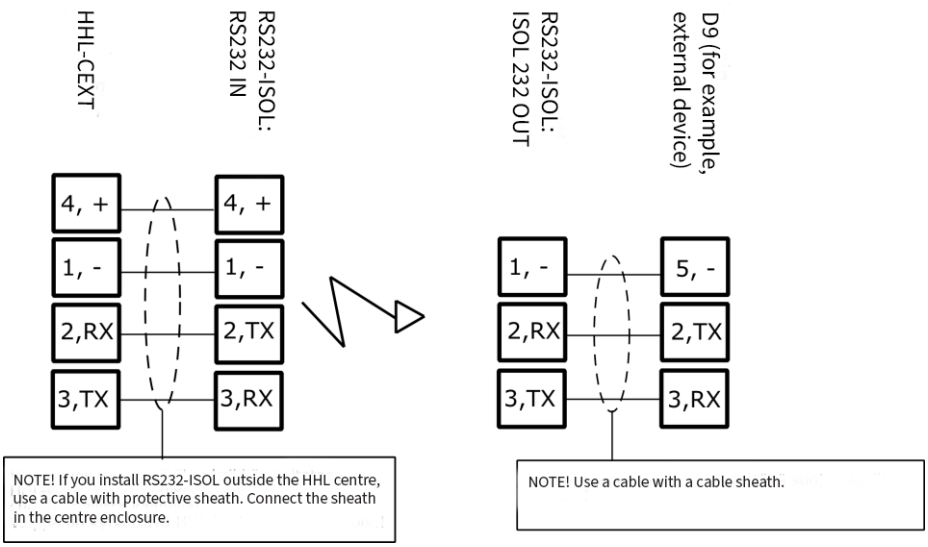


Figure 24 Isolated Connection

The connector numbers in the figure above refer to the terminal block in the HHL central unit, to the D9/D25 female connector, or to a port on a 4 (5)-port screw terminal.

The ports are numbered in the following fashion on every Oy Hedengren Ab product which uses a 4 (5)-port screw terminal.

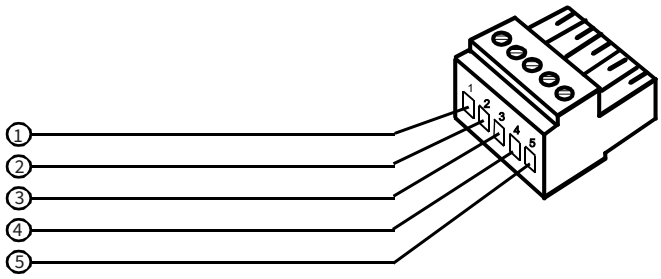


Figure 25 Numbering on Screw Terminals

8.4 Non-isolated Connection

Use a non-isolated connection for double insulated devices.

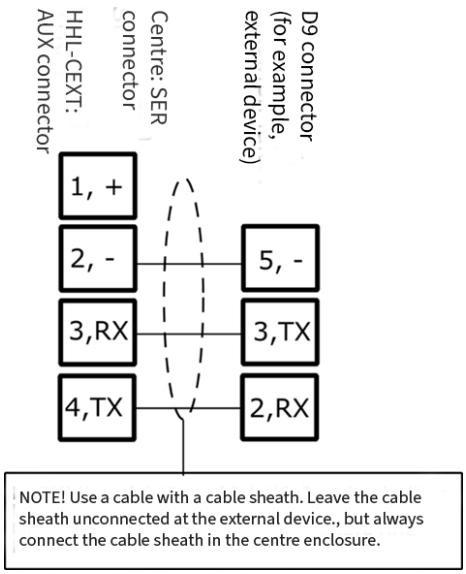


Figure 26 Non-isolated Connection

For more information, see chapter RS-232 Isolation Unit RS232-ISOL.

9. Accessories

9.1 Serial Expansion Unit HHL-CEXT

Use HHL-CEXT expansion unit to increase the number of serial ports in the central unit. The HHL-CEXT unit creates two additional ports, PORT A and PORT B.

Connect HHL-CEXT to the central unit with the included flat cable. Make sure that the flat cable does not interfere with the operation of the tamper switch. Secure the expansion unit in the top left corner of the central unit with the included plastic standoffs.

The expansion unit has two isolated serial ports, which you can configure as either RS-232 or RS-485 ports. Select the mode by setting all the jumper switches (4) that refer to the port (A or B) to **232** (RS-232) or **485** (RS-485). The port is not operational unless all the jumper switches (4) are set to 232 or 485.

You can power an external device only through the **Power Output** connector. To use this option, you must wire the minus of the **Power Output** to the minus in the serial port. This connection is not isolated.

To verify that serial communication works, see the RGB LEDs on the expansion unit: **D1** (port A sending and receiving) ja **D2** (port B sending and receiving).

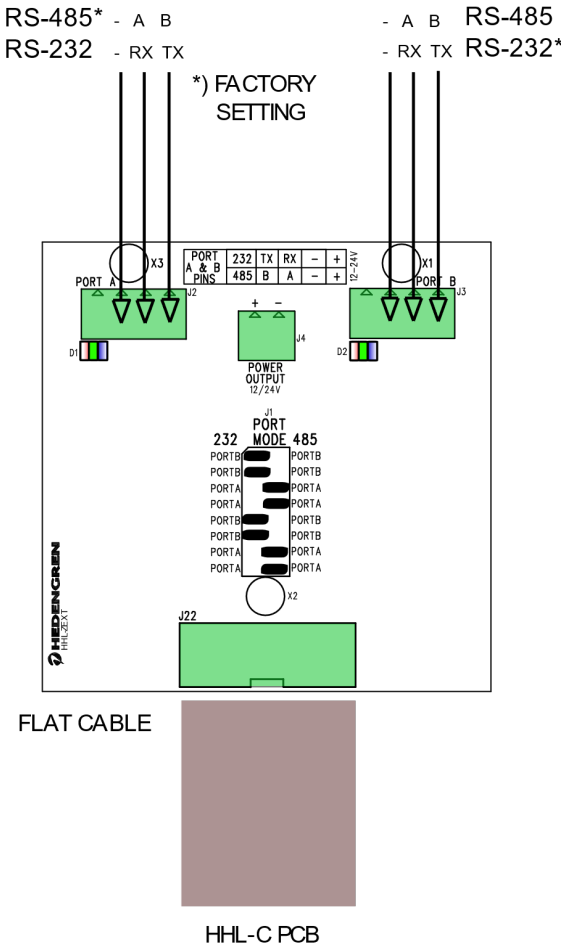


Figure 27 Connecting Serial Expansion Unit

9.2 HEDSAM-OUT12 Relay Output Card

Program address 1-8 to the HEDSAM-OUT12 card.

