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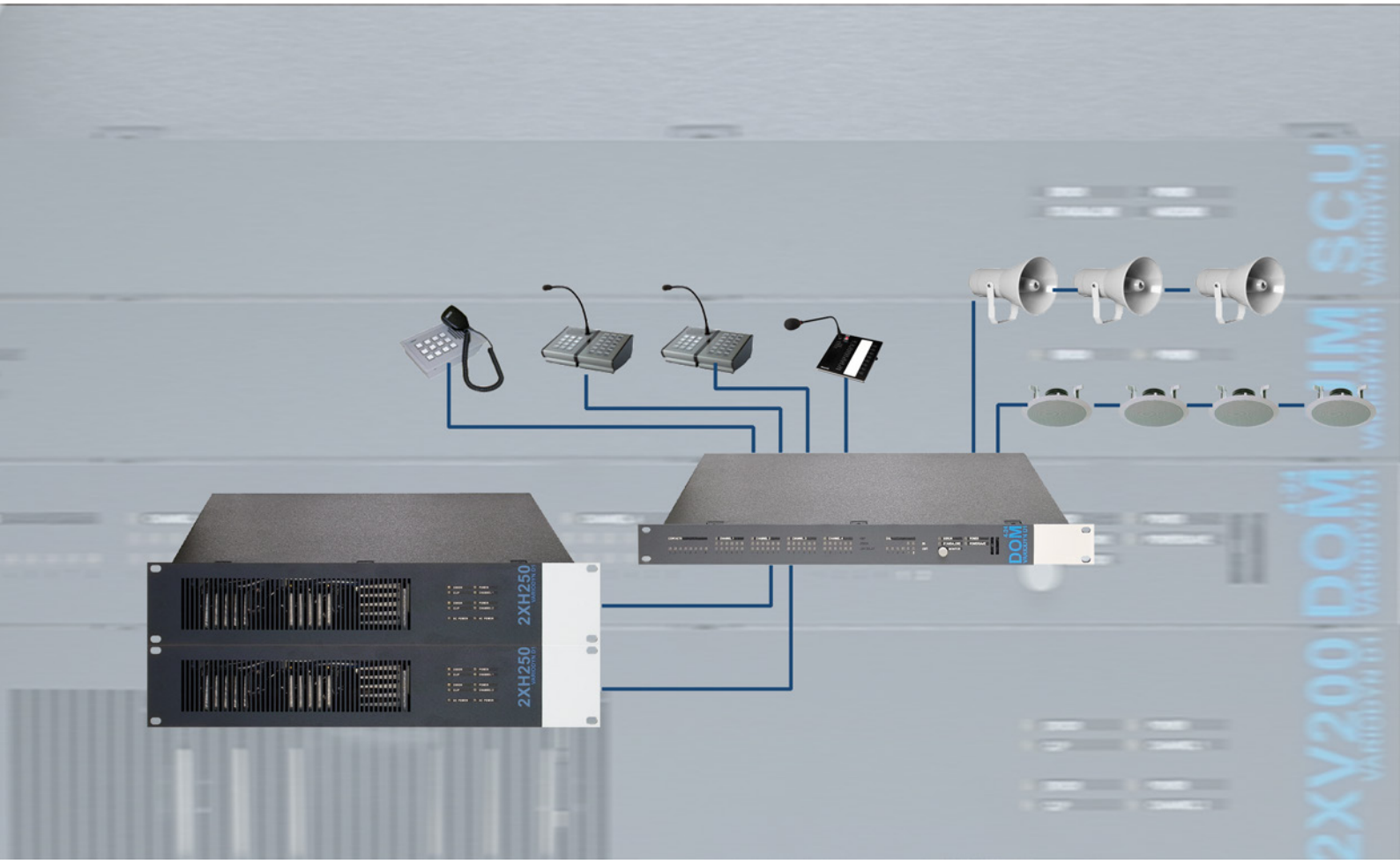

VARIODYN® D1 System

GB Installation Instruction

798663.GB0
05.2019

Intended purpose
This products may only be used for the applications outlined in the catalogue and in the technical description, and only in conjunction with the recommended and approved external devices and components.
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Safety-related user information
This manual includes all information required for the proper use of the products described.
In order to ensure correct and safe operation of the product, all guidelines concerning its transport, storage, installation, and mounting must be observed. This includes the necessary care in operating the product.
The term 'qualified personnel' in the context of the safety information included in this manual or on the product itself designates:

- project engineers who are familiar with the safety guidelines concerning fire alarm and extinguishing systems.
- trained service engineers who are familiar with the components of fire alarm and extinguishing systems and the information on their operation as included in this manual.
- trained installation or service personnel with the necessary qualification for carrying out repairs on fire alarm and extinguishing systems or who are authorised to operate, ground and label electrical circuits and/or safety equipment/systems.

Symbols
The following information is given in the interest of personal safety and to prevent damage to the product described in this manual and all equipment connected to it.
Safety information and warnings for the prevention of dangers putting at risk the life and health of user and maintenance personnel as well as causing damage to the equipment itself are marked by the following pictograms.
Within the context of this manual, these pictograms have the following meanings:

Warning - Designates risks for man and/or machine. Non-compliance will create risks to man and/or machine. The level of risk is indicated by the word of warning.

Note - Important information on a topic or a procedure and other important information!

Standards and guidelines - Observe configuration and commissioning information in accordance to the national and local requirements.

Hazard warnings on the system components

Warning – risk source.

Warning – dangerous electrical voltage.

Dismantling

In accordance with Directive 2012/19/EU (WEEE), after being dismantled, electrical and electronic equipment is taken back by the manufacturer for proper disposal.

Table of contents

1 General /Application

In line with the applicable standards, the following systems must all consist of components that satisfy the standards of the EN 54 series: a sound system for emergency purposes (SEP), as per EN 50849; a voice alarm system (VAS), as per DIN VDE 0833-4, and, in Austria, a sound system for emergency purposes (SEP), as per TRVB (technical fire prevention guideline) 158 S.
It must be ensured that these components interact together in a manner appropriate to the function. Devices for use in demanding ambient conditions, such as cold stores, galvanising plants or corrosive atmospheres, must be suitable for this particular application or must be adapted using suitable protective measures.

Designation of the system depending on the region of use

Depending on the location of use (country, applicable standard), the system is designated as e.g.:

D Voice alarm systems ➔ according to DIN VDE 0833-4 and EN 54
or Emergency audio system ➔ according to EN 50849

A Emergency audio warning system ➔ according to TRVB 158 S

In the interests of readability, only the term “voice alarm system” (VAS) is used in the following chapters.

A voice alarm system can be used for triggering and generating alarms anywhere that may pose a hazard to people. Voice alarms are particularly effective in buildings and rooms frequented by visitors or other people who are not trained in how to respond in an emergency or where visual alarms cannot always be clearly recognised. An especially high level of risk exists in the case of people who are dependent on external help in an emergency, e.g. when evacuation of the building is necessary. This may include people who are ill, the elderly, and children.

The voice alarm system is mainly used in combination with a fire alarm control panel (FACP) for emitting alarms. In practice, the voice alarm system is also used for purposes outside of this area of application. Typical examples of this include spoken messages such as those used in advertising or for paging people in airports, announcements at train stations, or playing background music.

Different requirements are placed on the voice alarm system depending on this combined use as an alarm and as a general public address system. For example, external loudspeakers which can generate a high sound pressure level are required for voice alarms. At the same time, however, it should be possible to transmit a high-quality music signal in other areas and, ideally, to control the volume for individual areas as well. The requirements related to safety, comfort, and flexibility demand a high level of expertise in the planning and implementation of a system as well as excellent knowledge of the individual product components.

The VARIODYN® D1 System is assembled at the factory as a modular expandable version with various components in accordance with the specific building requirements. Special solutions can thus be implemented economically and effectively for buildings of different sizes and for various alarm purposes.

The VARIODYN® D1 System is a voice alarm system that includes an integrated energy supply according to EN 54-4 and outputs for connecting loudspeakers according to EN 54-24.

Activation of the VAS can take place manually and/or via an FAS according to EN 54-2 incl. an interface according to VDE 0833-4.

1.1 Responsibility of the Operator

In addition to the standard-compliant design, a stipulation of the minimum requirements and functions between the operator of the system and the responsible authorities is required for the construction and operation of a VAS system.

Here the local standard as the TRVB 158 S in Austria (AWS/ENS) and the DIN VDE 0833-4 in Germany have to be followed if the system is controlled automatically by a fire alarm control panel.

Basic stipulations

- Definition of the safety level (I, II, III)
- Scope of public address system
- Alarm areas, detection areas, fire compartments
- Site of the voice alarm control panel (VACP), configuration levels, and accessibility
- Need for fire microphones and number of terminals, as well as their usability
- Alarm organisation and specification of the announcement texts

1.2 Related Documents

These installation instructions are intended for qualified technicians or trained installers and contain all of the important information needed for assembling and installing VARIODYN® systems. Additional information on assembly, operation, commissioning, and configuration can be found in the following documents:

Part No.	Name
798661.GB0	System design principles for Voice Alarm Systems (VAS)
798662.GB0	Operating Instructions for the VARIODYN® D1 System
798664.GB0	Commissioning Instructions for the VARIODYN® D1 System and VARIODYN® D1 Comprio
798678	Commissioning Instructions VARIODYN® D1 Networking
798683.GB0	Installation Instruction VARIODYN® D1 devices and accessories

Additional and updated Information

The described features, specifications and product related information in this manual correspond to the date of issue (refer to date on the front page) and may differ due to modifications and/or amended Standards and Regulations of the System design, Installation and Commissioning.
Updated information and declaration of conformity are available for comparison on the www.esser-systems.comor www.hls-austria.com homepage.

2 Standards and Directives

An emergency audio warning system (AWS) or a voice alarm system (VAS) as defined by the DIN VDE 0833-4 and TRVB 158 S standards must consist of components that meet the standards of the DIN EN 54 series. It must be ensured that these components interact together in line with the function.

However, some installation and configuration practices may contravene EN54 requirements. In this case the application must meet the local standards and requirements for the application regarding the instructions and specifications given in this manual.

Devices for use in demanding ambient conditions, such as cold stores, galvanising plants, or corrosive atmospheres, must be suitable for this particular application or must be adapted using appropriate protective measures.

The functionality of the voice alarm system (VAS) depends on the operating system software used and on the system configuration. The terminal assignments and connections depicted in these installation instructions refer exclusively to the specifics of the operating system software version used at the time this product was shipped. As a result of building-specific programming, the information on the display may differ from the figures and descriptions provided here.

- The system may only be installed in dry, clean, and adequately lit areas with restricted access. The ambient conditions must correspond to class 3k5 in accordance to DIN EN 60721-3-3.
- The components must be mounted in suitable floor type cabinets using suitable fastening materials to ensure that there is no mechanical tension.
- The system may only be put into operation after being properly assembled.
- Strong electrical / electromagnetic and mechanical influences must be avoided. This especially applies to the installation of components and installation cables in the direct vicinity of fluorescent lamps or energy cables, and to mounting on vibrating, unstable surfaces such as thin partition walls.
- The system may not be installed in facilities or equipment that have damaging effects. Parts of the system may be fed through such facilities or equipment, provided the requirements of the DIN VDE 0800 series of standards are met.
- For cabinet or wall installation, operating modules and visual displays should be installed between 800 mm and 1800 mm above the place where the operator stands.

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

Protective and functional earth
For the device to function properly, the network side protective earthing (PE) connection must be connected to the correct terminal. The functional earth (FE) must also be connected to the PE rail.

Neutral conductor
As a rule, it must be ensured that the neutral conductor is properly connected.

- In particular, for three-phase connected devices in VARIODYN® D1 cabinet systems, suitable protection must be provided against overvoltage caused by a break in the neutral conductor and the phase shift which may result from this.
- For single-phase connected devices, suitable protection against overcurrent must be ensured to guard against the consequences of a break in the neutral conductor (usually caused by the operator).
- For more information, see Chapter 6.3.

Commissioning
A complete function test must be performed on the system upon completion of the commissioning as well as after every change to the customer data programming.

2.1 Approvals

Specification	:	EN 54-4 : 1997 / A1 : 2002 / A2 : 2006
		EN 54-16 : 2008 and EN 54-17 : 2006
Declaration of Performance	:	DoP-20997130701
		DoP-00376130701
		DoP-00405140414

- The DoP numbers apply to VARIODYN® D1 voice alarm systems including all components. The valid DoP numbers are specified on the type plates of the devices.
- The standards and guidelines listed in this documentation apply in their respective latest versions.

The current and valid versions of each of these standards, regulations and ordinances must be observed during the planning and installation as well as during the operation of an emergency intercom system or voice alarm system, including connection to a fire alarm system (FAS).

DIN VDE 0833	Hazard alarm systems for fire, intrusion and hold-up
- 1	General specifications
- 2	Requirements for fire alarm systems (FAS)
- 3	Requirements for intrusion and hold-up alarm systems
- 4	Requirements for voice alarm systems in case of fire

DIN 4066	Information signs for fire brigade
DIN 14675	Fire detection and fire alarm systems - Design and operation
DIN 33404-3	Auditory danger signals, unified emergency signal
DIN EN 54-1	Fire alarm systems – Introduction
DIN EN 54-3	Fire alarm systems – Fire alarm equipment – Sounders (acoustic alarms)
DIN EN 54-4	Fire alarm systems – Power supply equipment
DIN EN 54-16	Fire alarm systems – Components for voice alarms in fire alarm systems, voice alarm control panels
DIN EN 54-17	Fire alarm systems – short circuit isolators
DIN EN 54-24	Fire alarm systems – Components for voice alarms in fire alarm systems, loudspeakers
DIN EN 60268-16	Sound system equipment (electroacoustic devices) – Objective rating of speech intelligibility by speech transmission index
DIN EN 50849	Sound systems for emergency purposes (formerly 60849)
DIN EN 61672	Electroacoustics – Sound level meters
DIN EN ISO 9921	Ergonomics – Assessment of speech communication
DIN VDE 0800-1	Telecommunications – general concepts; requirements and tests for the safety of facilities and apparatus
DIN VDE 0815	Wiring cables for telecommunication and data processing systems
DIN VDE 0845-1	Protection of telecommunication systems against lightning, electrostatic discharges and overvoltages from electric power installations; provisions against overvoltages
Sample guideline for cabling systems	Sample guideline on fire protection requirements for cabling/wiring systems; the respective implementations apply in the individual German federal states (guideline for cabling/wiring systems)
Guideline for cabling/wiring systems	See sample guidelines for cabling/wiring systems
2014/34/EU (ATEX)	Directive for equipment and protective systems for intended use in potentially explosive atmospheres. It replaces Directive 94/9/EC.
TRVB 158 S	Emergency audio warning system ➔ according to Ö-Norm
VdS 2095	Automatic fire alarm and fire detection systems; Planning and installation
VdS 2046	Safety regulations for electrical systems up to 1000 volts
VdS 2015	Electrical equipment and systems, leaflet for preventing damage
VdS 2833	Measures to prevent surge voltages on hazard warning systems

3 Planning and configuration

The planning and configuration information below offers a quick overview of the proper use as well as the technical capabilities of the VARIODYN® D1 System.

The specifications in the technical planning documents as well as the applicable standards, national regulations and local requirements must always be complied with in the installation.

3.1 System Overview

The networkable, modular VARIODYN® D1 System is assembled from components into a building-specific configuration. Special solutions can thus be implemented economically and effectively for buildings of different sizes and for various alarm purposes.

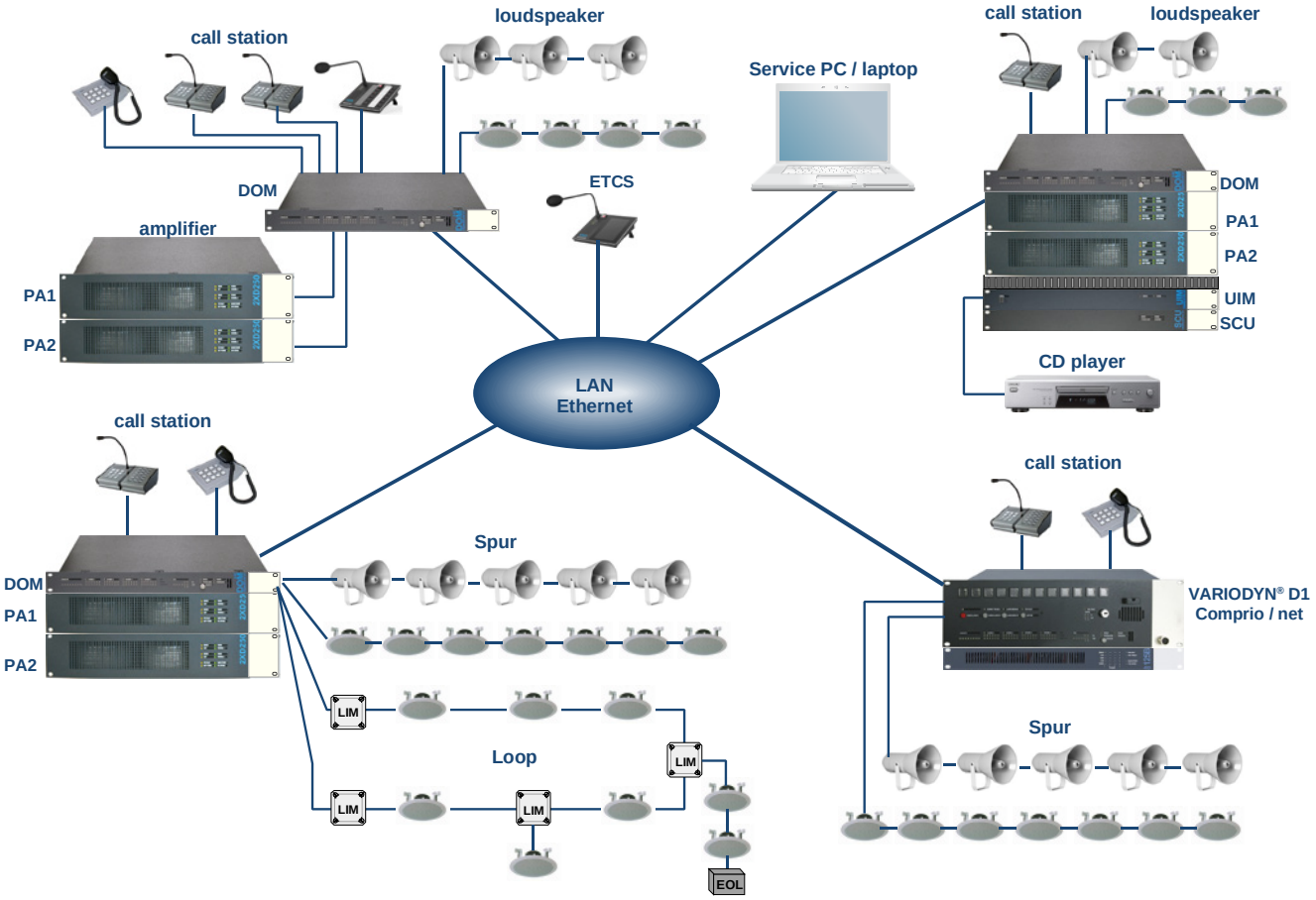


Fig. 1: System overview (example of a networked system)

For security reasons only one independent D1 network (LAN) can be used without a logical and/or physical connection to the internet or another network.

The technical performance characteristics may be limited by standards, directives, and local requirements.

3.2 Redundancy of the VARIODYN® D1 System

Alternatively, the VARIODYN® D1 System can also have a redundant structure. The devices listed in the diagram are required for this purpose.

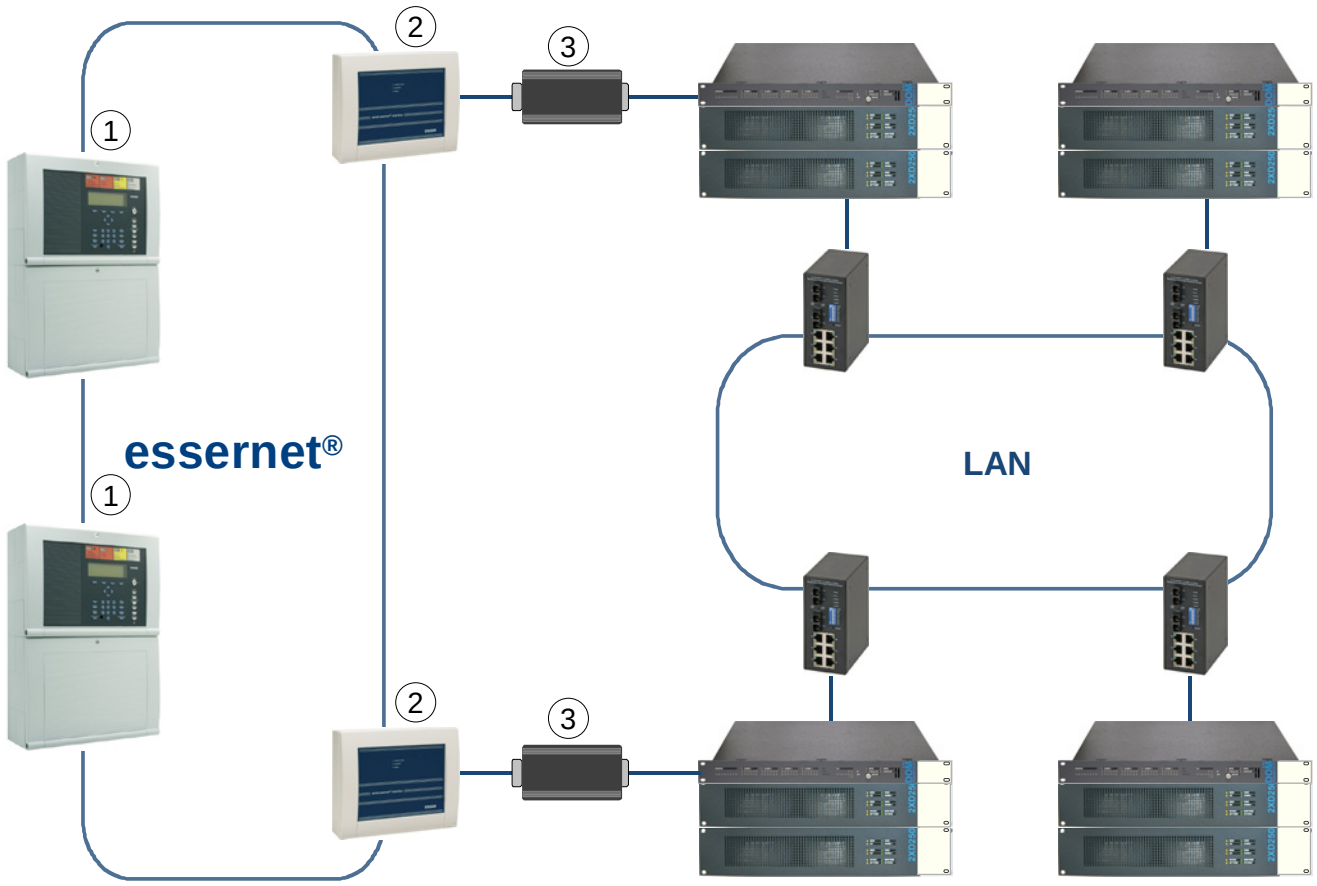


Fig. 2: Redundancy of the VARIODYN® D1 System

①	ESSER fire alarm control panel (FACP)
②	Serial essernet® Interface
③	TWI-RS232 adapter (Part No. 583386.21)

- The technical performance characteristics may be limited by standards, directives and local requirements.
- For more information on the devices and accessories, see documentation (Part No. 798683.GB0 / 798678.GB0).

3.3 System requirements

Components	Number without protocol 11	Number from protocol 11
DOM / SCU / ETCS	250	400
Amplifier channels	1000	1600
Multiple amplifiers	250	400
PA-Server	10	10
PC-Callstation	10	---

- With a DAL bus, the cables are run in a star arrangement and with Ethernet in a tree arrangement (from device to device)
- Both the maximum cable lengths and the cable specifications must be observed
- Up to 4 loops per DOM4-8 or DOM4-24
- Observe the max. number of the Loop Isolator Module (LIM) and the ring loop length depending on the amplifier used. - See tables in chapters 3.4.2 and 5.1.2.
- Up to 5 spurs with more than one loudspeaker per ring loop (with EOL)
- Do not route outbound and inbound rings conductors in the same cable or the same conduit
- A single loudspeaker output of a DOM may be loaded with the max. channel amplification power of the connected amplifier. In this case, the other loudspeaker outputs of the same channel may not be used
- Up to 500 W per loudspeaker output / per ring loop
- The total power of all loudspeaker outputs that belong to one channel may not exceed the channel power of the connected amplifier

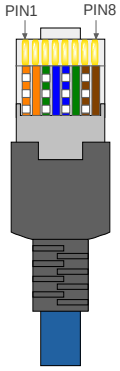
Observe the max. cable lengths and cable specifications.

The DOM protocol 3.0 cannot be used in systems with system communication unit (SCU). The system limits apply without DOM protocol 3.0.

3.4 Cable Types and Specifications

The cable types listed are required for installation of the VARIODYN® D1 System and must be used accordingly.

DAL-Bus (Digital Audio Link)
Devices, such as digital call stations (DCS) digital fire brigade call stations (DCSF) and universal interface modules (UIM) are connected to the digital output module (DOM) via the DAL bus. The devices are connected via at least one shielded CAT5 cable. With a maximum distance of 300 m.
For distances greater than this, fibre optic cables are used. Length max. 2,000 m. Due to the 24 V DC supply voltage over the DAL bus, a special fibre optic converter is required for this (e.g. Part No. 583316.21 or 583317.21). In addition, fibre optic cables of type multimode 50/125 µm GI, 62,5/125 µm GI with duplex SC connection are required.
If E30 cabling is required, the cable type JE-H (St) H 4 x 2 x 0.8 mm BETAflam® must always be used.
Max. length 150 m.



PIN	Assignment	
	DOM	DCS / DCSF
1	RX +	TX +
2	RX -	TX -
3	GND	GND
4	TX +	RX +
5	TX -	RX -
6	GND	GND
7	+ 24 V DC	+ 24 V DC
8	+ 24 V DC	+ 24 V DC

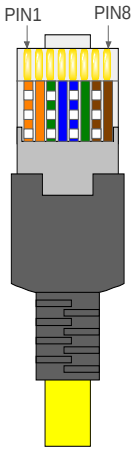
Fig. 3: DAL bus RJ45 connector (blue)

The RX and TX connections in these components are prepared for direct connection of the blue DAL bus cable.

- The signal cable for the DAL bus and Ethernet network connection must be positioned at a sufficient distance from disruptive electromagnetic fields, power cables, and other sources of electrical interference in order to prevent a negative effect (minimum distance: 0.5 m to loudspeaker lines, other signal cables or power cables).
- To prevent malfunctions, only devices of the VARIODYN® D1 System specified for use on DAL bus cables (e.g. call stations and UIM) can be connected.

Ethernet (100 Mbit)

Maximum cable length = 90 m between two devices.
A longer cable length can be realised using standard LAN repeaters (option).



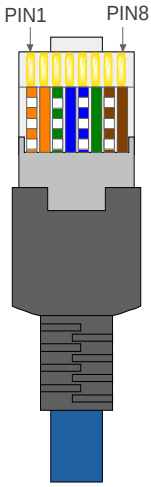
PIN	Assignment
1	TX +
2	TX -
3	RX +
4	Not assigned
5	Not assigned
6	RX -
7	Not assigned
8	Not assigned

Fig. 4: Ethernet RJ45 connector (yellow)

AVC Inputs (Automatic Volume Control)

Microphones are connected to the AVC inputs via a microphone cable (e.g. 2 x 0.5 mm² + shielding) in order to regulate the volume based on the ambient noises.

Attach the cable shielding of the microphone cable to the connector plug.



PIN	Assignment
1	Not assigned
2	Not assigned
3	Not assigned
4	Not assigned
5	Not assigned
6	Not assigned
7	Sound wire B / ALRINB
8	Sound wire A / ALRINA

Fig. 5: AVC-pin assignment RJ45 connector (blue)

3.4.1 System cables (overview)

The following system cables are required for directly connecting the devices in the installation cabinet:

Name	Part No.
Patch cable CAT5, 1 m, yellow, (ETH) VARIODYN® D1	583486A
Patch cable CAT5, 2 m, yellow, (ETH) VARIODYN® D1	583487A
Patch cable CAT5, 3 m, yellow, (ETH) VARIODYN® D1	583488A
Patch cable CAT5, 1 m, blue, (DAL) VARIODYN® D1	583481A
Patch cable CAT5, 2 m, blue, (DAL) VARIODYN® D1	583482A
Patch cable CAT5, 3 m, blue, (DAL) VARIODYN® D1	583483A
Patch cable CAT5, 1 m, grey, (DAL) VARIODYN® D1	583466A
Patch cable CAT5, 2 m, grey, (DAL) VARIODYN® D1	583467A
Patch cable CAT5, 3 m, grey, (DAL) VARIODYN® D1	583468A
Signal cable 12 for UIM® D1 for connecting control contacts. Ex works cabling of 12 control contacts of the UIM to the rear cabinet wall; up to 4 cables are required per UIM	583401.21
Cable for rear cabinet wall and/or relay contacts DOM4-8 for loudspeaker connection. Ex works cabling of the loudspeaker/speaker (SPK) outputs of the DOM4-8 to the rear cabinet wall; 1 cable required per DOM4-8	583451.21
Cable for rear cabinet wall DOM4-24 for loudspeaker connection. Ex works cabling of the loudspeaker/speaker (SPK) outputs of the DOM4-24 to the rear cabinet wall; up to 4 cables are required per DOM4-24	583452.21
Input cable DOM – XV VARIODYN® D1 Ex works cabling of DOM (1) to final amplifier (1), 2 channels (audio frequency (AF), control)	583471.21
Output cable XV – DOM VARIODYN® D1 Ex works cabling from final amplifier (1), 2 channels (max. 100 V) to DOM (1)	583476.21
Backup cable RC 22 VARIODYN® D1 Ex works cabling from 2 backup channels to the backup channel of the DOM	583422.21
Input cable DOM RJ45 - XVRJ45 Prefabricated cabling from DOM (2) to final amplifiers (2), 2 channels (AF, control)	583491A
Output cable 2XV - DOM VARIODYN® D1 Prefabricated cabling from 2 final amplifiers (2), 4 channels (max. 100 V) to DOM (2)	583477.21
Input cable DOM - XVRJ45 Prefabricated cabling from DOM (1) to final amplifiers (2), 2 channels (AF, control)	583472.21
Input cable DOMRJ45 - XV Prefabricated cabling from DOM (2) to final amplifiers (1), 2 channels (AF, control)	583473.21

Various types of cabling are required depending on the hardware version (1) or (2) of the DOM and the power amplifier.
(1): 583361.03 (DOM4-8); 583362.03 (DOM4-24)
(2): 583361.21 (DOM4-8); 583362.21 (DOM4-24)
580221.41 (2XH250); 580222.41 (2XH500); 580231.41 (2XD250), 580232.41 (2XD400)

3.4.2 Specification loudspeaker cables

The following cable cross-sections (mm²) must be used for loudspeaker loop, depending on the power and cable length:

Power / Length	100 W	200 W	300 W	400 W	500 W
100 m	0.5	0.5	0.5	0.75	0.75
200 m	0.5	0.5	0.5	0.75	1
300 m	0.5	0.75	0.75	1	1.5
400 m	0.5	0.75	0.75	1	1.5
500 m	0.5	0.75	0.75	1.5	1.5
600 m	0.5	0.75	1	1.5	1.5
700 m	0.75	1	1	1.5	2
800 m	0.75	1	1.5	2	2
900 m	0.75	1.5	1.5	2	2.5
1000 m	0.75	1.5	1.5	2	2.5

Cable type: The loudspeakers can be connected using communications cable I-Y (St) Y n x 2 x 0.8 mm, for example. If a different, comparable cable type is used, please bear in mind the output and cable length required.

