Tunstall

English

Planning manual

Flamenco^{IP+}

Nurse call systems according to DIN VDE 0834

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1. Characteristics

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1.1. General description

Flamenco^{IP+} is a nurse call system intended for use in hospitals, nursing homes and similar facilities. The nurse call system complies with the German standard DIN VDE 0834, including the applicable requirements described in the standards. This guarantees the highest level of functional and operational reliability.

Flamenco^{IP+} combines the functions of a modern nurse call system with the possibilities offered by modern value-added solutions to support care processes. With intelligent data networking that also functions across existing infrastructures, Flamenco^{IP+} uses state-of-the-art technology and provides simple support to any type of care organisation.

Based on independently functioning technology, permanent self-monitoring and intelligent networking, Flamenco^{IP+} offers the highest degree of functional safety.

Easily operated products that are suitable for everyday use guarantee the highest level of efficient support in routine care. The system is supplemented by extensive interfaces and thus offers integration options for third-party and legacy systems.

The addition of speech communication using the latest digital VoIP technology enables excellent voice quality and thus provides optimal support for the nursing staff. This feature can be implemented using internal system components and also permits the connection of external telecommunication devices.

1.1.1. System structure

The devices in the rooms are interconnected using an intelligent RAN room bus and form a functional unit. Even a simple combination of call switch and room lamp is smart enough to process and display messages. In the event of a fault in the higher-level network or individual control units, local functions are retained in full.

Starting from the RAN room bus, the connection to the next hierarchical level of the system is established through an IP gateway in the room terminal (ComTerminal^{IP} or ConnectionTerminal IP). These gateways form the connection to the ward's network infrastructure and the assigned control unit, the IP-SystemManager.

In conjunction with a HEALTH or CARE software module, the IP-SystemManager provides a complete nurse call function for an organisational group (usually a ward). Multiple IP-SystemManagers are connected through an IP network infrastructure to form a complete system with speech connection and cross-ward functions such as ward coupling.

1.1.2. Safety according to the German standard DIN VDE 0834

In accordance with current regulations and functional safety requirements, individual rooms are arranged into organisational groups and controlled and monitored via a local IP-SystemManager. Should a malfunction occur, this ensures that only individual functional units are affected and prevents a total failure.

A dedicated physical, independent network is required for the installation from the room terminals (ComTerminals^{IP} or ConnectionTerminals IP) to the local IP-SystemManager. General networks that already exist at the facility may not be used within an organisational group for the nurse call system.

The individual organisational groups, which are controlled by a local IP-SystemManager, can subsequently be networked with each other via an existing IP infrastructure. All sections of the system are permanently monitored and any faults are reported via the interfaces provided for this purpose in order to inform the responsible staff.

The structured system topology of Flamenco^{IP+}, together with permanent system monitoring, automatic fault detection and selective redundancy, provides a high degree of functional and operational reliability for the entire system.

1.2. Intended purpose

1.2.1. Nurse call system

The Flamenco^{IP+} nurse call system is used to summon and locate people by raising and displaying calls. One issue associated with nurse call systems is the risk posed to callers or third parties if a fault occurs and calls are therefore not detected or signalled. Flamenco^{IP+} nurse call systems are intended for use in hospitals, nursing homes, care wards, old-age or senior citizen homes, rehabilitation facilities and all comparable facilities.

1.2.2. Distributed information system

Flamenco^{IP+} is not a medical device. It can, however, form part of an medical electrical system in combination with active medical devices for diagnosis and therapy. Active medical devices for diagnosis and therapy can be connected to the Flamenco^{IP+} nurse call system to transfer information. This creates a distributed information system.

The transmission of information and alarms through such a distributed information system is not securely guaranteed. When using this application, the alarm system of the medical electrical device must not be deactivated under any circumstances. The user cannot assume that alarm signals will be transmitted. They must therefore remain in the acoustic vicinity of the medical electrical device (monitoring unit).

Risk analysis

If the operator decides to combine the nurse call system and medical electrical devices in a distributed information system, technical documentation must be created detailing risk management measures relating to the distributed transmission of information and the required behaviour in case of a fault. The operator must draw up project documentation that details how the system was planned and installed, how to use it according to its intended purpose and how to perform servicing. In particular, the operator must set down that the system is to be operated as a distributed information system.

The safety features of the nurse call system according to the German standard DIN VDE 0834, such as the monitoring of all devices within 30 seconds and call display within 5 seconds, simplify the analysis. If the alarms are transferred to other system sections that are not compliant with the German standard DIN VDE 0834, these sections must be analysed separately.

1.2.3. Transmission paths

Under the defined conditions, the use of transmission paths of other systems is permitted according to the German standard DIN VDE 0834.

The use of the transmission paths of the nurse call system for other services is also possible. Tunstall defines and provides the interfaces.

Mutual interference of the connected systems must be excluded. Each organisational group must continue to work autonomously in case of an error.

1.3. Planning the nurse call system

Nurse call systems must be planned by expert nurse call system planners only. Tunstall offers training courses that can be used to obtain this qualification. Before planning a nurse call system, all safety-related details must be defined by the operator and the expert planner of the nurse call system. As a minimum, this includes:

- Functional features of the nurse call system
- Power source for safety purposes
- Responsibility for the signalling of failures
- Implementation of electrical safety

The expert planner must plan the nurse call system according to the operator’s requirements, the structural conditions and the valid regulations. The planning of the nurse call system must be documented in such a way that the installer of the nurse call system can set it up in line with the standards.

1.4. Example ward

Figure 1. Example ward

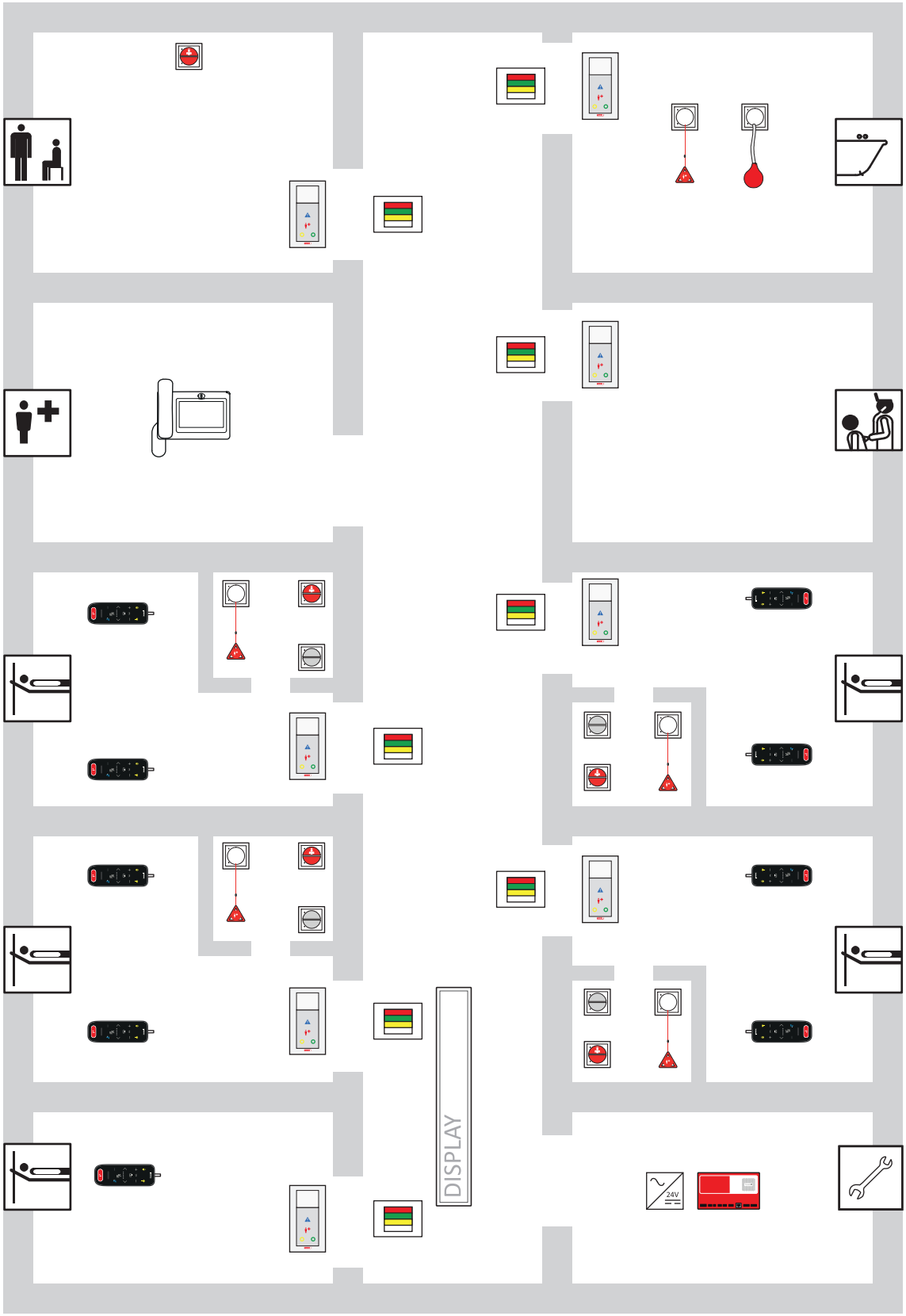
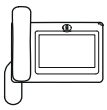


Figure 1: “Example ward” (page 12) shows examples of the rooms on a ward that – depending on their individual function – are equipped with useful technical equipment for initiating and handling calls.

Table 1. Explanation of symbols used on the example ward

Symbol	Product
	Room lamp
	ComTerminal^{IP}
	Pull cord call switch
	Pneumatic call switch
	Call switch
	Cancel switch/WC
	ePat®^{lite}
	ComStation^{IP}
	Corridor display^{IP}
	Power supply unit
	IP-SystemManager

1.5. System limits

1.5.1. Nurse call system

The maximum size of a Flamenco^{IP+} nurse call system is limited by the maximum number of installable IP-SystemManager control units. For each nurse call system, a maximum of 63 IP-SystemManagers can be installed.

The sum of the following components must not exceed max. 63:

- Number of wards (maximum 99 locations each)
- Number of console workstations at the ManagementCenter
- Number of connected medical electrical systems
- Number of connected fire alarm systems

NOTICE
These system limits may be exceeded under certain conditions. Contact Tunstall for a review and approval of the available options for individual projects.

NOTICE
Different conditions apply if the Flamenco^{IP+} nurse call system is to be connected to a Flamenco nurse call system (i.e. using an OSY-ControlCenter). In this case, refer to the technical manual for Flamenco system family.

The spatial expansion of the nurse call system is limited by the extent of the IP network that connects the IP-SystemManager control units to each other.

ManagementCenter

A maximum of 14 of the nurse call systems defined in the previous section can be connected to one ManagementCenter. A ManagementCenter can be set up as a single workstation or multiple workstation system. A multiple workstation system can consist of a maximum of 10 console workstations.

1.5.2. Speech connections

Only one speech connection can be active for each ward at one time.

The maximum number of possible simultaneous cross-ward speech connections is eight.

The number of possible simultaneous speech connections at the ManagementCenter is physically limited to one since there is only one speech unit.

An announcement is possible in all connected rooms at the same time.

1.5.3. Ward

A maximum of 99 locations can be assigned to one IP-SystemManager for ward control. Each location is usually characterised by an installed device. These can be IP-based devices (e.g. ComTerminal^{IP} or ConnectionTerminal IP) or devices connected to the OSYnet group bus of the IP-SystemManager.

However, only a certain number of the 99 locations may be room terminals (ComTerminals or ConnectionTerminals) i.e. rooms. The decisive factor is the requirement from the German standard DIN VDE 0834-1 that an organisational group (usually a ward) includes all rooms that can be managed by one person when there is minimal staffing. The precise number of rooms must therefore be determined by the operator of the nurse call system.

The following list shows the devices that must be counted as a location:

IP-based devices

- ComTerminal^{IP} (76 0510 00, 76 0510 10)
- ConnectionTerminal IP (76 0550 00, 76 0550 10)
- ComStation^{IP} (76 0605 50)
- Corridor display^{IP} Alpha 16 (76 0150 00, 76 0160 00)

Devices connected to the OSYnet group bus

- OSYlink-Door entry speaker 2 (77 0801 10) for connecting a door entry speaker 2 (77 0351 00)
- OSYlink-Universal (77 0803 00) with 8 inputs and 6 outputs for connecting third-party devices
- OSYlink-Announcement (77 0804 00) for connecting max. 5 loudspeakers with announcement interface (05 0024 02 or 05 0024 03)
- OSYlink-Announcement (77 0804 00) for connecting a maximum of four 1-channel audio amplifiers 100V/25W (000647 13). A maximum of four loudspeakers (05 0024 04) can be connected per 1-channel audio amplifier 100V/25W.
- OSYlink AS-CCS (77 0870 00)
  (+ devices of a legacy system connected to the OSYlink AS-CCS)

Cable lengths

The copper cable length between IP-based devices (IP-SystemManager, ComTerminal^{IP}, ConnectionTerminal IP, ComStation^{IP}, Corridor display^{IP} Alpha 16) and the nearest active network component (e.g. switch) must not exceed 90 m.