You can connect a maximum of 8 relay cards. To connect a relay card, you need an HHL-CEXT expansion unit.

All the wires are connected to the card with plug connectors, which can be easily connected and disconnected.

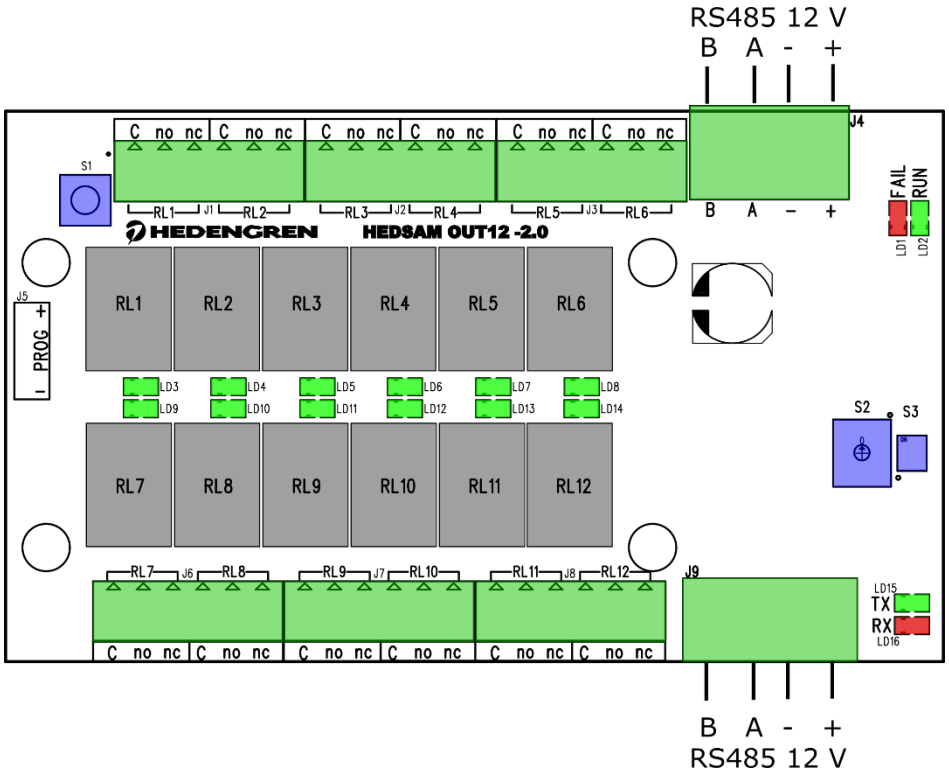


Figure 28 HEDSAM-OUT12 Relay Card

The LEDs on the card indicate functions and serial traffic.

LED	Function	Additional Information
TX	Outgoing serial traffic	
RX	Incoming serial traffic	
RUN	Normal function	Flashes once per second
FAIL	Fault	Solid red

To use the additional serial ports SER1 and SER2, the HHL-C32 and HHL-C256 central units require an expansion unit HHL-CEXT.

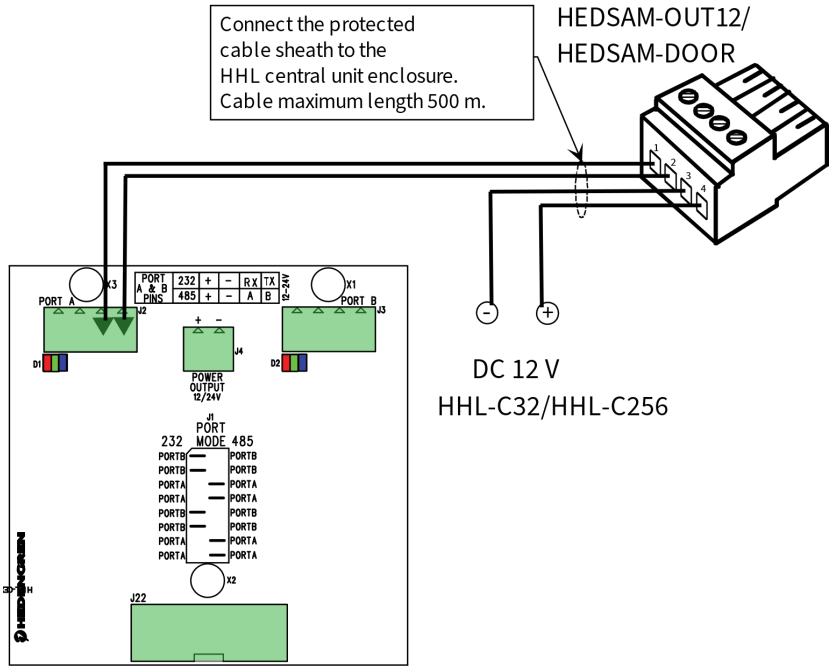


Figure 29 Connecting HEDSAM-OUT12 Relay Card

You must set the communication mode on the expansion card to RS-485.

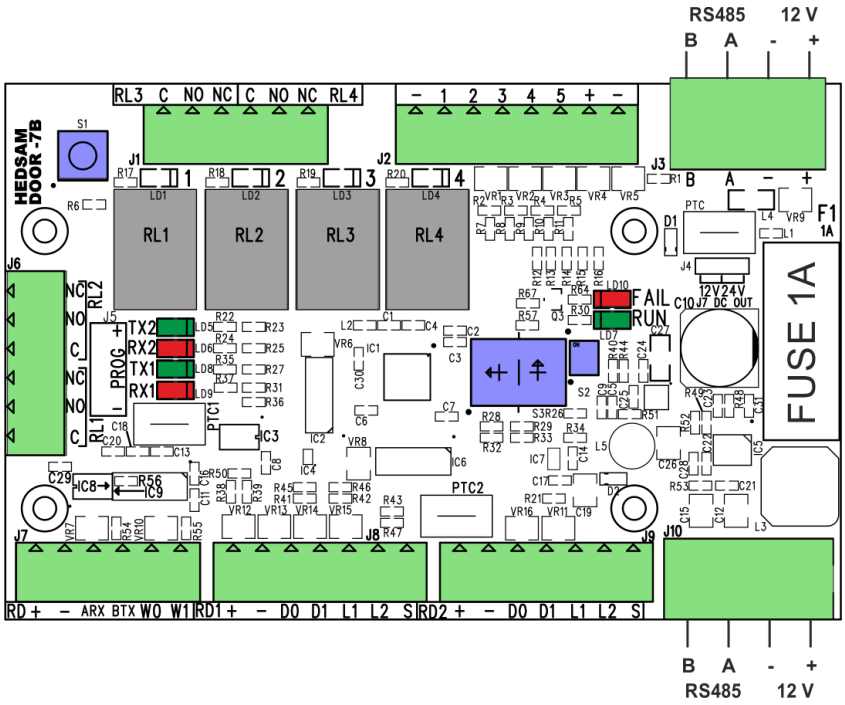
9.3 HEDSAM-DOOR Serial Card

Program an address between 1 and 8 to the HEDSAM-DOOR card.