Conversion:

Cable cross-section	➔	Cable diameter
0.5 mm²	➔	0.8 mm
0.75 mm²	➔	1.0 mm

Calculation aid:

Loop fault-free	➔	Max. 1 dB (=10 %) power loss
Loop with faults	➔	Additional 2 dB power loss

Up to 1st speaker max. 150 m cable length; the further speakers are evenly distributed.

3.4.3 Specification Loop Isolator Modul (LIM)

The maximum distance between two Loop Isolator Modules (LIM) in the ring depends on the selected cable cross-section in Chapter 3.4.2. The distance can be configured for specific projects using the values in the following table.

Cable cross-section	Max. distance
2.5 mm²	165 m
2 mm²	130 m
1.5 mm²	100 m
1 mm ²	66 m
0.5 mm²	33 m
0.25 mm²	16.5 m

The factory recommendation is a configuration with 1.5 mm² ≙ max. distance 100 m.

4 Mounting

Requirements for the installation site and installation surface

The floor type cabinet installation with voice alarm systems may only be installed in dry, clean, and adequately lit areas with restricted access acc. to DIN EN 60721-3-3. If several voice alarm system components are to be installed in an enclosed floor type cabinet, it is necessary, for example, to consider the maximum load capacity (kg/m²) of the floor (e.g. pile floors).

To prevent the floor type cabinet from becoming top heavy when the pivot frame is open, it must be fastened to a suitable wall !

Devices with visual displays

As a rule, the visibility of the visual displays must be ensured when installing the devices. For devices with visual displays, an installation height of 1,600 mm (+ 200 mm) above the standing surface of the operator is recommended.

Weight of the installation devices

In general, heavy devices are installed below and light devices above. Due to the heavy weight of the power amplifiers, they must be fastened/secured separately with special installation brackets. In principle, an additional installation bracket must be provided for the combination of a DOM and two power amplifiers.
Max. two double final amplifiers may be installed one above the other. The lower power amplifier is also screwed on with a installation bracket.
A ventilation panel (Part No. 583708) is installed beneath this, and a DOM is installed above the amplifier combination. This results in a 6 HU combination, and the power amplifiers can always be connected with the system cables in this arrangement (see 3.4.1).

Cabinet ventilation

If an ambient temperature exceeding the ratings specified in the technical data of the installed devices is expected in the upright cabinet, the cabinet must be ventilated. In principle, heat accumulation between the installed devices and between the devices and the walls of the floor type cabinet must be prevented.

In the event of high thermal influences within an installation cabinet, individual components should be separated above and below by ventilation grating (Part No. 583708).

Installation kit for fuse switch disconnector

The installation kit (Part No. 583716 – optional) can be integrated into the VARIODYN® D1 cabinet system and, together with the optional fuse switch disconnector and fuse link, makes it possible for the voice alarm system's emergency power supply/batteries (24 V DC) to be switched off completely.
3 HUs are required for the installation kit for rack mounting. For additional information, consult document 798673.HO.

4.1 Overview of the Individual System Components for Rack Mounting

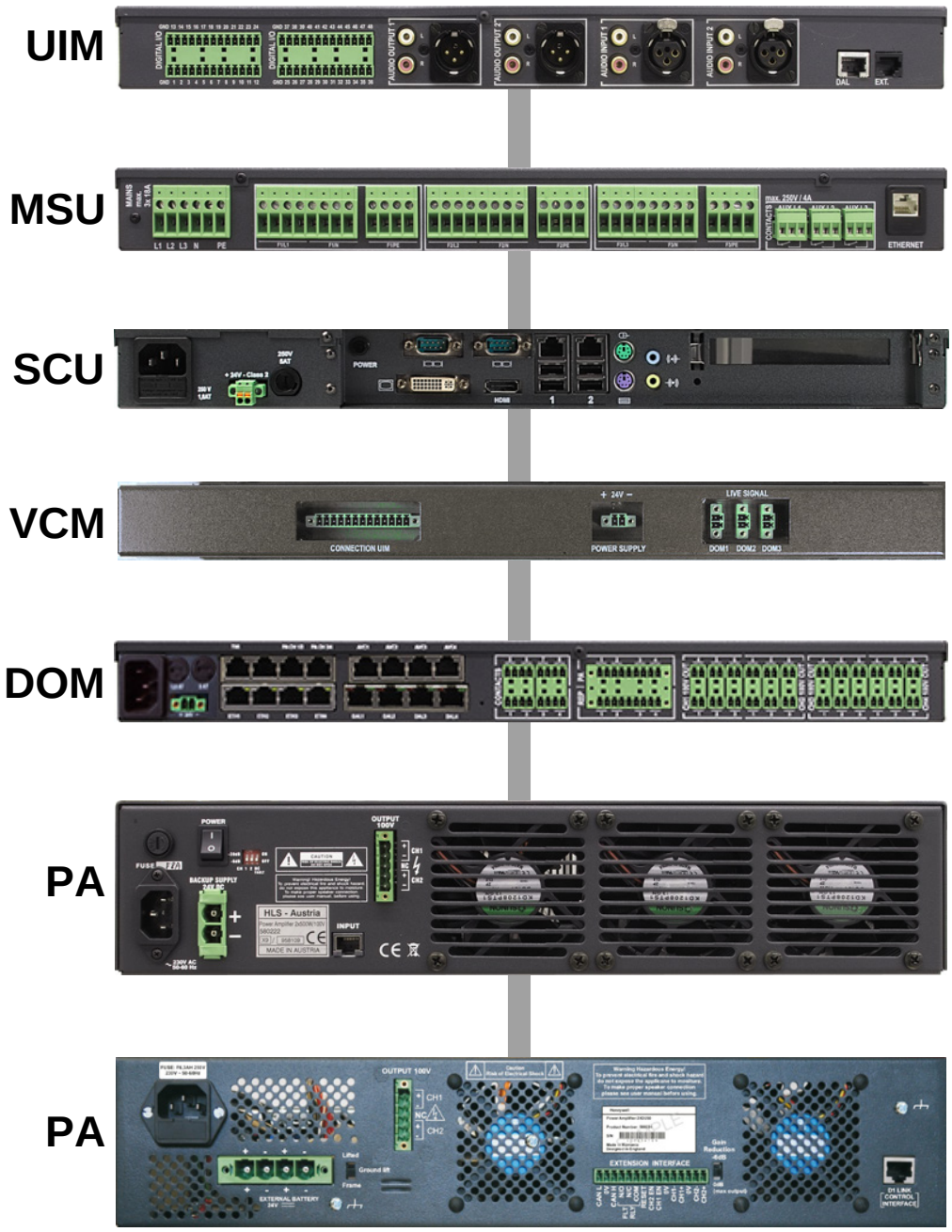


Fig. 6: VARIODYN® system components (example)

Abbreviation	Description	Part No.
UIM	Universal-Interface-Module	583331.21
MSU	Main-Switch-Unit	583371.21
SCU	System-Communication-Unit	583381.22, 583381.31
VCM	View-Control-Module	583315
DOM	Digital-Output-Module	583361.22, 583362.22
PA	Power Amplifier	580221.41, 580222.41, 580231, 580232, 580242, 580243, 580248, 580248.11, 580249.11, 580262

4.2 Floor type cabinet / Rack-mounting (Part No. 5849xx)

Conventional cabinet systems offer good access from the front and back or have a pivot frame which can be used to swivel the installed electronics out of the cabinet. Optional components can be mounted on C profile rails, for example.

Depending on the temperature that can be expected inside the cabinet due to the installation of voice alarm system components, ventilation grating and active fans can also be used.

VARIODYN® cabinet system

When developing the VARIODYN® cabinet system, the technically required heavy weight of the individual installation components, such as final amplifiers and UPS, was taken into account. Despite the high stability, the cabinet system has a low deadweight, which simplifies transport and assembly work.

The VARIODYN® cabinet systems are available in different heights and designs - see Product Catalog.

1 HU = 1 height unit = 44.45 mm or 1¾ inches

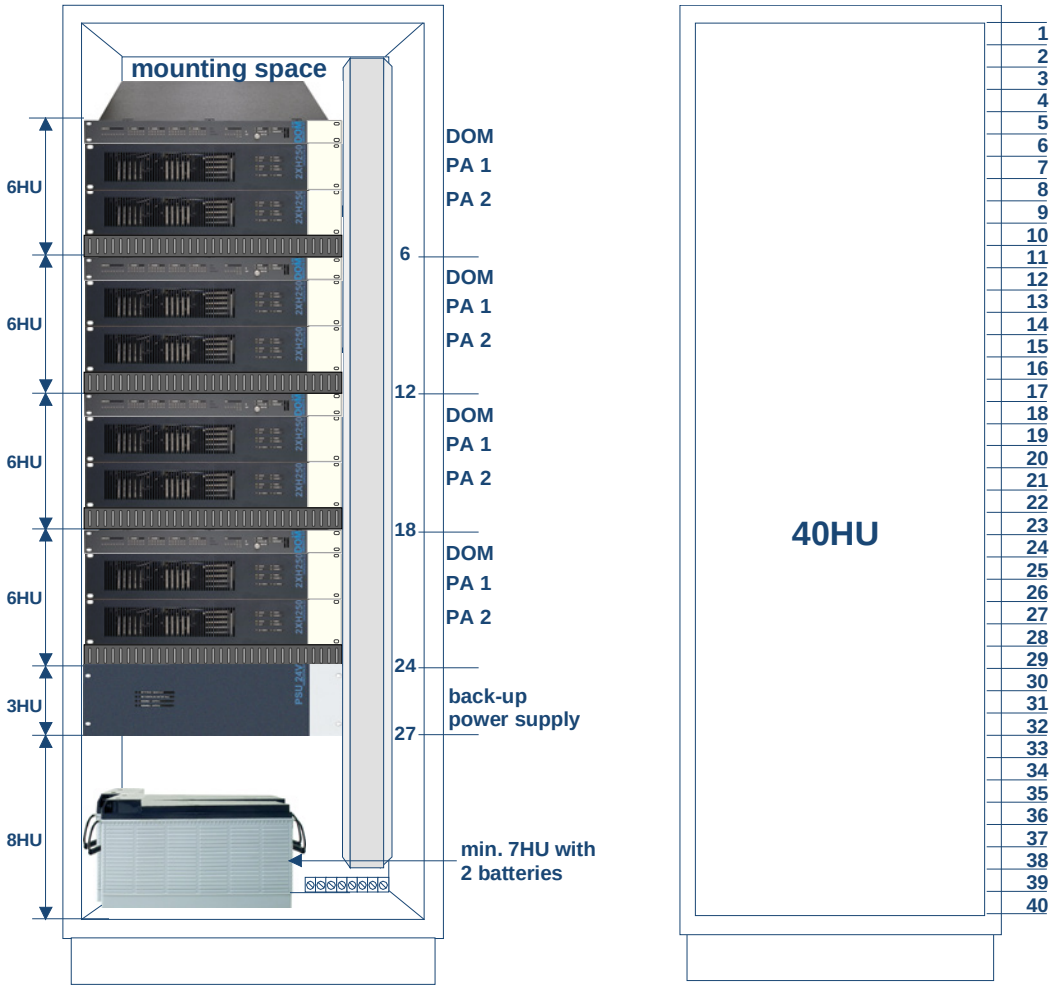


Fig. 7: System components with HU specifications (Example - Floor type cabinet Part No. 584901)

- Please note the weight and installation depth of the power amplifiers!
- All devices are installed with M6 screws from installation set 1 (Part No. 583703).

Max. 2 batteries per floor type cabinet (B x T = 800 x 600 mm)
Max. 4 batteries per floor type cabinet (B x T = 800 x 800 mm).

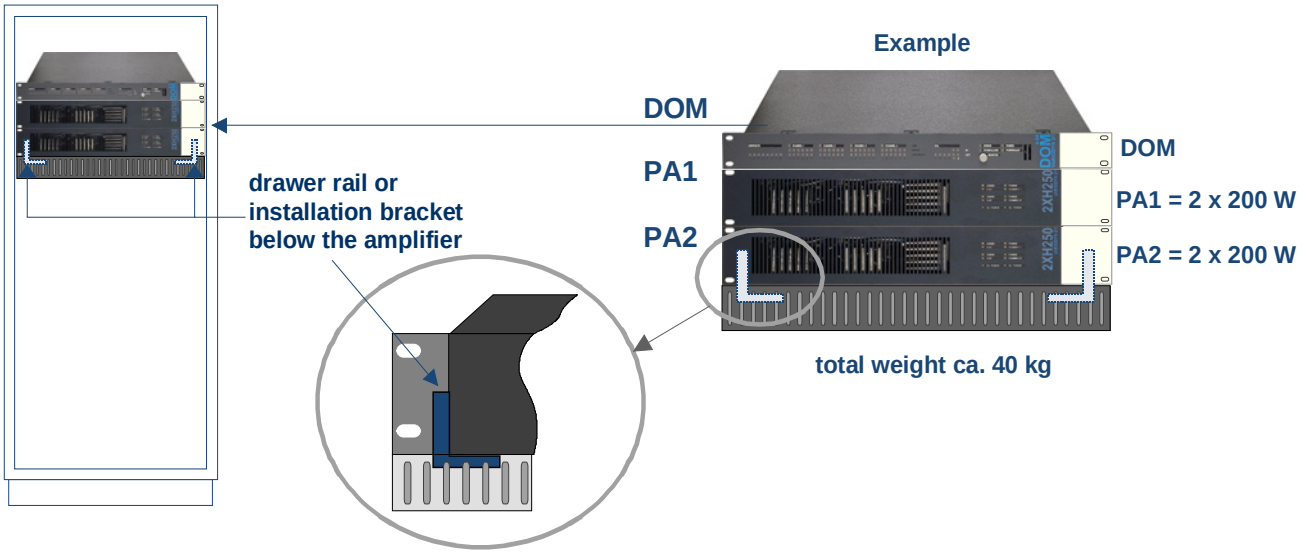


Fig. 8: Example installation of devices with installation bracket (Example)

Device	Weight	Device	Weight
Amplifier 2XH250 / 2XH500	approx. 17 Kg	Digital-Output-Module (DOM 4-8)	approx. 5,7 Kg
Amplifier 2XD250 / 2XD400	approx. 19 Kg	Digital-Output-Module (DOM 4-24)	approx. 6,5 Kg
Amplifier 4XD und 4XV-Serie	approx. 14 Kg	View-Control-Module (VCM)	approx. 0,9 Kg
Main-Switch-Unit (MSU)	approx. 4,2 Kg	Universal-Interface-Module (UIM)	approx. 3,6 Kg
		System-Communication-Unit (SCU)	approx. 3 Kg

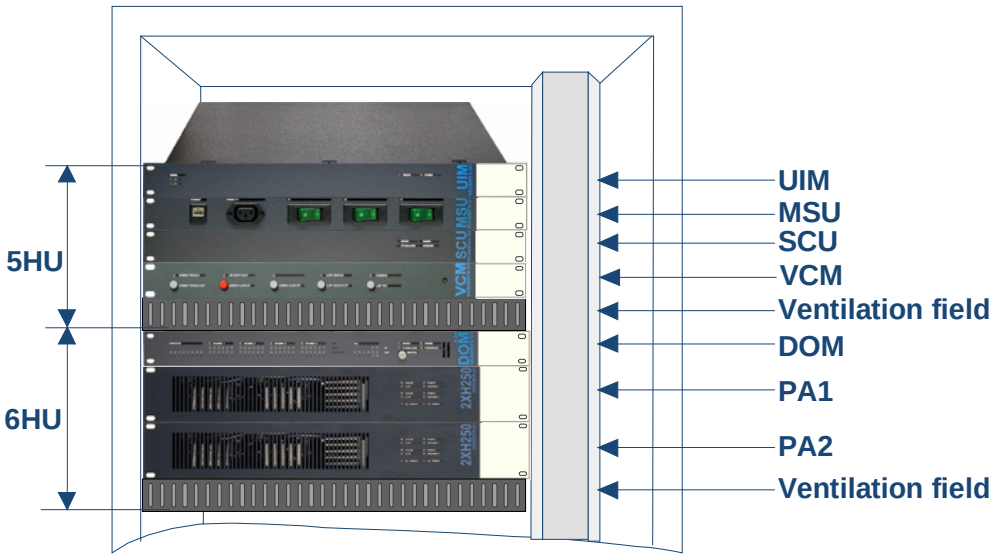


Fig. 9: Sample arrangement of the devices

- As a rule, in a cabinet, the heavy devices should be installed on the bottom and the lighter components should be installed towards the top. Two power amplifiers installed on top of each other must be additionally fastened with suitable installation brackets.
- If components are included in addition to the MSU (SCU, UIM, VCM), they should also be installed with a ventilation field below them and fastened with corresponding installation brackets.

5 Installation

Cable paths and installation

Only use the cable entries provided by the factory. Use separate cable entries and cable glands for the power supply and signal lines. All connected voltage and signal lines must be secured with suitable fastening material, e.g. plastic cable fasteners, so that they cannot come loose or move around.

Ensure that the power supply line cannot touch the signal lines (SELV) when moved. Work may only be performed on the system when it is de-energised and voltage-free (network and emergency power supply).

The devices in the floor type cabinet must be protected against moisture. To ensure this, all installation cables must be equipped with suitable cable sleeves at the sections passing through the entries, before they are fed into the floor type cabinet.

Openings and cable entries

Unused cable entries must be closed with suitable material. Open installation spaces in the pivot frame and/or installation cabinet must be closed with filler plates.

Fibre optic converter

Special fibre optic converters are required to connect the digital call station (DCS) or the interface module (UIM) to a DOM 4-xx via fibre optic cables (see “Accessories”).

The fibre optic cable connection increases the possible distance (cable path) between the DOM and a DAL bus device to max. 2000 m.

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

Protective and functional earth
For the device to function properly, the network side protective earthing (PE) connection must be connected to the correct terminal. The functional earth (FE) must also be connected to the PE rail.

Commissioning
A complete function test must be performed on the system upon completion of the commissioning as well as after every change to the customer data programming.

5.1 Wiring of the loudspeaker

5.1.1 Spur

The End of line module (EOL-Part No. 583496) for terminating the loudspeaker circuits for standardised system monitoring if more than 20 loudspeakers are connected per line. The EOL is connected at the end of the line, after the last loudspeaker.

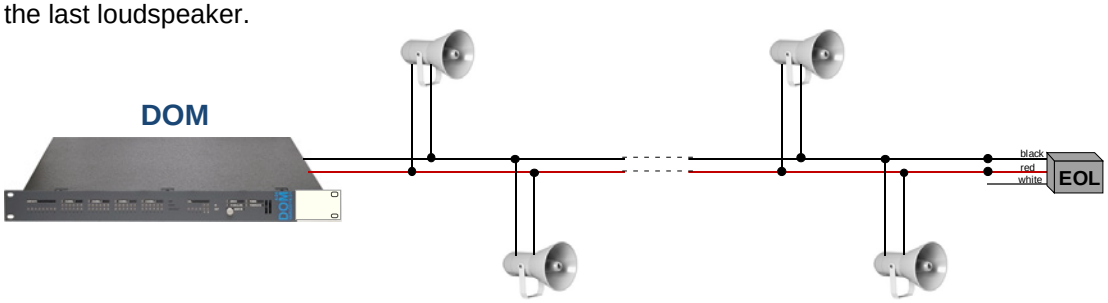


Fig. 10: Wiring with more than 20 loudspeaker

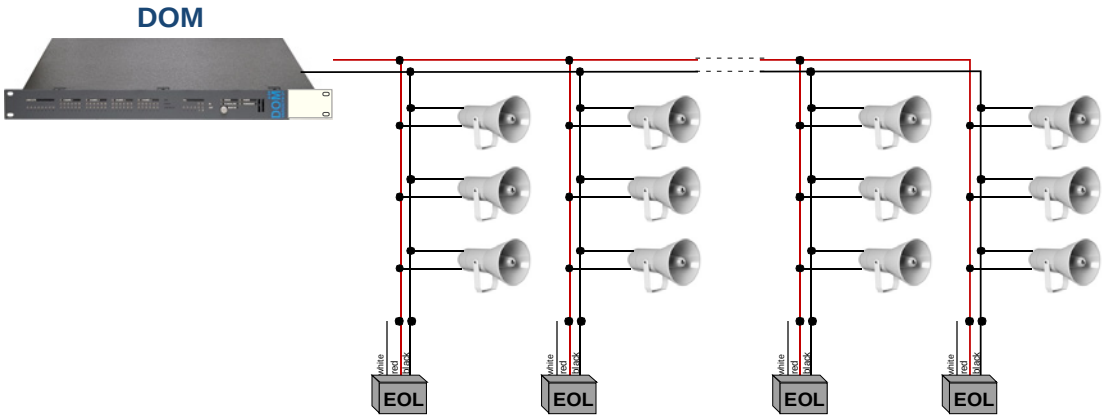


Fig. 11: Wiring of loudspeaker as monitoring spur line incl. EOL

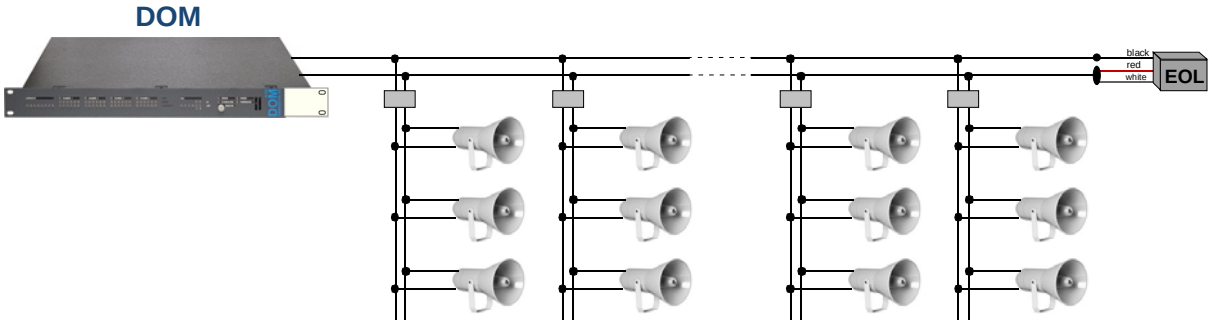
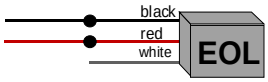
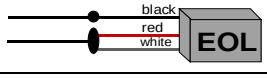


Fig. 12: Wiring of loudspeaker incl. EOL and volume controller

	Up to 250 W (inclusive)
	As of 250 W or with volume controller
	Volume controller (Part No. 581321, 581322, 581323)

- The loudspeakers can be connected using communications cable I-Y (St) Y n x 2 x 0.8 mm or comparable, for example. If a different, comparable cable type is used, please bear in mind the output and cable length required.
- Spur lines with volume controllers are not monitored!
- To ensure correct loudspeaker monitoring by means of impedance measurement, a maximum of 20 loudspeakers are permitted per line. If more than 20 loudspeakers are used, an End of Line module (EOL) must be connected.
- Max 5 EOL per spur.

5.1.2 Loop

Loudspeaker connection using loop technology with standardised cable monitoring enables redundant cabling including Loop Isolator Modules (LIM e. g. Part No. 583342).
The LIM is installed in the ring loop and isolates operational areas from areas where a short-circuit has occurred. This ensures complete loudspeaker functionality on the ring loop at all times.

Ring loop technology (schematic diagram)

The loudspeaker circuits are connected to the DOM and wired to the final amplifier output via the circuit relay. Each circuit is constantly monitored for short-circuit, earth fault, and interruption.
Either standard loudspeaker circuits or a loop line can be connected to the connection terminals of the loudspeaker outputs. A loop takes up the connection terminals for two standard loudspeaker circuits (outbound and inbound connection of the loop).

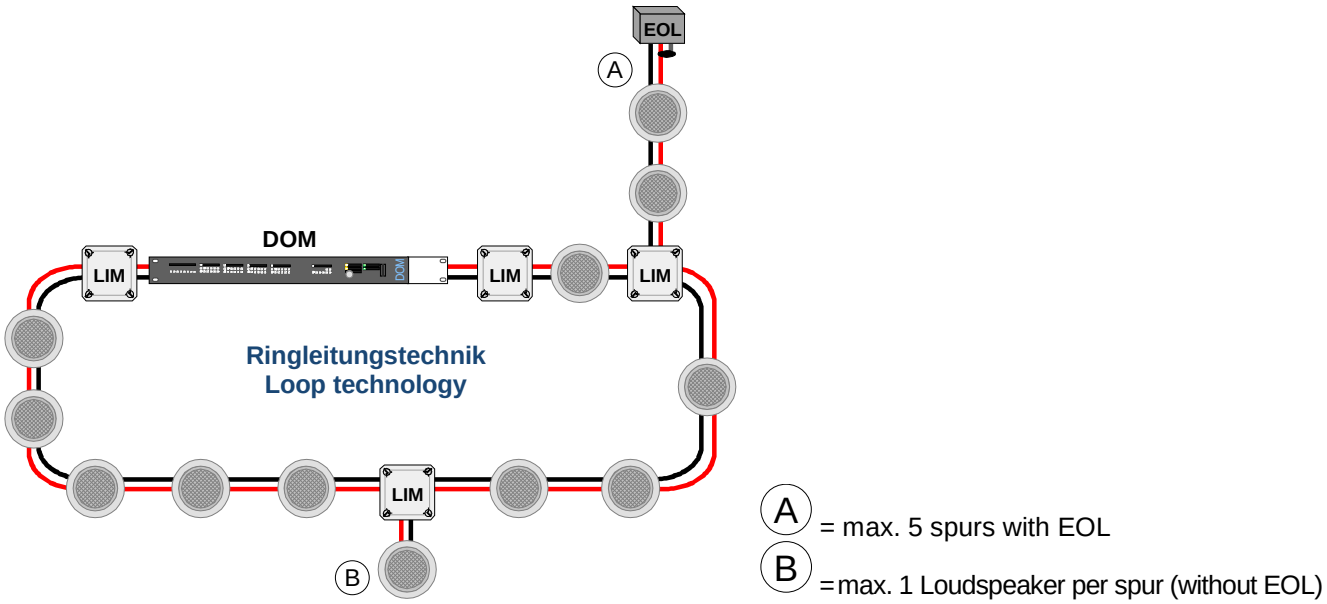


Fig. 13: Loop technology

- A power reserve of 20% per amplifier should also be planned in.
- The loudspeakers can be connected using communications cable I-Y (St) Y n x 2 x 0.8 mm or comparable, for example. If a different, comparable cable type is used, please bear in mind the output and cable length required.

Features

- Approved in accordance with EN 54-17 (included in the EN 54-16 approval of the VARIODYN® D1 System)
- Up to 4 rings per DOM4-8 or DOM4-24
- Up to 500 W power per loop
- Up to 5 spurs with more than one loudspeaker per loop (including EOL)
- Easy migration of existing spurs into the loop
- Fully fail-safe if each loudspeaker is fitted with an LIM
- Replaces A/B cabling
- Partially eliminates the need for E 30 cabling (DIN VDE 0833-4, chapter 7.10)
- Various standard cable types can be used for loudspeakers
- Cable leads can be wired in parallel to increase the cable cross-section - Do not route outbound and inbound loop conductors in the same cable or the same conduit

Amplifier	Maximum number of LIMs	Max loop length including spur lines
2XD250	40	1000
2XD400	64	1000
4XD250B	25	500
4XD300	40	1000
4XD500	50	1000

- No other amplifiers are approved for combination with LIMs
- Observe the maximum number of LIMs and the loop length for the amplifier used
- 20 % power reserve per amplifier should be planned in
- The maximum load is different for each amplifier and should be determined in consultation with the Technical Support.