The maximum cable length of the OSYnet group bus is 700 m. The IP-SystemManager must be installed at the beginning or end of the group bus.

1.5.4. Rooms

The RAN room bus is connected to the room terminal (ComTerminal^{IP} or ConnectionTerminal IP) and networks the devices in the room with each other.

The total length of all RAN lines connected to a room terminal must not exceed 50 m.

A maximum of 30 RAN users can be connected to a RAN room bus.

A maximum of 6 beds can be identified as call locations for each room.

RAN users are as follows:

Connection sockets

- Connection socket with call switch, bedhead unit (70 0171 50)
- Connection socket with call switch (70 0171 60...)
- Connection socket combi (70 0425 00)
- Connection socket combi, bedhead unit (70 0435 00)

Room lamps

- Room lamp, 3 sections (77 0170 00, 77 0171 00, 77 0175 00)
- Room lamp cardiac alarm, WC (77 0170 01, 77 0175 01)
- Room lamp, 4 sections (77 0170 10, 77 0171 10, 77 0175 10)

Switches

- Call switch (77 0211 00..., 77 0211 01...)
- Staff presence switch (77 0212 00...)
- Cancel switch/WC (77 0213 00...)
- Cardiac alarm switch (77 0214 00...)
- Pull cord call switch (77 0215 00..., 77 0215 01...)
- Pull cord call switch insert (29 0707 20F)
- Pneumatic call switch (77 0216 00..., 77 0216 01...)
- Call switch/WC with cancel switch (77 0217 00...)
- Call switch with privacy switch (77 0218 00...)
- Staff presence combination with call tone (77 0219 00...)

RAN interfaces

- IR TV control module universal (77 0360 11)
- RAN interface (77 0840 00)
- RAN interface universal (70 0848 00)
- RAN interface with speech (77 0880 00)

1.5.5. Configuration possibilities for care organisation

- 32 ward couplings can be defined for each nurse call system.
- 8 shifts can be defined for each ward. Each shift can consist of 8 zones.

1.6. Climatic conditions for the nurse call system

1.6.1. Ambient temperature

+5 °C to +40 °C (+ 55 °C in medical supply units).

1.6.2. Relative humidity

Devices for patient rooms, staff rooms and living rooms

Up to 85% relative humidity (no condensation).

Devices for bathrooms and wet rooms

Up to 95% relative humidity (condensation possible).

Pull cord call switches are permitted be exposed to dripping water on occasion.

1.7. Standards

The following standards relevant to nurse call systems must always be observed:

- DIN VDE 0834-1:2016-06, Call systems in hospitals, nursing homes and similar institutions – Part 1: Requirements for equipment, erection and operation
- DIN VDE 0834-2:2019-02, Call systems in hospitals, nursing homes and similar institutions - Part 2: Environmental conditions and electromagnetic compatibility
- DIN EN 60601-1:2022-11, Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
- DIN EN 60601-1-8:2021-12, Medical electrical equipment - Part 1-8: General requirements for basic safety and essential performance - Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems
- DIN EN 60669-2-2:2007-05, Switches for household and similar fixed electrical installations - Part 2-2: Particular requirements - Electromagnetic remote-control switches (RCS)
- DIN EN IEC 62368-1:2021-05, Audio/video, information and communication technology equipment - Part 1: Safety requirements
- DIN EN IEC 80001-1:2023-02, Application of risk management for IT-networks incorporating medical devices - Part 1: Safety, effectiveness and security in the implementation and use of connected medical devices or connected health software
- DIN EN ISO 11197:2020-05, Medical supply units
- DIN VDE 0100-200:2023-06, Low-voltage installations - Part 200: Definitions
- DIN VDE 0100-410:2018-10, Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
- DIN VDE 0100-560:2022-10, Low-voltage electrical installations - Part 5-56: Selection and erection of electrical equipment - Safety services

In addition, observe all other national installation guidelines. Also, observe any applicable regulations of individual states or regions (e.g. ordinances on hospital construction).

2. Functions

Contents

2.1. Presence registration

An essential prerequisite for the proper operation of the nurse call system is the presence registration of staff. All rooms in which medical staff may be present must be equipped with presence buttons in an easily accessible place.

When entering the room, the presence button is switched on; when leaving the room, it is switched off again.

2.1.1. Presence switched on

If staff presence is switched on, this

- signals the current location of staff.
- acknowledges a fresh call in the room.
- prepares the reception of forwarded calls.
- prepares the raising of emergency calls. This means that calls from rooms with presence switched on are signalled with higher priority.
- prepares the raising of an alarm in the room. Pressing a blue cardiac alarm button raises an alarm only when presence is on.
- deactivates the privacy feature in the patient room.

Answered or acknowledged calls are cancelled by switching off the presence (exceptions: WC call, WC emergency).

2.1.2. Presence 1 and 2

Flamenco^{IP+} nurse call systems offer presence buttons for two staff groups. The assignment of staff to the staff groups is determined by the operator of the nurse call system, for example:

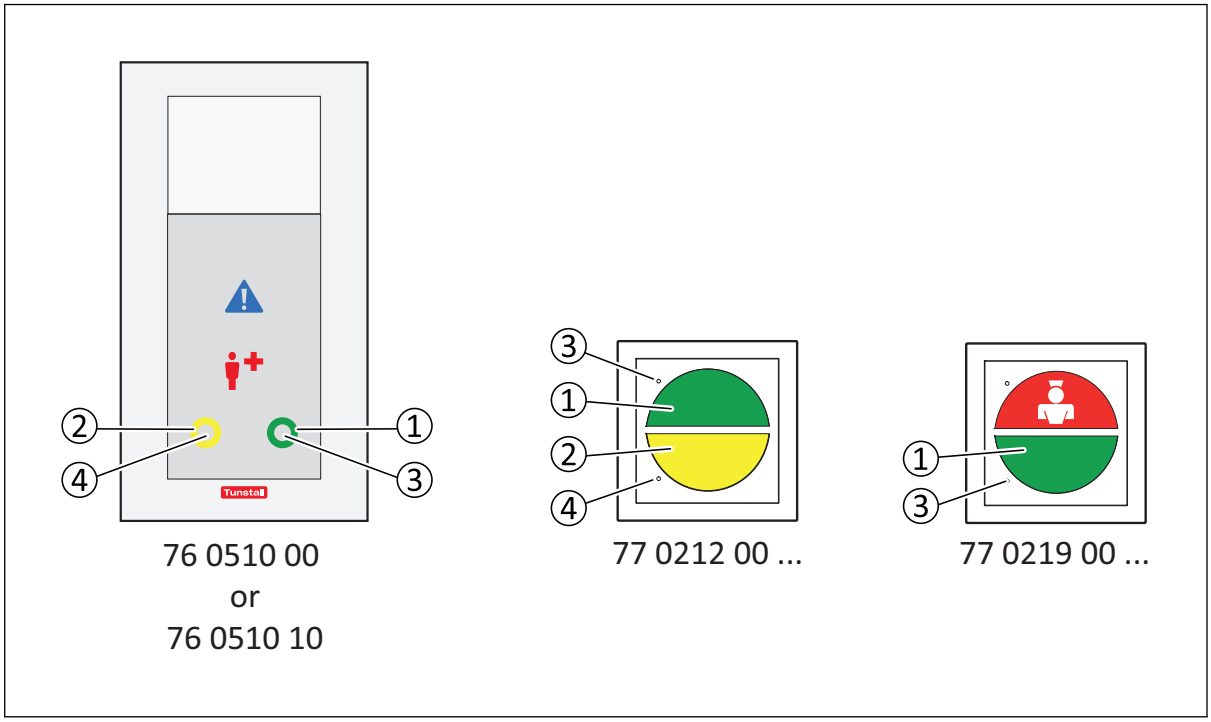
- Presence 1 (green button): Nursing staff
- Presence 2 (yellow button): Nursing staff 2 or doctor

2.1.3. Presence buttons

Large presence buttons are available with the following devices:

- ComTerminal^{IP} (76 0510 00, 76 0510 10)
- Staff presence switch (77 0212 00…)
- Staff presence combination with call tone (77 0219 00…)

Figure 2. Devices with presence buttons



[1]	Presence button staff 1, green
[2]	Presence button staff 2, yellow
[3]	Reminder light presence 1, green
[4]	Reminder light presence 2, yellow

2.1.4. Indication of presence

If the presence button has been activated, the associated reminder lights come on.

Activated presences are signalled in colour on the room lamp:

- Presence 1: green
- Presence 2: yellow

At the display devices and call handling consoles, the presence of the two staff groups is displayed on a room-by-room basis.

2.2. Call types and call categories

A call is used to summon help. Depending on the call event, a distinction is made between call types which are, in turn, divided into call categories (i.e. priority levels). This ensures that calls with higher priority are signalled with priority.

Table 2. Call categories and call types

Call category	Call type	Call event
Calls (normal priority)	Call	A patient has raised a call, or the plug of a call device has been pulled out of the connection socket (plug alert).
	WC call	A patient has raised a call in the WC room.
	Door call	The call button on a door entry speaker was pressed (“rings”) to gain access.
Emergency calls (medium priority)	Emergency call 1	Staff 1 (nursing staff) has raised a call. That is, a call was raised while presence 1 was switched on.
	Emergency call 2	Staff 2 (depending on the project definition: doctor or nursing staff 2) has raised a call. That is, a call was raised while presence 2 was switched on.
	WC emergency	Staff raised a call in the WC room. That is, a call was raised in the WC room while presence was switched on.
	Diagnostic call	A medical electrical device has raised a call. This could be a device that automatically raises a call when set limit values are exceeded or fallen below (e.g. infusion pump). **WARNING!** This call type acts only as supplementary information to the acoustic signalling on the medical electrical device. The user cannot rely on this information (distributed information system).
Alarms (high priority)	Cardiac alarm	Staff member has pressed a special cardiac alarm button to summon special staff (e.g. resuscitation team).

2.2.1. Plug alert

All patient devices that are plugged in raise a plug alert when the plug is removed. This pug alert call is signalled using the call type “call”.

While presence is switched on, a plug alert causes a visual display on the room lamp. However, this call is not transferred to a call handling console. This is to enable staff to plug, unplug and replace patient devices without raising a call.

2.3. Visual signalling in the room

2.3.1. Location light

Call buttons have location lights (i.e. a light indicator) that are used to find the call button in the dark.

2.3.2. Reassurance light

Call buttons have reassurance lights. These are lights that indicate the raising of a call on this call device and serve to reassure the patient. The reassurance light also remains illuminated after presence has been switched on and thus indicates to staff the call location within the room.

2.3.3. Reminder light

Presence buttons and WC cancel buttons have reminder lights that indicate the button is switched on and thus remind staff to reset the button.

2.4. Signalling on room lamps

Table 3. Signalling on room lamps 77 0171 10 and 77 0170 10

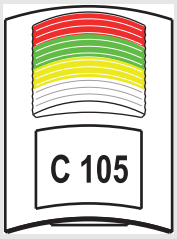
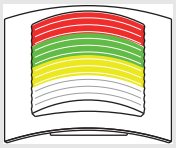
77 0171 10	77 0170 10	Light section	Meaning
		Red	Call category (call, emergency call, alarm)
		Green	Presence 1
		Yellow	Presence 2
		White	WC call, WC emergency

Table 4. Signalling on room lamps 77 0171 00 and 77 0170 00

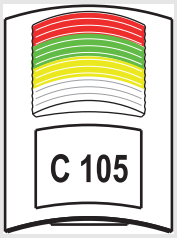
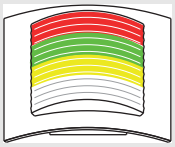
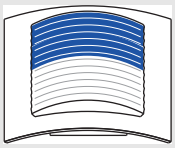
77 0171 00	77 0170 00	Light section	Meaning
		Red	Call category (call, emergency call, alarm)
		Green	Presence 1
		Yellow	Presence 2

Table 5. Signalling on room lamp 77 0170 01

77 0170 01	Light section	Meaning
	Blue	Cardiac alarm
	White	WC call, WC emergency

The room lamp 77 0170 01 is suitable as a supplement to the room lamps 77 0171 00 and 77 0170 00 for displaying calls from the WC and alarms separately.