You can use the HEDSAM-DOOR card to connect a card reader to the user panel in order to use them together.

You can freely program the 4 relay outputs on the HEDSAM-DOOR card.

All the wires are connected to the card with plug connectors, which can be easily connected and disconnected.



Kuva 30 HEDSAM-DOOR Serial Card

10. Cable Lengths

10.1 Input Voltage to Devices

The minimum operational voltage for the central unit's power outputs is 10 V.

When feeding power to external devices from the HHL central unit's power source, note the minimum operational voltage and maximum power consumption of the devices.

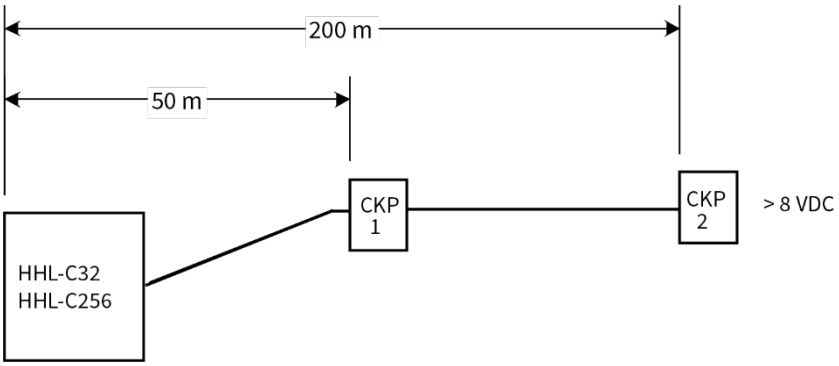
The location of the devices on the cable is also important. whether they are equidistantly spread along the cable or only connected at the cable ends.

Assess the cable requirements by identifying the minimum operational voltages of the devices. Attempt to place the device with the highest voltage requirement in the beginning of the cable. If the cable has devices with different minimum operational voltages, estimate the cable length by assessing each device separately. However, you must know the total power consumption in the cable.

The cable type is MHS (188 Ω/km).

Example 1

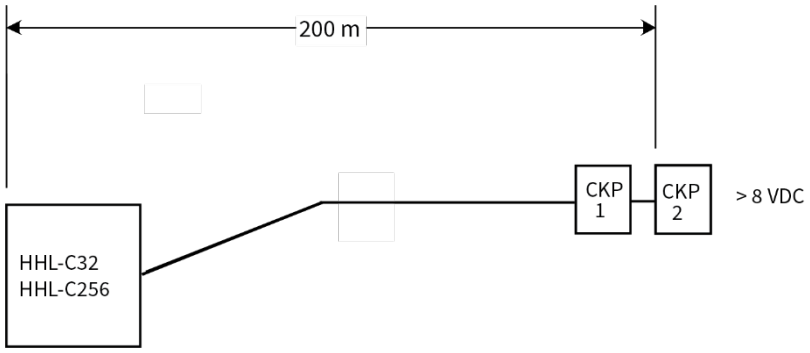
- 2 x HHL-CKP user panels, maximum power consumption 110 mA per unit, minimum operational voltage 8 V.
- Distance to the first HHL-CKP user panel is 50 m.
- Distance to the last HHL-CKP user panel is 200 m.
- Maximum current in the cable between device x, HHL-CKP 1 and the central unit is 110 + 110 mA = 220 mA. The voltage requirement is 8 V.



According to graph Devices Equidistant: Minimum Operating Voltage 8.5 V, one conductor pair is required to power the user panel.

Example 2

- 2 x HHL-CKP user panels, maximum power consumption 110 mA per unit, minimum operational voltage 8 V.
- The user panels are located in separate buildings. This means that they are located at the end of the cable.
- Maximum current in the cable between HHL-CKP 1 and the central unit is 110 + 110 mA = 220 mA. The voltage requirement is 8 V.



According to graph Devices at Cable Ends: Minimum Operating Voltage 8.5 V, two conductor pairs are required to power the user panel.