Three operating modes can be implemented with a DOM4-8 or DOM4-24:

Fig. 14: Operation with up to 4 loop

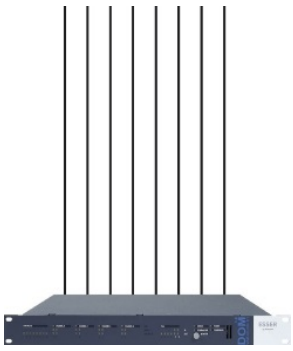


Fig. 15: Operation with up to 8 spurs

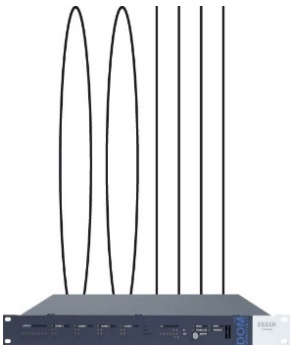


Fig. 16: Mixed operation, e.g. with 2 loops and 4 spurs (example)

Wiring example with 6 Fire section (FS)

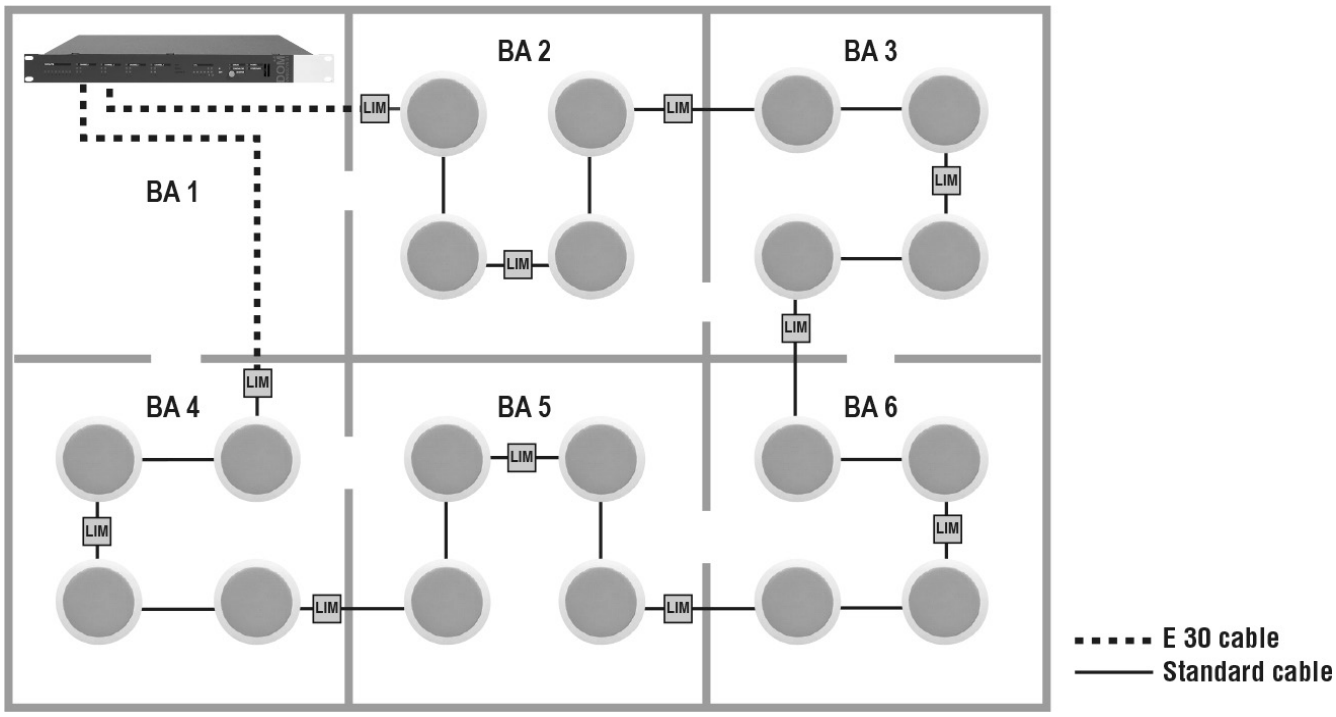


Fig. 17: Loop technology in place of A/B cabling (example)

- Do not route outbound and inbound ring conductors in the same cable or the same conduit.
- Maximum ring loop length 1000 m including connected spur lines (observe cable cross-section).
- Install LIM at the start and end of the loop. Maximum distance to DOM 10 m.
  - For performance calculation, use 3 watts per LIM
  - Twisted loudspeaker cable 2 x 1.5 mm² or communication cable I-Y (St) Y n x 2 x 0.8 mm can be used for the loop. Note the building-specific power requirements and permitted cable length!

6 Devices

6.1 Digital-Output-Module (DOM)

The DOM (Part No. 583361.22 or 583362.22) is the central control element of the VARIODYN® D1 System. Components such as the call stations, the double final amplifiers, and also the loudspeakers are connected to a DOM. A DOM offers interfaces to all input/output modules and also manages and monitors the loudspeaker circuits. Up to 250 DOM can be connected via the Ethernet connection to allow realisation of small to large VAS.

Fig. 18: Front view (the DOM4-24 is shown here)

Additional information on LED indicators and buttons can be found in the operating instructions (Part No. 798662.GB0).

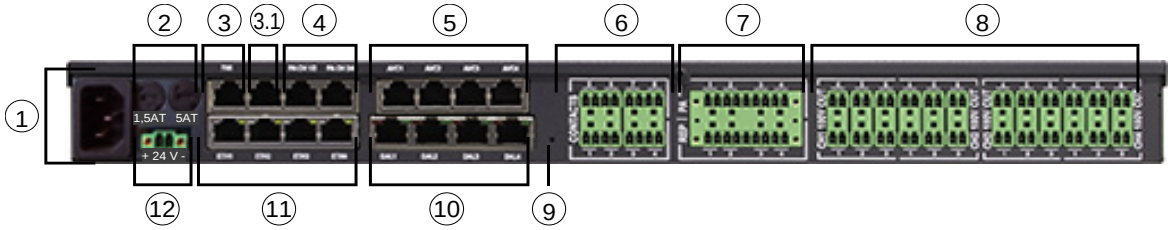
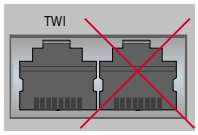


Fig. 19: Rear view Digital Output Module (DOM)

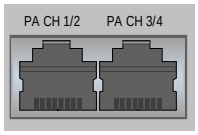
①	110 … 230 V AC nominal voltage via IEC power socket
②	Device fuses F1 and F2
③	Two wire interface (TWI), e.g. for connection of a time synchronisation module (TCM)
③.1	Do not connect!
④	2 x RJ45-plug connections ➔ AF output to power amplifier (PA)
⑤	AVC1 to AVC4 - 4 x inputs for automatic volume control (AVC)
⑥	Connection terminals of the eight potential-free control contacts (switching capacity max. 30 V AC / 1 A or 30 V DC / 1 A)
⑦	Plug connection to the output of the power amplifier (prefabricated system cable available). The terminals of the SPK-outputs are designed with touch protection • Four power amplifier inputs (PA) • Four power amplifier backup inputs (REP)
⑧	Connection of the loudspeaker circuits • DOM4-8: 4 channels, each with 2 circuit relays • DOM4-24: 4 channels, each with 6 circuit relays
⑨	Do not activate button – for internal use und service only
⑩	DAL1 to DAL4 - 4 x RJ45-plug connections ➔ DAL bus / device
⑪	ETH1 to ETH4 - 4 x RJ45-plug connections ➔ Ethernet network 100 Mbit/s with switch function
⑫	24 V DC Emergency power supply (if available)

① 110 … 230 V AC – Rated voltage	
	A power supply cable is included in the delivery. Observe local standards and guidelines prior to operation. Alternatively, the connection can take place via the main switch unit (MSU). See chapter 6.3. Exception: DOM (Part No. 583361.22.UL and 583362.22.UL)

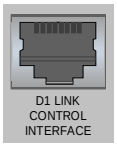
② Fuses		
		Device fuses F1 = 1.6 AT / 250 V and F2 = 5 AT / 250 V Never repair or bridge the device fuse that is installed or replace it with anything other than the stated type!

③ Two Wire Interface (TWI)	
	Connection option for a time synchronisation module (TCM),a Contact-Interface-Module (CIM), a service PC, or an fire alarm control panel. Do not connect second jack!

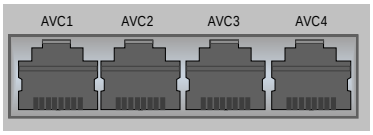
A TWI-RS232 adapter (Part No. 583386.21) is also required for connecting the service PC and the FACP.

④ PA CH1/2 and PA CH3/4 (output to power amplifier)	
	0 dB signal output for connection to a power amplifier (PA).

Power amplifier (PA)

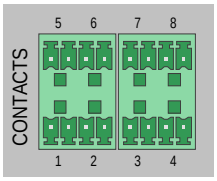
Connection	PIN	Assignment of RJ45 socket for connection to a DOM	
	1	CH2 IN+	Systematic input for channel 2 (CH2)
	2	CH2 IN-	
	3	System Error	Normal operation: + 24 V (12 V … 24 V), Aux (battery) supply error 0 V, mains (110 …230 V) supply error 24 V intermittent
	4	CH1 IN+	Systematic input for channel 1 (CH1)
	5	CH1 IN-	
	6	0 V	0 V reference potential for the connection to VARIODYN® D1
	7	Ext. 24 V	Ext. 24 V active ➔ 'Ext. amp enable' PIN monitored
	8	Ext. amp. enable	Switch off channel 1 (CH1) and channel 2 (CH2) ➔ High level (12 V … 28 V)

⑤ AVC1 to AVC4 (inputs for the automatic volume control AVC)



Up to 2 sensor microphones each can be connected to the AVC inputs. The automatic volume control (AVC) is regulated via the sensor microphones. Audio equipment may also be connected. AVC4 can optionally be used as a high-level input for external devices (e.g. CD player, etc.).

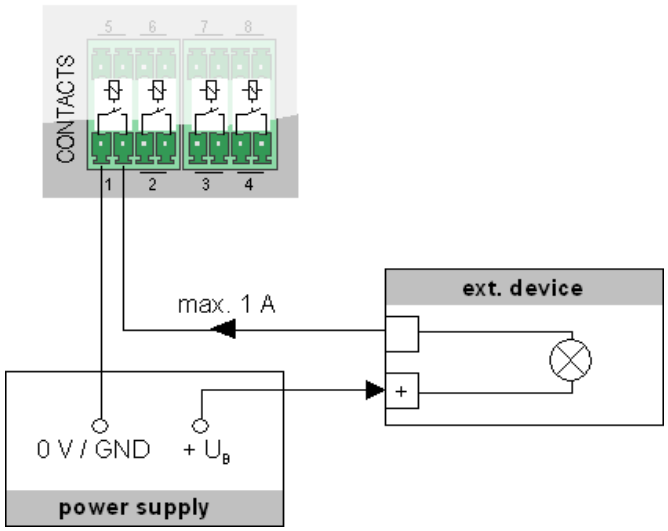
⑥ 8 potential-free control contacts



The potential-free control contacts can be used to control external devices or perform switching operations (e.g. activation of emergency call points, fire alarm systems, and telephone exchanges) with the control contacts (NO/NC contacts). Max. switched load 30 V AC / 1 A or 30 V DC / 1 A.

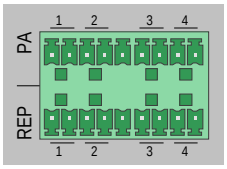
The function of the control contacts is defined in the system configuration:
Normally open (NO) - factory default
or
Normally closed (NC)

Connection example:



For information on backup amplifiers, see Chapter 7.7.

⑦ IN REP / PA (100 V AF signal input)



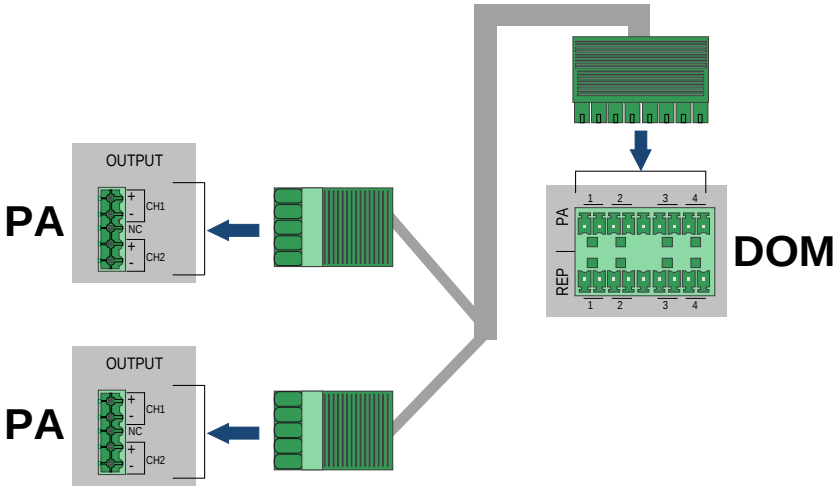
These terminals are designed with touch protection.

- 4x power amplifier inputs (PA)
- 4x power amplifier backup inputs (REP)

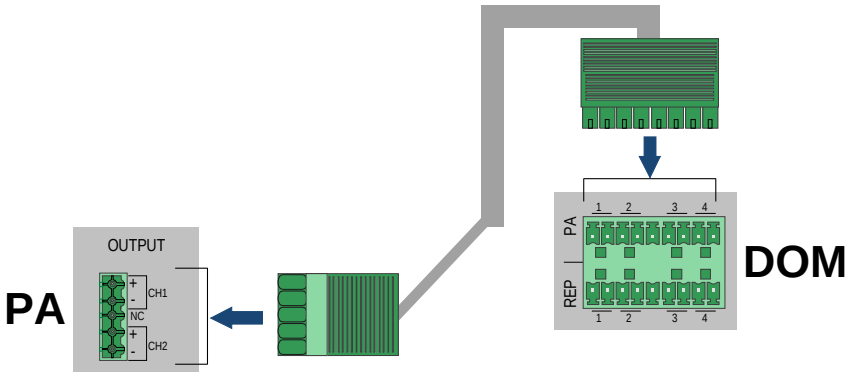
The AF signals modulated by the power amplifier are connected to these connection terminals of the DOM and run from there internally to the individual loudspeaker circuits (use only system cables).
Backup amplifiers are also connected using specific backup cables (see product group catalogue).

Max. cable cross-section: 1.5 mm²

Connection example amplifier:

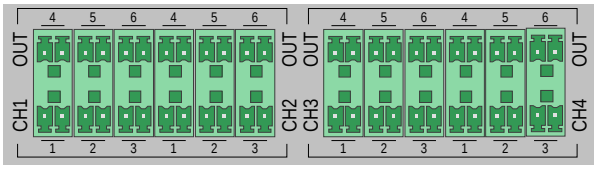


Output cable (Part No. 583477.21).



- DOM Flex Applications for 2XD- and 4XD-Amplifier see Chapter 6.1.3.
- For information on backup amplifiers, see Chapter 7.7.

⑧ CH1 to CH4 SPK OUT (loudspeaker circuits)



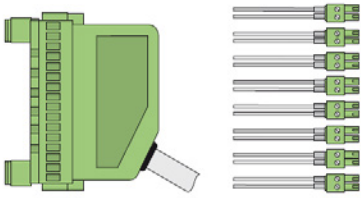
Connections for the loudspeaker circuits

The DOM4-8 and DOM4-24 modules are equipped with four independent audio outputs in order to control four amplifier channels.
Each audio output

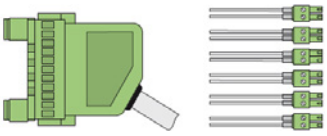
- can control two switched loudspeaker circuits (i.e. max. 8 circuits) in the case of the DOM4-8,
- can six switched loudspeaker circuits (max. 24 circuits) in the case of the DOM4-24.

When connecting a backup amplifier, connect the backup cable RC 22 (Part No. 583422.21) here.

Cable for Cabinet Rear Panel DOM4-8 (Part No. 583451.21) and DOM4-24 (Part No. 583452.21)
Refabricated cabling of the SPK outputs of the DOM4-8 to the cabinet rear panel
One cable per DOM4-8 or up to four cables per DOM4-24 can be connected. Also suitable for cabling DOM4-x switch contacts to the rear cabinet wall.

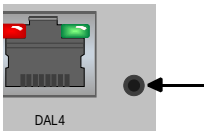


Cable for DOM4-8 (Part No. 583451.21)



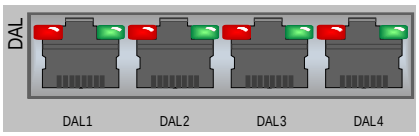
Cable for DOM4-24 (Part No. 583452.21)

⑨ Reset button



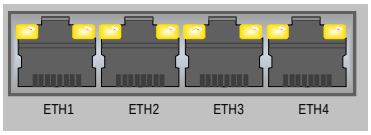
Do not press button – for factory testing only

⑩ DAL1 to DAL4 (Digital Audio Links of the DOM)



Connections for the DAL bus. The devices (e.g. call stations or UIM) connected to the DAL bus are controlled and supplied with the required operating voltage via the connection.

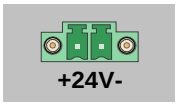
⑪ Ethernet ETH1 to ETH4 (network connection)



ETHERNET network connections (100 Mbit/s, with switch function) for connecting the individual components in a TCP/IP network.

The standard IP address of the DOM: “192.168.1.246”.

⑫ 24 V DC Back-up power supply



24 V DC connection of the power supply (if present)

Monitor button (on the front panel)

The monitor button can be used to listen in to the audio outputs and inputs on the DOM.

Pressing the button repeatedly will run through the individual listening points. The current listening point is indicated by flashing (green) of the respective LED. Listening is automatically stopped after a preset time (default = 180 seconds) or can be manually stopped by pressing the monitor button for a longer time.

A fault in the system is indicated by a blinking LED “ERROR” light and a warning signal generated by the integrated buzzer.

The acoustic signal can be acknowledged by pressing the monitor button a single time (mute buzzer).

6.1.1 Lithium Battery

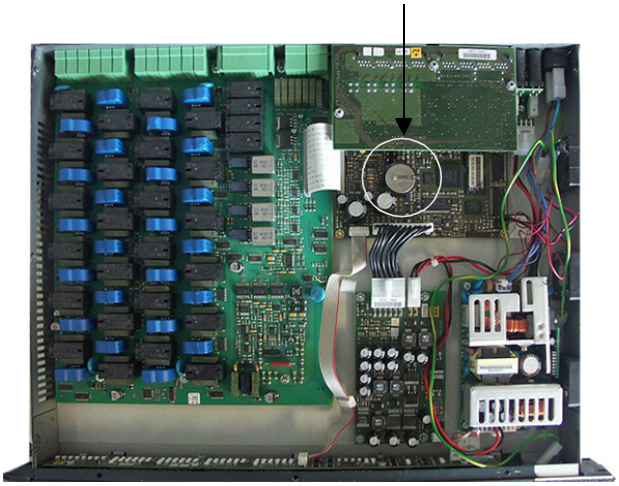


Fig. 20: Location of the battery with open housing

A 3 V lithium battery (type CR2430) is integrated into the DOM unit to protect the customer data. In order to ensure the protection over the long term, this battery should be replaced after no more than five years, such as during regular maintenance.

To do this, save the customer data to the service PC, switch off the power supply (mains and battery), carefully open the DOM housing, remove the battery and replace with an identical or equivalent battery type.

Insert the new battery, carefully close the housing, switch on the power supply (mains and battery) and transfer the saved customer data from the service PC back to the DOM.
Perform a function test!

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

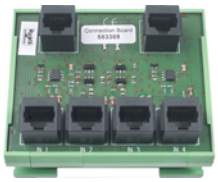
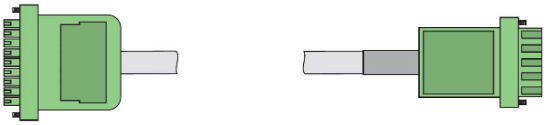
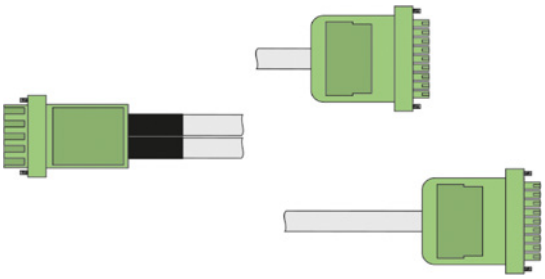
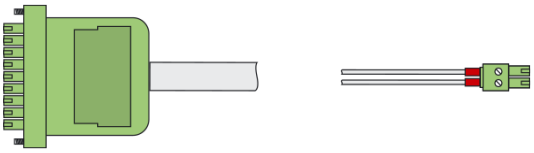
6.1.2 Specification - DOM

Audio output		
Output type	:	Electronically symmetrical
Nominal level	:	0 dBu
Max. output level	:	+ 6 dBu
Frequency range	:	20 Hz … 20 kHz
Max. variance from linear frequency	:	± 1 dB in the frequency range
Distortion factor at nominal level	:	0.03 % @ 1 kHz
Max. distortion factor	:	0.05% in the frequency range
Signal-to-noise ratio at nominal level	:	> 75 dB (A) -weighted, > 70 dB unweighted
Load impedance min.	:	min. 5 kΩ, max. 500 pF
Sensor input (Automatic Volume Control AVC)		
Input type	:	Symmetrical non-earthed
Nominal level	:	- 51 dBu
HP input	:	0 dBµ
Frequency range	:	100 Hz … 8 kHz
Max. variance from linear frequency	:	± 6 dB in the frequency range
Distortion factor at nominal level	:	< 0.02 % at 1 kHz
Max. distortion factor	:	1 % in the frequency range
Signal-to-noise ratio at nominal level	:	> 65 dB A-weighted, > 60 dB unweighted
Input impedance	:	typ. 200 Ω
8 control contacts		
Contact type	:	relay contact, potential-free
Max. voltage	:	30 V AC / 1 A or 30 V DC / 1 A
Max. current	:	5 A constant current
Impulse withstand voltage	:	Min. 1.5 kV
Pass-through contacts (Audio)		
Max. voltage	:	250 V AC / 5 A or 30 V DC / 5 A
Impulse withstand voltage	:	min. 1.5 kV
General specifications		
Mains voltage	:	110 … 230 V AC, +10 % / - 15 %
Rated frequency	:	50 … 60 Hz
Emergency power supply	:	24 V DC
Current consumption	:	1.3 A @ 24 V DC
Power rating	:	40 W / 70 W @ 110 … 230 V AC DOM4-8 (without / with 4 x DAL)
Power rating	:	50 W / 80 W @ 110 … 230 V AC DOM4-24 (without / with 4 x DAL)
Battery	:	3 V - Lithium (type CR2430 or equivalent)
Ambient temperature	:	-5 … +55 °C
Storage temperature	:	-10 … +60 °C
Humidity	:	15 % … 90 % rel. hum. (non-condensing)
Housing	:	metal
Color	:	grey, similar to RAL 7016
Weight	:	DOM 4-8 ➔ 5,7 kg / DOM 4-24 ➔ 6,8 kg
Dimensions (W x H x D)	:	483 x 44 x 360 mm (1 HU)
Specification	:	EN 54-16

6.1.3 DOM Flex Applications for 2XD- and 4XD-Amplifier

Using DOM Flex applications, a DOM or VARIODYN® D1 Comprio can operate flexibly with the optimal number of amplifier channels. All applications are compatible with existing components such as a DOM, VARIODYN® D1 Comprio, and amplifiers that comply with EN 54-16 certification.
The amplifiers are optimally installed according to their output, so that each amplifier channel operates with the ideal number of loudspeaker lines.

This simply requires the use of relevant amplifier output cables and in the case of application 1–24, a connection board.

Description	Part No.	Figure
Connection Board	583369	
Output cable1-18 (1 channel up to 6 lines) (1 channel up to 18 lines)	583430	
Output cable 2-12 (2 channels each up to 12 lines)	583431	
Output cable 1-24 (2 channels each up to 24 lines)	583432	
Backup cable RC 41 VARIODYN® D1	583441.10	
Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A	

6.1.4 Application 2-12

Application 2–12 operates with a DOM with two amplifier channels. Each amplifier channel supplies 12 loudspeaker lines. When using a four-channel amplifier, an extra DOM and the application 2–12 can use the remaining two channels.

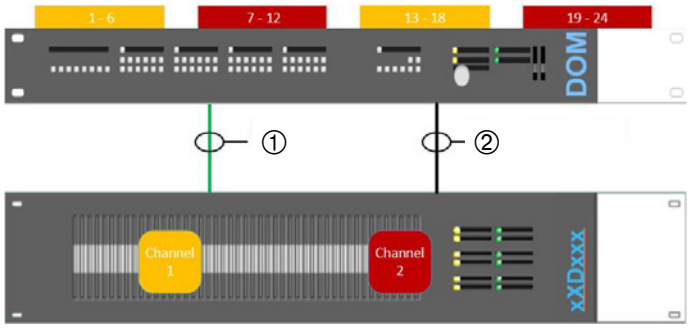


Fig. 21: Overview application 2-12

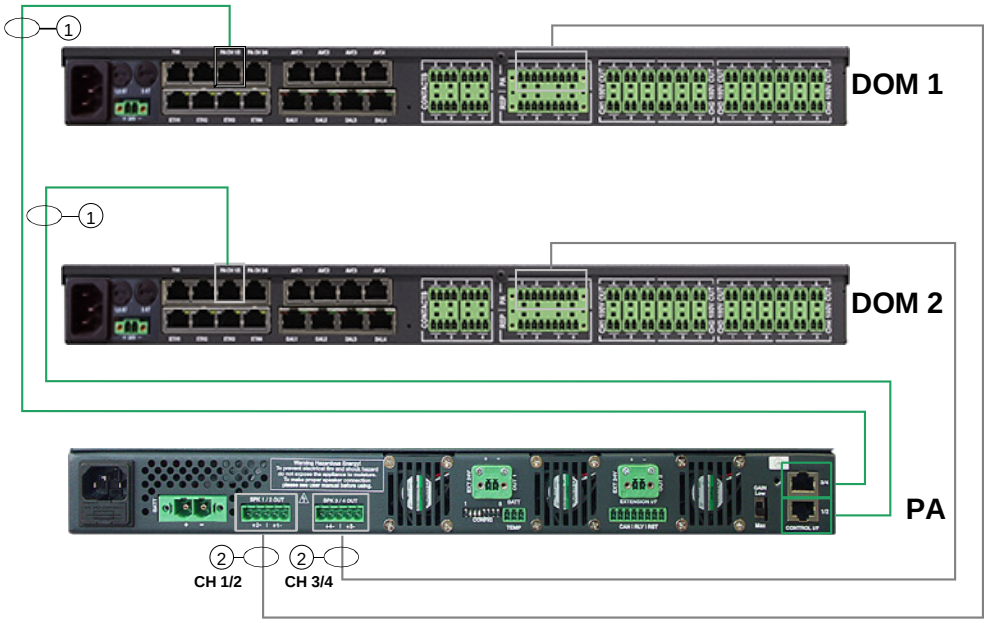


Fig. 22: Input / output connection (Example with 4XD125B)

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
②	Output cable 2-12 (2 channels each up to 12 lines)	583431

6.1.5 Application 1-18

Application 1–18 operates with a DOM with two amplifier channels. The first amplifier channel supplies 18 loudspeaker lines. The second channel supplies six loudspeaker lines and can be used with amplifiers 4XD125B and 4XD250B for backup. The two other channels can be used with application 2–12, for example.

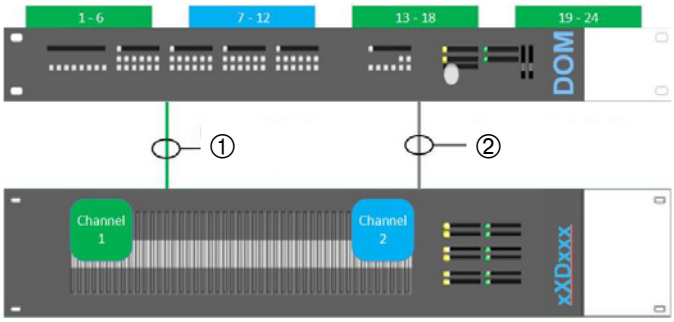


Fig. 23: Overview application 2-18

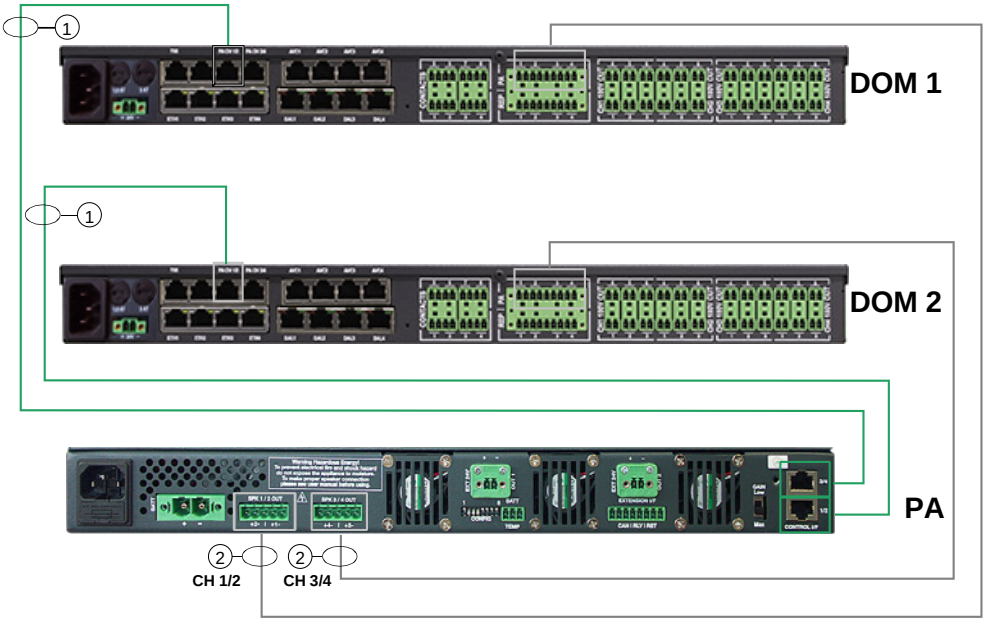


Fig. 24: Input / output connection (Example with 4XD125B)

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
②	Output cable1-18 (1 channel up to 6 or 18 lines)	583430

6.1.6 Application 1-24 – Variant 1

Application 1–24 – variant 1, operates with three DOM, each with an amplifier channel. The amplifier channel supplies all the loudspeaker lines of the DOM = 66 zones per amplifier + backup for all three DOM.

- This application, including backup on channel 2, is solely permitted with amplifiers 4XD125B and/or 4XD250B.
- The spare connections on the connection board must not be used to connect additional amplifiers.