Table 6. Signalling of the room lamps

Event	Colour	Fresh call	Answered call
Call category: Call	Red	Two options selectable via DIP switch.[a.]	Permanent light
WC call	Red + white[b.]	Two options selectable via DIP switch.[a.]	Permanent light
Emergency call	Red	Flashes rapidly	Permanent light
WC emergency	Red + white[b.]	Flashes rapidly	Permanent light
Cardiac alarm	Red + blue[c.]	Flickers	Permanent light
Presence 1	Green (permanent light)		
Presence 2	Yellow (permanent light)		

[a.] Option 1: Fresh calls of the call category “Calls” are indicated with a short attention flash. This makes it possible to distinguish between fresh calls and answered calls. (Option 1 = factory setting). A risk assessment is a prerequisite for the use of option 1. Option 2: Fresh calls of the call category “Calls” are displayed as permanent light according to the German standard DIN VDE 0834-1. Fresh and answered calls cannot be distinguished.

[b.] only for room lamp 77 0170 01, 77 0171, 10,77 0170 10, .

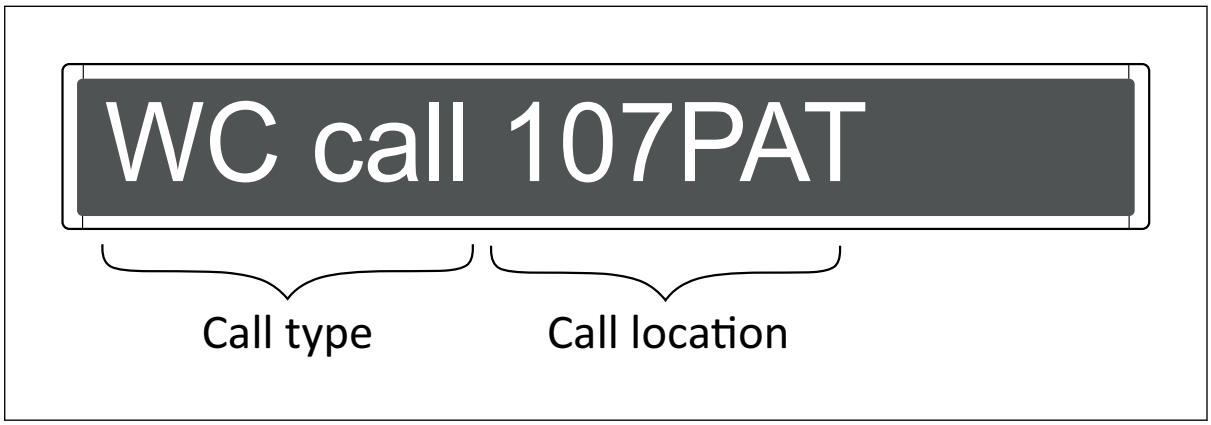
[c.] only for room lamp 77 0170 01.

NOTICE
If multiple calls occur at the same time, the call with the highest call category is displayed. Fresh calls within a call category are displayed before answered calls.

2.5. Signalling on the Corridor display^{IP} Alpha 16

The Corridor display^{IP} Alpha 16 (single-sided version: 76 0150 00, double-sided version: 76 0160 00,) shows the call type and room number of the call location in alphanumeric form. The display shows 16 characters; longer texts are displayed as tickers.

Figure 3. Display on the Corridor display^{IP} Alpha 16 (76 0150 00 or 76 0160 00)



If multiple calls occur, the call with the highest priority is displayed. Optionally, the system can be configured so that all calls are displayed in succession on a rolling basis (SystemOrganizer software).

When no calls are active, the time is displayed.

In addition, the calls are signalled acoustically. The three call categories have different sound sequences. In the configuration options of the SystemOrganizer software, the call tone can be set to “soft”, “medium” or “loud” separately for each ward.

The type of display messages can be configured for all corridor displays in the nurse call system or on a ward-specific basis using the SystemOrganizer software as follows:

- Display only of fresh calls or answered calls.
- Display of the ward name for the call location: never, always or only in the case of calls from external wards.
- Call display static or rolling.
- Rolling display of calls and presences.
- Rolling display of calls, presences and faults.

To play back announcements, two loudspeakers are integrated in the Corridor display^{IP} and are sent using VoIP in the nurse call system network.

If required, the call tone, transmission of announcements and time display can be deactivated on the Corridor display^{IP}.

2.6. Call handling consoles

Call handling consoles, known as “consoles” for short, are used by staff to display and handle calls. A distinction is made between the following categories of call handling consoles:

Table 7. Call handling consoles

Category	Application
Ward console	Ward consoles are used to answer calls from a ward. The ward console in the Flamenco^{IP+} system is called ComStation^{IP}.
Call forwarding point	Call forwarding points are devices that can be used to answer forwarded calls in the rooms. ComTerminals^{IP} are used for this purpose in Flamenco^{IP+} nurse call systems.
Central console	The central console is a call handling console where the calls from several wards (usually from all wards of one or more buildings) are answered. The central console in the Flamenco^{IP+} system is called ManagementCenter^{PC}.
Mobile console	Mobile consoles are mobile devices (DECT, Wi-Fi or GSM) that are used to handle calls. They can be used in addition to the other call handling consoles. Since nursing staff carry the mobile device with them, this enables calls to be transferred to the right nursing staff member.

2.6.1. Ward console: ComStation^{IP}

Figure 4. ComStation^{IP} (76 0605 50)

The ComStation^{IP} is based on an IP desk phone with an adapted Android operating system. It is installed at the nurse station on the ward. The nurse call function is pre-installed as an application on the IP telephone. It is operated using a large touch display with a 7-inch screen.

Calls and presences in the ward are shown in list form on the display. Coloured indicators are used to distinguish the call categories and presence groups. Fresh calls flash. The three call categories have different flash-signal sequences.

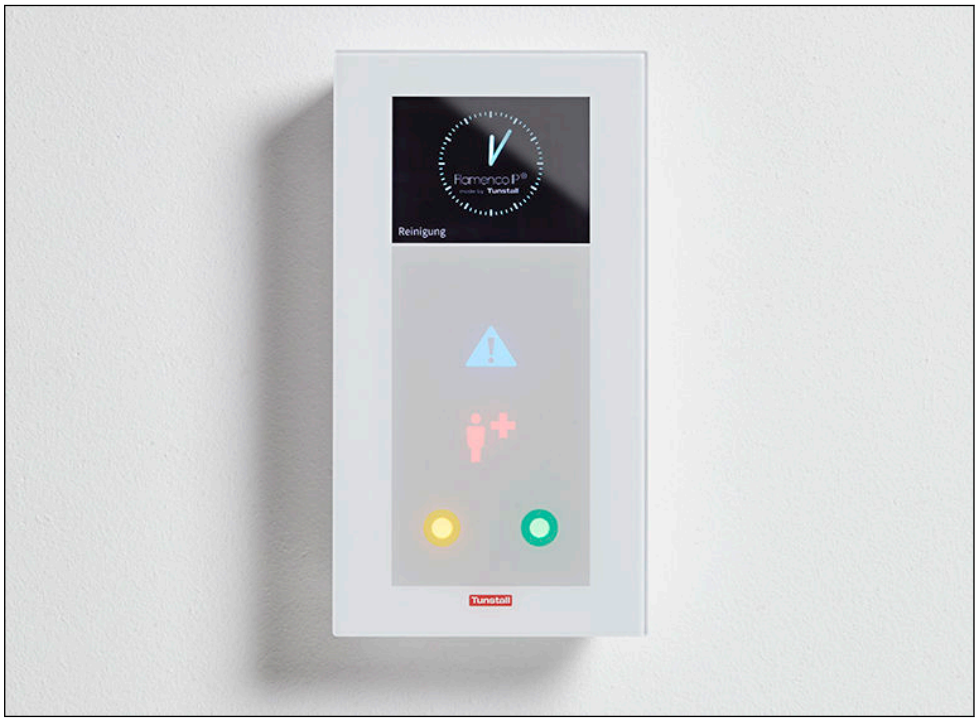
The staff at the ComStation^{IP} answer calls, i.e. a speech connection is established to the call location. The call type and the bed number are then displayed on the screen. The member of staff speaks to the caller to clarify what help is needed. If staff are needed at the call location, they can go themselves or establish a speech connection to a room where staff are present and inform the staff there. As long as the call has not been handled to completion, it is referred to as an answered call. Its call indicator lights up with a permanent light (i.e. it no longer flashes). The call is cancelled only when no further actions are necessary. As a rule, staff cancel the call in the room. Calls of the call type “call” can also be cancelled on the ComStation^{IP}.

In addition to call handling, the ComStation^{IP} can be used to initiate functions that include:

- Making announcements
- Calling a ComTerminal^{IP}, ComStation^{IP}, ManagementCenter^{PC}
- Switching ward couplings on and off (i.e. coupling wards from an organisational perspective). Coupling means that calls are displayed and answered within the coupled wards.
- Switching shifts on and off as part of zone nursing, i.e. specifying that the ward is divided into smaller units (“zones”) within which calls are displayed and answered.

2.6.2. Call forwarding point: ComTerminal^{IP}

Figure 5. ComTerminal^{IP} (76 0510 00, 76 0510 10)



In certain situations, calls are displayed on the ComTerminals^{IP} where presence is switched on. This process is called call forwarding. It occurs, for example, if a call has not been answered at the ward console within a specified time.

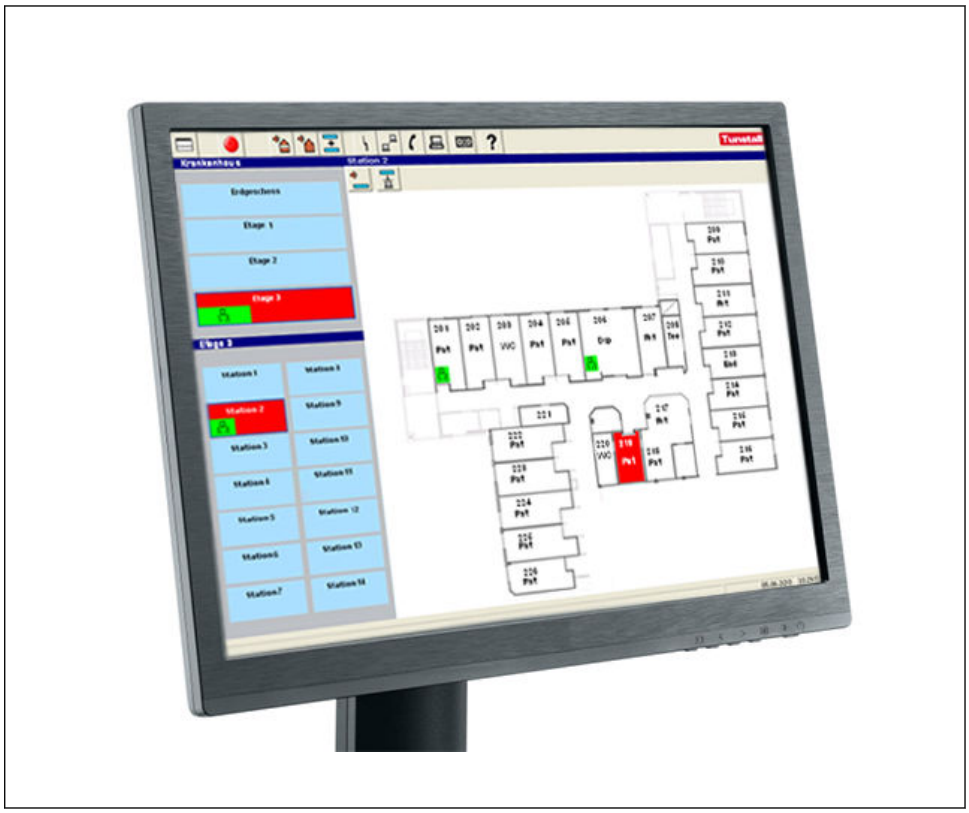
The touch display of the ComTerminal^{IP} shows the call type and call location of the forwarded call. A call tone is also emitted. The sound sequence differs depending on the call category.

Staff can answer the forwarded call and establish a speech connection to the call location. Calls of the call type “call” can be cancelled remotely.

In the configuration options of the SystemOrganizer software, the call tone volume can be set to “soft”, “medium” or “loud” separately for each ward.

2.6.3. Central console: ManagementCenter^{PC}

Figure 6. ManagementCenter^{PC} (77 0610 00)



The ManagementCenter^{PC} is a PC workstation with a speech unit.

Calls and presences on the ward are shown on ward plans. Coloured indicators are used to distinguish the call categories and presence groups. Fresh calls flash. The three call categories have different flash-signal sequences.