10.1.1 Equidistant Devices

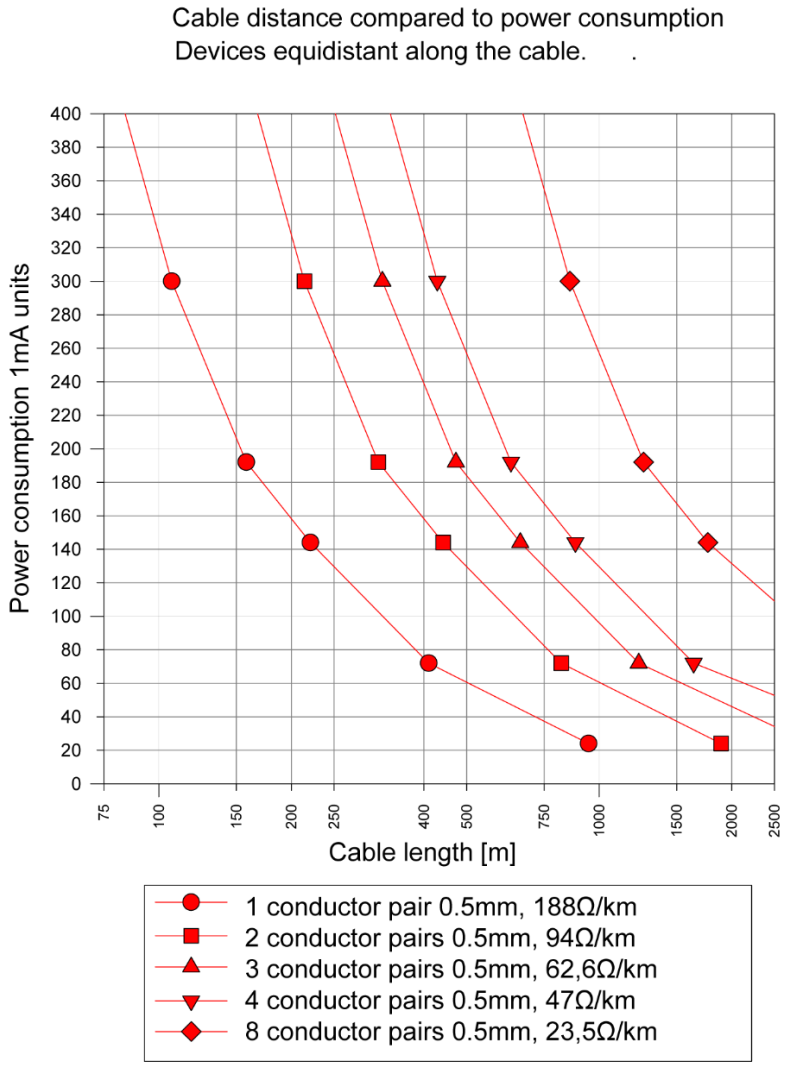


Figure 31 Devices Equidistant: Minimum Operating Voltage 6.5 V

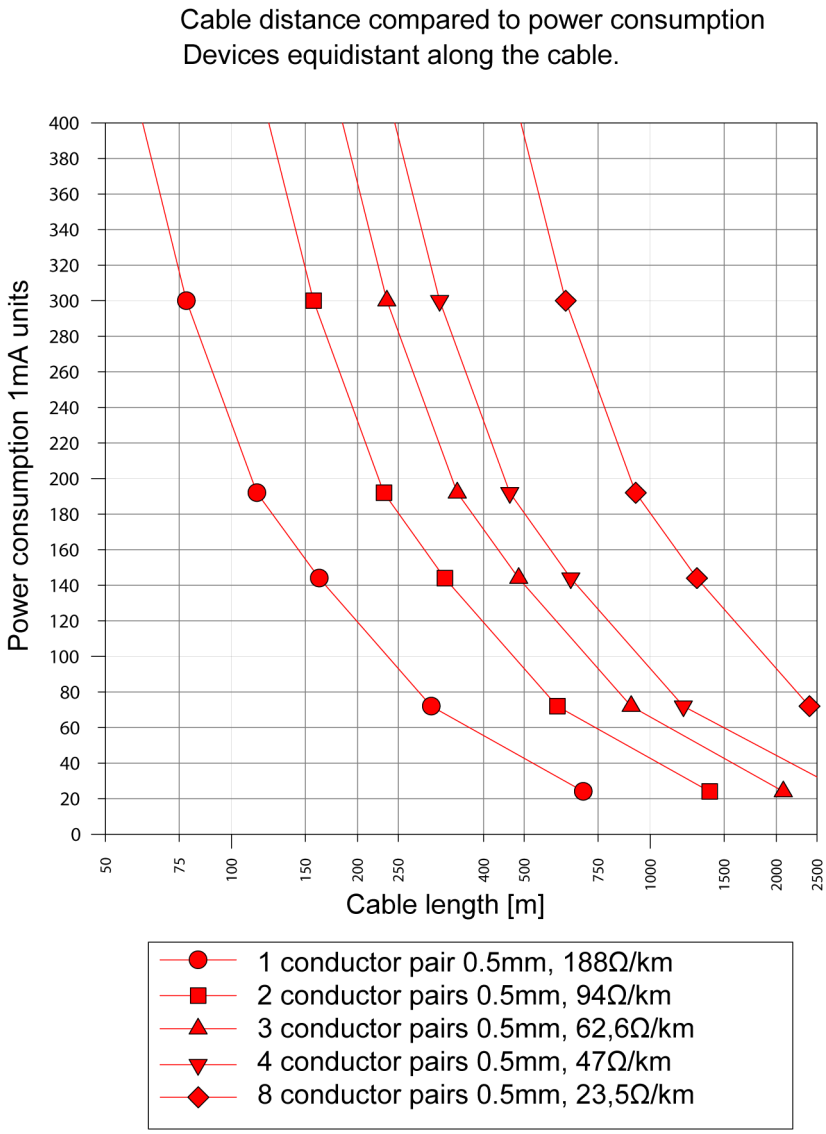


Figure 32 Devices Equidistant: Minimum Operating Voltage 7.5 V

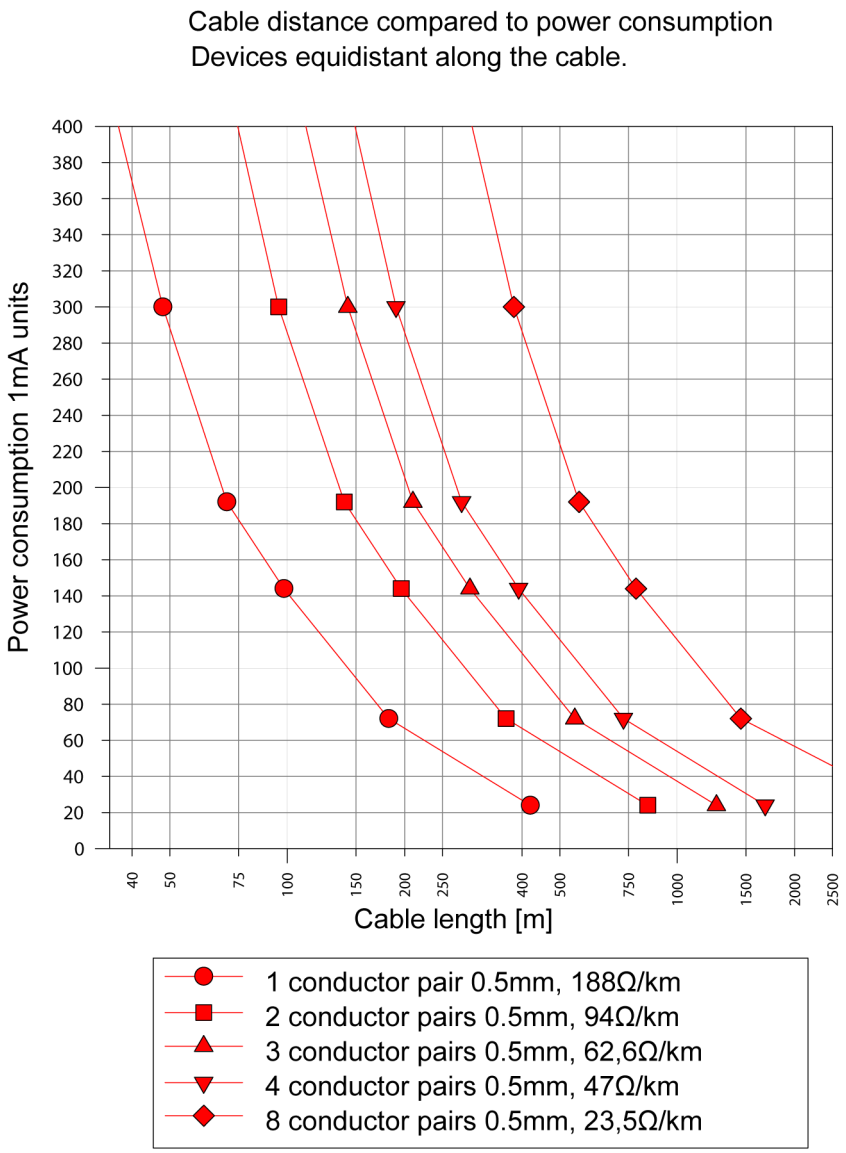


Figure 33 Devices Equidistant: Minimum Operating Voltage 8.5 V

10.1.2 Devices at Cable Ends

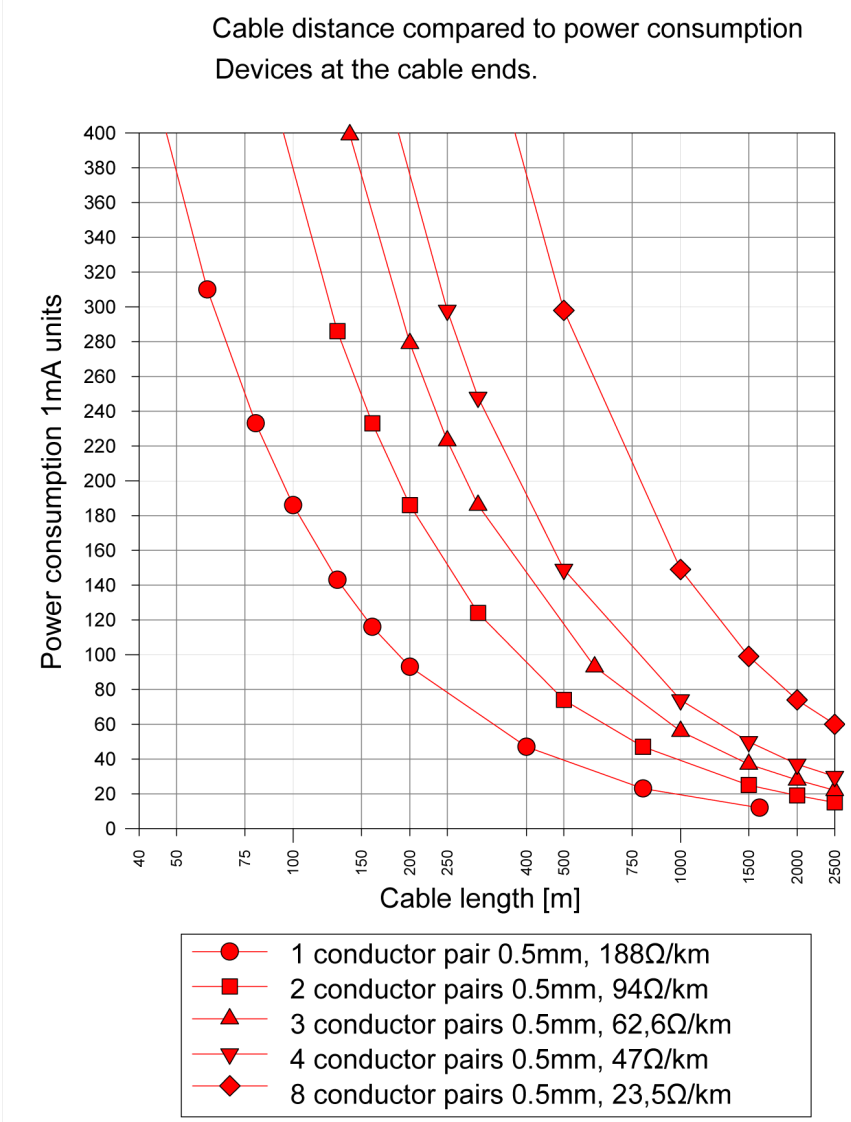


Figure 34 Devices at Cable Ends: Minimum Operating Voltage 6.5 V

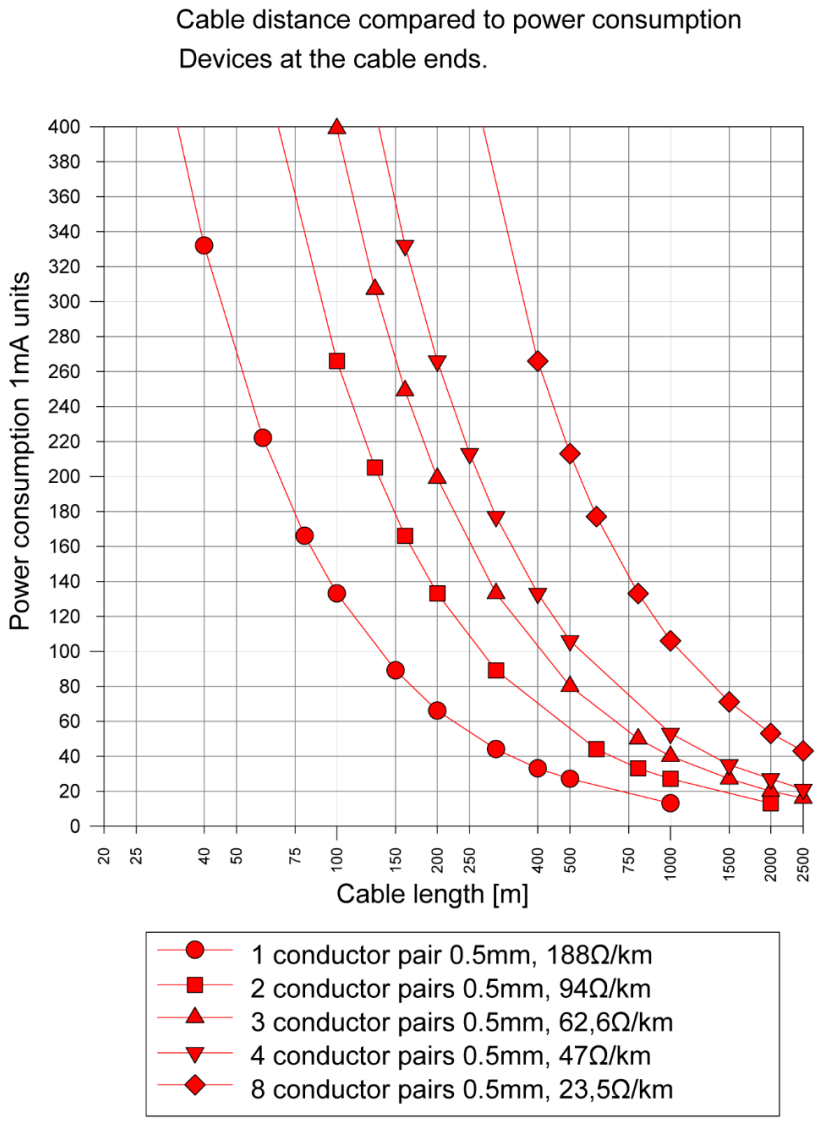


Figure 35 Devices at Cable Ends: Minimum Operating Voltage 7.5 V

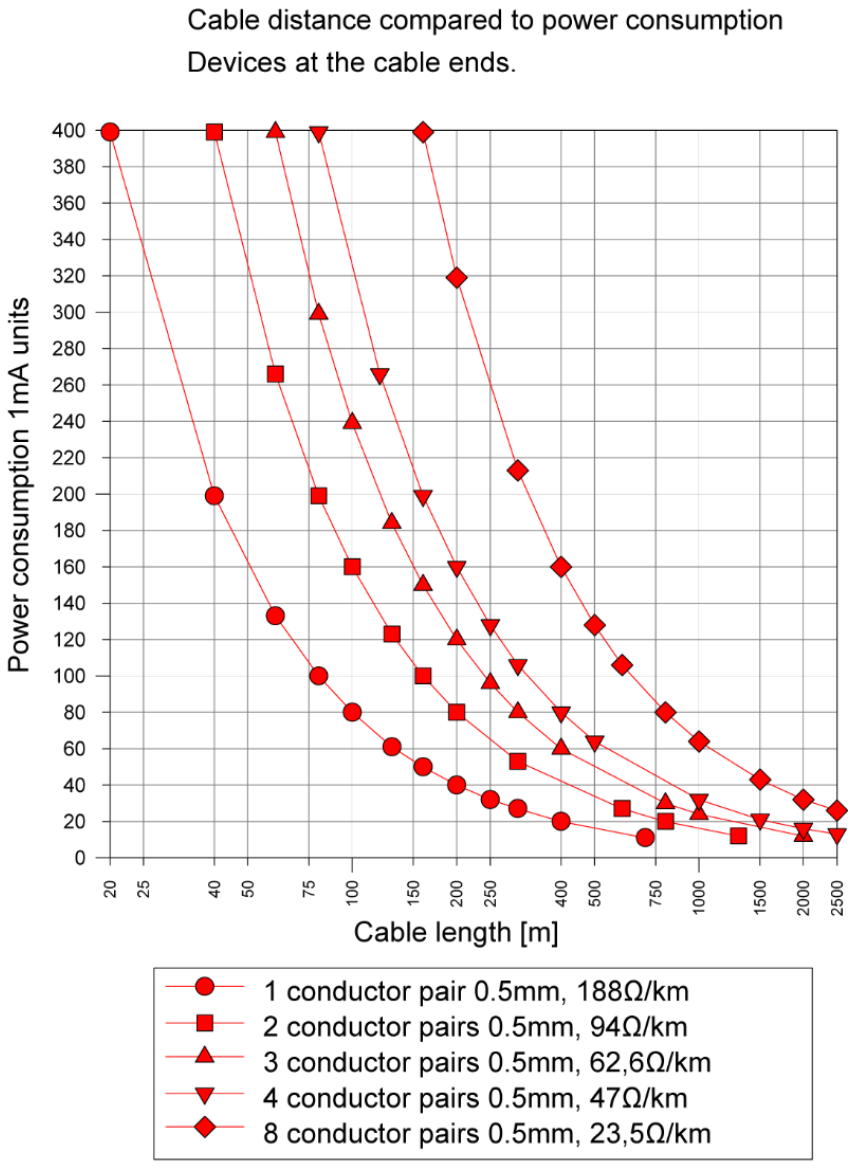


Figure 36 Devices at Cable Ends: Minimum Operating Voltage 8.5 V

10.2 Address Units

The minimum line voltage of the HHL central unit is 14 V.

When you select the graph, you must know if the address units are located at the cable ends or equidistantly along the cable. Refer to chapter Address Units at Cable Ends only if the addresses are in separate buildings and the distance to the building is more than half of the total cable length.

MW-9132:

- Maximum power consumption: 0.75 mA.
- Address unit load: 8 V / 0.75 mA = 10666 Ω.
- Cable type: MHS, conductor diameter 0.5 mm.
- Minimum operational voltage of an address: 8 V.

Maximum power loss in the cable: 14 – 8 = 6 V.

The conductor pair resistance of the MHS cable: 188 Ω/km.

To calculate the number of required conductor pairs, you need:

- The number of addresses in the cable.
- The cable distance to the furthest address.

Using the graph:

- Select the graph based on whether the address units are located at the cable ends or equidistantly along the cable.
- Count the number of address units in the cable.
- Estimate the cable distance to the furthest address unit.
- Find the point where these values intersect.

If the intersecting point is above the curve, select the next higher number of conductor pairs (on the right).