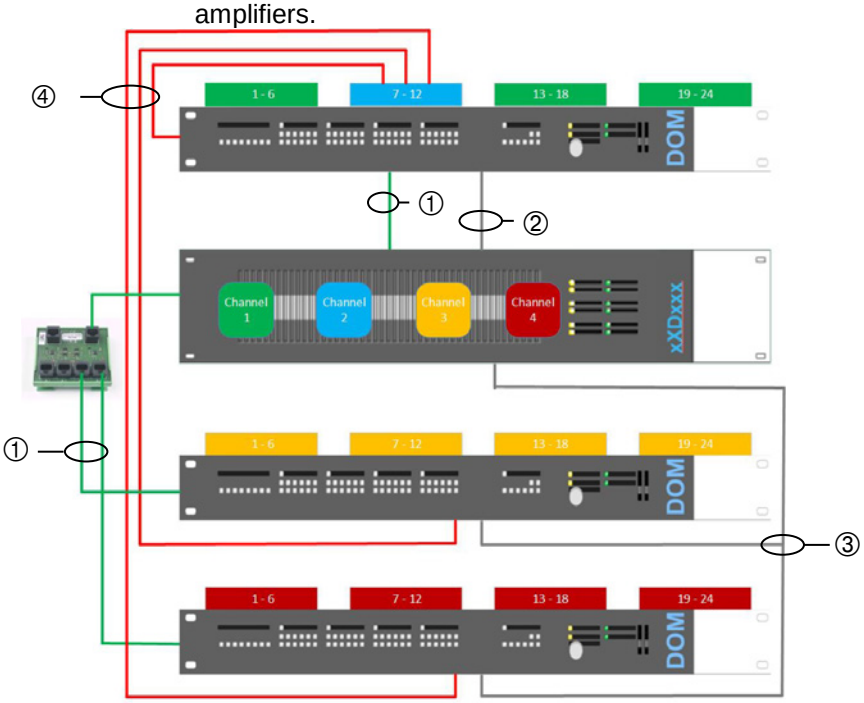


Fig. 25: Overview application 1-24 – Variant 1

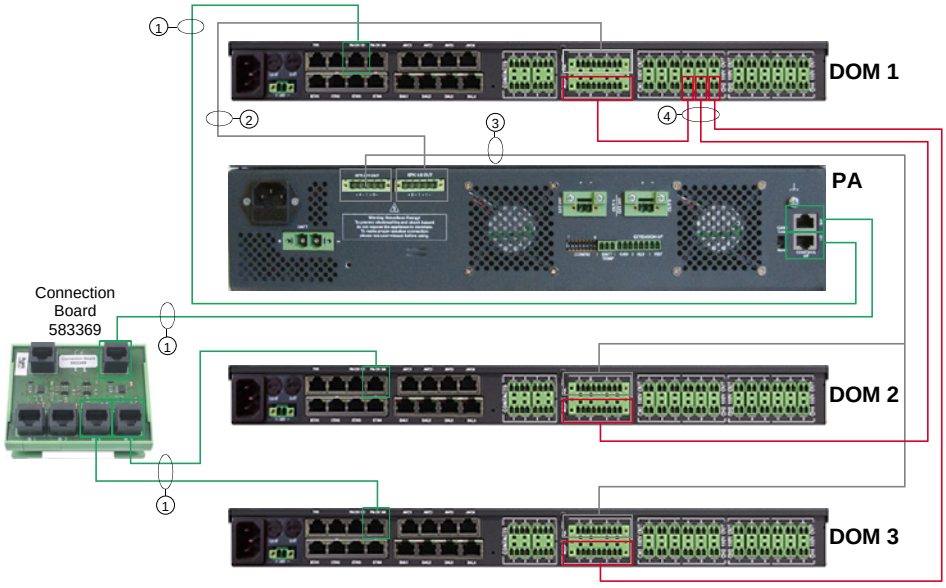


Fig. 26: Input / output connection

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
②	Output cable1-18 (1 channel up to 6 or 18 lines)	583430
③	Output cable 1-24 (2 channels each up to 24 lines)	583432
④	Backup cable RC 41 VARIODYN® D1	583441.10

6.1.7 Application 1-24 – Variant 2

Application 1–24 – variant 2, operates with four DOM, each with an amplifier channel. The amplifier channel supplies all the loudspeaker lines of the DOM – a total of 96 zones. No backup.

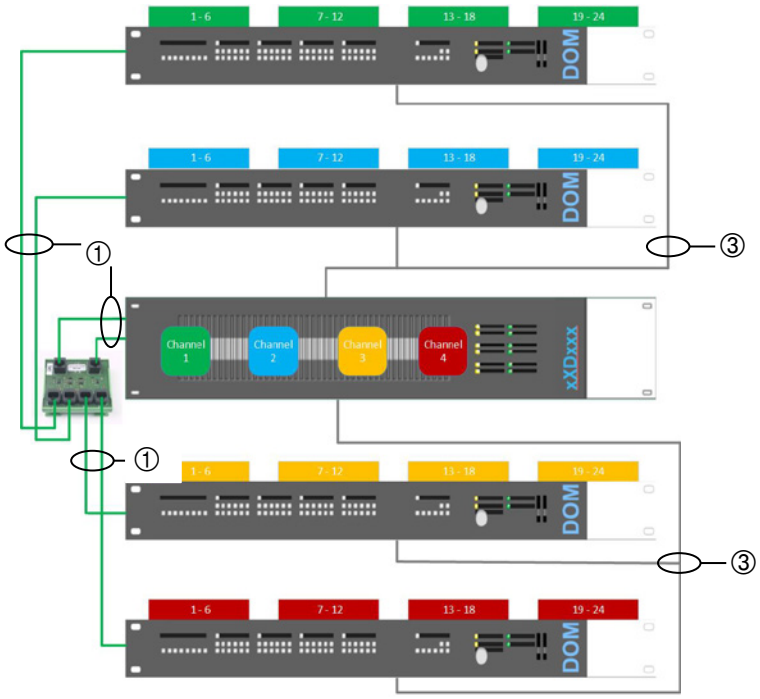


Fig. 27: Overview application 1-24 – Variant 2

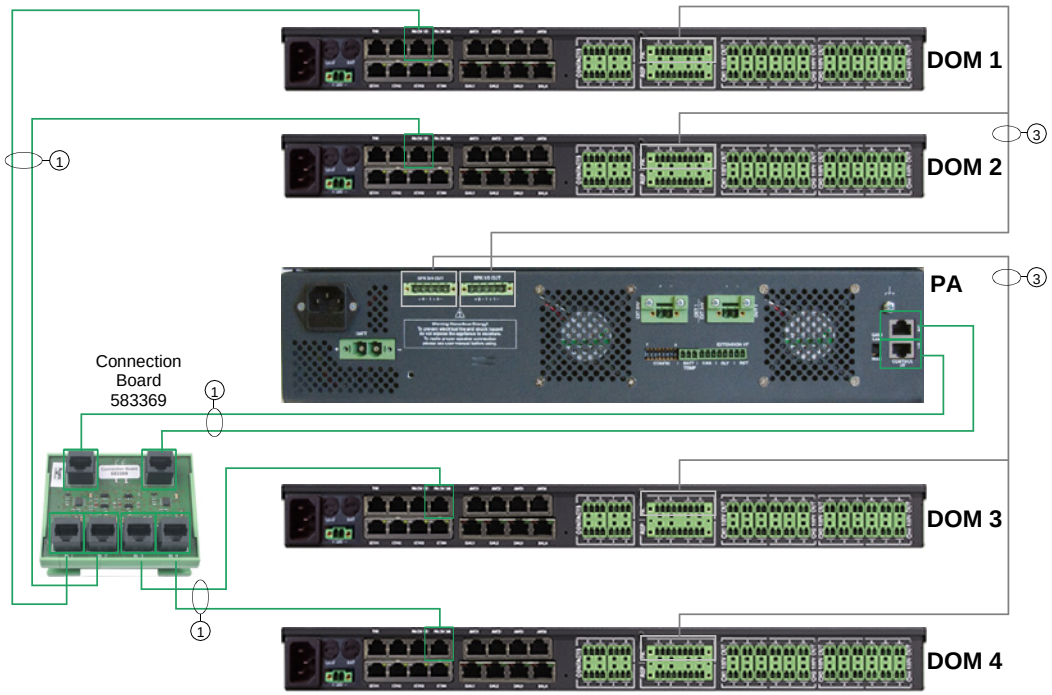


Fig. 28: Input / output connection

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
③	Output cable 1-24 (2 channels each up to 24 lines)	583432

6.1.8 Application 1-24 – Variant 3

Application 1–24 – variant 3, operates with four DOM, each with an amplifier channel. The amplifier channel supplies all the loudspeaker lines of the DOM, separated according to A and B ≙ 96 AB zones. No backup.

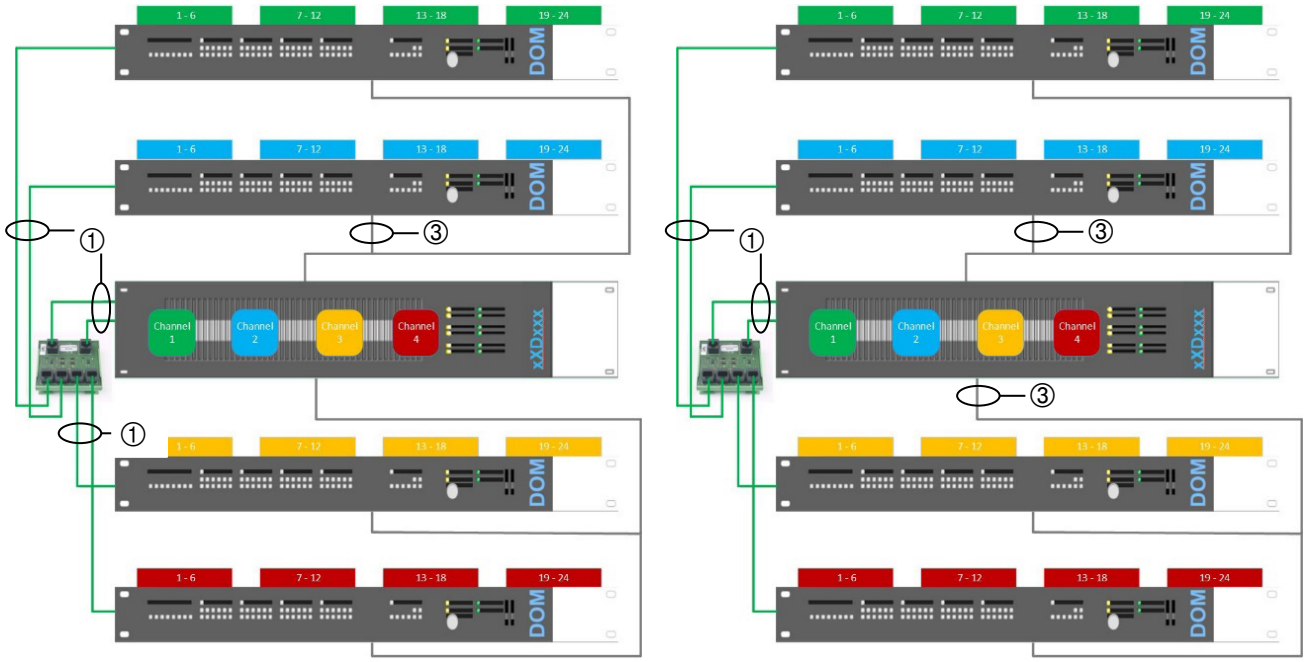


Fig. 29: Overview application 1-24 – Variant 3

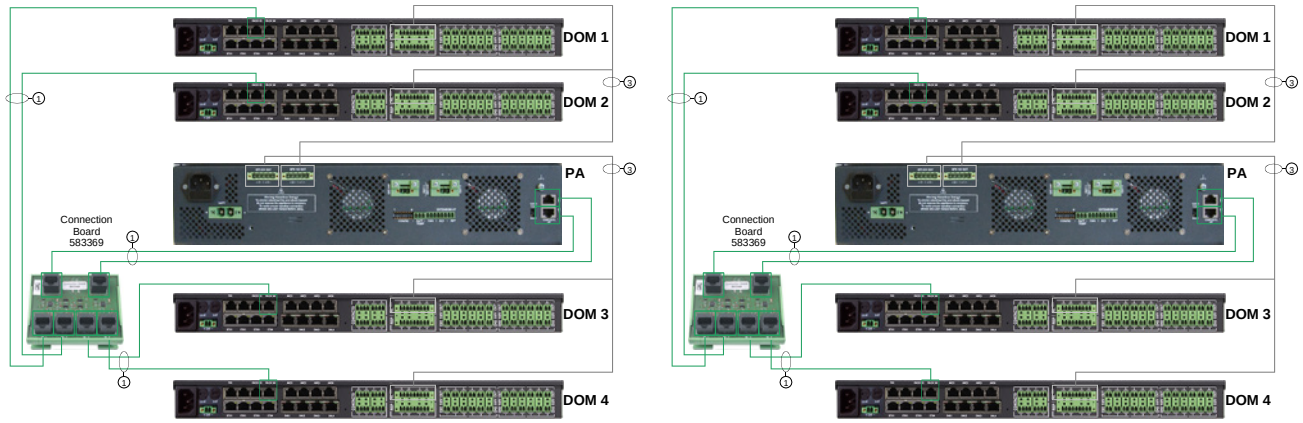


Fig. 30: Input / output connection

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
③	Output cable 1-24 (2 channels each up to 24 lines)	583432

6.1.9 Application 1-24 – Variant 4

Application 1–24 – variant 4, operates with two DOM with amplifiers 2XD250 or 2XD400.

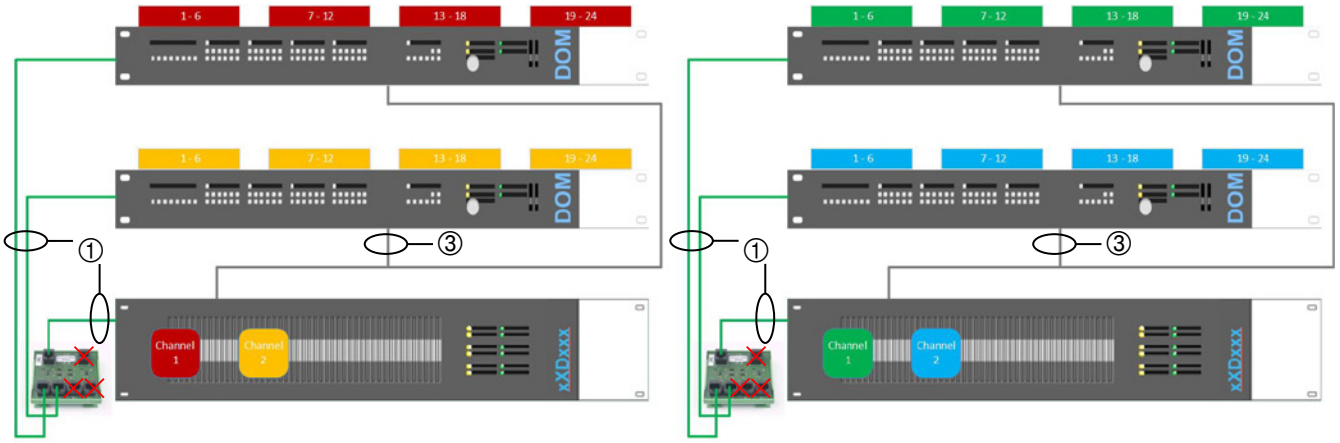


Fig. 31: Overview application 1-24 – Variant 3

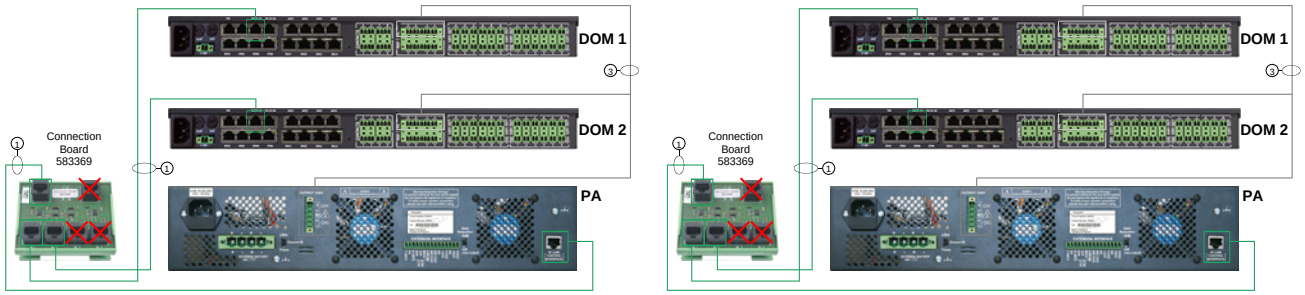


Fig. 32: Input / output connection

The spare connections ✕ on the connection board must not be used to connect additional amplifiers.

①	Input cable DOM amplifier (0,5 m, green) ➔ audio frequency (AF), control to power amplifier (PA)	583491 or 583491A
③	Output cable 1-24 (2 channels each up to 24 lines)	583432

6.2 View-Control-Module (VCM)

The View Control Module (Part No. 583351) allows the standard-compliant display of collective messages as well as operation via the five integrated buttons. For VAS according to EN 54-16, at least one VCM required. For every additional room with VAS installation cabinets, a separate VCM must be used.

The module is connected to a Universal Interface Module (UIM) and supplied with 24 V DC via the emergency power supply. The first contact of DOM 1 must be connected to one of the VCM inputs for monitoring of the life sign signal of the DOM.

The VCM is configured via the programming and service software Designer D1.

Fig. 33: Front view of View-Control-Module (VCM)

Additional information on the indicators refer to operating instructions (Part No. 798662.GB0).

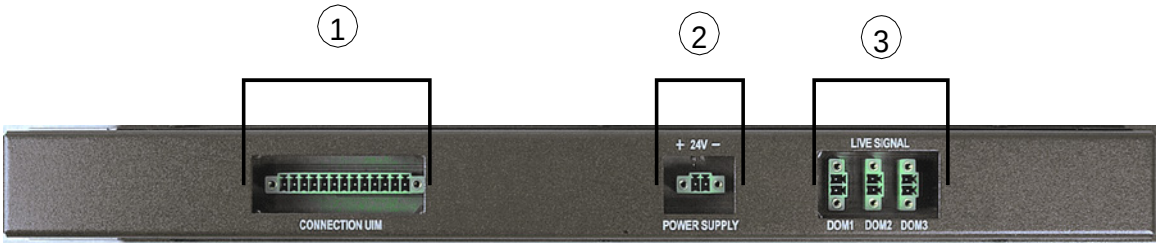
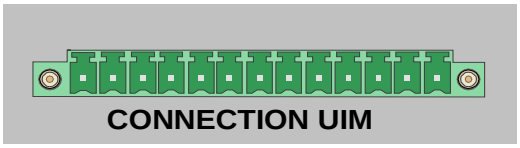


Fig. 34: back view of View-Control-Module (VCM)

①	Plug-in connection for connecting the control contacts of the UIM. The terminals are designed with touch protection.
②	24 V DC power supply
③	3 inputs for monitoring the DOM life sign signals.

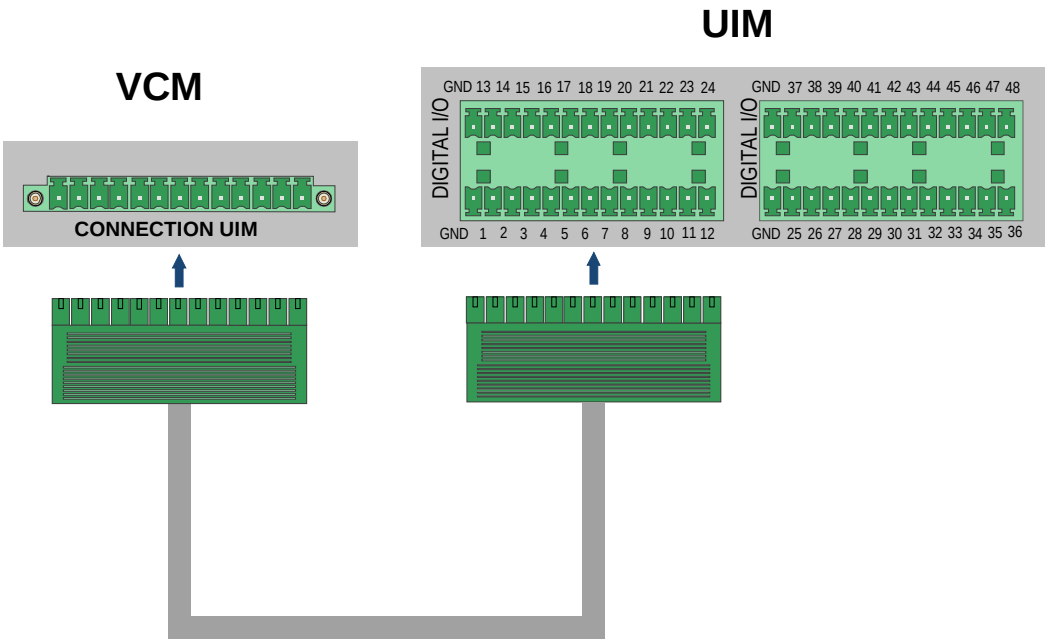
View-Control-Module (VCM) ➔ UIM and DOM connection

① Connection of the VCM



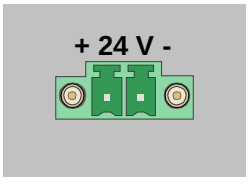
The collective messages are passed on to the VCM via the control contacts of the UIM and displayed on the VCM. Use the prefabricated cable for the connection.

Connection example ➔ UIM



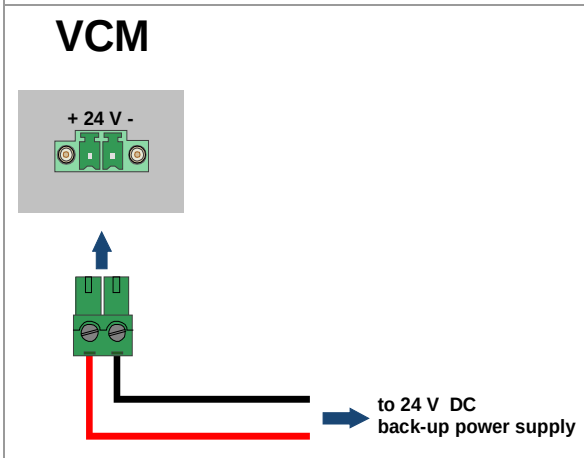
For the connection diagram of the UIM inputs/outputs, see chapter 6.4.

② 24 V DC power supply



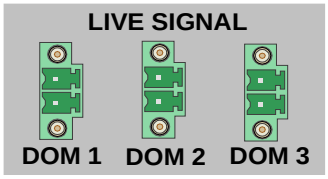
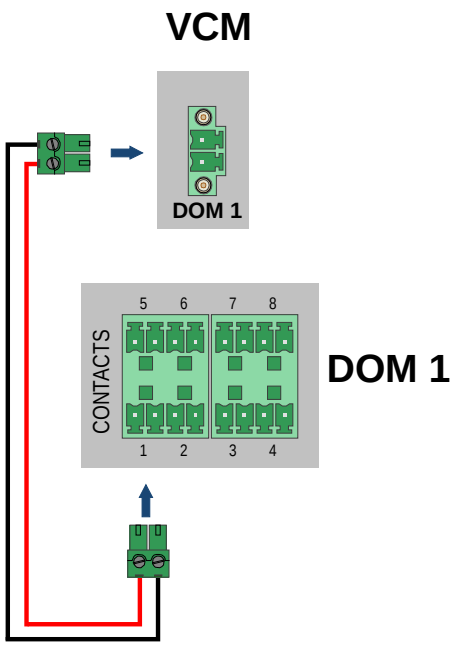
The supply of 24 V DC to the VCM takes place via the 24 V DC emergency power supply. Use cable type I-Y (St) Y 2 x 2 x 0.8 mm and the enclosed two-pin plug to make the connection.
Max. cable cross-section: 1.5 mm²

Connection example ➔ 24 V DC



Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

③ Connection of the DOM	
	Monitoring of the life sign signals takes place via the control contacts of DOM 1. Use cable type I-Y (St) Y 2 x 2 x 0.8 mm and the enclosed two-pin plug to make the connection. The connection to one DOM is sufficient for monitoring of the life sign signals. Max. cable cross-section: 1.5 mm²
Connection example → DOM	
	

- Do not connect terminals DOM 2 and DOM 3.
- For the connection diagram of the DOM inputs/outputs, see chapter 6.1.

6.2.1 Specification - VCM

Back-up power supply	:	24 V DC
Power consumption	:	10 mA @ 24 V DC
Air Humidity	:	40 % … 90 % rel. hum. (non-condensing)
Ambient temperature	:	-5 °C … +55 °C
Storage temperature	:	-10 °C … +60 °C
Housing	:	metal
Colour	:	grey, similar to RAL 716
Weight	:	approx. 0,9 kg
Dimensions (W x H x D)	:	483 x 44 x 33 mm (1 HU)
Specification	:	EN 54-16

6.3 Main Switch Unit (MSU)

The Main Switch Unit (Part No. 583371.21) is used to individually safeguard the power supply of all VARIODYN® D1 components that are installed in a floor type cabinet. Up to three components can be connected to a MSU.

Each of the three connections can accept a current of max. 18 A. The overcurrent switch (per connection) is automatically triggered if there is an overcurrent, but can also be used for manually switching the 230 V AC rated voltage. If a supply voltage is present and the fuse is switched on, the respective indicator light will light up in green.

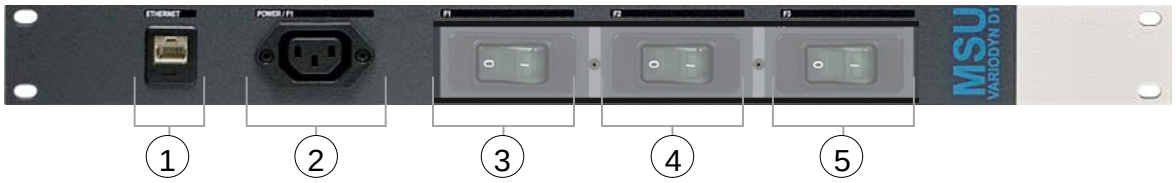


Fig. 35: Front view of main switch unit (MSU)

Additional information on the indicators refer to operating instructions (Part No. 798662.GB0).

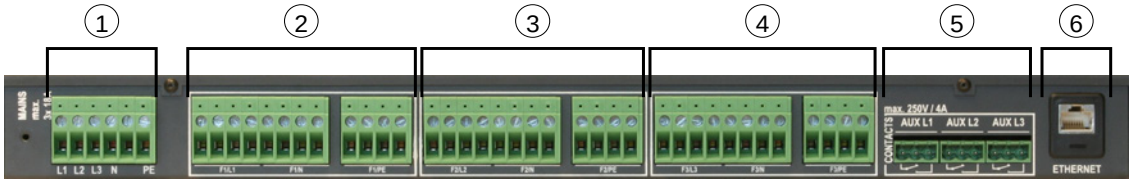
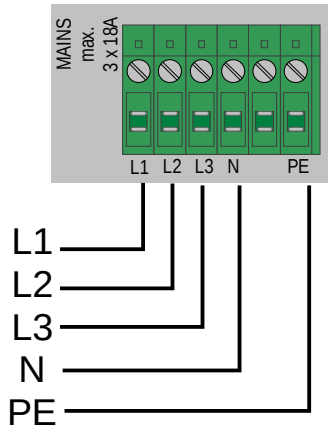


Fig. 36: Rear view of main switch unit (MSU)

①	Connection of the individual (max. 3) power supply phases L1 / L2 and L3. Maximum cable cross-section of 4 mm² (flexible) to 6 mm² (rigid). The protective earthing conductor (PE) and neutral conductor (N) must always be connected.
②/③/④	Up to 4 components can be connected to terminals 2, 3 and 4, in accordance with the requirements. These terminals can be single switched as a single pole with the fuses arranged on the front.
⑤	Potential-free switch contacts for activating external devices for the remote display of the switching status of the corresponding overcurrent circuit breaker. Max. cable cross-section 2.5 mm²
⑥	RJ45 socket ➔ Ethernet connection to DOM The rear-side Ethernet connection is connected to the front-side Ethernet connection (for direct connection of the service PC on the front side of the MSU).

- **Neutral conductor**
  - As a rule, it must be ensured that the neutral conductor is properly connected.
  - In particular, for three-phase connected devices in VARIODYN® D1 cabinet systems, suitable protection must be provided against overvoltage caused by a break in the neutral conductor and the phase shift which may result from this.
  - For single-phase connected devices, suitable protection against overcurrent must be ensured to guard against the consequences of a break in the neutral conductor (usually caused by the operator).
- Observe permitted torque (max. 0.4 Nm) of the terminals!

① L1-L3, N, PE



Connection of the 230 V AC rated voltage L1 / L2 / L3 and N / PE.

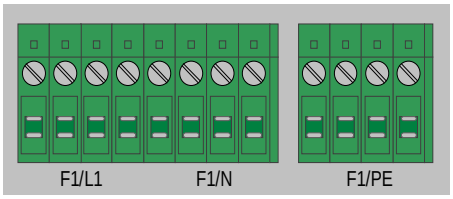
Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures

Before handling electronic modules, always take suitable precautions to prevent static electricity.

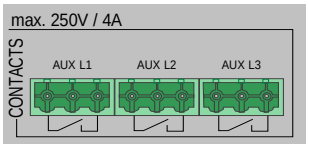
The control panels must only be connected to the mains by qualified electricians and in compliance with all relevant standards and guidelines.

② - ④ Fx/Lx, Fx/N, Fx/PE



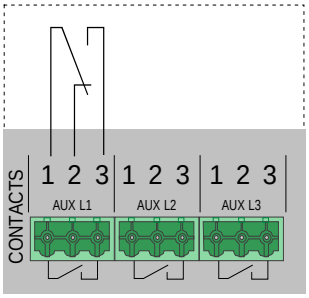
Up to 4 components can be connected to the three connection terminals (phases). Each phase is protected by a separate overcurrent circuit breaker. The front-side IEC power socket is also supplied via phase 1 (L1). All 3 phases can be switched individually via the front-side switches.

⑤ Switch contacts

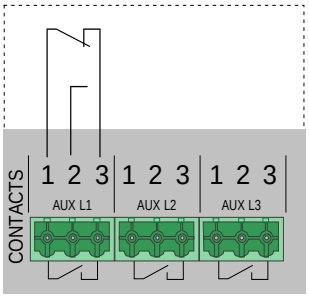


The switch contacts (AUX L1, L2, L3) are assigned to the overcurrent circuit breakers (L1, L2, L3) on the front side. Each switch contact is activated when the associated overcurrent circuit breaker is tripped.

When switched off, contact 1 is connected with contact 2; when switched on, contact 1 is connected with contact 3.

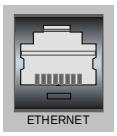


Example with overcurrent switch 2 (switch contact AUX L2)
Overcurrent protection contact switched off
Control contacts 1 + 2 closed



Switched on: contact 1 with contact 3

⑥ ETHERNET



RJ45 socket ➔ Ethernet connection to DOM

Connection Main-Switch-Unit (MSU) ➔ DOM and PA

1. Connect 230 V AC rated voltage / emergency power supply to the terminal block ① of the MSU.
   The protective earthing conductor (PE) and neutral conductor (N) must always be connected.
2. Connect the prefabricated power cord to the terminal block ② of the MSU and to the IEC power socket ① on the rear side of the DOM.
3. To connect a power amplifier (PA) to the MSU, another prefabricated power cord must be connected to terminal block ③ of the MSU for each amplifier and to the IEC power socket of the respective amplifier.
4. Use a CAT5 patch cable (yellow) to connect the ETHERNET connection of the MSU and of the DOM.
5. If a second amplifier (PA) is present, it must be connected to the free terminal block ④ of the MSU and to the IEC power socket of the respective amplifier with another prefabricated power cord.