Staff at the ManagementCenter^{IP} answer calls, i.e. the staff establishes a speech connection to the call location. The call type is then displayed on the screen, together with further information if this has been set up. The member of staff at the ManagementCenter^{PC} speaks to the caller to clarify what help is needed. If staff are needed at the call location, the member of staff at the ManagementCenter^{PC} establishes a speech connection to a room where staff are present and informs them accordingly. As long as the call has not been handled to completion, it is referred to as an answered call. Its call indicator lights up with a permanent light (i.e. it no longer flashes). The call is cancelled only when no further actions are necessary. As a rule, staff cancel the call in the room. Calls of the call type “call” can also be cancelled remotely from the ManagementCenter^{PC}.

In addition to call handling, the ManagementCenter^{PC} can be used to initiate functions that include:

- Making announcements
- Switching wards to decentral or central mode, i.e. determining whether a ward is managed by ManagementCenter^{PC} (centrally) or whether calls are displayed and answered on the ward.
- Switching ward couplings on and off (i.e. coupling several wards operating in decentral mode). Coupling means that calls are displayed and answered within the coupled wards.

2.6.4. Mobile console: mobile device (DECT, Wi-Fi, GSM)

Figure 7. Mobile console

The display of the mobile device shows the call type and call location. A speech connection is established between the mobile device and call location.

Further properties of the mobile console depend on the selected mobile device and the PBX.

The mobile consoles do not form part of the nurse call system, but rather a PBX that is connected to the nurse call system via the IP network.

To operate this application, an additional software module is installed on the IP-System-Manager with “System” operating mode: Function module UMS/A (76 0740 01) for Ascom systems or function module UMS/T (76 0740 10) for Tetronik systems.

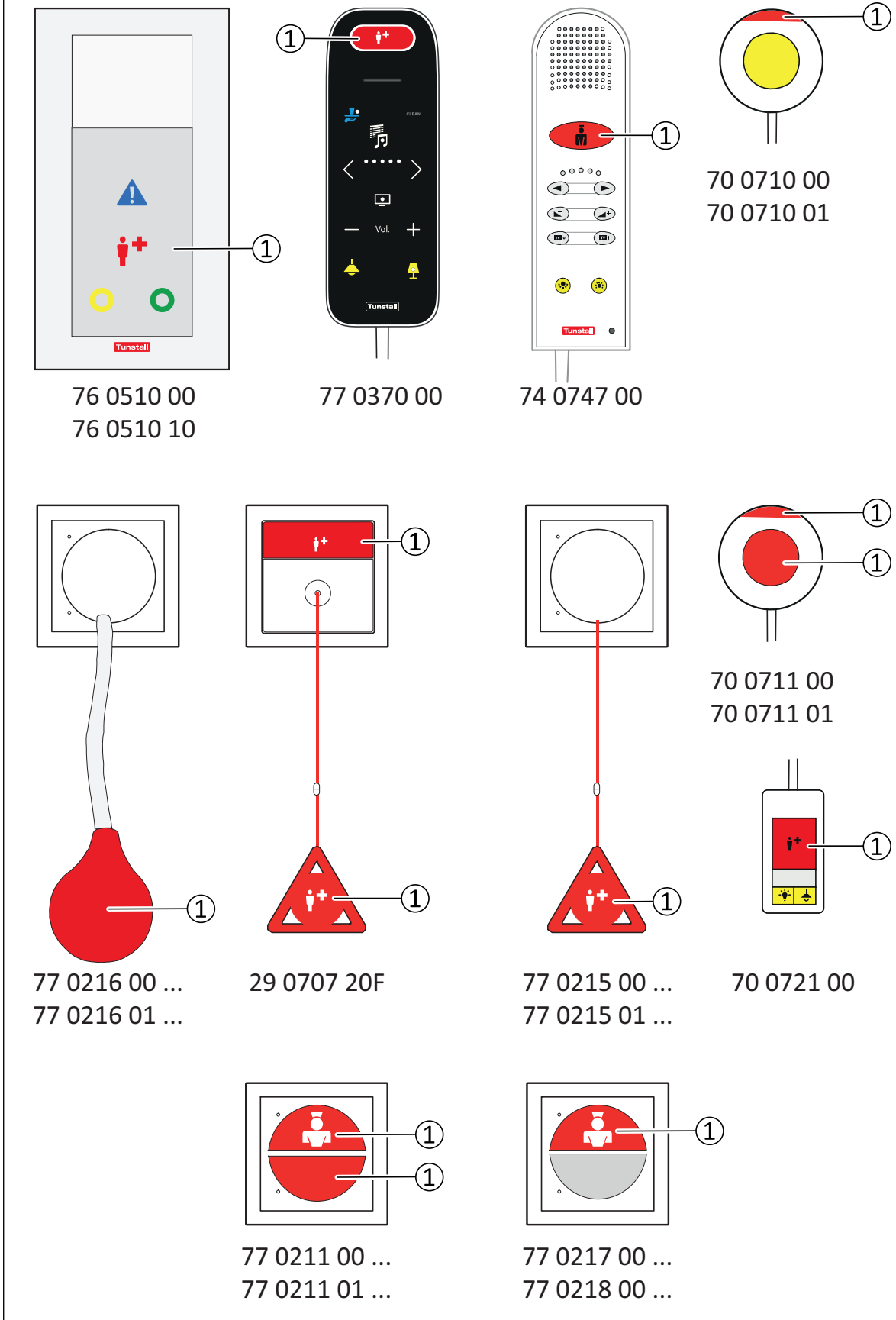
2.7. Call handling

2.7.1. Raising a call

Calls are raised by pressing a specially marked call button. The call buttons are red and marked with a clear symbol. Exception: Cardiac alarms (blue button).

Call buttons are integrated into the ComTerminal^{IP}, ePat$^{®lite}$, patient handset and the pear push switches, but are also available individually as call switches. Call switches with a pull cord or rubber ball for pneumatic actuation are also available. An overview of the components for raising calls is provided in Figure 8: “Call devices” (page 36).

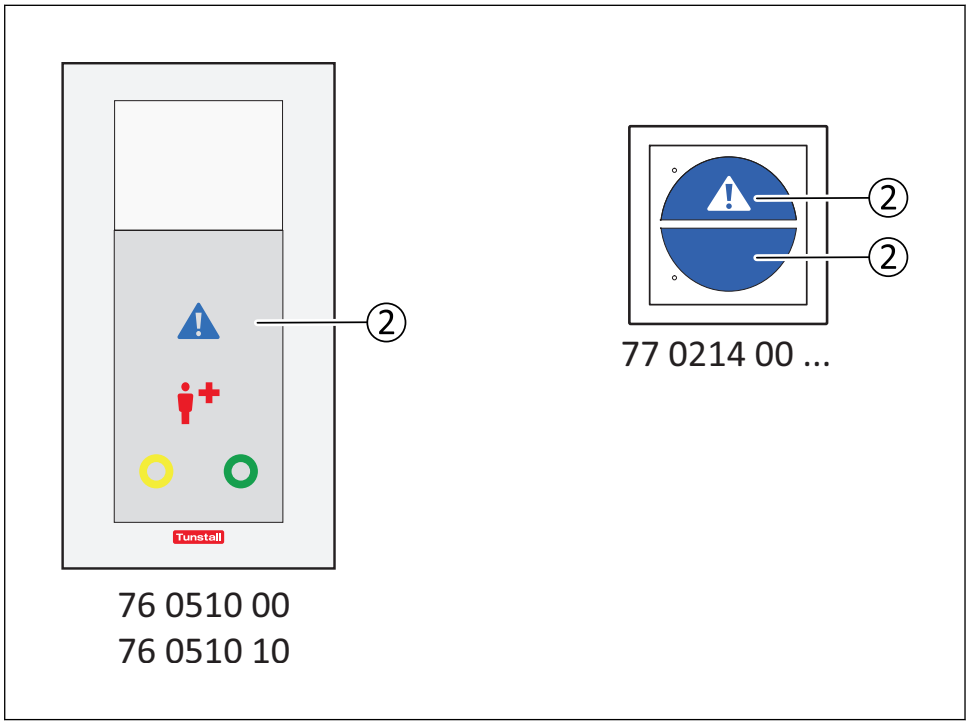
Figure 8. Call devices



[1] Components for raising calls (red)

Cardiac alarms, which are calls with high priority, are raised by pressing a specially marked, blue cardiac alarm button. Cardiac alarm buttons are integrated into the ComTerminals^{IP}, but are also available individually as alarm switches. Cardiac alarm buttons are intended for use by staff and are therefore active only when presence is switched on in the room.

Figure 9. Devices for raising alarms



[2] Cardiac alarm buttons (blue)

Table 8. Call devices

Product	Components for raising calls	Persons	Call type
ePat®lite	Red call button	Patient	Call with bed identification
Patient handset	Red call button	Patient	Call with bed identification
Pear push switch	Red call button	Patient	Call with bed identification
ComTerminal^{IP} call button	Red call button	Staff	Emergency call[a.] + call
ComTerminal^{IP} cardiac alarm button	Blue cardiac alarm button[a.]	Staff	Alarm[a.]
Room call switch	Red call button, pull cord, rubber ball for pneumatic actuation	Patient, Staff	Call, emergency call[a.]
Room cardiac alarm switch	Blue cardiac alarm button[a.]	Staff	Cardiac alarm
Call switch/WC	Red WC call button, pull cord, rubber ball for pneumatic actuation	Patient, Staff	WC call WC emergency[a.]
Diagnostic connection cable	For example, contact of a medical electrical device	Automatic	Emergency call

[a.] Prerequisite: presence is switched on.

2.7.2. Accepting a call

A raised call is first acknowledged or answered.

Answering a call at a call handling console

The process of accepting a call at call handling console by establishing a speech connection is referred to as “answering”.

The available call handling consoles are: Ward console (ComStation^{IP}), central console (ManagementCenter^{PC}), mobile console (mobile device), call forwarding point (ComTerminal^{IP}).

Acknowledging a call at the call location

A call is acknowledged when staff at the call location switch on their presence without the call previously being answered at a call handling console.

2.7.3. Speaking

After a call has been answered, a speech connection is established from the call handling console to the call location.

2.7.4. Cancelling a call

Once the person seeking help has been assisted, the call must be cancelled.

Cancelling a call at the call location

A call can be cancelled at the call location if it has previously been answered or acknowledged by staff.

Calls of the types call, emergency call 1, emergency call 2 and alarm are cancelled automatically at the call location when presence is switched off. WC calls and WC emergencies must be cancelled by pressing a special grey WC cancel button in the WC area of the call location.

Remotely cancelling calls at the call handling console

Certain types of calls (default: calls) can be cancelled remotely at the call handling console if a speech connection has been verifiably established beforehand. This evidence can be provided by the PrimusGlobal+ “Call Recording” software (e.g. as 50 1027 00).

Cancellation options for call types

The following table summarises the cancellation options for the call types.

Table 9. Cancellation options for the different call types

Call type	Cancellation option
Call	At the call location automatically by switching off the presence or cancelled remotely on the call handling console after a speech connection has been established with the call location.
WC call	By pressing the grey WC cancel button in the WC area of the call location.
Door call	A door call is cancelled remotely on the call handling console after a speech connection has been established to the call location.
WC emergency	By pressing the grey WC cancel button in the WC area of the call location.
Emergency call 1	By switching off the presence at the call location.
Emergency call 2	By switching off the presence at the call location.
Diagnostic call	By resetting the call on the triggering device and then switching off the presence.

Call type	Cancellation option
Cardiac alarm	By switching off the presence at the call location.

2.7.5. Call forwarding

In certain situations, calls are displayed in the rooms where presence is switched on. This process is called call forwarding. It occurs, for example, if a call has not been answered at the ward console within a specified time.

The touch display of the ComTerminal^{IP} shows the call type and call location of the forwarded call. A call tone is also emitted. The sound sequence differs depending on the call category.

The cancel switch/WC (77 0213 00...), the call switch/WC with cancel switch (77 0217 00...), staff presence combination with call tone (77 0219 00...) and presence switch (77 0212 00...) signal forwarded calls acoustically with a call tone. The sound sequence varies depending on the call category. Forwarded calls with speech option can be answered at the ComTerminal^{IP} (call forwarding point). After the speech connection to the call location has been established, the call can be cancelled remotely or the speech connection can be closed without cancelling.

ConnectionTerminal IP has no display or operating elements. For this reason, forwarded calls in rooms with a ConnectionTerminal IP are only signalled on switches with a call tone. The staff presence combination with call tone (77 0219 00...) or the presence switch (77 0212 00...) can be used for this purpose. As the ConnectionTerminal IP does not offer the option of call forwarding point, the call location must be visited directly. The room lamp at the call location and the display on a corridor display are used to identify the call location.