10.2.1 Equidistant Address Units

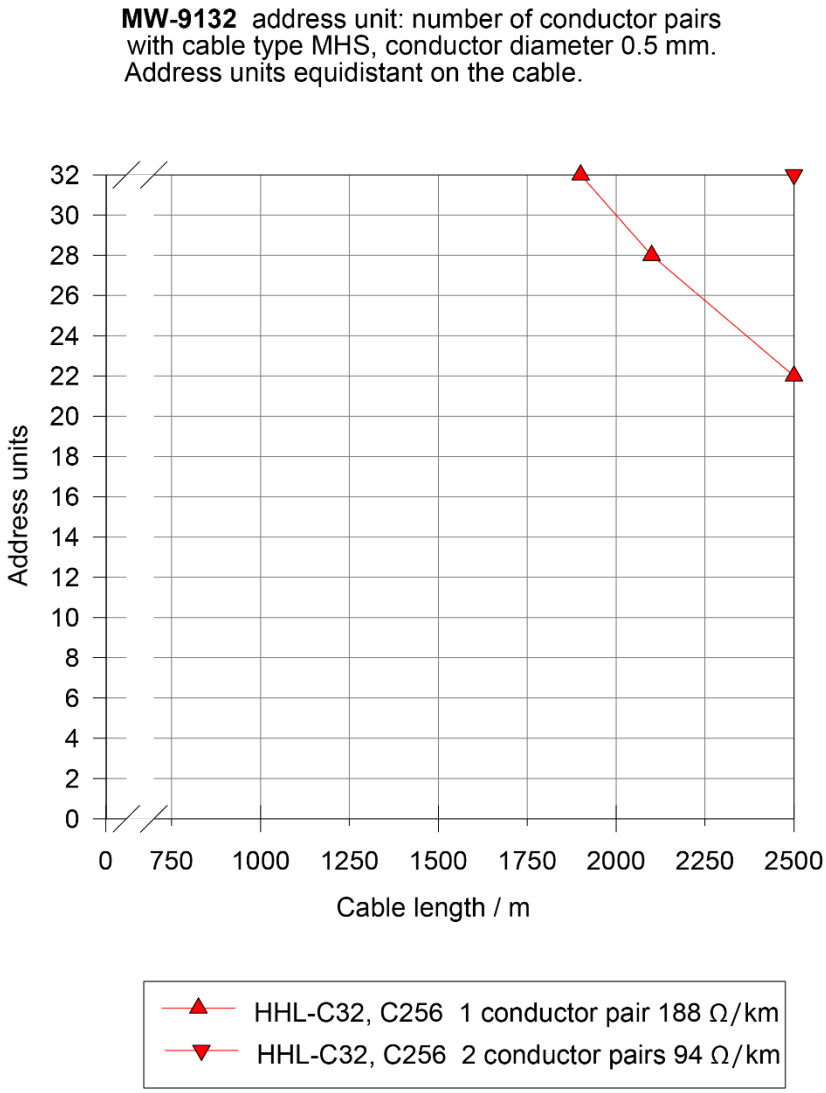


Figure 37 Equidistant Address Units

10.2.2 Address Units at Cable Ends

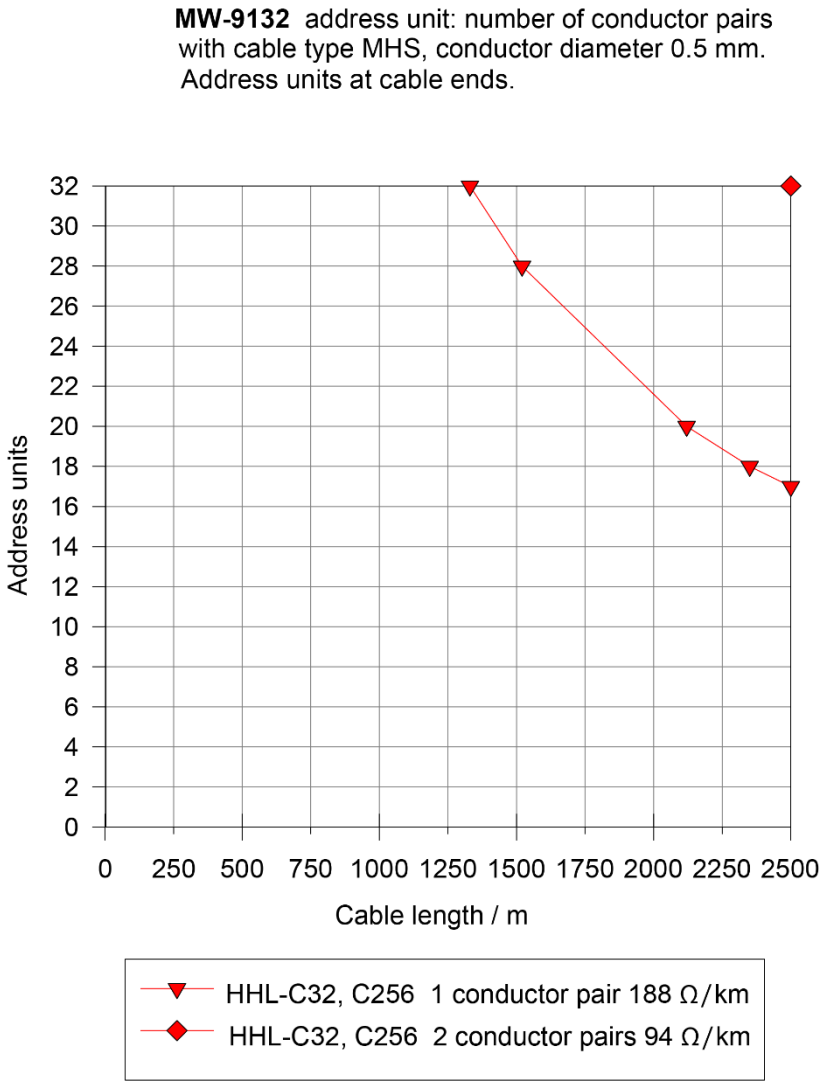


Figure 38 Address Units at Cable Ends

11. HHL System Service and Maintenance

In order to function properly and serve its purpose optimally, the HHL system must be regularly maintained. Although the system continuously monitors and tests itself, the system should be regularly tested by a qualified professional.

During operation, observe and document any abnormalities in the system. If applicable, run an initial test on the part of the system where the abnormality was detected. If necessary, contact a qualified professional to perform a more thorough test.

A comprehensive system check should be performed at least once per year to test the operation of the following system features and components:

- Central unit and the auxiliary components
- Power supplies, battery chargers and batteries
    - Replace the batteries every 5 years and always after a deep discharge.
- Alarm components
- Alarm transmission components
- Fault monitoring components
- Sabotage monitoring components
- Antimasking components
- Detectors
- Switching on and off
- Arming and disarming the system
- External controls and outputs
- System integrations

Clearly document all the abnormalities discovered during the tests and draft a corrective action plan. Execute the plan and correct all the abnormalities without delay.

After the test is completed, make sure that the system is restored to the normal operating mode.

12. Troubleshooting

12.1 RS-485 Data Connection Issues

Serial port traffic is commonly indicated with red (incoming data) and green (outgoing data) LEDs.

When the red LED flashes, the unit is receiving data. However, this does not mean that the unit understands the data. Failure to interpret the data can be caused by components having different potential values. If you use separate power supplies, these should be securely insulated (not grounded). When you do the cabling, connect the negative between the devices (with several wires in problematic cases).

A solid red LED usually means that the A and B wires are reversed. Switch the polarity of the A and B wires.

Verify the data connection by using an LED without a front resistor. Connect the LED to the line instead of the unit. When you connect the LED between the A and B wires, the LED should flash. Switch the polarity of the LED. When you connect the LED between the B and A wires, the LED should flash. If the LED does not flash, check the cable for integrity.

12.2 Disruptions in User Panel Data Line

Disruptions in the J data line (possible incorrect code, cover alarm) indicate a ground leakage. The system can be grounded from only one point when the grounding point is a RS-232-connected device (PC). This PC must be located in the same room (in the the same electricity supply section). Otherwise, isolate the RS-232 device(s) from the central unit with an isolation unit. Measure the ground leakage by disconnecting the directly connected PC from the system. Then, use a multimeter to measure each connection point within the DC range against the protective ground. The multimeter should display 0 mA.

12.3 Address Line Problems

12.3.1 No Voltage

- If the voltage is 0 V, make sure that the line is not disconnected.
- If the voltage is still 0 V, inspect the cable for shortages. Disconnect the cable from the central unit. Measure the output voltage (>8 V <17 V).