Ensure that the same load is applied to all phases when connecting. If it is not possible to guarantee this, precautionary measures must be taken against a break in the neutral conductor occurring (e.g. different loads through different connections).

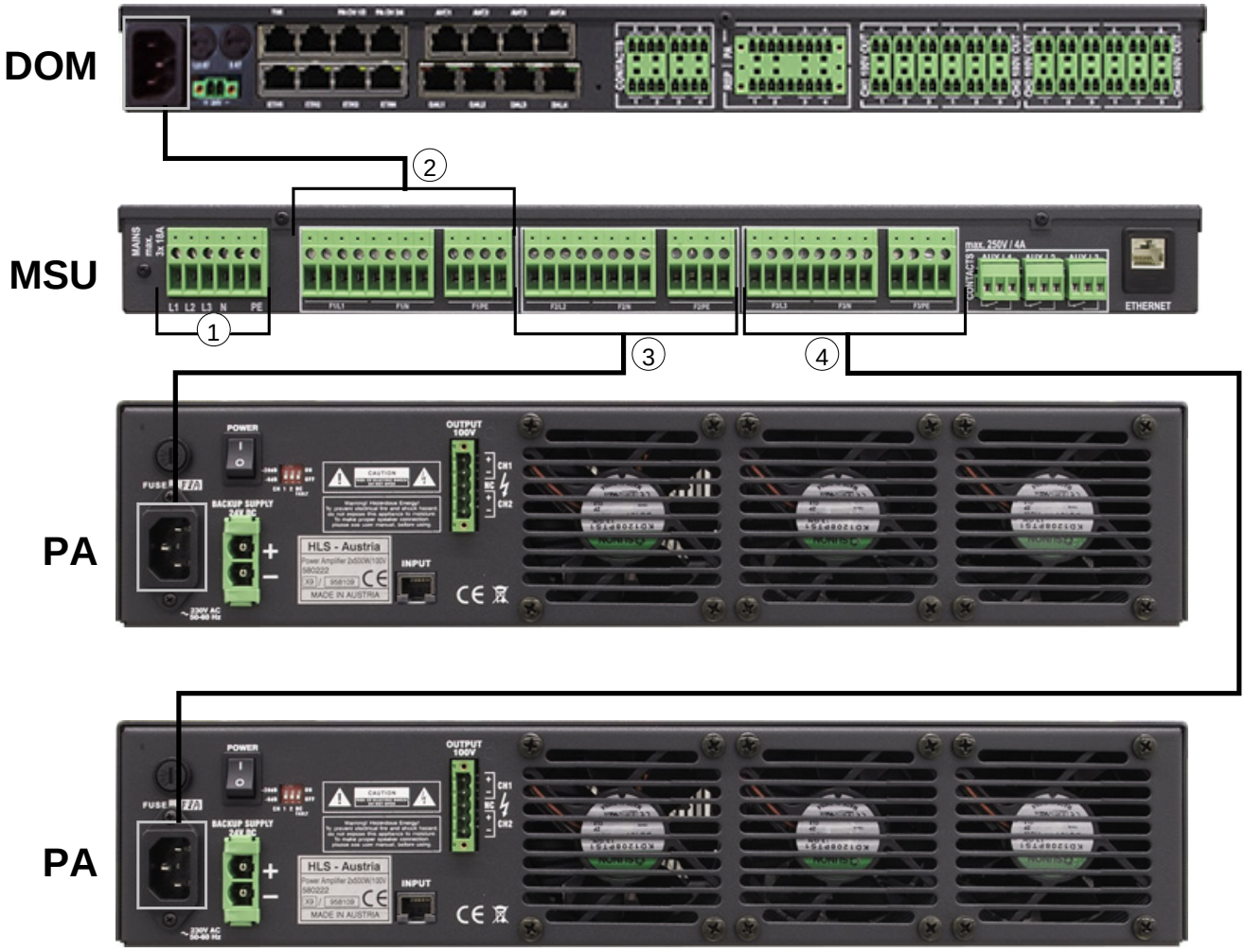


Fig. 37: Connection example of an MSU with three devices (DOM + 2 PA)

6.3.1 Protection against a break in the neutral wire

The neutral conductor monitoring module (Part No. 584970) should be used to protect against a break in the neutral conductor occurring. This module is connected upstream with the MSU contactor (Part No. 584971) and enables the safe and immediate all-pole interruption of the power supply in the event of:

- undervoltage
- phase failure
- asymmetry, including for reverse voltage
- neutral conductor missing in the system
- neutral conductor break in the device supply cable
- neutral conductor mixed up with phase

The control panels must only be connected to the mains by qualified electricians and in compliance with all relevant standards and guidelines.

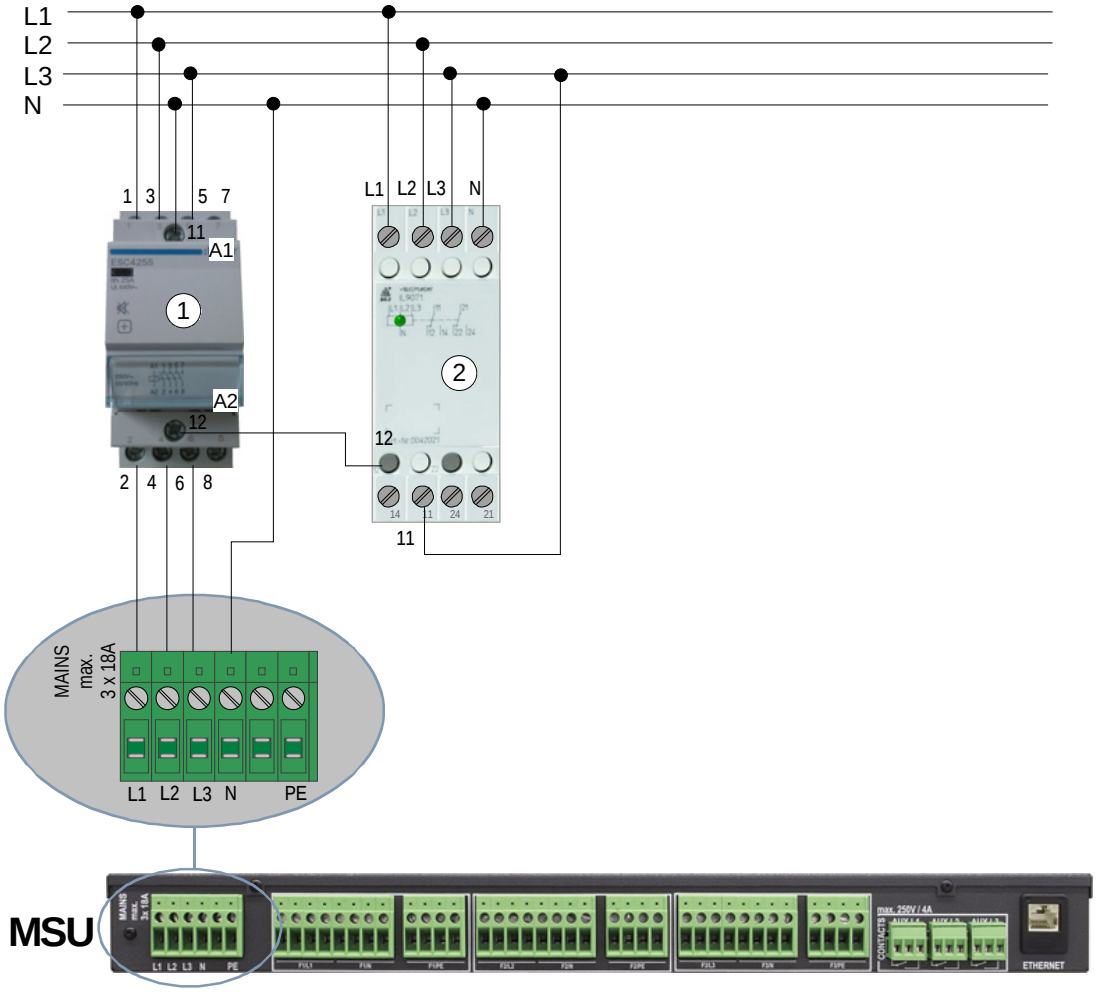


Fig. 38: Wiring example – protection against break in neutral conductor

①	Protection (Part No. 584971)
②	Neutral conductor monitoring module (Part No. 584970)
MSU	Main-Switch-Unit (MSU) (Part No. 583371.21)

6.3.2 Specification - MSU

Thermal fuse protection			
Rated current	:	18 A	
Indicator lamp	:	230 V AC	
Service life	:	10,000 switching cycles	
Deactivation	:	Single-pole	
Withstand voltage	:	Test voltage 3000 V AC	
Insulation resistance	:	>100 MΩ (500 V DC)	
Switching capacity Icn	:	150 A	
Approvals/Certifications	:	VDE, Semko (EN 60934)	240 V AC, 28 V DC
		BV, LroS	250 V AC, 28 V DC
		UL, CSA	250 V AC, 50 V DC
Auxiliary contacts			
Rated voltage	:	250 V AC	
Rated current	:	max. 4 A @ 250 V AC	
Withstand voltage	:	Test voltage 3000 V AC	
Insulation resistance	:	> 100 MΩ (500 V DC)	
General specifications			
Ambient temperature	:	-5 °C ... +55 °C	
Storage temperature	:	-10 °C … +60 °C	
Humidity	:	15 % … 90 % rel. hum. (non-condensing)	
Housing	:	metal	
Colour	:	grey, similar to RAL 7016	
Weight	:	approx. 4.2 kg	
Dimensions (W x H x D)	:	483 x 44 x 345 mm (1 HU)	
Specification	:	EN 54-16	

6.4 Universal Interface Module (UIM)

The Universal Interface Module (Part No. 583331.21) serves as the interface module of the VARIODYN® D1 System for a connection between two analogue audio inputs, two analogue audio outputs and 48 control contacts. The UIM is connected to the digital output module (DOM) via the DAL bus and is also supplied with the required operating power via this connection.

Fig. 39: Front view of universal interface module (UIM)

Additional information on LED indicators refer to operating instructions (Part No. 798662.GB0).

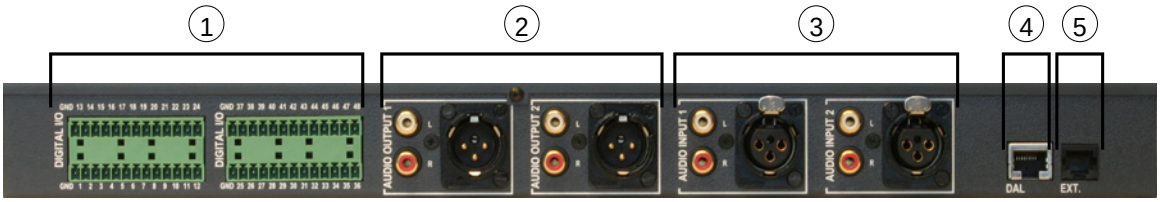


Fig. 40: Rear view of universal interface module (UIM)

①	48 control contacts (individually programmable as input or output), max. cable cross-section 1.5 mm²	
②	Two analogue audio outputs OUTPUT 1 / OUTPUT 2	XLR pin 1: Shielding XLR pin 2: Tone wire a XLR pin 3: Tone wire b
③	Two analogue audio inputs INPUT 1 / INPUT 2	
④	Connection of the DAL bus ←→ Digital-Output-Module (DOM)	
⑤	Not used!	

VARIODYN® D1 to VARIODYN 3000

If the VARIODYN® D1 is completely disconnected from power (mains and battery) for maintenance purposes, for example, the order must be followed:

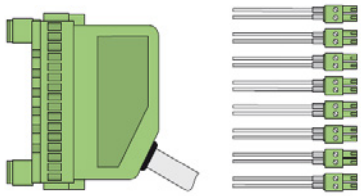
- Before the VARIODYN® D1 is completely switched off from the power, disconnect the control line between the UIM and VARIODYN 3000.
- To do so, unplug the corresponding plug on the UIM.
- After switching on the VARIODYN® D1 again (mains and battery), reconnect the plug and check the system function.

① Control contacts (inputs/outputs)

The 48 control contacts (digital I/O) can be used for controlling voice alarm system components or for connection to other systems, such as a fire alarm control panel. The function of the input or output can be individually programmed in the configuration for each control contact.

The reference potential for the control contacts is available at the four GND terminals.

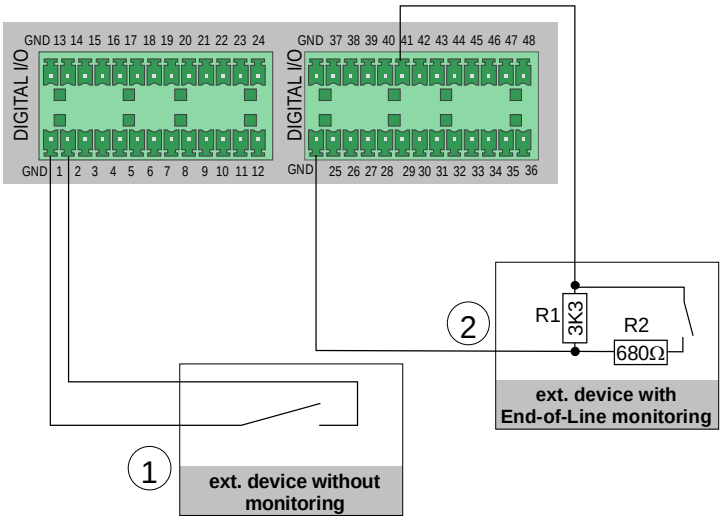
Contacts 41 – 48 are also suitable for monitoring the connected line for short-circuit or line interruption.



Cable for cabinet rear panel UIM (Part No. 583401.21 - (Option)

Prefabricated cabling from the control contacts to the cabinet rear panel; per UIM max. 1 piece.

Connection diagram of the inputs (example)



① Input with switch contact

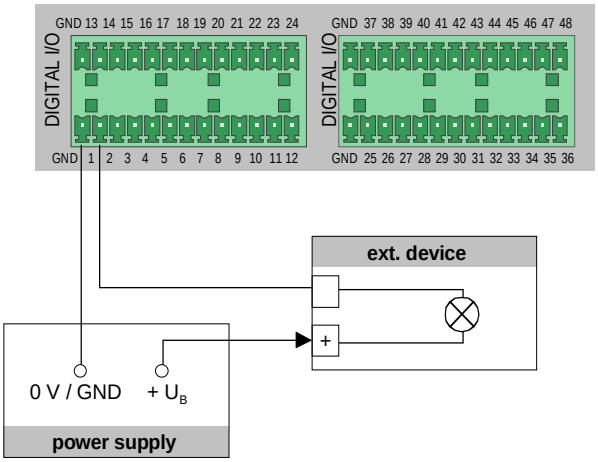
The input is switched to GND and tripped by closing the external, potential-free contact.

② Input with line monitoring

The "line monitoring" function can be activated in the configuration for the control outputs 41 to 48. In this case, the connected line is monitored for wire break and short-circuit.

Connection to external monitoring resistors (R1/R2) is required for this function.

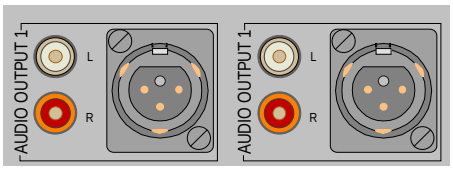
Connection diagram of the outputs



An active output switches to 0V / GND.

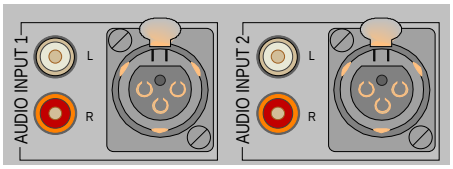
Triggering of an ext. device (+24 V DC) current consumption max. 50 mA

② Audio outputs



The two analogue potential-free audio outputs are arranged symmetrically on the XLR sockets and asymmetrically on the CINCH sockets. The audio signal is available on the L + R CINCH sockets.

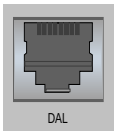
③ Audio inputs



The two analogue potential-free audio inputs can be used, e.g., to connect an external audio source (CD/MP3 player etc.) and are arranged symmetrically on the XLR sockets and asymmetrically on the CINCH sockets. The stereo signal is mixed into a mono signal on the CINCH sockets.

The XLR socket and corresponding CINCH sockets cannot be used at the same time.

④ DAL



Connection of the DAL bus ←→ Digital-Output-Module (DOM)

Connecting universal interface module (UIM) ➔ DOM

1. Use a patch cable CAT5 blue to connect the DAL connection of the DOM and the DAL connection of the UIM.
2. If external control inputs or outputs are present, wire them to the terminals of the UIM ①.
3. If external audio inputs or outputs are present, connect them to the CINCH or XLR sockets of the UIM ② and ③.
4. XLR socket: Pin 1 = shielding, pin 2 = tone wire A, pin 3 = tone wire B.

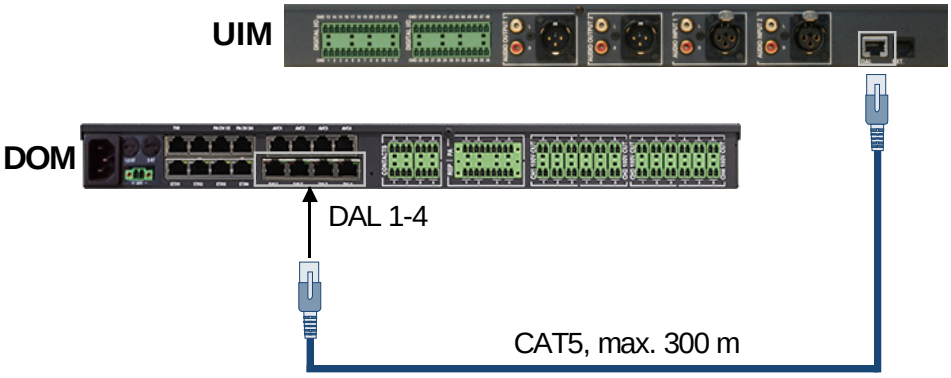


Fig. 41: Connection of the UIM to the DOM using CAT5 cable

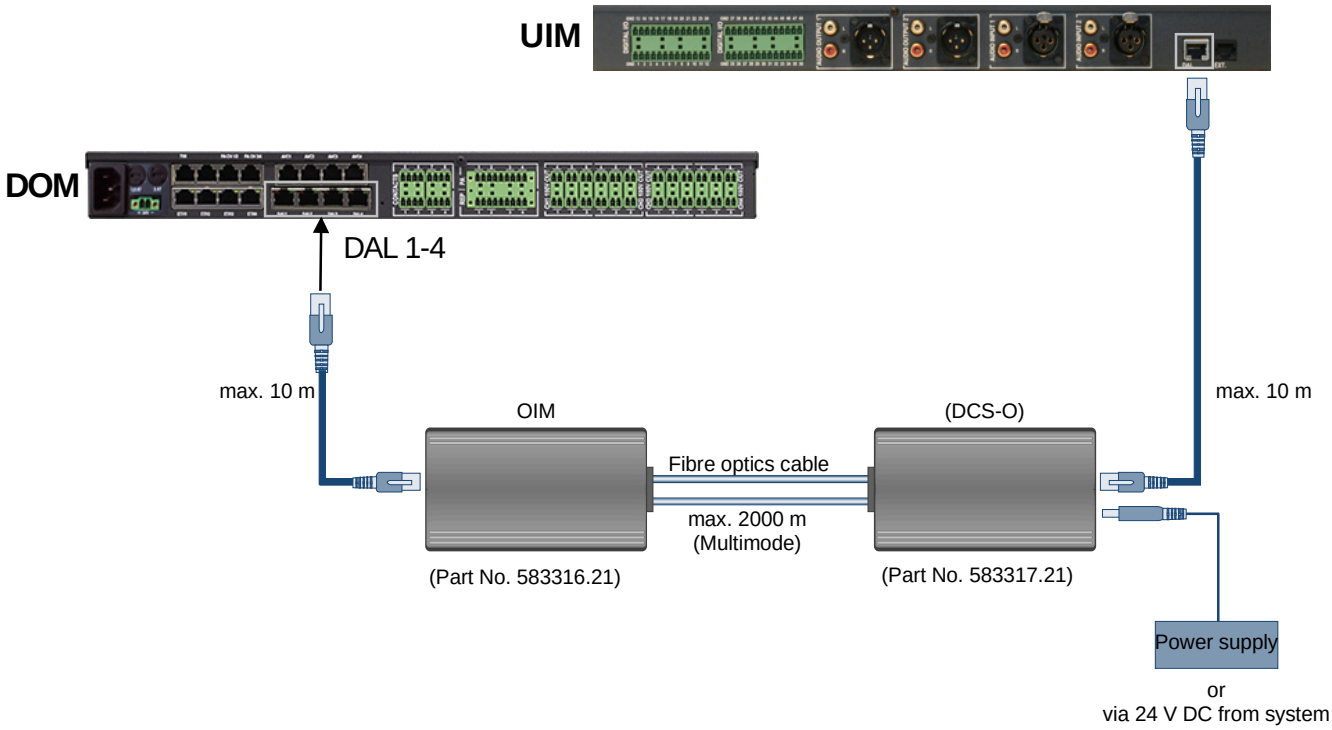


Fig. 42: Connection of the UIM to the DOM via fibre optic cable (FOC)

See chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** for detailed information on the fibre optic converter and the required external power supply

6.4.1 Specification - UIM

Audio inputs		
Nominal level	:	0 dBu
Max. level	:	+ 6 dBu
Frequency range	:	20 Hz … 22 kHz
Signal-to-noise ratio	:	> 95 dB
Distortion factor at nominal level	:	< 0.05 %
Audio outputs		
Nominal level	:	0 dBu
Frequency range	:	20 Hz … 22 kHz
Signal-to-noise ratio	:	> 85 dB
Distortion factor at nominal level	:	< 0.05 %
Output impedance	:	200 Ω
XLR socket	:	Symmetrical, potential-free
CINCH socket	:	Asymmetrical, potential-free
XLR socket		
Type	:	Symmetrical potential-free
Input impedance	:	100 kΩ
CINCH socket		
Type	:	Asymmetrical potential-free
Input impedance	:	1 kΩ
Control contacts		
Input contact		
Max. input voltage	:	max. 24 V DC (over DAL-Bus)
Input voltage logical 0	:	> 8.5 V DC @ 5,6 kΩ
Input voltage logical 1	:	< 7.5 V DC @ 4,5kΩ
Input resistance	:	10 kΩ
Output contact		
Max. external voltage	:	24 V DC
Load current per output	:	max. 50 mA
Short-circuit proof against + 24 V	:	1 secound
General specifications		
Power consumption	:	< 150 mA @ 24 V DC
Ambient temperature	:	-5 °C … +55 °C
Storage temperature	:	-10 °C … +60 °C
Humidity	:	15 % … 90 % rel. hum. (non-condensing)
Housing	:	metal
Colour	:	grey, similar to RAL 7016
Weight net / gross	:	3,6 kg
Dimensions of unit (W x H x D)	:	483 x 44 x 345 mm (1 HU)
Specification	:	EN 54-16

6.5 System Communication Unit (SCU)

The System Communication Unit is used as a digital audio memory for the VARIODYN® D1. Voice information and music are saved in the SCU and can be loaded later using the buttons of the call station, for example. The storage of alarms and messages for evacuation measures takes place according to EN 50849 in a non-volatile electronic memory element with a capacity of approximately 120 minutes.

Additional audio signals, such as various announcements, acoustic signals, music or advertising texts, are saved on the internal hard drive (capacity approx. 150 hours). The SCU is also used for logging and recording remote DOM announcements. These are also stored on the internal hard disk and are saved with the date, time and trigger information.

Only the power supply and network connection are needed to install the device.

Fig. 43: Front view SCU

- For additional information, see the commissioning instructions (Part No. 798664.GB0).
  For information about LED indicators, see the operating manual (Part No. 798662.GB0).
- The integrated USB ports are used exclusively for firmware updates.

6.5.1 System Communication Unit SCU (Part No. 583381.22)

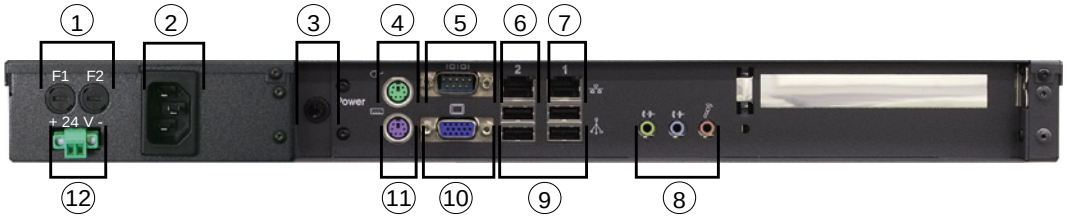


Fig. 44: Rear view SCU (Part No. 583381.22)

①	Device fuses F1 ➔ 1.6 AT and F2 ➔ 5 AT/250 V
②	IEC power socket 230 V AC
③	System restart button / System shutdown button (system stop)
④	Not used!
⑤	Not used!
⑥	Not used!
⑦	Ethernet connection to DOM or service PC
⑧	Not used!
⑨	4 x USB ports
⑩	Not used!
⑪	Not used!
⑫	24 V DC power supply (input)

Device fuses
Never repair or bridge the device fuse that is installed or replace it with anything other than the stated type!

6.5.2 System Communication Unit SCU (Part No. 583381.31)

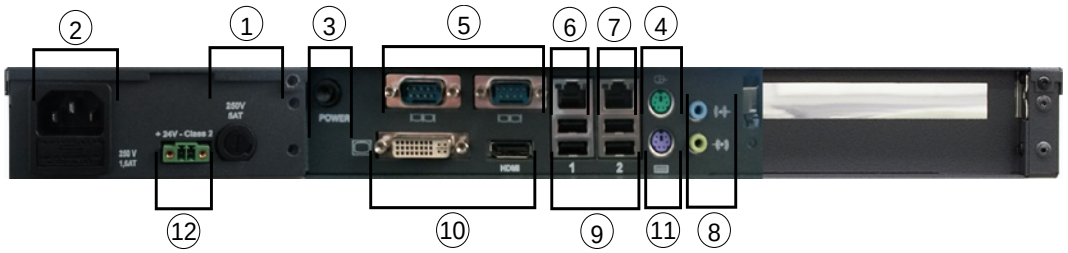


Fig. 45: Rear view SCU (Part No. 583381.31)

①	Device fuse 5 AT/250 V
②	IEC power socket 230 V AC incl. device fuse 1.6 AT
③	System restart button / System shutdown button (system stop)
④	Not used!
⑤	Not used!
⑥	Ethernet connection to DOM or service PC
⑦	Not used!
⑧	Not used!
⑨	4 x USB ports
⑩	Not used!
⑪	Not used!
⑫	24 V DC power supply (input)

Device fuses
Never repair or bridge the device fuse that is installed or replace it with anything other than the stated type!

6.5.3 System Communication Unit (SCU) ➔ DOM connection

Before connecting the SCU to a VARIODYN® D1 network, an IP address (network address) must be configured via web-interface. Factory setting IP address of SCU: 192.168.1.136.

Further Information about IP address refer to commissioning instructions (Part No. 798664.GB0).

- Use a prefabricated yellow CAT5 patch cable to connect the ETHERNET port of the DOM and the SCU.
- Connect the SCU to the primary power supply / emergency power supply (or main switch unit (MSU), if present).

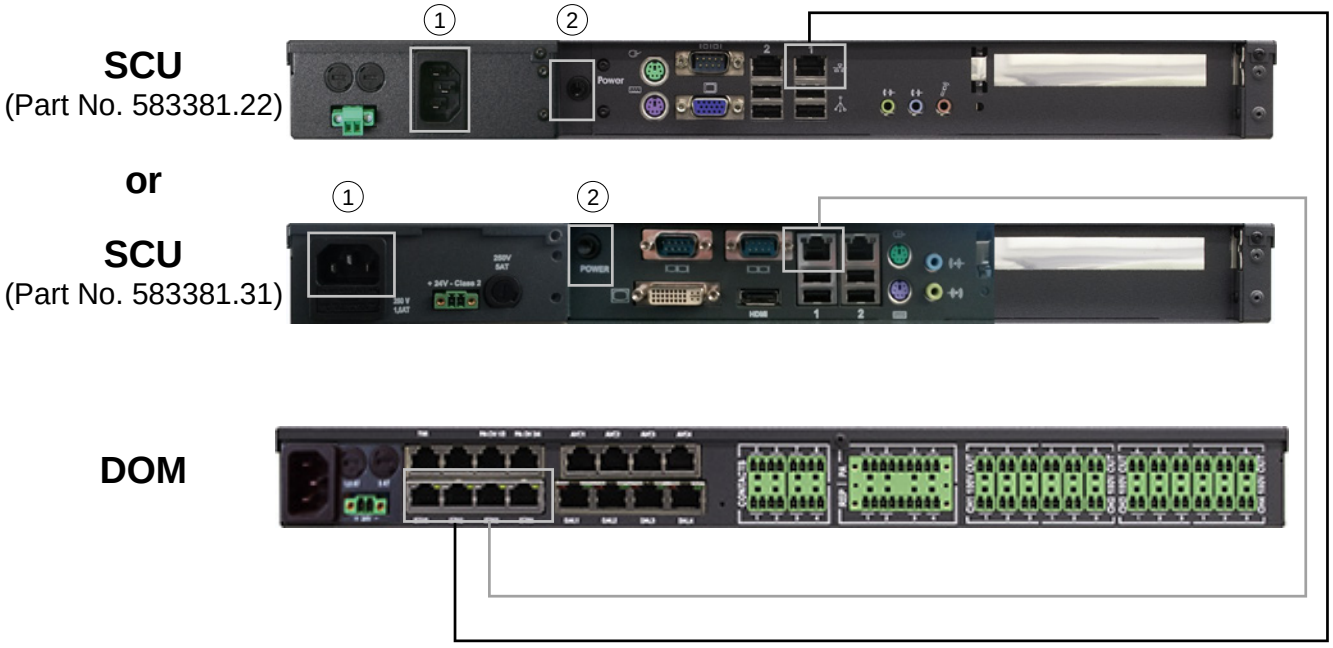


Fig. 46: Connection of SCU to DOM

Starting up the SCU

1. Connect the device to the 230 V AC rated voltage ①.
2. The SCU starts on its own. If the "POWER" LED does not light after about 10 seconds, press the button ② once briefly. More information about the SCU can be obtained via the Web interface.