NOTICE
On the presence switch (77 0212 00...), the call tone is deactivated at the factory. If the call tone is required, it must be activated during installation.

2.8. Speech communication

2.8.1. Call handling consoles

ComStation^{IP} and ManagementCenter^{PC}

Speech is supported in handset mode or hands-free mode.

Mobile devices (DECT, Wi-Fi, GSM)

The products are standard commercial telephones. Communication is therefore conducted in the same way as a normal telephone call.

2.8.2. Speech devices in the room

Speaking per room

Free speaking using the microphone and loudspeaker of the ComTerminal^{IP}.

Speech per bed

Each bed can be equipped with a speech device (ePat$^{®lite}$ or patient handset). Speech communication takes place either freely or discreetly at reduced volume.

This function is supported by the ComTerminal^{IP} and ConnectionTerminal IP room terminals.

Non-system patient device

The speech connection at the bedside can be established using a non-system patient device, such as a patient telephone, instead of the ePat$^{®lite}$ or the patient handset. The characteristics of the communication are then determined by the third-party device.

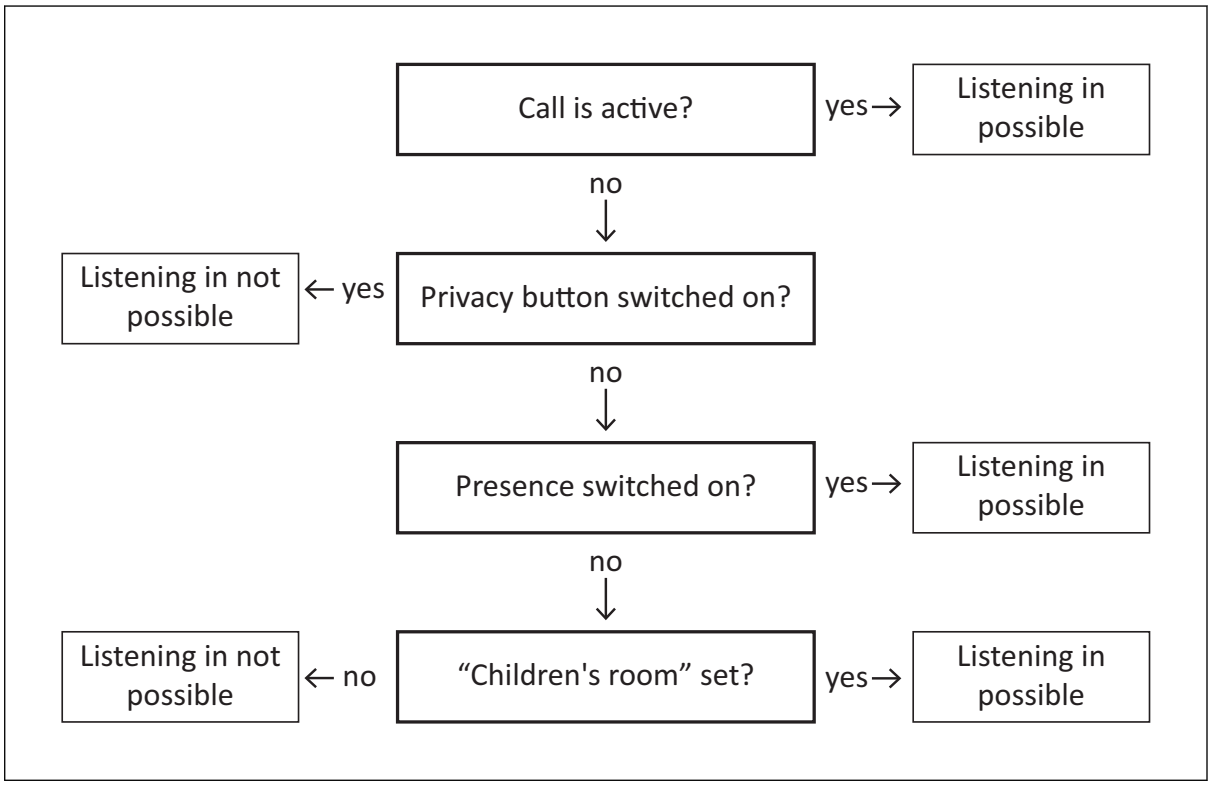
2.8.3. Privacy

The ComTerminals^{IP} are equipped with an automatically controlled privacy function. This prevents unnoticed eavesdropping.

However, to meet the requirements of special situations, the privacy function can also be switched off automatically or manually. Whether the privacy function is on or off depends on:

- Situation (call, presence)
- Setting for the privacy button on the ComTerminal^{IP} or separate call switch with privacy switch
- Room type “children's room” (setting on ComTerminal^{IP} and SystemOrganizer)

Figure 10. Privacy principle



NOTICE
A speech connection to a patient device (ePat®lite, PBK Hand) can only be established if a call has been raised with this device.

2.8.4. Announcements

Announcements can be made from the ComStation^{IP} ward console and ManagementCenter^{PC} central console.

Announcements are played on the following devices:

- ComTerminals^{IP}
- Corridor displays^{IP}
- Separate loudspeakers (05 0024 02, 05 0024 03, 05 0024 03)
- ComStation^{IP}

The announcements can be preceded by an announcement tone or by an announcement text (configurable).

ComStation^{IP}

The ComStation^{IP} enables staff to make announcements to their own ward.

Table 10. Announcement types on the ComStation^{IP}

Announcement audience	Meaning
All staff groups	All rooms in which staff are reported as present.
Staff 1	All rooms in which staff 1 are reported as present.
Staff 2	All rooms in which staff 2 are reported as present.
Entire ward	All rooms in the ward and the ward corridor, regardless of presence.

ManagementCenter^{PC}

The ManagementCenter^{PC} can be used to make announcements to all connected wards:

Table 11. Announcement types on the ManagementCenter^{PC}

Announcement type	Announcement audience
Collective announcement	All connected rooms and corridors.
Staff announcement	All rooms in which staff are reported as present. Selectable: any staff, staff 1 or staff 2.
Ward announcement	All rooms on the ward and the ward corridor.
Ward staff announcement	All rooms on a ward in which staff are reported as present. Selectable: any staff, staff 1 or staff 2.
Area announcement (freely selectable zone)	Selected rooms, corridors or wards.
Area announcement (defined zone)	Defined area selected from a predefined list.
Multiple line	Selected rooms. Responses can be made from rooms where the privacy function is not enabled.

Specific rooms can be excluded from announcements, such as operating theatre areas (configuration in SystemOrganizer).

It is possible to activate automatic announcements. Previously recorded announcements are transmitted to the configured areas. This feature is activated using the ManagementCenter^{PC} central console.

2.9. Configuring call escalation

The SystemOrganizer software is used to define the call escalation process. Call escalation determines when which call is displayed on which display device. This ensures that every call is transferred to the responsible party.

Call escalation is configured using various settings.

2.9.1. Configuring display classes

The display of calls on system's own display devices is determined by configuring display classes.

The system's own display devices are divided into four display device types: Room terminals ComTerminals, ConnectionTerminals), ComStations, Corridor displays and ManagementCenter.

The default system settings include three display classes that correspond to the three call categories: *call*, *emergency call*, *alarms*. The *call* display class includes the call types call, WC call and door call. The *emergency call* display class includes the call types diagnostic call, emergency call 1, emergency call 2, telephone call and WC emergency. The *alarms* display class includes the call types cardiac alarm and fire alarm.

The system distinguishes between three operating modes. The **Subcentral** operating mode is used if a ComStation is available, i.e. the calls should first be displayed on the ComStation. If a call has not been answered at the ComStation after the set time elapses, it is displayed on the corridor displays and forwarded to the rooms with presence switched on (rooms with ComTerminal oder ConnectionTerminal). In *Decentral* operating mode, calls are displayed directly on corridor displays and forwarded to rooms with presence switched on (rooms with ComTerminal oder ConnectionTerminal). **Central** operating mode is used only in nurse call systems with a ManagementCenter, i.e. the calls should first be displayed on the ManagementCenter.

The configuration settings determine which display class (call, emergency call, alarm call) is displayed in which operating mode after which time delay on which type of display device. This is preset, but can be changed. Display classes can also be changed on a ward-specific basis.

2.9.2. Configuring call transfer

Call transfer refers to the transfer of selected call types from one ward to another. The call type is displayed in both the source ward and the destination ward.

Call transfer can be active on a permanent basis or only at certain times. The time control can be set for individual days of the week and times.

2.9.3. Configuring display zones

Configuring display zones enables events (call types, presences, faults) in the nurse call system to be displayed on cordless telephones and pagers connected via an interface.

As a rule, a display zone corresponds to a ward. However, it is also possible to create other display zones.

A display zone is defined using a combination of *events*, *call devices*, *display devices* and a *delay*.

The following can be selected as *events*: The individual call types, presence registrations and faults.

Call devices are selected indirectly by selecting rooms and beds.

Individual cordless phones, groups of cordless phones, individual pagers or groups of pagers can be selected as *display devices*.

The *delay* is set in seconds and specifies the time delay after which the event should be sent to the display device.

Display zones can also be adapted to the shifts used for zone nursing.

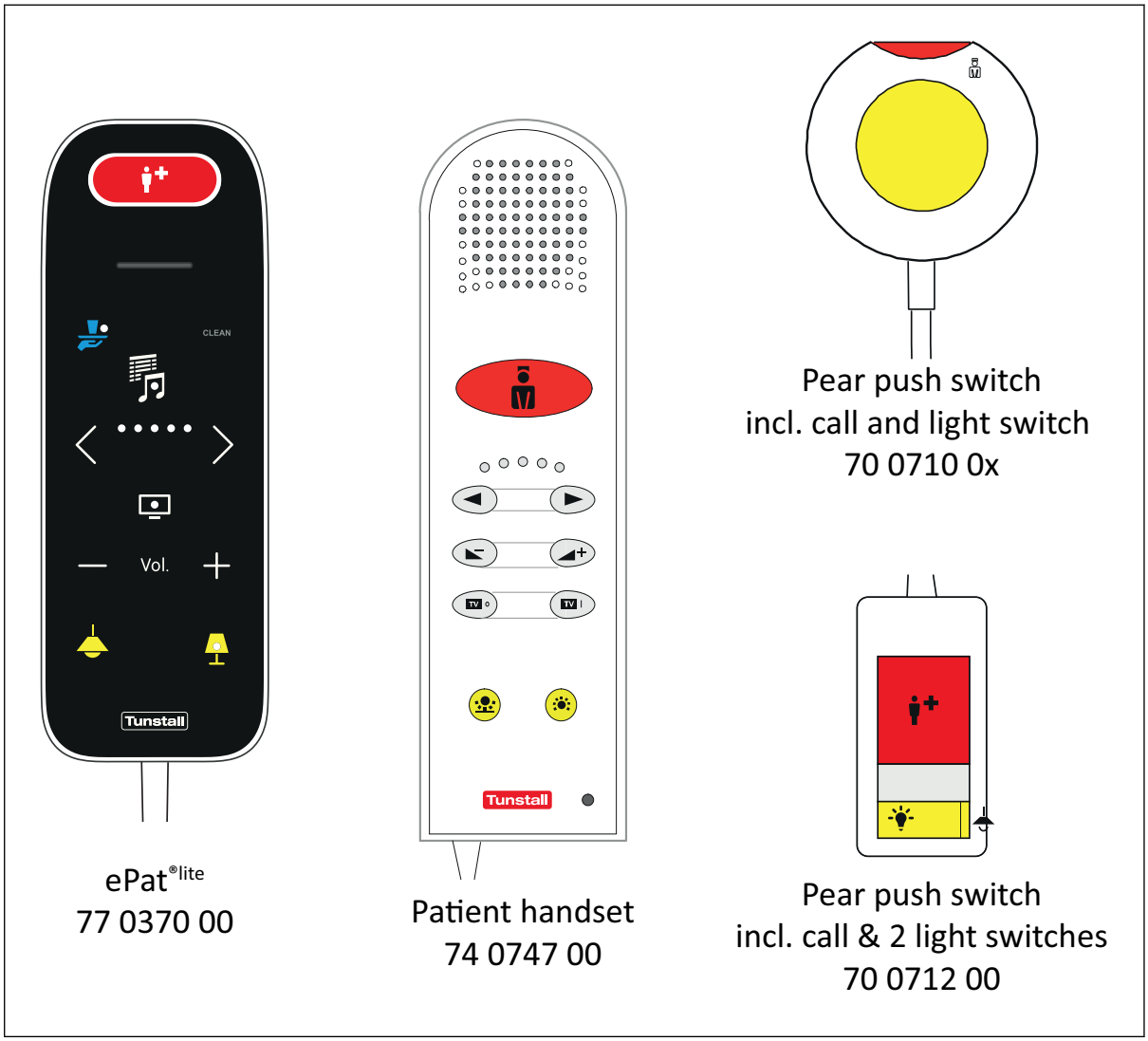
3. Interfaces

Contents

The range of functions offered by Flamenco^{IP+} is expanded by networking with other systems. You can benefit from these synergy effects. Combine the best individual solutions and products into a powerful, cost-efficient communication concept. Flamenco^{IP+} offers interfaces in the room and ward and centralised interfaces in the nurse call system.