If you do not get a voltage reading after these procedures, the motherboard is defect.

12.3.2 Address Levels Missing

- Check the line voltage (see above).
- Verify the polarity of the line.
- Verify the connection of the address unit: red = +, black = -.
- Disconnect the line from the central unit's motherboard. Connect the address unit directly to the motherboard. If you can see the address levels, inspect the cable in smaller sections.
- Make sure that the address units are not defect.

If you do not see the levels directly from the motherboard, the motherboard is defect.

12.3.3 Individual Address Level Missing

- Measure the line voltage between the red + and black – wire (>8 V <17 V).
- Verify the connection of the address unit: red = +, black = -.
- If you do not see the levels, check the address unit in the central unit's line output.
- Check the address marking in the address unit.

If you cannot see the level directly from the motherboard on any of the memory slots 1-32, the address unit is defect.

12.3.4 All Addresses Have Level 255

- Disconnect the line cable from the central unit and see if the level drops to ~0. If the level drops, measure the voltage in the line cable. The voltage must be 0 V. If the cable has voltage, the connection is incorrect or the detectors are not compatible. One of the wires can be galvanically connected to the voltage. The alarm contacts of the detectors must be potential-free.
- If the level remains at 255 after removing the cable, the motherboard is defect.

12.3.5 Line Level Fluctuates

- The line level normally fluctuates between 0 and 5 steps. This fluctuation is normal and does not indicate a problem. If the fluctuation is higher than this, the cable length is incorrect or that there is an external cause or ground leakage.

13. Technical Data

13.1 Central Unit

Keskusmalli	HHL-C32	HHL-C256
Security level	2 [1)]	2 [1)]
Environmental class	I [3)]	I [3)]
Operating temperature	5 – 40 °C	5 – 40 °C
Dimensions [L x W x H]	460 x 276 x 100 mm [4)]	580 x 380 x 100 mm [5)]
Weight (incl. 1 x 7 Ah / 1 x 20 Ah battery)	7 kg	14 kg
Battery weight (12 V / 7 Ah, 12 V / 20 Ah)	2.7 kg	6.5 kg
Power source type	A	A
Number of address channels	1	8
Addresses / channel	32	32
Number of addresses	32	256
Number of groups	64	64
Transformer	38 VA / 22 VAC	150 VA / 33 VAC
Transformer AC in minimum 230 VAC – 15%	195.5 VAC	195.5 VAC
Transformer AC in maximum 230 VAC + 10%	253 VAC	253 VAC
Maximum battery capacity	20 Ah	80 Ah
Minimum battery capacity	7 Ah	20 Ah
Maximum number of batteries 12 V / 20 Ah	1 [4)]	4 [4)]
Maximum number of batteries 12 V / 7 Ah	2	-
Battery type	Lead	Lead
Battery maximum charge current	0.7 A	2.8 A
Battery charge voltage @ 20 °C temperature compensated	13.8 V	13.8 V
Battery charging time [80%]	24 h	24 h
Voltage outputs		
Nominal voltage	13.8 V	13.8 V
Minimum voltage	10.0 V	10.0 V
Maximum voltage	14.5 V	14.5 V
Output voltage normal variety	50 mV	50 mV
Output voltage maximum variety	450 mV	450 mV
Surge protectors	18 V	18 V
+12VDC F1 [A]	6.3 A	6.3 A

+12VDC F2 (fuse: 5x20T)	6.3 A	6.3 A
+12VDC F3 (fuse: 5x20T)	0.5 A	1.0 A
+12VDC F4 (fuse: 5x20T)	0.5 A	1.0 A
Central unit power consumption	100 mA	100 mA
Voltage outputs load capacity		
Security level 4 / 60 h backup operation	566 mA	1233 mA
Maximum load (security level 2 / 12 h backup operation)	700 mA, 14 Ah batteries	2500 mA, 32 Ah batteries
Programmable outputs		
Relay output [1 A]	2	2
Open collector outputs [100 mA]	6	6
Open collector outputs 3 – 8 max.	0.5 A	0.5 A
Batteries disconnection	10.5 V	10.5 V
Batteries undervoltage	10.8 V	10.8 V
Central unit tamper switch	optional [1)]	optional [1)]
Serial ports		
PROG	RS-232	RS-232
NET (SER1)	RS-232	RS-232
PANEL (user panels 1-8)	RS-485	RS-485
AUX (SER2)	RS-232/RS-485	RS-232/RS-485
SER3 [6)]	RS-232/RS-485	RS-232/RS-485
SER4 [6)]	RS-232/RS-485	RS-232/RS-485
Päälle/poiskytkentä	User panel, user-specific code. Time program	User panel, user-specific code. Time program
Antimasking	Fault	Fault
User code [6 digits]	1000000	1000000

[1) 2)] A standard central unit fulfills the requirements of security classification 2. Security level 4 requires a tamper switch in the central unit enclosure.

[3)] Indoors, 5 – 40 °C. RH<95%

[4) 5)] There are 2 central unit enclosure options:

- Hedbox-M is meant for the HHL-C32 central unit. The enclosure can house 1 x 7 Ah battery.
- Hedbox-L is meant for the HHL-C256 central unit. The enclosure can house 2 x 20 Ah batteries.

Install the additional batteries in a separate battery box < 1 m from the enclosure.

The required battery capacity depends on the security level and the system load.

[6)] Requires an HHL-CEXT expansion unit, SER3 (Port A) SER4 (Port B).

13.2 System Components

Device	Description	Sec. Level	Environm. Class	Operating Temp	Power Consumption in Ready Mode	Max. Power Consumption	Voltage	Dimensions [L x W x D]
HHL-CKP	User panel	2	II	–10 - 50 °C	60 mA	110 mA	8 – 15 V	143 x 146 x 31 mm
RS232-ISOL	RS-232 isolator	2	I	5 - 40 °C	50 mA	50 mA	8 - 15 V	37 x 69 x 30 mm
HHL-CEXT	Serial expansion unit	2	I	5 - 40 °C	10 mA	15 mA	8 - 15 V	51 x 66 x 30 mm
HEDSAM-OUT12	Relay output card	2	I	5 - 40 °C	20 mA	270 mA	8 - 40 V	75 x 110 x 50 mm
MW-9532	Address unit	2	II	–10 - 50 °C	0.8 mA	1.1 mA	8 - 16 V (pulse type)	14 x 18 x 4 mm
MW-9432	Address unit	2	II	–10 - 50 °C	0.5 mA	0.75 mA	8 - 16 V (pulse type)	14 x 18 x 4 mm
KMW-SP8/2	Loop hub	2	I	5 - 40 °C	8 mA	12 mA	8 - 16 V (pulse type)	100 x 65 x 14 mm