For direct connection with a PC, a “cross-over network cable” (patch cable) must be used!

Switching off / removing the SCU

1. Press the button ③ once briefly and wait until the LED >POWER< (front side) goes out.
2. Disconnect the device from the power supply.

6.5.4 Lithium Battery

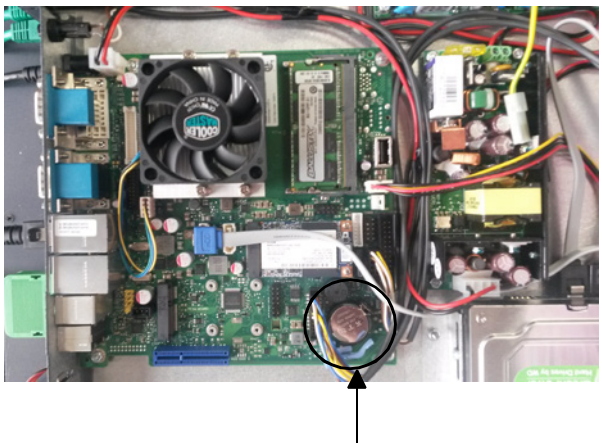


Fig. 47: Location of the battery with open housing

A 3 V lithium battery (type CR2032) is integrated into the SCU (Part No. 583381.31) unit to protect the customer data. In order to ensure the protection over the long term, this battery should be replaced after no more than five years, such as during regular maintenance.

To do this switch off the power supply (mains and battery), carefully open the SCU housing, remove the battery and replace with an identical or equivalent battery type.

Insert the new battery, carefully close the housing, switch on the power supply (mains and battery). Perform a function test!

If the SCU does not start up fully following a battery change, please check whether the BIOS flash disk is being booted. No other boot devices are permitted.

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

6.5.5 Specification - SCU

Emergency power supply		**(Part No. 583381.22)**	**(Part No. 583381.31)**
Back-up power supply	:	24 V DC	
Current consumption	:	1.33 A @ 24 V DC	0,9 A @ 24 V DC
Power consumption	:	32 W @ 230 V AC	24 W @ 230 V AC
Battery	:	3 V - Lithium (type CR2032 or equivalent)	
General specifications			
Rated voltage	:	230 V AC, +10 % / - 15 %	
Nominal frequency	:	50 … 60 Hz	
Rated current	:	0.5 A @ 230 V AC	0,2 A @ 230 V AC
Flash-memory	:	ca. 2 h	
Hard drive capacity	:	ca. 1000 h	
Ambient temperature	:	-5 °C … +45 °C	
Storage temperature	:	-10 °C … +60 °C	
Air humidity	:	15 % … 90 % rel. hum. (non-condensing)	
Housing	:	metal	
Colour	:	grey, similar RAL 7016	
Weight	:	approx. 3 kg	
Dimensions (W x H x D)	:	483 x 44 x 360 mm (1 HU)	
Specification	:	EN 54-16	

7 Power Amplifiers (PA)

The power amplifier modules are each equipped with two or four amplifier channels. These are controlled and monitored by the VARIODYN® D1 modules DOM4-8 or DOM4-24.

- Correct functioning of the VARIODYN® D1 System is only ensured with a power amplifier and a suitably configured DOM.
- The described functions depend on the amplifiers required for the specific building.

Dimensioning / output power

An amplifier with a suitable output power must be selected for supplying the connected loudspeakers. The selected amplifier must ensure that the required sound level is achieved with the corresponding loudspeakers.

In principle, it is practical to select an amplifier with higher output, since it can generally achieve better sound results - particularly with high dynamic signals like voice signals. (low distortions, prevention of clipping and short-term shutdowns due to overloading when operated under load).

Generous amplifier dimensioning provides for expansion options if the voice alarm system needs to be expanded at a later date, e.g. due to changed use / apportionment of the alarm areas.

Ventilation

Temperature-controlled forced ventilation ensures that the temperature stays low and remains even. In the case of cabinet installation, make sure there is sufficient ventilation (incoming and outgoing air).

- The air outlet of the device or device fan may not be blocked or disrupted!
- Run installation cables at a good distance.
- In the case of cabinet installation, make sure there is sufficient ventilation (incoming and outgoing air)!!

Type	Output power as per EN 54-16	Part No.
2XH500	2 x 500 W	580222.41 *1, 2
2XD250	2 x 250 W	580231 *1
2XD400	2 x 400 W	580232 *1
4XD125B	4 x 125 W	580242 *3, 4
4XD250B	4 x 250 W	580243 *1, 4
4XD300	4 x 300 W	580248 *4 / 580248.11 *1, 4
4XD500	4 x 500 W	580249 * 4 / 580249.11 *1, 4
4XV300	4 x 300 W	580261 *3, 4
4XV500	4 x 500 W	580262 *3, 4

*1 Loop mode possible.
*2 Final stages have analogue gain and output transformers.
*3 Not approved for operation in combination with loop isolator modules (LIMs)!
*4 Digital final stage with ‘direct drive’.

7.1 Power amplifier 2XH-Series

The 2XH series power amplifiers provide two independent amplifier channels. For additional information refer to product catalogue.

Fig. 48: Front view power amplifier (Example 2XH500)

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

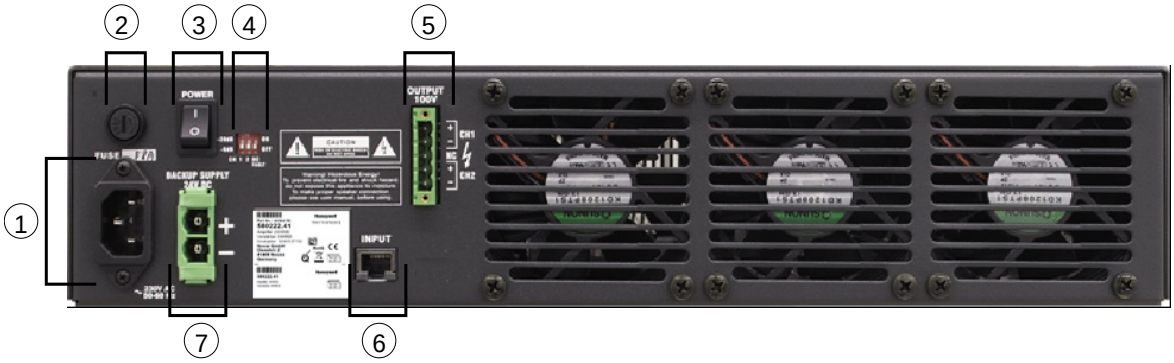
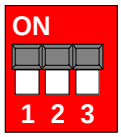
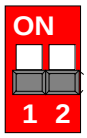
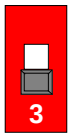
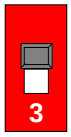


Fig. 49: Rear view of power amplifiers (Example 2XH500)

①	230 V AC rated voltage via IEC power socket
②	Primary fuse T 8 A / 250 V
③	On / off switch
④	DIP Switch
⑤	Plug connection to DOM (use system cable) The SPK outputs are designed with touch-protected terminals.
⑥	Plug connection – AF input signal from DOM
⑦	24 V DC power supply (if available)

7.1.1 DIP switches 2XH series

 **ON** **OFF**	**Factory setting**
 **ON** **OFF**	**CH 1/2** Configuration of the LED signalling for indicating the audio signals as of -20 dB or as of -6 dB. **Separate, individual settings are possible for both channels 1 (CH 1) and 2 (CH 2).**
 **ON** **OFF**	**DC FAULT** ON ➔ An error in the emergency power supply (24 V DC – if present) is reported.
 **ON** **OFF**	OFF ➔ No emergency power supply is connected.  If an emergency power supply is connected, there will be no indication of a fault even though the DIP switch is set to ‘OFF'.

7.2 Power amplifier 2XD-Series

The 2XD series power amplifiers provide two independent amplifier channels (double final amplifiers). For additional information refer to product catalogue.

Fig. 50: Front view power amplifier (Example 2XD250)

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

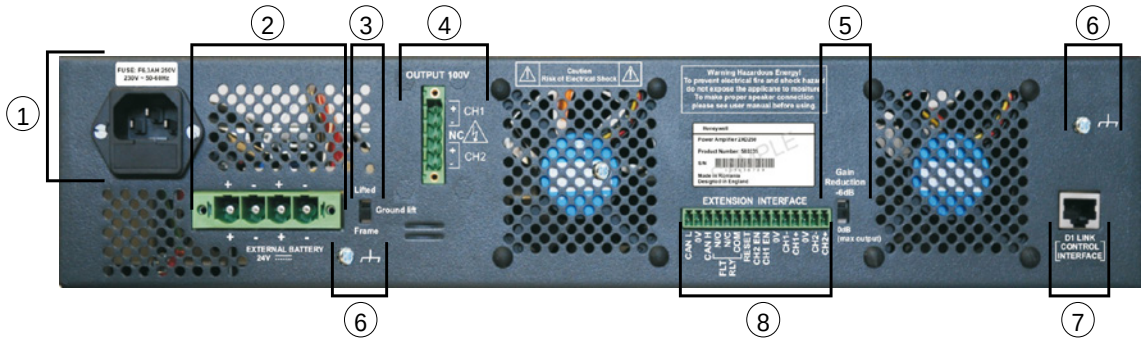


Fig. 51: Rear view of power amplifiers (Example 2XD250)

①	230 V AC rated voltage via IEC power socket
②	24 V DC emergency power supply (if available)
③	0 V connection and housing
④	Plug connection to DOM (use system cable) The SPK outputs are designed with touch-protected terminals.
⑤	Configuration of the amplifier power 0 dB (= max. power) or reduced by 6 dB
⑥	PE
⑦	Plug connection – AF input signal from DOM
⑧	Extension interface – do not connect anything here!

7.2.1 DIP-Switch 2XD-Series

The housing of the amplifier must be opened to configure the DIP switch. Disconnect the system beforehand!

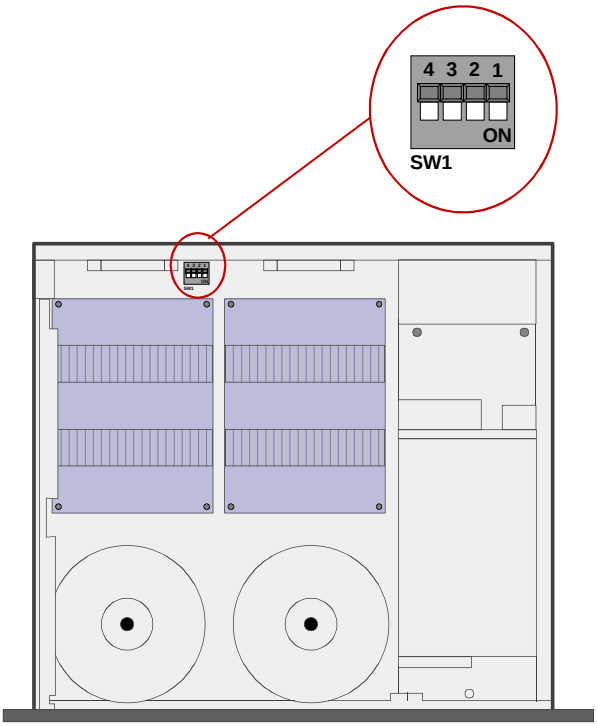


Fig. 52: Position of the DIP-Switch SW1

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

Set required DIP switch SW1 position as given in the table below:

SW1 = OFF (factory setting)		SW1 = ON	
1 OFF	LED of channel 1 and 2 lit to indicate an audio signal that exceeds -20 dB	1 ON	LED of channel 1 and 2 lit to indicate an audio signal that exceeds -6 dB
2 OFF	Automatic reset of a system fault after 2 minutes	2 ON	NO automatic reset of a system fault
3 OFF	Monitored 24 V DC Backup supply voltage	3 ON	NO monitoring of the 24 V DC Backup supply voltage
4 OFF	Not used	4 ON	Not used

7.3 Connect - 2XH and 2XD-series

1. Connect the power amplifier to the switched power supply of the MSU. If an MSU is not present, connect the power amplifier directly to the power supply / emergency power supply.
2. Use the prefabricated cable (Part. No. 583477.21) to connect the PA output of the DOM and the D1 LINK CONTROL INTERFACE socket of the power amplifier.
3. Use the input cable DOM amplifier (Part No. 583491A) to connect the SPK-OUTPUT on the power amplifier and PA input of the DOM – be sure to use the correct socket!
4. The amplifier must be connected to a programmed DOM for correct operation.
5. Connect additional power amplifiers accordingly.

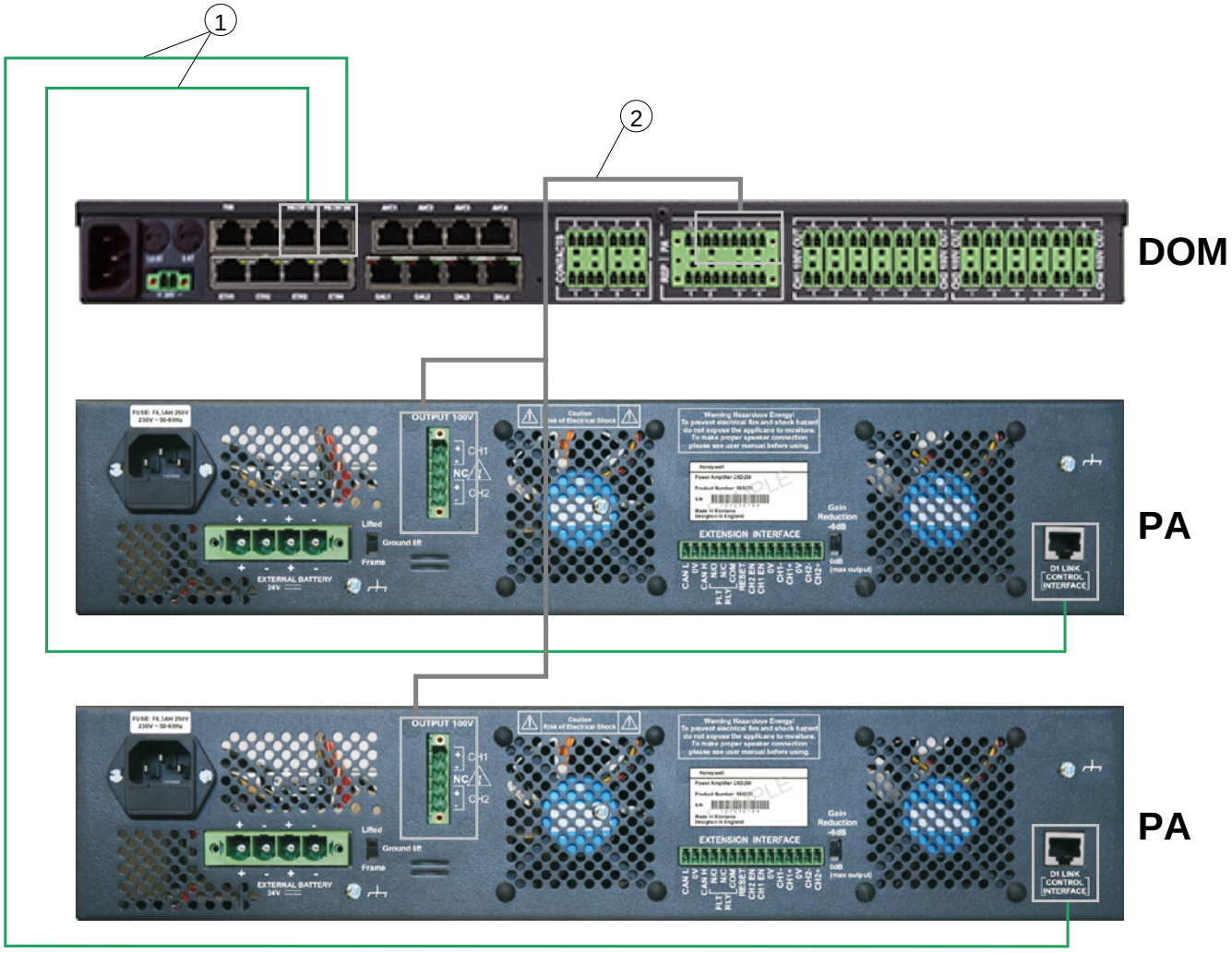


Fig. 53: Connection of the inputs/outputs

①	Input cable DOM amplifier ➔ AF output signal to power amplifier (PA)	Part No. 583491A *5
②	Output cable 2 amplifier - DOM	Part No. 583477.21 *5

*5 Depending on the hardware version of the DOM and the power amplifiers, the system cables (Part No. 583471.21 and 583476.21) may also be used. If the DOM and power amplifier hardware versions differ, the system cables (Part No. 583472.21 and 583473.21) should be used.

7.3.1 Specification - 2XH and 2XD-Series

Type		2XH500	2XD250 / 2XD400
Mains voltage	:	230 V AC, +10% / -15%	
Frequency range	:	50 … 60 Hz	
Emergency power supply	:	24 V DC	
Rated current @ 230 V AC *6	:	5,7 A	1 A / 1,6 A
Rated current @ 24 V DC *6	:	41 A	8,8 A / 13,9 A
Current (1 kHz sinus / 1 min.) @ 24 V DC *7	:	86,0 A	25,0 A / 40,5 A
Output power *8	:	2 x 500 W	2 x 250 W / 2 x 400 W
Technology	:	class H	class D
Transmission range	:	20 … 22 kHz	50 … 22 kHz
Input level	:	0 dBu	
System input impedance	:	≥ 10 kOhm	20 kOhm
Signal to noise ratio	:	≥ 101 dB	≥ 90 dB
Channel separation	:	≥ 75 dB	
Distortion factor @ 1 kHz	:	≤ 0.05 %	≤ 0.3%
Efficiency	:	approx. 50 %	≥ 80%
Ambient temperature	:	-5 °C … +55 °C	
Storage temperature	:	-10 °C … +60 °C	
Humidity	:	40 % … 90 % rel. hum. (non-condensing)	
Housing	:	metal	
Colour	:	grey, similar to RAL 7016	
Weight	:	approx. 17 kg	approx. 16,5 kg / 19 kg
Dimensions (W x H x D)	:	483 x 88 x 382 mm (2 HU)	483 x 88 x 402 mm (2 HU)
Specification	:	EN 54-16	

*6 Rated current @ 33% load
*7 Acc. EN 54-16 (laboratory test)
*8 Output power acc. EN 54-16

For analogue amplifiers, the output power is generally used as the planning dimension.
This is not always possible for digital final stages. If there are no details relating to amplifier / loudspeaker pairings for specific signals, a maximum of 50% of the nominal power should be used as the planning dimension.

7.4 Power Amplifiers 4XD-Series

The power amplifiers provide four independent amplifier channels (double final amplifiers). The described functions depend on the amplifiers required and/or used for the specific building.
For additional information refer to product catalog.

7.4.1 Power Amplifier 4XD125B

Fig. 54: Front view of power amplifier 4XD125B

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

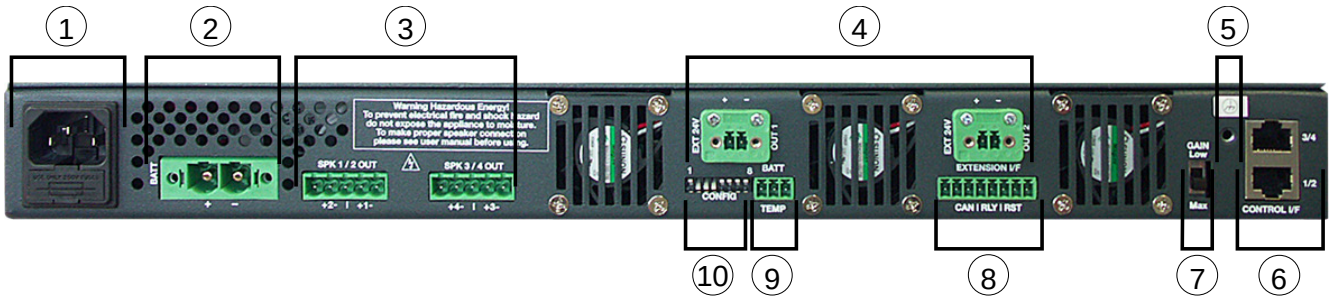


Fig. 55: Rear view of power amplifier 4XD125)

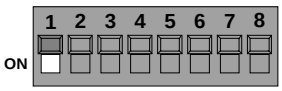
①	230 V AC rated voltage via IEC power socket and primary fuse T 8 A / 250 V
②	24 V DC emergency power supply
③	Plug connections to control unit (use system cable). The SPK outputs are designed with touch-protected terminals.
④	2 x output 24 V external
⑤	PE connection 0 V and housing
⑥	Plug connection – AF input signal from the control unit
⑦	GAIN LOW / MAX
⑧	EXTENSION L/F
⑨	BATT / TEMP – Temperature sensor
⑩	CONFIG - DIP-Switch

7.4.2 DIP switch 4XD125B

Before commissioning, the DIP switch ⑩ should be set to the desired function according to the table below. Here, OFF corresponds to the upper position and ON to the lower one.

- Always power-down the Amplifier before setting the DIP switch ⑩.
- Use a non-metallic tool to change the settings of the DIP switch.
- The DIP switch settings are read on Amplifier power-up.

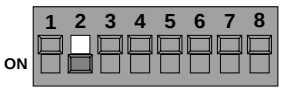
1



OFF: Standard operation of the 4 x 125 watt final stages (factory setting)

ON: *Switch setting not permitted*

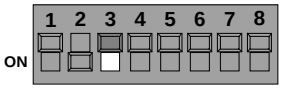
2



OFF: *Switch setting not permitted*

ON: Monitoring of the amplifier function (factory setting).

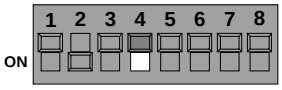
3



OFF: Charging function for the connected batteries activated (factory setting).

ON: Battery charging function deactivated. Supply via an external power supply.

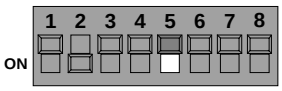
4



OFF: Monitoring of the connected batteries activated (factory setting).

ON: No monitoring of the connected batteries (required if no batteries are connected).

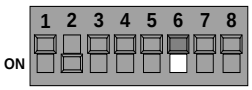
5



OFF: Display of the audio signal strength via the two green LED <High/Low channel> on the front side of the amplifier in the range -20 dB (low) and -6 dB (high). Display function for the deviation from the nominal value (factory setting).

ON: Display of the audio signal strength via the two green LED <High/Low channel> on the front side of the amplifier in the range -6 dB (low) and -3 dB (high). Display function for the deviation from the nominal value.

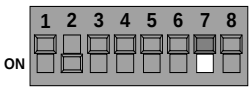
6



OFF: Setting of the attenuation factor 6 dB (factory setting).

ON: Setting of the attenuation factor 20 dB.

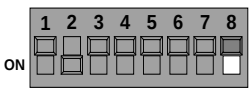
7



OFF: Reset display of the fault message automatically within 2 minutes after a reset (factory setting).

ON: Stored display of a fault message (resetting via I/F reset control input required).

8



OFF: CAN bus configuration (factory setting)

ON: *Switch setting not permitted*

7.4.3 Power Amplifier 4XD250B

The four-channel amplifier 4XD250B was specifically developed for use in the VARIODYN® D1 voice alarm system and has four independent individual amplifiers, each with 250 W output.
With an installation height of just two HUs, the amplifier is suitable for rack mounting and has a battery charging device to supply the voice alarm system with emergency power which is capable of charging batteries up to 105 Ah in compliance with standards.

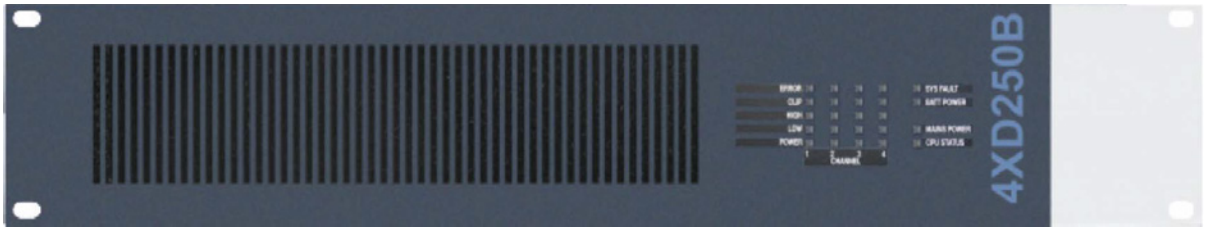


Fig. 56: Front view of power amplifier 4XD250B

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

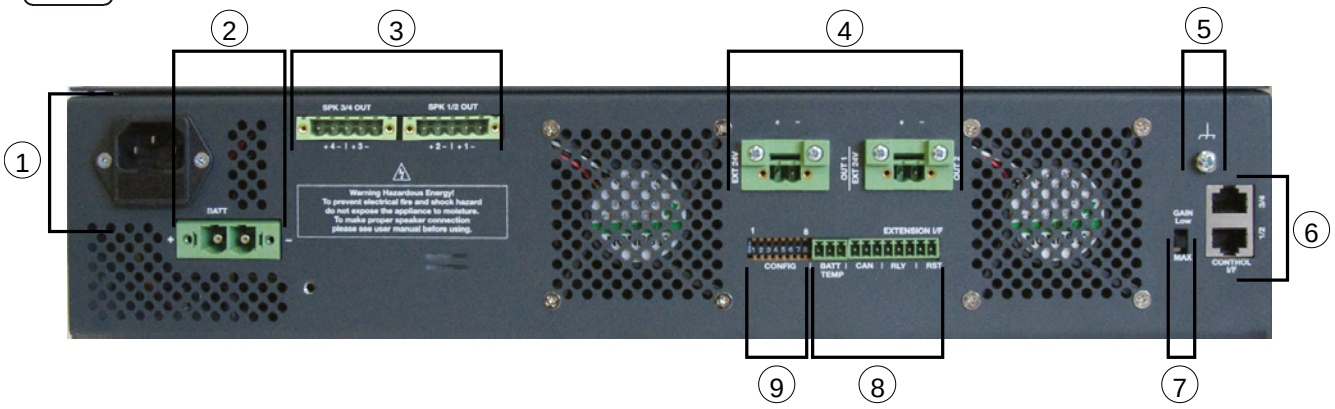


Fig. 57: Rear view of power amplifier 4XD250B

①	230 V AC rated voltage via IEC power socket and primary fuse T 8 A / 250 V
②	24 V DC emergency power supply
③	Plug connections to control unit (use system cable) The SPK outputs are designed with touch-protected terminals.
④	2 x output 24 V external
⑤	PE connection 0 V and housing
⑥	Plug connection – AF input signal from the control unit
⑦	GAIN LOW / MAX
⑧	EXTENSION L/F
⑨	CONFIG - DIP Switch

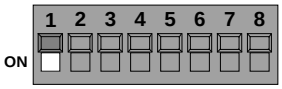
The described functions depend on the amplifiers required for the specific building.

7.4.4 DIP switch 4XD250B

Before commissioning, the DIP switch ⑨ should be set to the desired function according to the table below. Here, OFF corresponds to the upper position and ON to the lower one.

- Always power-down the Amplifier before setting the DIP switch ⑨.
- Use a non-metallic tool to change the settings of the DIP switch.
- The DIP switch settings are read on Amplifier power-up.

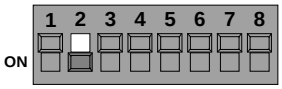
1



OFF: Standard operation of the 4 x 125 watt final stages (factory setting)

ON: *Switch setting not permitted*

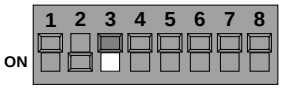
2



OFF: All channels will be auto-enabled if no external control signals are provided. Individual control of amplifier channels.

ON: All channels will be disabled if no external control signals are provided. Control of amplifier channels in pairs. (factory setting).

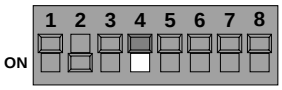
3



OFF: Charging function for the connected batteries activated (factory setting).

ON: Battery charging function deactivated. Supply via an external power supply.

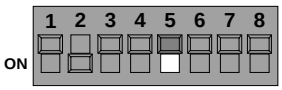
4



OFF: Monitoring of the connected batteries activated (factory setting).

ON: No monitoring of the connected batteries (required if no batteries are connected).

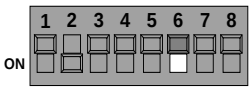
5



OFF: Display of the audio signal strength via the two green LED <High/Low channel> on the front side of the amplifier in the range -20 dB (low) and -6 dB (high). Display function for the deviation from the nominal value (factory setting).

ON: Display of the audio signal strength via the two green LED <High/Low channel> on the front side of the amplifier in the range -6 dB (low) and -3 dB (high). Display function for the deviation from the nominal value.

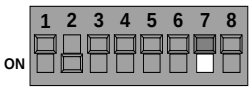
6



OFF: Setting of the attenuation factor 6 dB (factory setting).

ON: Setting of the attenuation factor 20 dB.

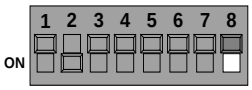
7



OFF: Reset display of the fault message automatically within 2 minutes after a reset (factory setting).

ON: Stored display of a fault message (resetting via I/F reset control input required).

8



OFF: CAN bus configuration (factory setting)

ON: When 2 amplifiers are connected on the CAN bus, then on ONE amplifier only this switch must be set to the ON position, for addressability.

7.4.5 Power Amplifier 4XD300 / 4XD500

The four-channel amplifier 4XD300/4XD500 was developed specifically for use in the VARIODYN® D1 voice alarm system and has four independent individual amplifiers, each with 300 W/500 W output and galvanically-isolated 100 V direct outputs, symmetrical inputs, inrush current limiting and soft starter.
With an installation height of just two HUs, the amplifier is suitable for rack mounting and has 24 V emergency power supply provided via an emergency power manager.