3.1. Interfaces in the patient room

Figure 11. Patient devices using interfaces



3.1.1. Lighting control

The patient devices ePat®lite (77 0370 00), patient handset (74 0747 00) and pear push switch incl. call & 2 light switches (70 0712 00) are equipped with two buttons for switching two light sources (reading light, room light). The pear push switch incl. call and light switch (70 0710 00, 70 0710 01) includes one switch to turn the light on and off. For information on the selection of light relays, refer to Section 17: “Lighting control” (page 275).

NOTICE
The pear push switch incl. call & 2 light switches (70 0712 00) can only be connected to the connection socket with call switch (70 0171 60...) or the connection socket with call switch, bedhead unit (70 0171 50). It does not work with the other connection sockets.

3.1.2. Entertainment/television

The patient devices ePat®lite (77 0370 00) and patient handset (74 0747 00) can transmit entertainment and TV audio through the integrated loudspeakers or connected headphones. The open sound is switched off when the headphone cord is inserted.

Up to five permanently set entertainment programmes can be connected using the connection socket combi (70 0425 00) or connection socket combi, bedhead unit (70 0435 00). The patient device can be used to trigger the following functions: Switch on/off, select programme and set the volume.

The IR TV control module universal (77 0360 11) enables a TV set (e.g. from Samsung, Philips or LG) to be controlled. The TV audio is played back on the patient device ePat®lite (77 0370 00) or the patient handset (74 0747 00). The patient device can be used to trigger the following functions: Switch on/off, select programme and set the volume.

The TV audio amplifier (77 0365 00) enables the TV audio from any TV set with a headphone socket to the transmitted to the patient device ePat®lite (77 0370 00) or the patient handset (74 0747 00). In this application, the TV is not controlled using the patient device.

Tunstall itself offers TV sets (LED TV set professional), that can be controlled using the patient device ePat®lite (77 0370 00) or patient handset (74 0747 00) in conjunction with the RAN interface (77 0840 00). The TV audio is transmitted via the patient device. The patient device can be used to trigger the following functions: Switch on/off, select programme and set the volume.

3.1.3. Blinds control

The ePat®lite (77 0370 00) and patient handset (74 0747 00) can be used to control the lowering and raising of blinds. To enable this function, the blinds control must be connected to the connection socket combi (70 0425 00) or connection socket combi, bedhead unit (70 0435 00) via the RAN interface universal (70 0848 00).

NOTICE
A patient handset (74 0747 00) can be used for either “entertainment” or “blinds control”. Both functions cannot be provided on the same device.

3.1.4. Call devices

In addition to wired call devices, wireless call devices can also be used. Radio receiver-T (Z 00 8202 33) can be connected to the connection sockets in the socket for pear push switches. Radio receiver-T UP (Z 00 8202 35) is used for flush mounting and is connected to the nurse call system via the RAN interface (77 0840 00). Both radio receiver-T models receive the signals of the MyAmie radio trigger (P68007/02), the iVi™ fall detector (P68005/47) and other radio transmitters from the Tunstall Telecare portfolio.

Radio transmission takes place on the social alarm frequency 869.2125 MHz.

NOTICE
The radio transmission is not monitored. According to the German standard DIN VDE 0834, the radio transmitters must therefore be used only as additional call devices in connection with the nurse call system.

The RAN interface (77 0840 00) is available for connecting non-system call devices. In addition to raising the “call”, “cardiac alarm” or “WC call” call type, this interface provides the location and reassurance light function, as well as a bed identification function.

3.1.5. Patient devices

It is possible to use operating devices from other manufacturers at the patient's bedside, instead of the patient devices (ePat®lite, patient handset, pear push switch) from Tunstall. Patient telephones with an installed call button for nurse call, for example, are suitable for this purpose. The call button and telephone speech channel can be connected in the room using the RAN interface with speech (77 0880 00).

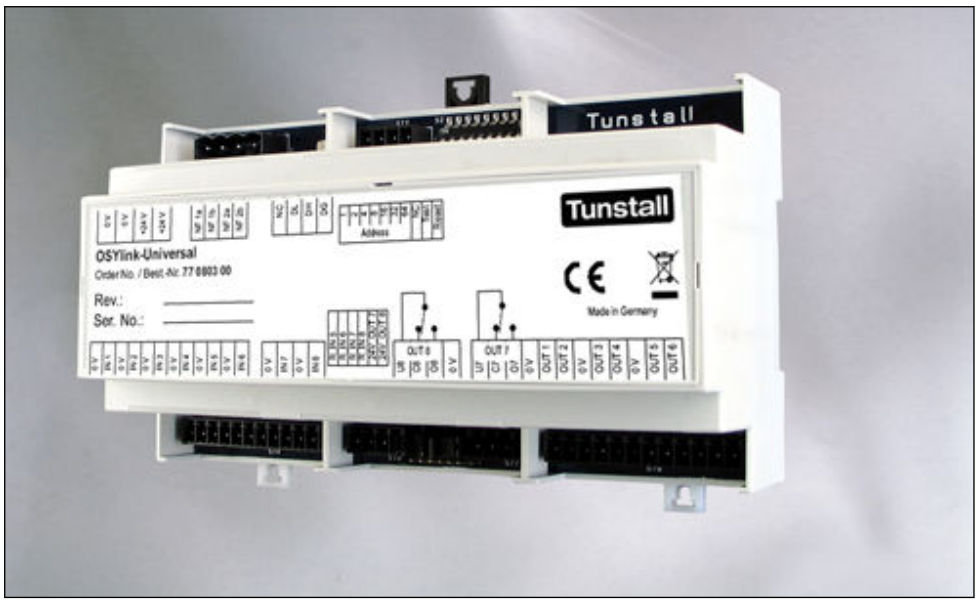
Examples of suitable products include the GS, 3, 4 and 5 models of the MediSET patient device from Siemens. The selection of a different third-party device must be agreed with Tunstall GmbH.

3.2. Interfaces on the ward

3.2.1. OSYlink-Universal

The universal interface OSYlink-Universal (77 0803 00) is an interface for connecting external systems and/or technical equipment. OSYlink-Universal is connected to the IP-SystemManager (i.e. the control unit) on the ward using the OSYnet group bus.

Figure 12. OSYlink-Universal (77 0803 00)



Inputs and outputs:

- 4 monitored switching inputs:
  - 2x call
  - Emergency call
  - Alarm
- 1 standard switching input, collective announcement (all wards)
- 1 standard switching input, collective announcement (all presences)
- 1 standard switching input for raising a call, plus a standard switching input for cancelling this call.
- 4 configurable electronic switching outputs. Factory setting:
  - 2x call
  - Emergency call
  - Cardiac alarm
- 1 electronic switching output, configurable
- 1 electronic switching output, configurable with location light function (functionally assigned to the switching inputs for call raising)

- 2 potential-free switching outputs, configurable (changeover contact, voltage source selectable via jumper)

Configuration of outputs in the SystemOrganizer:

- For which call types should the output switch?
- Should the output switch when a fresh call is raised, if an answered call exists or in both situations?
- Should the output emit a flashing signal or a continuous signal?
- What events at which locations should cause the output to switch?
- Should the output switch if an event is triggered at an input of this OSYlink-Universal (IN1-4, IN7)?

The function of the inputs cannot be configured in the SystemOrganizer.

3.3. Centralised interfaces of the nurse call system

3.3.1. Text messages to mobile staff (alarm server, radio paging system)

Text messages from the nurse call system can be transferred to external systems. In the typical application, pending call messages from the nurse call system are transferred to nursing staff who carry a DECT telephone or pager.

The connection is established to an alarm server or directly to a radio paging system. The physical connection is made either via a serial interface on an IP-SystemManager or via the IP network.

The connection is configured in the SystemOrganizer software.

Transfer via serial interface (ESPA 4.4.4)

The alarm server or radio paging system is connected to a serial port of the IP-SystemManager with the operating mode “System” or “System + Local”. The protocol is based on ESPA 4.4.4.

Transfer via IP network

Alarm servers and/or PBXs from Ascom can be connected via the IP network of the nurse call system. To enable this, the function module UM/A (76 0740 00) must be installed on the IP-SystemManager with “System” or “System + Local” operating mode, in addition to the system module HEALTH (76 0730 00) or CARE (76 0735 00). The function module provides system-wide availability of the function for transferring text messages from the nurse call system.

3.3.2. Telephony

The telephony infrastructure of the hospital can also be used for speech communication with the nurse call system. The telephone user will not notice any difference in the speech channel.

The nursing staff use the cordless phone they carry with them to handle calls from the nurse call system.

An alarm server is additionally required for the connection of the PBX. The alarm server manages the connection between the nurse call system and the PBX. The Flamenco system family supports Ascom UCM and Tetronik DAKS as alarm servers.

This enables the use of PBXs that are supported by Ascom UCM or Tetronik DAKS and that are able to create a SIP trunk to an Asterisk (PBX in the nurse call system).

The connection is configured in the SystemOrganizer software.

Even if an external device is not functioning (e.g. because the PBX has dropped out), the Flamenco nurse call system guarantees that an existing call is displayed within the nurse call system.

3.3.3. Hospital Information System

To support the nursing staff, patient data retrieved from the Hospital Information System (HIS) can be displayed during call handling on the ManagementCenter^{PC}. The system driver HL7 establishes the connection between the Hospital Information System (HIS) and the PrimusGlobal+ software family. Defined data fields are retrieved from the HL7 data record and are available for further display on the ManagementCenter^{PC}. The desired information is selected in close coordination with the customer. Support can be provided for various transfer protocols and transmission methods.

3.3.4. Fire alarm system

A fire alarm system (FAS) can be coupled unidirectionally to the nurse call system. Alarm messages from the fire alarm system are taken over by the nurse call system and displayed as calls (call type “fire alarm”, call category “alarms”).

Note: If required, more than one fire alarm system can be coupled.

The fire alarm system is connected to the IP-SystemManager with the operating mode “BMA/MED”. Communication takes place using the ESPA 4.4.4 protocol via an RS-232 serial interface.

The information to be transferred and its prioritisation are defined in close coordination between Tunstall and the customer.

The connection is configured in the SystemOrganizer software.