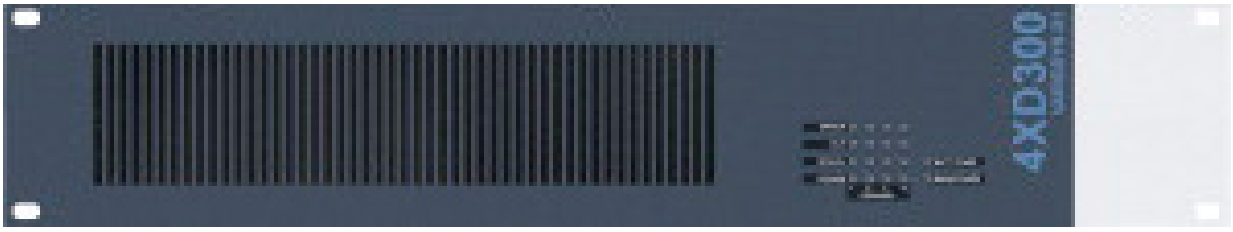


Fig. 58: Front view of power amplifier 4XD300

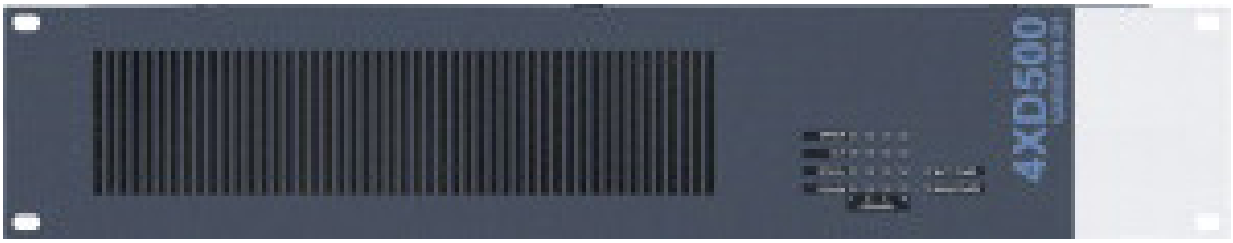


Fig. 59: Front view of power amplifier 4XD500

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

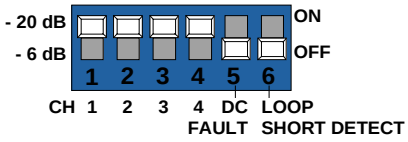
Fig. 60: Rear view of power amplifier 4XD300

①	230 V AC rated voltage via IEC power socket
②	Primary fuse F 10 A / 250 V
④	On / off switch
⑤	24 V DC emergency power supply
⑥	DIP switch
⑦	Plug connections to control unit (use system cable) The SPK outputs are designed with touch-protected terminals.
⑧	Plug connection – AF input signal from the control unit

7.4.6 DIP switch 4XD300/4XD500

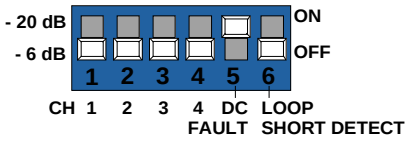
Before commissioning, the DIP switch ⑤ should be set to the desired function according to the table below. Here, ON corresponds to the upper position and OFF to the lower one.

- Disconnect the amplifier from the power source before setting the DIP switch ⑤.
- Set the DIP switch using a non-metallic tool.
- The DIP switch positions are read in when booting up the amplifier.



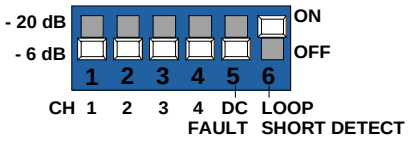
ON: Signal LED 'sensitivity' illuminates from -20 dB for each channel CH 1…4.

OFF: Signal LED 'sensitivity' illuminates from -6 dB for each channel CH 1…4.



ON: Faults relating to the 24 V power supply (AC and DC) are displayed.

OFF: Faults relating to the 230 V power supply (AC only) are displayed.



ON: Loop mode
In the event of a short-circuit, the amplifier switches off for approximately 0.75 seconds before restarting again immediately at full power. This means the loop is fully available again more quickly following a short-circuit.

OFF: Normal mode/spur line
In the event of a short-circuit, the amplifier switches off for approx. five seconds. The power is then slowly increased again after this.

Loop mode is only permitted for operation using loop technology incl. loop isolator modules (LIM).

7.5 Power Amplifier 4XV series

The power amplifiers provide four independent amplifier channels (double final amplifiers). The described functions depend on the amplifiers required and/or used for the specific building. For more information, see the product group catalogue.

7.5.1 Power Amplifier 4XV300 / 4XV500

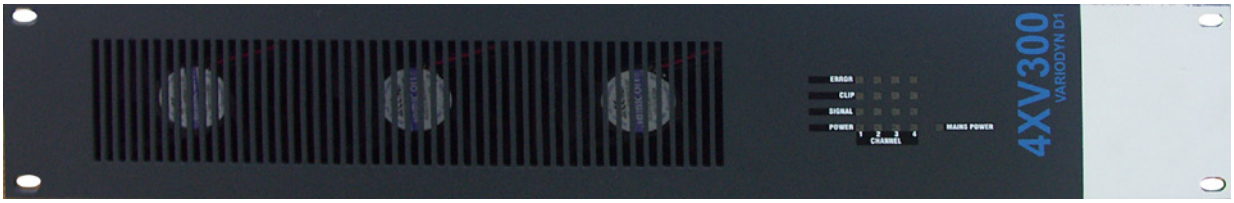


Fig. 61: Front view of power amplifier 4XV300

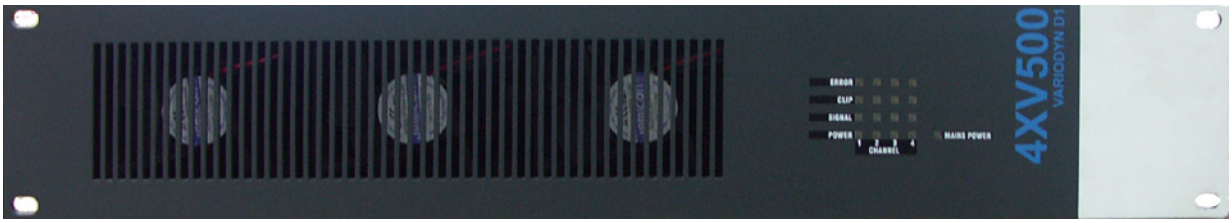


Fig. 62: Front view of power amplifier 4XV500

Additional information on LED indicators refer to operating instruction (Part No. 798662.GB0).

Fig. 63: Rear view of power amplifier 4XV300 / 4XV500

①	230 V AC rated voltage via IEC power socket
②	Primary fuse F 8 A / 250 V
③	On / off switch
④	Plug connections to control unit (use system cable) The SPK outputs are designed with touch-protected terminals.
⑤	Plug connection – AF input signal from the control unit

7.6 Connect - 4XD and 4XV-series

7.6.1 Connection DOM and Power Amplifier

1. Connect the DOM with the redundant power supply of the power amplifier.
2. Connect the PA output of the control unit and the D1 LINK CONTROL INTERFACE socket of the power amplifier with the green input cable DOM-Amplifier ① (Part No. 583491A).
3. Connect the SPK OUTPUT on the power amplifier and the IN PA input of the DOM using the amplifier - DOM grey output cable ② (Part. No. 583477.21) – ensure that the correct slot is used as per the cable labelling.

Connect channels CH1/2 (left slot) and CH 3/4 (right slot) on the power amplifier 4XD125B as per the figure below.

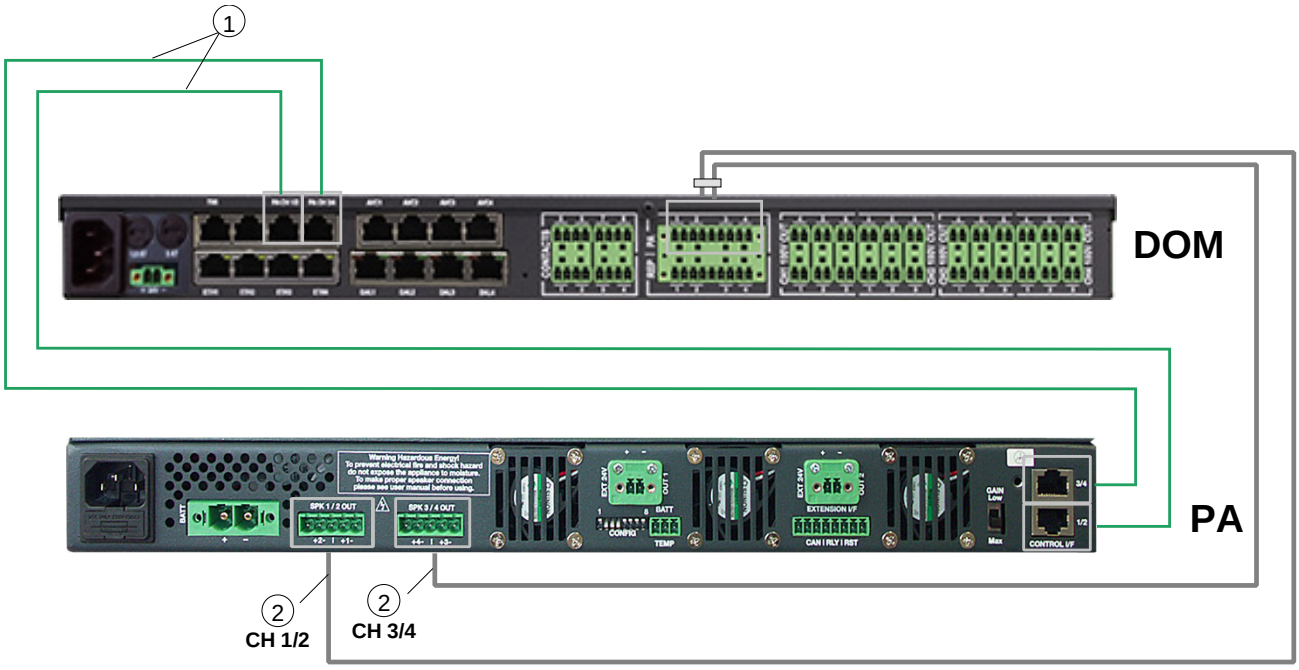


Fig. 64: Connection of the inputs/outputs (example with 4XD125B)

①	Input cable DOM amplifier (0,5 m, green) ➔ AF output signal to power amplifier (PA)	Part No. 583491A
②	Output cable 2 amplifier - DOM	Part No. 583477.21

7.6.2 Specification - 4XD and 4XV-Series

Type		4XD125B	4XD250B	4XD300	4XD500	4XV300	4XV500
Mains voltage	:	230 V AC, +10% / -5%					
Frequency range	:	50 … 60 Hz					
Emergency power supply	:	21,5 V DC … 28,5 V DC		24 V DC		---	---
Rated current @ 230 V AC *6	:	1,13 A	2,2 A	4,0 A	6,0 A	4,0 A	6,0 A
Rated current @ 24 V DC *6	:	9,44 A	18,6 A	25,9 A	40,1 A	---	---
Current (1 kHz sinus / 1 min.) @ 24 V DC *7	:	26,5 A	53,5 A	57,0 A	83,0 A	---	---
Output power *8	:	4 x 125 W	4 x 250 W	4 x 300 W	4 x 500 W	4 x 300 W	4 x 500 W
Technology	:	Class D					
Transmission range	:	20 … 22 kHz		20 Hz … 20 kHz			
Input level	:	0 dBu					
System input impedance	:	20 kOhm					
Signal to noise ratio	:	≥ 90 dB (A)		≥ 97 dB (A)			
Channel separation	:	≥ 75 dB		≥ 83 dB			
Distortion factor @ 1 kHz	:	≤ 0,3 %		≤ 0,05 %			
Efficiency	:	≥ 80 %					
Ambient temperature	:	-5 °C … +55 °C					
Storage temperature	:	-10 °C … +55 °C					
Humidity	:	up to 93 % rel. hum. (non-condensing)					
Housing	:	Metal					
Colour	:	grey, similar to RAL 7016					
Weight	:	approx. 9 kg	approx. 12 kg	approx. 14,3 kg	approx. 14,4 kg	approx. 13,4 kg	approx. 13,5 kg
Dimensions (w x h x d)	:	483 x 44 x 400 mm (1HU)	483 x 88,4 x 390 mm (2 HU)				
Specification	:	EN 54-4 and EN 54-16					

*6 Rated current @ 33 % load

*7 Acc. EN 54-16 (laboratory test)

*8 Output power acc. EN 54-16.

For analogue amplifiers, the output power is generally used as the planning dimension. This is not always possible for digital final stages. If there are no details relating to amplifier/loudspeaker pairings for specific signals, a maximum of 50 % of the nominal power should be used as the planning dimension.

7.7 Using backup amplifiers

7.7.1 Series 2XHx00 and 2XDxx0

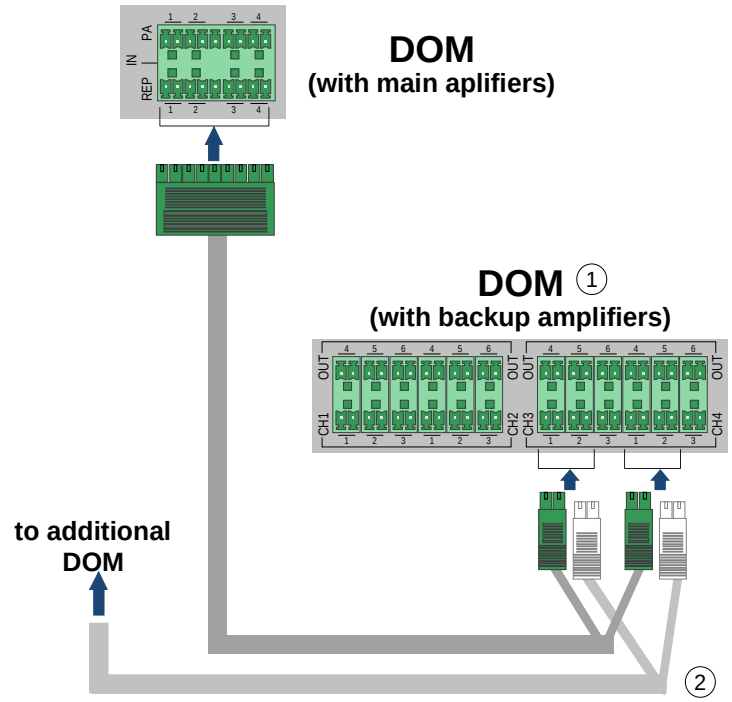
One DOM and one backup amplifier: *10 (with 2 channels):

- Backup for **6** DOMs, each using **one** power amplifier

or

- Backup for **12** DOMs, each using **two** power amplifiers

*10 The output power of the backup amplifier must be equal to or higher than that of the largest power amplifier.



① The existing DOM can be used for the connection. The second power amplifier replaces the first power amplifier.

② With a two-channel backup amplifier incl. the backup cable RC 22 (Part No. 583422.21), up to 6 DOMs can be substituted. This makes a maximum ratio of 1:12 (backup to power amplifiers) possible.

Use to connect the prefabricated cabling from two backup channels to four voice/data channels.

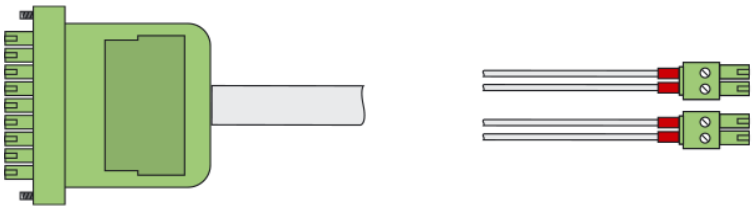
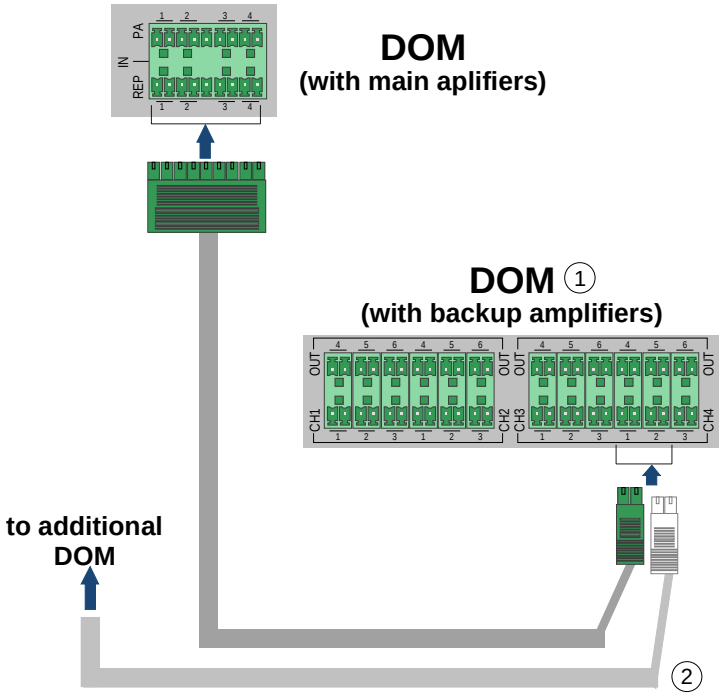


Fig. 65: Backup cable RC 22 VARIODYN® D1, 2 m (Part No. 583422.21)

7.7.2 Series 4XD125B and 4XD250B

One DOM and one backup channel:

- This channel can act as backup for the other three channels
- Additional backup **for 5** DOMs, each using one four-channel amplifier



① One channel can act as backup for the other three channels

② With a four-channel backup amplifier incl. the backup cable RC 41 (Part No. 583441), up to five further DOMs can be replaced with 4XD125B and 4XD250B.

Use to connect the prefabricated cabling from one backup channel to three voice/data channels for 3:1 backup in connection with four-channel amplifier 4XD125B or 4XD250B.

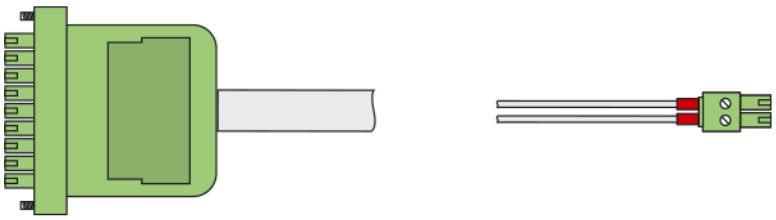


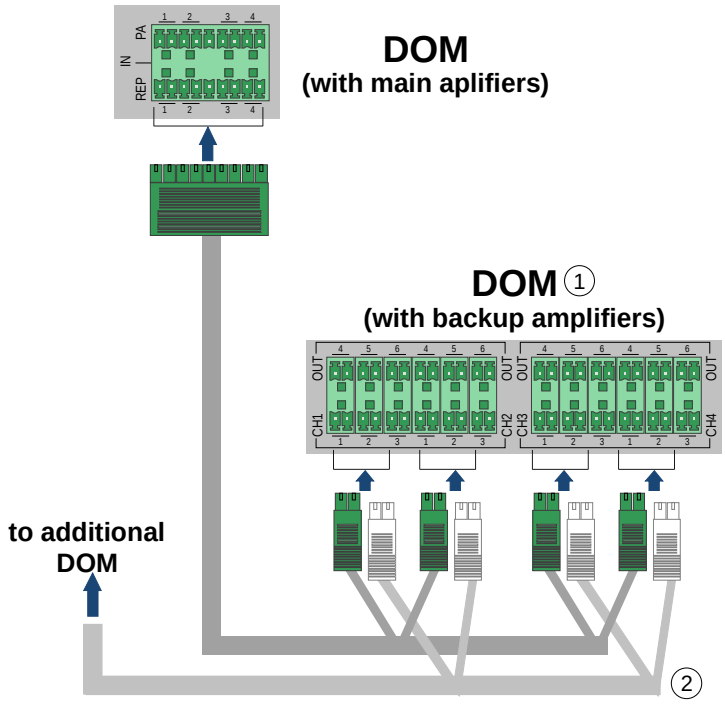
Fig. 66: Backup cable RC 41 VARIODYN® D1, 2 m (Part No. 583441) or 0.5 m (Part No. 583441.10)

For 3:1 backup operation, only one channel of a four-channel amplifier (4XD125B and/or 4XD250B) is required as a backup amplifier.

7.7.3 Series 4XDx00 and 4XVx00

One DOM and one backup amplifier:

- Backup for **6 DOMs,** each using one four-channel amplifier



① With a four-channel backup amplifier incl. the backup cable RC 44 (Part No. 583444) up to 6 DOMs can be substituted.

Use to connect the prefabricated cabling from four backup channels to four voice/data channels.

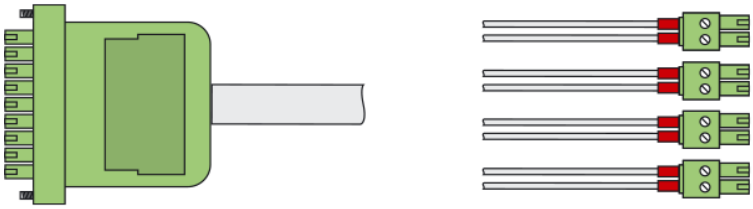


Fig. 67: Backup cable RC 44 VARIODYN® D1, 2 m (Part No. 583444) or 0.5 m (Part No. 583444.10)

8 Power Supply

In general, all devices of a VARIODYN® D1 System are supplied with power via the 230 V rated voltage. This can be connected directly (Fig. 43) or via an MSU (Fig. 44).

Fig. 68: 230 V AC direct connection (example)

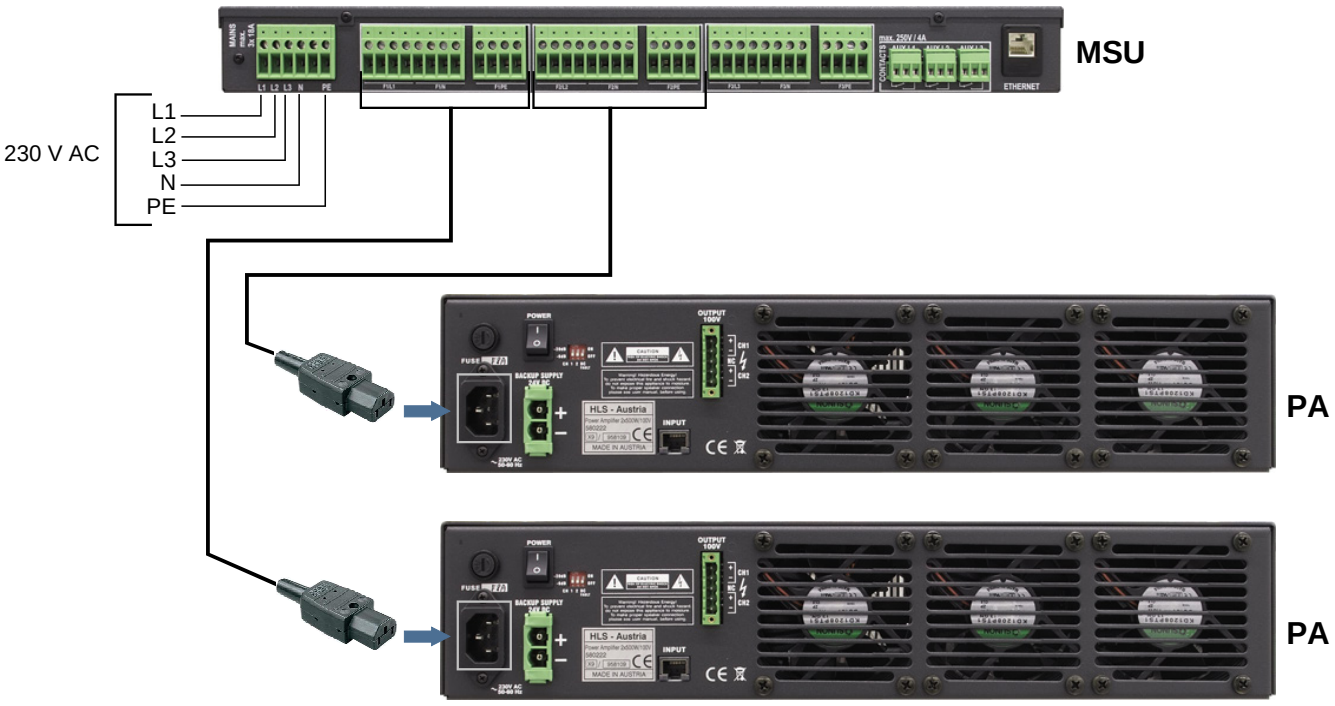


Fig. 69: 230 V AC cabling via MSU (example)

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

ESD / EMC preventive measures
Before handling electronic modules, always take suitable precautions to prevent static electricity.

8.1 Back-up power supply (Part No. 581721)

The emergency power supply conforms to EN 54-4 and is used in accordance with VDE 0833-4 and EN 50849, TRVB 158 S for the independent supply of power to the VARIODYN® D1 System. In the event of a mains power failure (230 V AC), the connected batteries will supply the system with power without any interruption.

Fig. 70: Front view Back-up power supply (Part No. 581721)

Mains fault		
	Off	Normal operation
	ON yellow	Device switched off or no operating voltage
Battery fault		
	Off	Normal operation
	ON yellow	Error in one or more batteries
Output		
	ON green	Normal operation
	Off	Back-up power supply output is faulty

For detailed information on the emergency power supply, see the manufacturer documentation.

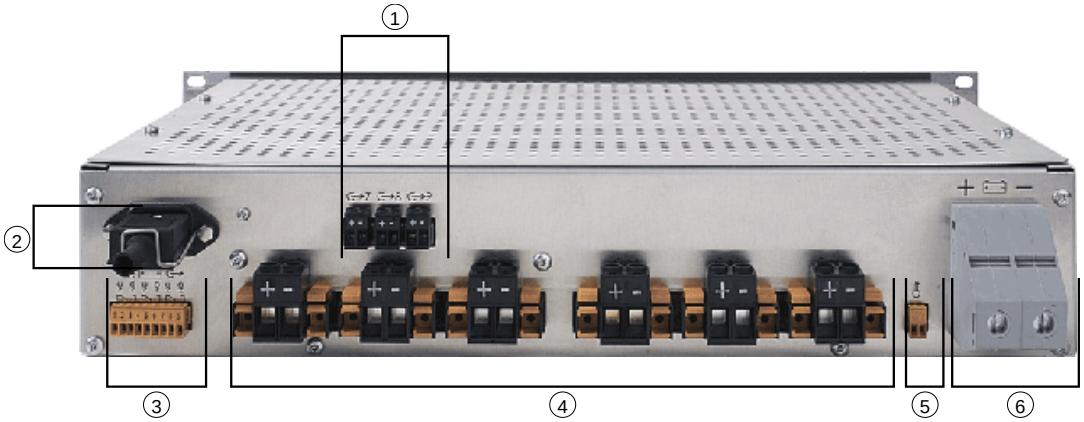
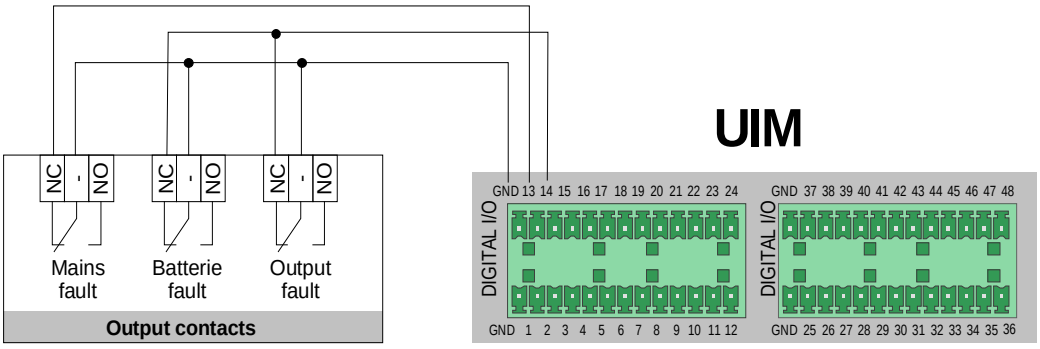


Fig. 71: Rear view

①	Terminals for max. tree DOM4-8 or 4-24 (24 V / 5 A)
②	Female appliance connector for 230 V AC nominal voltage
③	Terminals for output contact
④	Terminals for max. six Power Amplifiers (24 V / 40 A)
⑤	Temperature sensor
⑥	Terminals for Battery connection (+ / -)

③ terminals for output contact



8.1.1 Connection Back-up power supply (Part No. 581721)

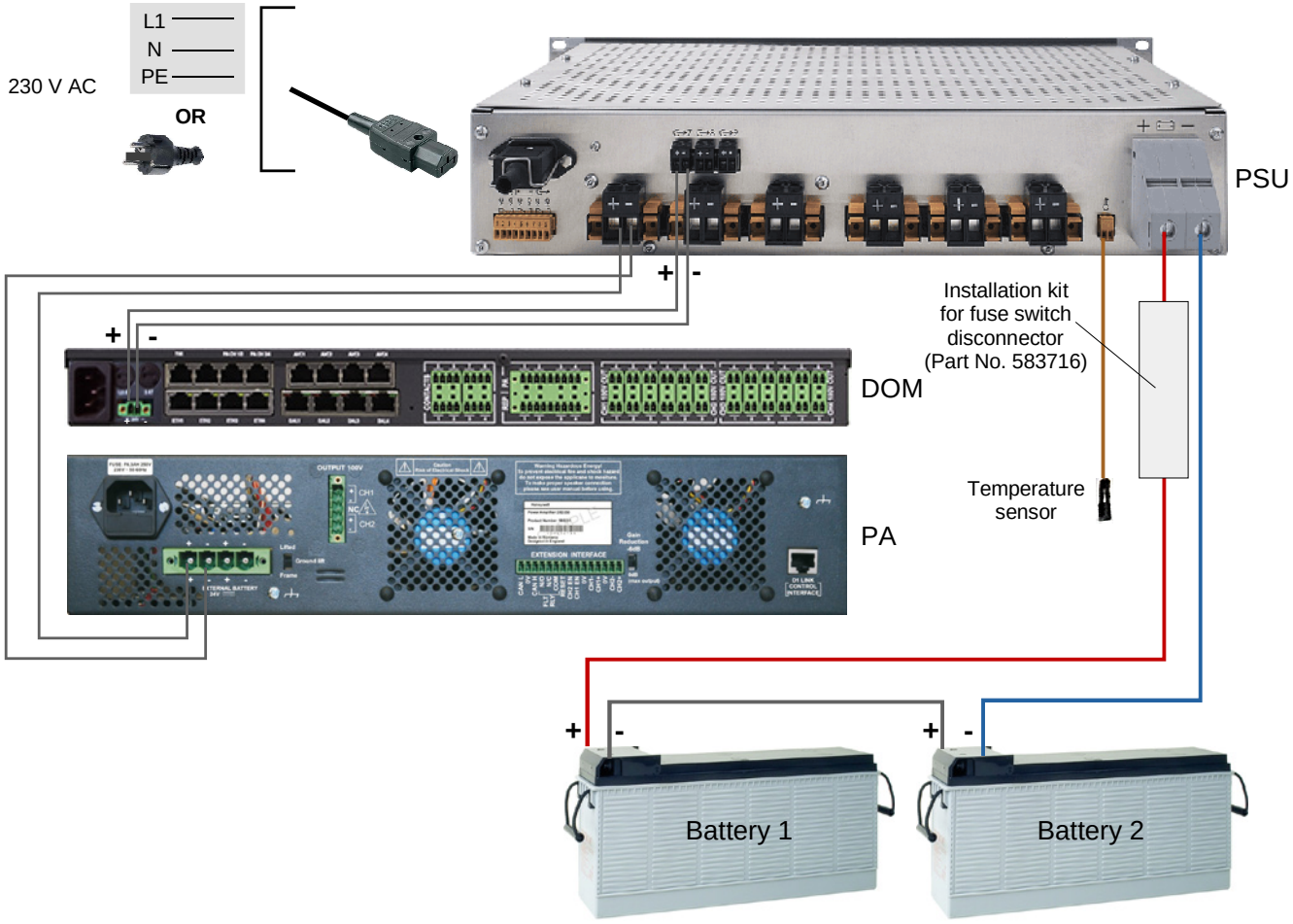


Fig. 72: Connection example

Danger – Electric shock!
Assembly and installation work may only be performed when the system is de-energised (voltage free).