4. Organisational forms

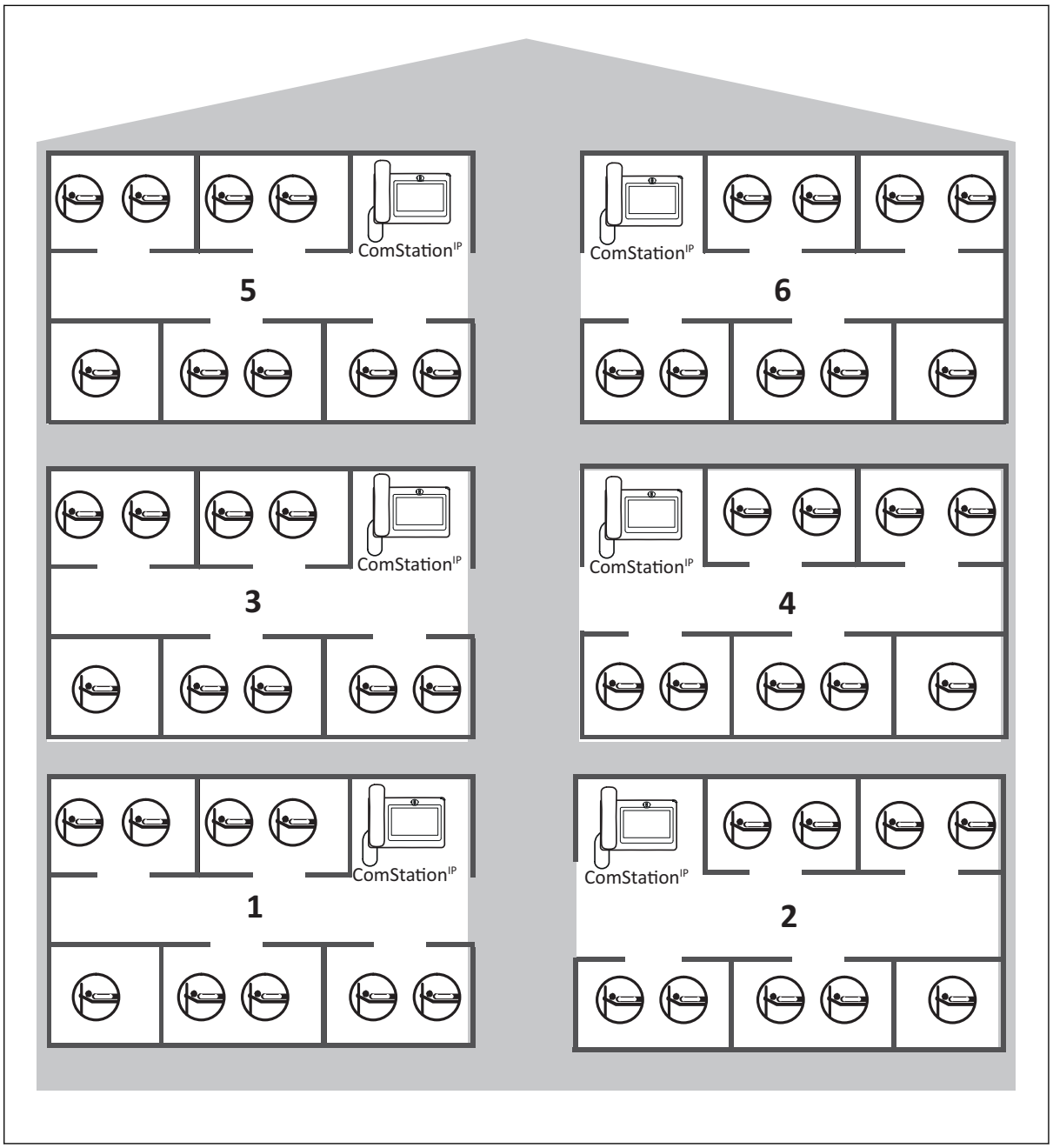
Contents

The Flamenco^{IP+} nurse call system can adapt to the care organisation of the hospital. Regardless of the installation, support can be provided for highly varied forms of care organisation. Organisational changes can be made without the need for additional installations or structural changes.

4.1. Ward operation

Ward operation is the traditional form of call handling. All calls within the ward reach the responsible nursing staff directly at a ComStation^{IP} ward console at the nurse station or by forwarding calls at the respective location.

Figure 13. Principle of ward operation



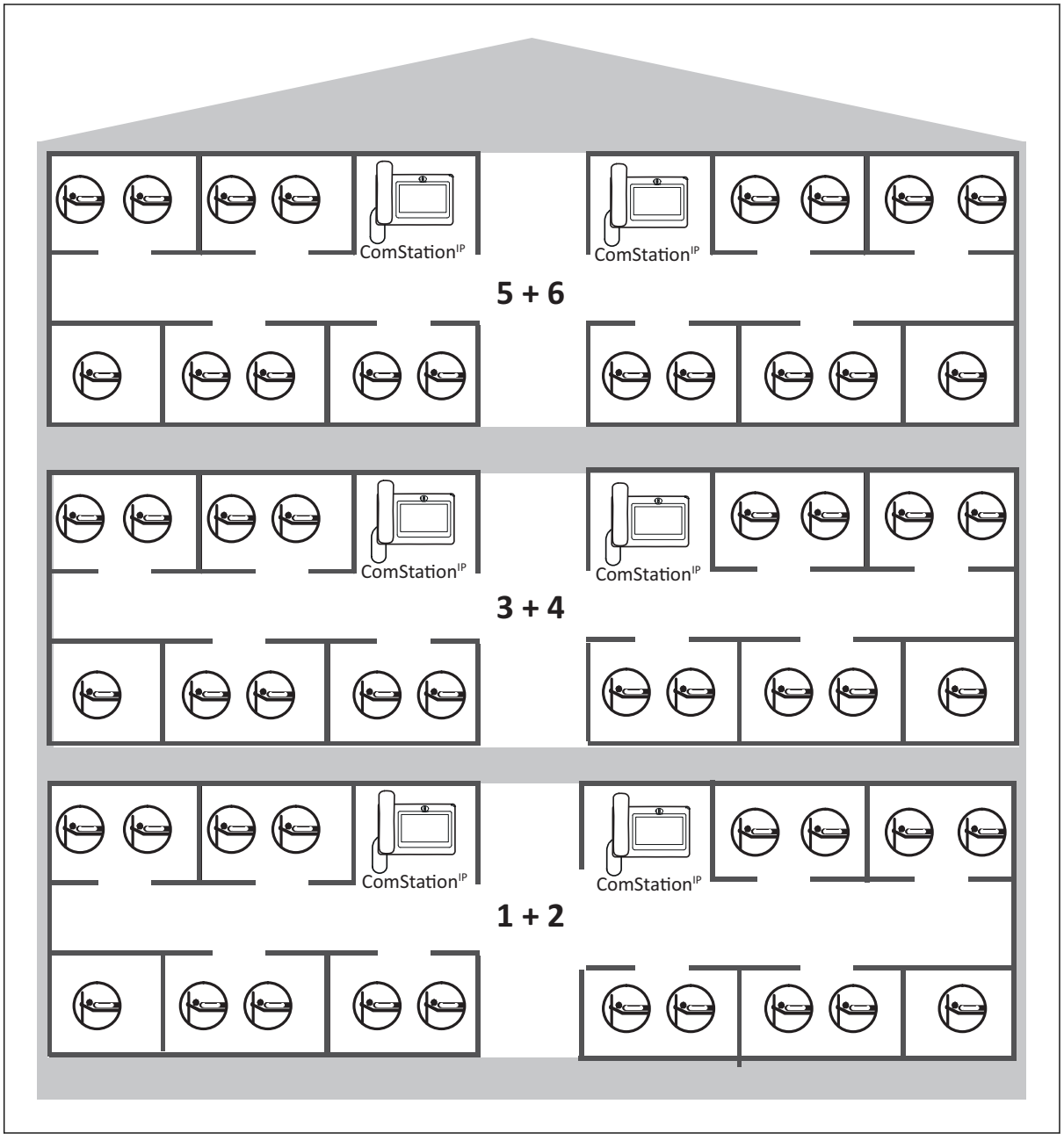
1–6 Wards 1–6

Ward operation provides ideal call handling if the “functional care” form of care is implemented on the ward. In functional care, all nursing tasks on the ward are distributed among the entire ward staff. Each nurse has an area of responsibility (function) for all patients on the ward.

4.2. Ward coupling

During quiet periods, two or more wards working in ward operation can be combined organisationally. This is implemented in the nurse call system using ward coupling. All calls and presences of the coupled wards are then displayed on all call handling consoles on the coupled wards or forwarded to rooms with presence switched on.

Figure 14. Principle of ward coupling



1–6 Wards 1–6

1 + 2 Ward 1 is coupled with ward 2

3 + 4 Ward 3 is coupled with ward 4

5 + 6 Ward 5 is coupled with ward 6

Ward couplings are created in the SystemOrganizer software. Each ward coupling is used to store the coupling of a selection of wards.

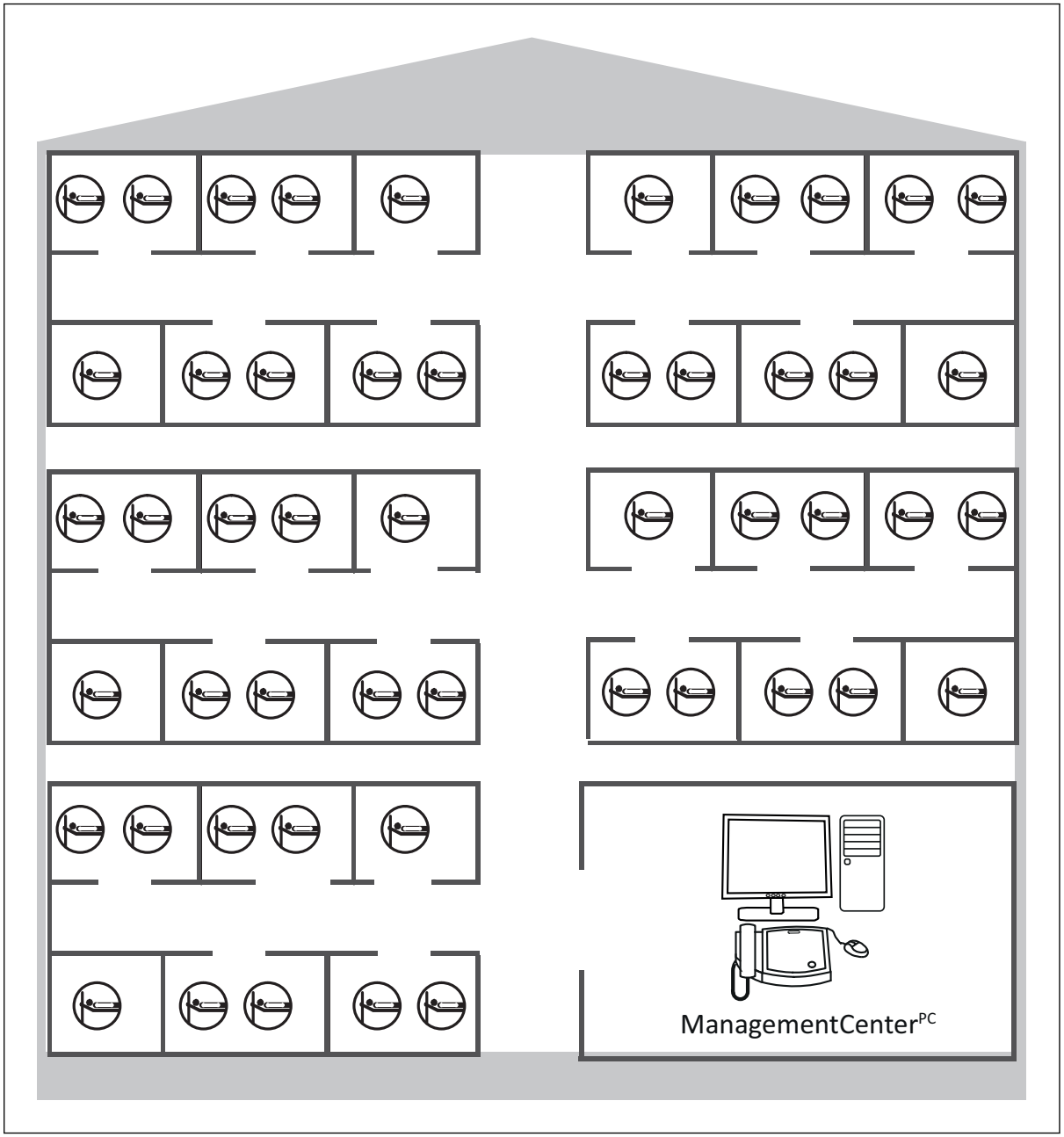
The ward couplings can be switched on and off manually or automatically. Manual switching means that the nursing staff switch on the required ward coupling at the call handling console (ComStation...) as necessary. Automatic switching means that the ward coupling is switched on and off on a time-controlled basis. Based on the day of the week, the time control function determines the time window during which the ward coupling is active.

4.3. Central call handling

When using central call handling, all calls from all wards are routed exclusively to a higher-level ManagementCenter^{PC} central console where they are answered and evaluated, and from where all further measures are initiated. The ManagementCenter^{PC} central console can be used as the sole call handling console for the building. This form of central operation can also be used on a temporary basis (e.g. at night). Or, specific individual wards may work temporarily in ward operation.

Equipment for raising calls must be provided in all rooms where patients may be present. It must be possible to report presence in all rooms where staff are to be available. To make full use of the possibilities offered by the ManagementCenter^{PC}, additional functional areas (e.g. diagnostics, pharmacy) should be integrated into the system.