- The installation kit fuse switch disconnector (Part No. 583716) can be used to switch off the emergency power supply / batteries completely (24 V DC).
- A standard fused conductor (150 A) must be used for the connection to the positive battery terminal!

8.2 Back-up power supply PSU 24V-2 (Part No. 581722) and PSU 24V-2 net (Part No. 581724)

The emergency power supply conforms to EN 54-4 and is used in accordance with VDE 0833-4 and EN 50849, TRVB 158 S for the independent supply of power to the VARIODYN® D1 System. In the event of a mains power failure (230 V AC), the connected batteries will supply the system with power without any interruption.

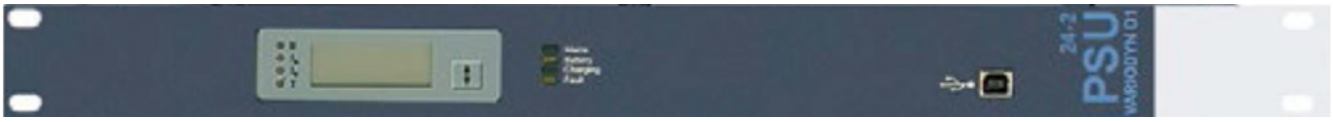


Fig. 73: Front view Back-up power supply (Part No. 581722 / -24)

Display ➔ The main control parameters

Mains fault		
	Off	Normal operation
	ON yellow	Device switched off or no operating voltage
Battery fault		
	Off	Normal operation
	ON yellow	Error in one or more batteries
Output		
	Off	Normal operation
	ON green	Charging
	Flashing	Fast charge
Fault		
	Flashing	Fault at one of the inputs
	ON yellow	Common fault

USB port ➔ for service purposes

For detailed information on the emergency power supply, see the manufacturer documentation.

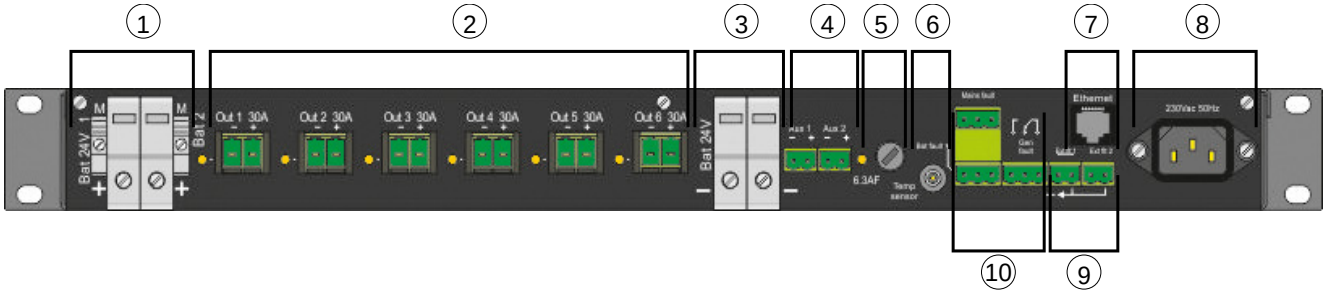
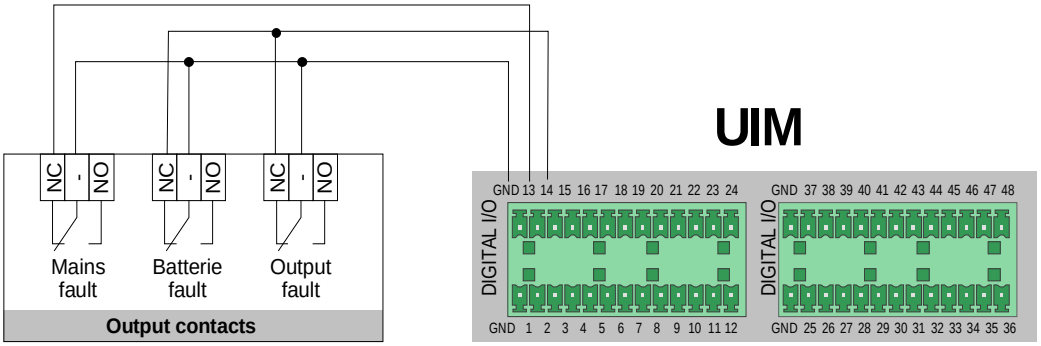


Fig. 74: Rear view

① + ③	Connecting terminals (+ / -) for up to two 24 V batteries (BAT1, BAT2) and two additional ports for charging the battery (M)
②	Connecting terminals for up to six power amplifiers (24 V / 40 A)
④	Connecting terminals for two control units, up to three DOM4-8 or 4-24 (24 V / 5 A) per connection
⑤	Fuse 6.3 AF
⑥	Connecting terminals for temperature sensor
⑦	Ethernet port (Part No. 581724 only)
⑧	Female appliance connector for 230 V AC nominal voltage
⑨	Two inputs for external error messages (EXT FLT1 / EXT FEHL 1 and EXT FLT2 / EXT FEHL 2)
⑩	Three output contacts (Mains fault / NETZFEHL, BAT fault / BATTFEHL and Gen fault / SUMMFEHL)

⑩ Output contact connectors or terminals

3-pin sockets are provided for the output contacts. 3-pin plugs are included with the delivery. If these are plugged into the socket accordingly, they can be used as normally open or normally closed contacts of the internal signal relays. Use YnTKSY 1 x 2 x 0.8 cable (Ø 0.8 mm²) for the connections.



8.3 Back-up power supply PSU 24V-4 (Part No. 581723) and PSU 24V-4 net (Part No. 581725)

The emergency power supply conforms to EN 54-4 and is used in accordance with VDE 0833-4 and EN 50849, TRVB 158 S for the independent supply of power to the VARIODYN® D1 System. In the event of a mains power failure (230 V AC), the connected batteries will supply the system with power without any interruption.

Fig. 75: Front view Back-up power supply (Part No. 581723 / -25)

Display ➔ The main control parameters

Mains fault		
	Off	Normal operation
	ON yellow	Device switched off or no operating voltage
Battery fault		
	Off	Normal operation
	ON yellow	Error in one or more batteries
Output		
	Off	Normal operation
	ON green	Charging
	Flashing	Fast charge
Fault		
	Flashing	Fault at one of the inputs
	ON yellow	Common fault

USB port ➔ for service purposes

For detailed information on the emergency power supply, see the manufacturer documentation.

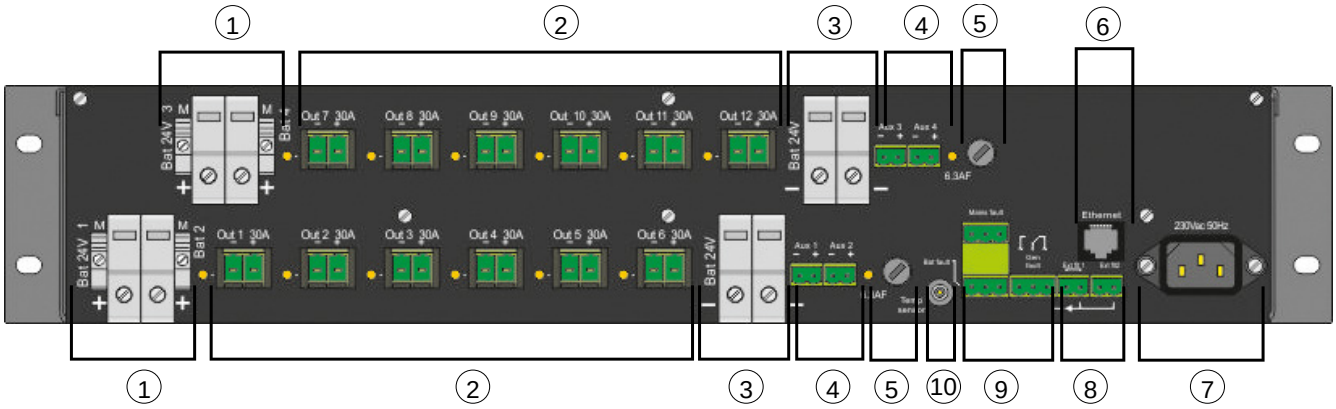
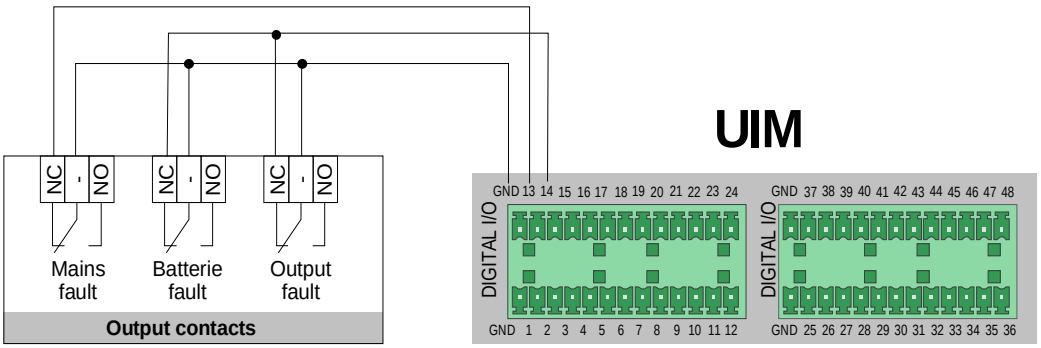


Fig. 76: Rear view

① + ③	Connecting terminals (+ / -) for up to two 24 V batteries (BAT1, BAT2, BAT3, BAT4) and four additional ports for charging the battery (M)
②	Connecting terminals for up to twelve power amplifiers (24 V / 40 A)
④	Connecting terminals for four control units, up to three DOM4-8 or 4-24 (24 V / 5 A) per connection
⑤	Fuse 6.3 AF
⑥	Ethernet port (Part No. 581725 only)
⑦	Female appliance connector for 230 V AC nominal voltage
⑧	Two inputs for external error messages (EXT FLT1 / EXT FEHL 1 and EXT FLT2 / EXT FEHL 2)
⑨	Three output contacts (Mains fault / NETZFEHL, BAT fault / BATTFEHL and Gen fault / SUMMFEHL)
⑩	Connecting terminals for temperature sensor

⑨ Output contact connectors or terminals

3-pin sockets are provided for the output contacts. 3-pin plugs are included with the delivery. If these are plugged into the socket accordingly, they can be used as normally open or normally closed contacts of the internal signal relays. Use YnTKSY 1 x 2 x 0.8 cable (Ø 0.8 mm²) for the connections.



8.3.1 Connecting the emergency power supply (Part No. 581722 / -23 / -24 / -25)

The emergency power supply units are designed to connect the components of a voice alarm system. The amplifier outputs are equipped with a 30 A fuse.

Higher power amplifiers that require a higher current should be connected to two outputs simultaneously (2 x 30 A).

Connectors for connecting the outputs are included with the power supply unit. The maximum cable diameter is:

- 6 mm^2 for the amplifier outputs
- 2.5 mm^2 for the 24 V control unit outputs

For emergency power inputs of the amplifiers > 45 µF, use the included toroidal ferrite core as illustrated below.

Fig. 77: Using the ferrite core

Emergency power supply PSU 24V-2 has two outputs and emergency power supply PSU 24V-4 has four outputs for control units of the voice alarm system. If multiple control units and peripherals are required, multiple control units can be connected to one of these outputs. The use of a separate fuse to protect each strand is recommended.

Connecting the batteries

The power supply unit does not include dedicated fuses for the batteries.
If such fuses are required, they should be installed close to the positive pole of a battery, separately for each strand.

Use cable (maximum diameter 16 mm^2) to connect the batteries to the emergency power supply terminals labelled **BAT**. Observe polarity.

Incorrect connection of the batteries can seriously damage the emergency power supply and connected peripherals.

The positive poles of the terminals are labelled with numbers to permit differentiation of the battery strands. Each strand is monitored separately. The minus poles are connected to one another.

Use 0.75 mm^2 cable to connect the **M** outputs in the centre of the respective row of batteries. Install a 0.5 to 2 AF fuse close to the batteries to protect this connection.

Connecting the temperature sensor

Connect the external temperature sensor (included with the delivery) to the dedicated socket (Temp sensor / TEMP FÜHL). The temperature sensor should be positioned close to the batteries, ideally between neighbouring batteries.

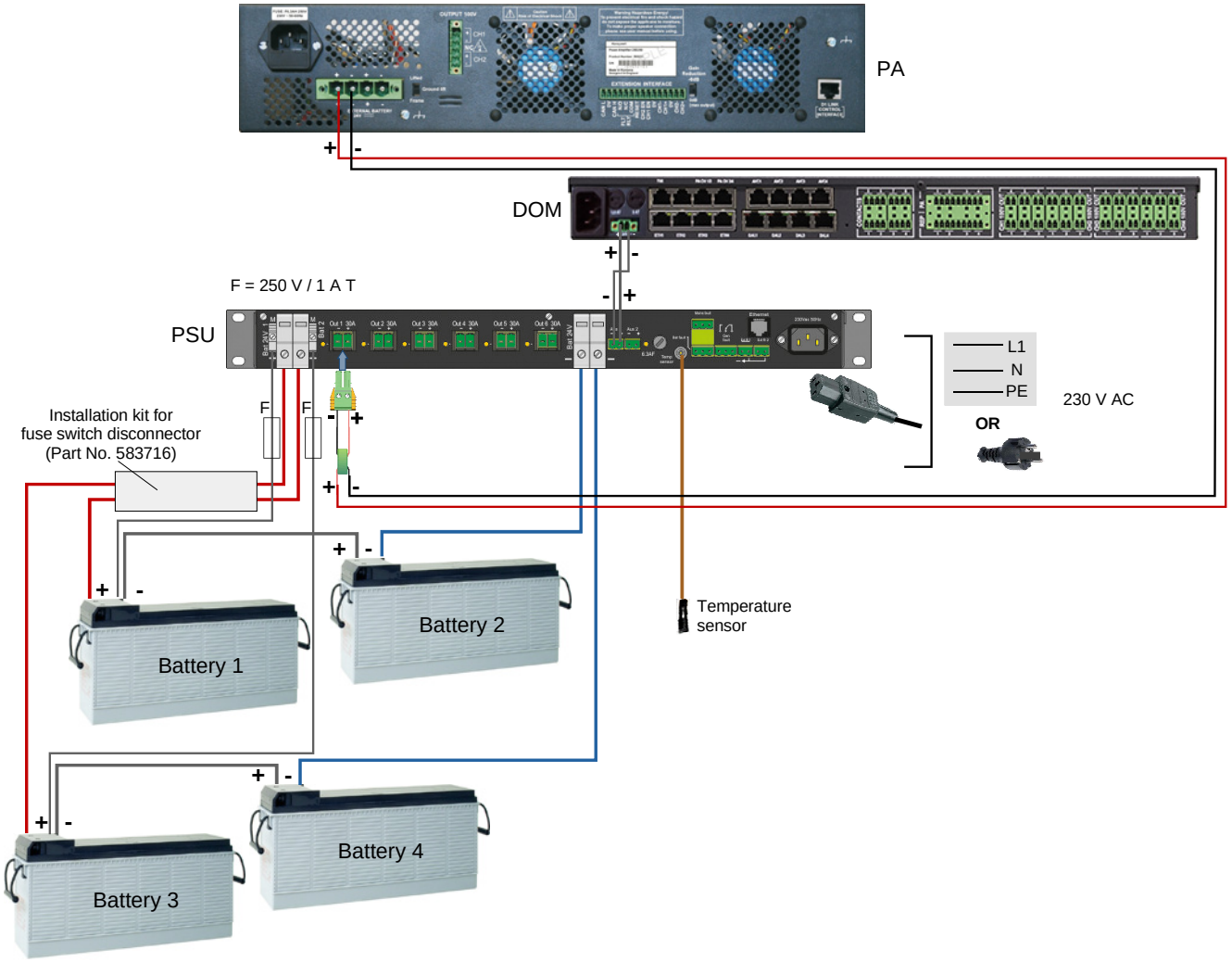


Fig. 78: Sample connection PSU 24V-2 (Part No. 581722 / -24)

Initial commissioning of the VA/PA system using emergency power supply PSU 24V-2 or PSU 24V-4 and the connected batteries must be completed by a qualified technician, a fire alarm specialist for example.
Installation and commissioning must be completed in accordance with the applicable standards.
Following successful commissioning, there must be no error messages pending in relation to the emergency power supply.

1. The battery circuit resistance values (cable cross-sections) for proper operation of the VA/PA system depend on two factors:

   - Battery capacity
   - Current consumption during an alarm

2. The factory-configured resistance parameters can be changed during commissioning. The software required for this is available online at www.variodyn-d1.com and www.hls-austria.com.

Danger – Electric shock!
Assembly and installation work may only be performed while the system is de-energised (without power).

- The installation kit fuse switch disconnector (Part No. 583716) can be used to switch off the emergency power supply / batteries completely (24 V DC).
- For more important information and safety information, refer to the documentation provided by the device manufacturer.

Mounting
The emergency power supply as well as the batteries 12 V / 105 Ah (Part No. 581730) or 12 V / 150 Ah (Part No. 581731) are installed in the cabinet according to following Figure.

Initial start up

New batteries must be recharged for at least 24 hours before the system is started up. If the batteries were manufactured more than nine months ago (see print on them), they will have to be recharged for at least 48 hours.

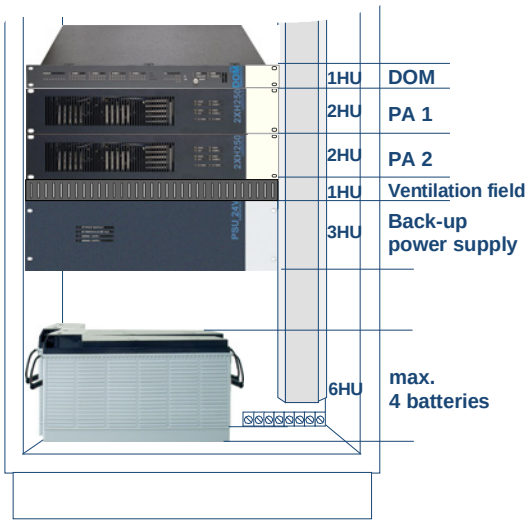


Fig. 79: Example – Rack mounting with Back-up power supply

- Only use approved battery types for the system's emergency power supply.
- Only ever connect batteries of the same type to the emergency power supply (manufacturer, manufacturing date, capacity, charge) and only ever replace batteries in pairs.
- Also note the information from the battery manufacturer on the total discharging of batteries.
- Connect the batteries in series.
- Battery connection cable
  - Length: Max. 1.5 m
  - Cross-section: ≥ 25 mm²
- Max. 4 batteries per floor type cabinet.

Specification Back-up power supply

Type		24 V / 150 A (Art.-Nr. 581721)	PSU 24V-2 (Art.-Nr. 581722 / -24)	PSU 24V-4 (Art.-Nr. 581723 / -25)
Rated voltage	:	230 V AC		
Output voltage	:	24 V DC		
Output current (idle)	:	max. 12 A	16 A + 2 A ≙ Battery charging current + constant current for ext. consumers	32 A + 4 A ≙ Battery charging current + constant current for ext. consumers
Output current (alarm)	:	max. 150 A	max. 186 A	max. 372 A
Weight	:	6 kg	ca. 5,2 kg	ca. 8,5 kg
Dimensions (W x H x D)	:	483 x 88 x 395 mm (2 HU)	483 x 45 x 328 mm (1 HU)	483 x 90 x 328 mm (2 HU)
Specification	:	EN 54-4:1997/A2:2006	EN 54-4:1997/A1:2002/A2:2006	
CE certificate	:	0333-CPD-075381	1438 - CPR - 0319	

- A tool is available for downloading in the customer area of www.variodyn-d1.com or www.hls-austria.com to assist in calculation of the emergency power supply and power loss for the VARIODYN® system.
- Observe the emergency power supply manufacturer's instructions. Download from www.variodyn-d1.com or www.hls-austria.com.
- For additional information about the emergency power supplies, see the product group catalogue.
- Each power output of the PSU 24V-2 and PSU 24V-4 is designed for a continuous current of max. 30 A. If higher continuous currents are required, e.g. 2 or 3 outputs can be connected together. Then continuous currents of 60 A (with 2 outputs) or 90 A (with 3 outputs) are possible.

Observe the specification of the respective amplifier! A critical assessment of the system usage is recommended to ensure that the power outputs provide sufficient power to the amplifiers in the event of an alarm.
A complete system test is absolutely necessary after commissioning!

8.4 PE connection

Connect the PE (protective earthing) and FE (functional earth) connection of the housing with the same PE rail of the (sub-) distribution box from which the system is supplied with the voltage (required cable cross-section ≥ 6 mm²).

Electrically conductive parts of the housing of the cabinet must be connected with a PE cable (required cable cross-section ≥ 1.5 mm², flexible).

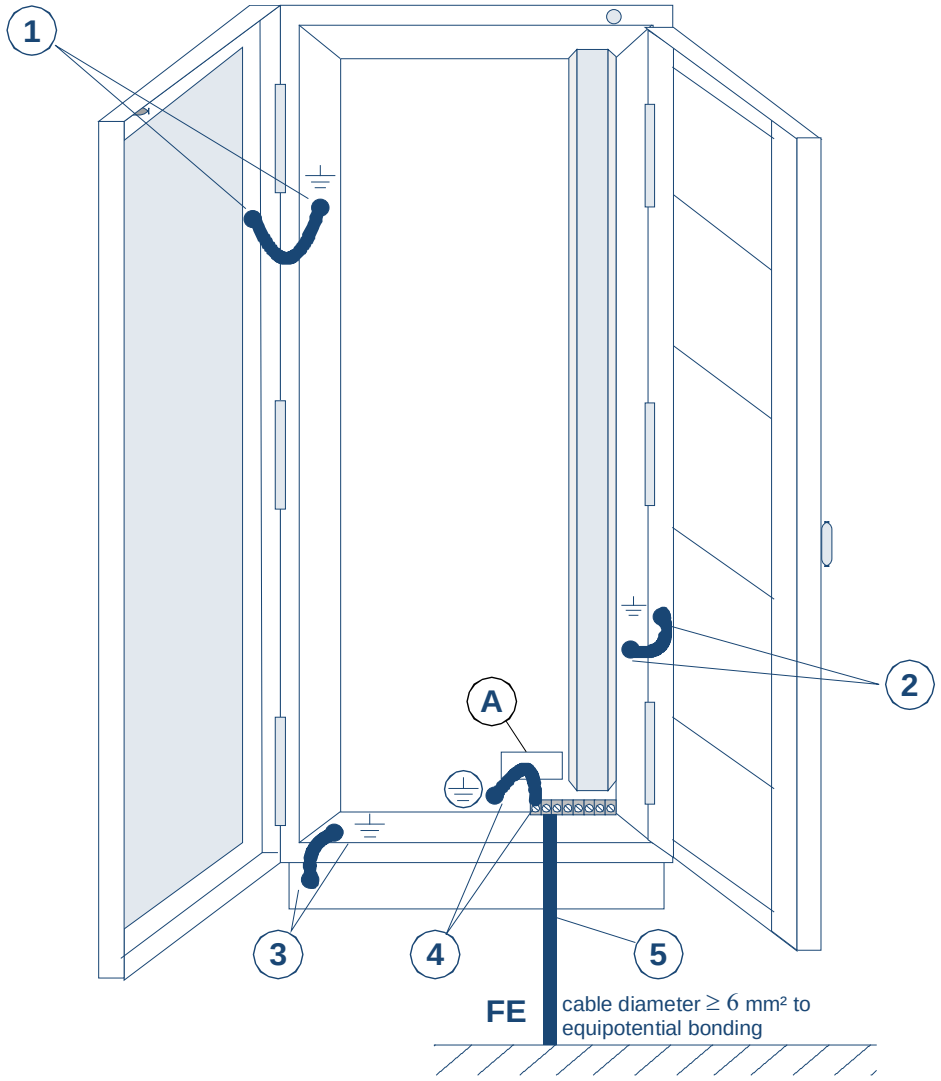


Fig. 80: PE connection

PE connections			Cable cross-section
① Cabinet door	⇔	Side wall	1.5 mm²
② Pivot frame	⇔	Side wall	
③ Side wall	⇔	Cabinet base	
④ Terminal strip	⇔	Mounting plate	2.5 mm²
⑤ Terminal strip	⇔	Central earthing point/potential equalisation	≥ 6 mm²

Ⓐ Position of label – reference to leak current –

9 Devices and accessories

Various devices and accessories, e.g. Loop Isolator Modules (LIM), digital call stations (DCS), can be connected to the VARIODYN® D1 System. Detailed information on this is available in the documentation (Part No. 798683.GB0), which is available to download at www.variodyn-d1.com or www.hls-austria.com.

10 Commissioning

The programming and service software Designer D1 is a comprehensive software tool that simplifies the planning and configuration of complex VARIODYN® D1 public address systems.

Features

- Plan and design complex voice alarm systems
- Create individual configurations
- Copy configurations into the system
- The VARIODYN® D1 System should only be configured by a trained, specialised technician.
- Before using the programming and service software Designer D1, carefully read through the commissioning instructions (Part No. 798664.GB0). These instructions provide a detailed description of the functions that must be entered manually when commissioning the voice alarm system (e.g. calibration of the loudspeaker circuits).

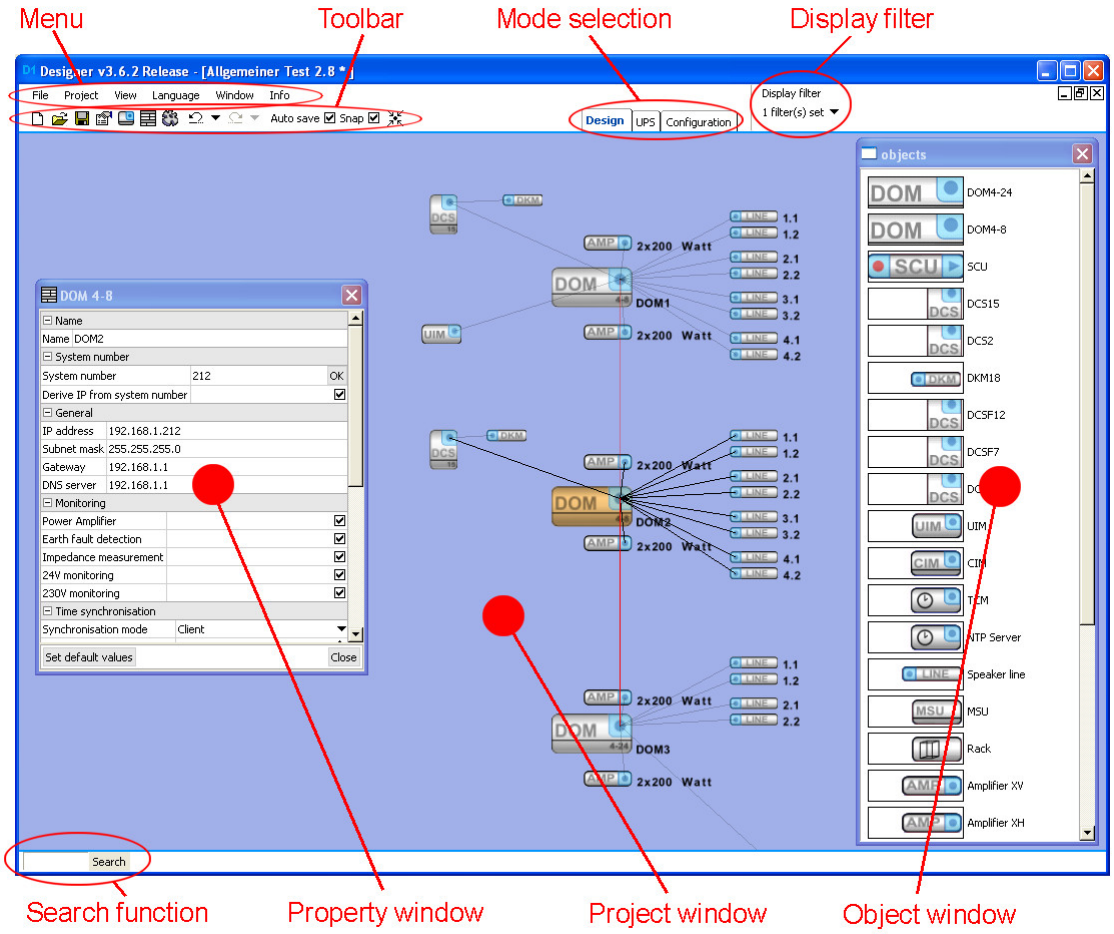


Fig. 81: Program interface of the “Designer D1” software (example)

11 Open Source Software – Information

The product VARIODYN® D1 comprises Open Source-Software in accordance to the modified BSD Licences (2-clause, 3-clause).

For additional more detailed information, consult the commissioning documentation VARIODYN® D1 (Part No. 798664.GB0).

Notes

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