Figure 15. Principle of central call handling

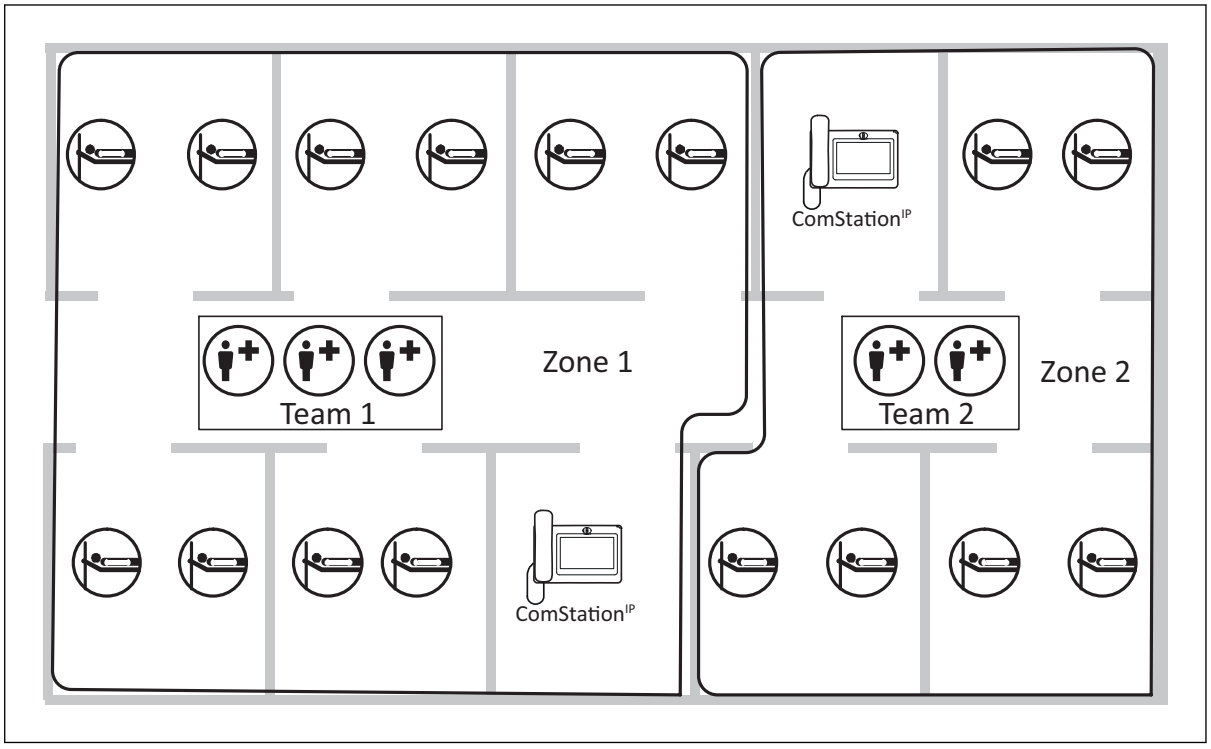


Central call handling is also very well suited for use across a grouping of several hospitals. One ManagementCenter^{PC} is then responsible for all connected buildings.

4.4. Zone nursing

In zone nursing, the ward is divided into organisational zones. The nursing staff are divided into teams. Each team is responsible for one zone. In Flamenco^{IP+}, these zones are referred to as zones. ComStation^{IP} ward consoles are suitable as call handling consoles for zone nursing. Call forwarding also takes place within the zone.

Figure 16. Principle of zone nursing



The zones in a ward are not permanently fixed. The division into zones can change. Each division of the ward into zones is called a shift. A shift is therefore the division of the ward into several zones. The zones can overlap, meaning that all rooms may belong to several zones. Different shifts can be defined for each ward (e.g. morning shift, late shift, night shift).

The zones and shifts for the hospital's wards are created using the SystemOrganizer software. The nursing staff activate the required shift at the call handling console (ComStation...).

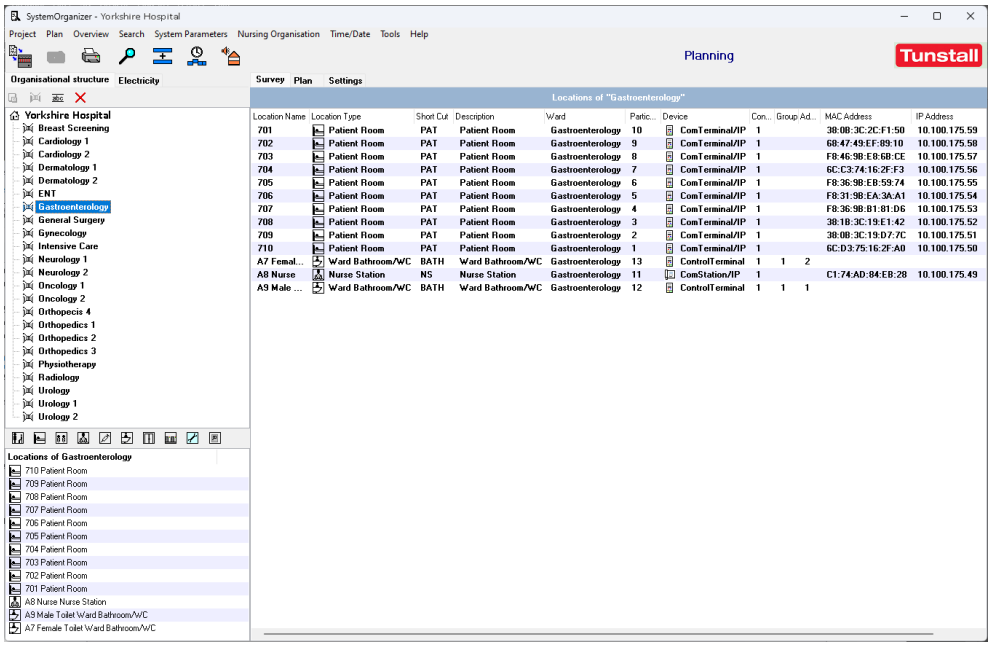
The calls from zones within zone nursing can also be transferred to cordless telephones or pagers. The events (calls, presences, faults) from a zone that are displayed on a cordless phone or pager are defined in the SystemOrganizer software using the display zones for the zone. In other words, you specify which events from the zone should be displayed on which cordless phone or pager. In this way, shift operation is also taken into account when transferring calls to cordless telephones and pagers.

5. SystemOrganizer configuration software

Contents

5.1. Software description

Figure 17. SystemOrganizer (77 0750 00)



The SystemOrganizer software is a planning and configuration tool for the Flamenco system family. It provides the user interface to the control units of the nurse call system and enables the full configuration of the nurse call system.

The operation and division of the system settings follows the basic Flamenco principle. The physical parameters are strictly separated from the organisational assignments.

Access is password protected across five different user levels. This ensures that each group of users, from the planning office to care management, can change only the settings important for their work.

During the planning phase, the SystemOrganizer is already used to enter the project structures of buildings, wards and rooms. All parameters can be changed at any time and adapted to the respective requirements.

The use of the same data from the beginning of planning throughout the entire system life cycle removes the need for duplicate data maintenance at any time. All data can be copied, saved and exported from the nurse call system. This ensures that the currently valid data can be accessed at any time.

5.2. Functions

5.2.1. System planning functions

- Setting up the basic structure of buildings, wards, rooms
- View based on floor plans
- Screenshot directly from the screen
- Import of existing graphics
- Selection of predefined room types
- Free labelling of room numbers and designations
- Printable overviews of the buildings, wards and rooms created

5.2.2. Configuration functions

- Setting of date and time
- Assignment of IP addresses of the rooms and peripherals
- Designations and room numbers for rooms, wards, buildings
- Setting of call types and system messages
- Signalling options
- Parameters for call handling, e.g. call types, call categories
- Organisational assignment of rooms (locations) to wards, shifts, etc.
- Definition of ward couplings
- Configuration of escalation procedures for call handling
- Management of interfaces to external systems
- Management of mobile telephony devices
- Setting of all system parameters

5.3. Prerequisites

- Microsoft Windows 11, Windows 10 (32 bit, 64 bit)
- 10/100 Mbit LAN access
- “SystemOrganizer” system training

6. Room types

Contents

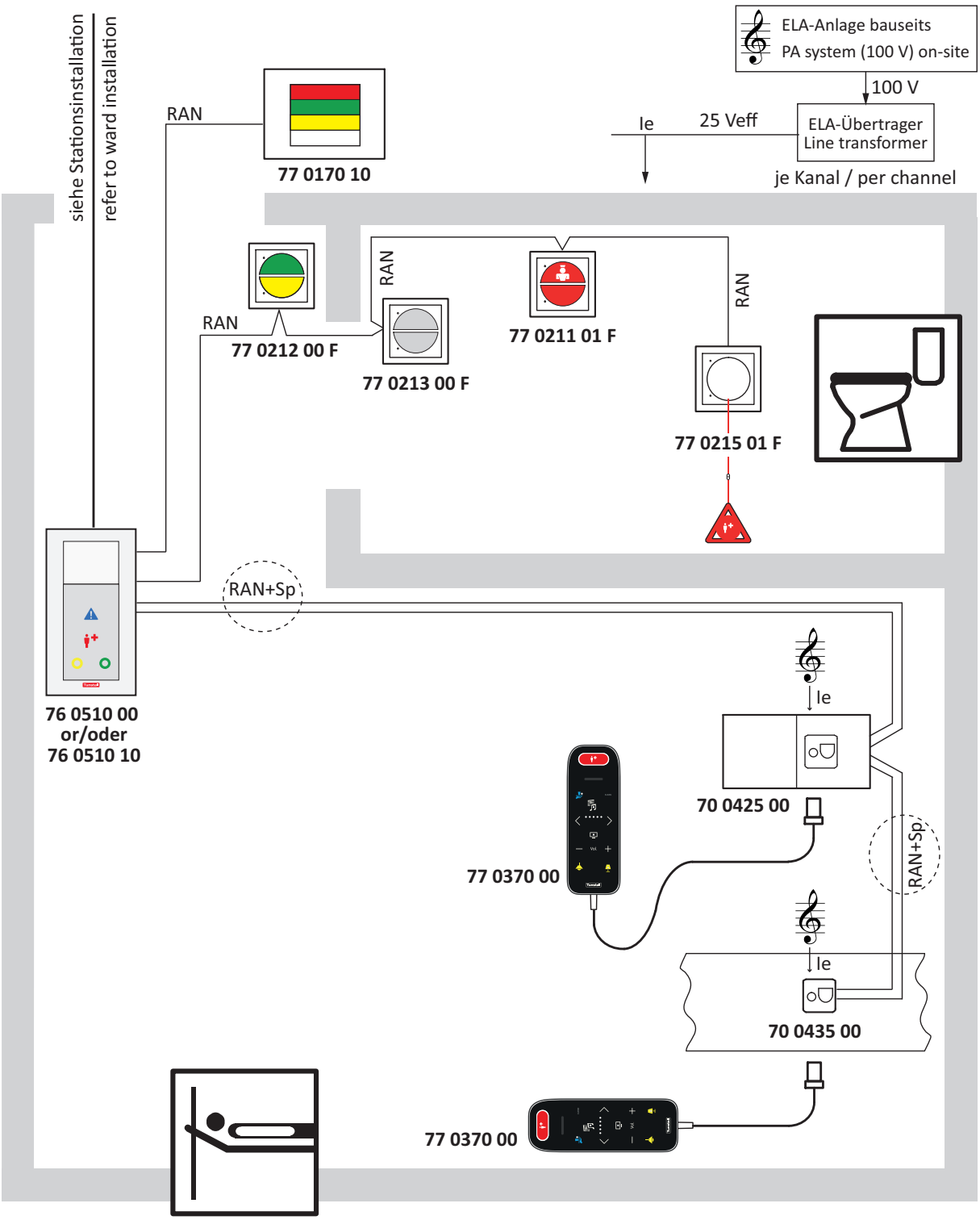
The following requirements for room equipment must be fulfilled:

- All rooms and areas inside buildings in which patients are present must have a call device, e.g., in patient rooms, day rooms, treatment rooms and waiting rooms.
- A call device must be present at every bed.
- A room lamp must be present outside every room from which a call can be raised.
- All rooms in which staff need to be contactable must have a presence switch.
- In WCs or other rooms that cannot be viewed from the presence switch, the call is not permitted to be cancelled using the presence button. A cancel switch/WC must be provided in this case.

To simplify planning, the following section shows frequently used room types with equipment examples.

6.1. Patient room

Figure 18. Patient room



NOTE! When connecting non-system devices to the nurse call system, safe isolation must be maintained using 2 x MOPP in accordance with DIN EN 60601-1, see Section 16: “Electrical safety” (page 265).

Back boxes and connectors: Section 6.6: “Back boxes, connectors” (page 86), ward installation: Section 6.7: “Ward installation” (page 89), cable legend: Section 6.8: “Cable legend” (page 91).

Per room		
	ComTerminal^{IP}, PoE (power supply = PoE+) **or** ComTerminal^{IP}, 24V (power supply = 24 V DC)	76 0510 00 76 0510 10
	Room lamp, 4 sections **or** Room lamp, 3 sections	77 0170 10 77 0170 00

Per bed (bedside speech)		
	Connection socket combi **or** Connection socket combi, bedhead unit	70 0425 00 70 0435 00
	ePat®^{lite} or Patient handset	77 0370 00 74 0747 00

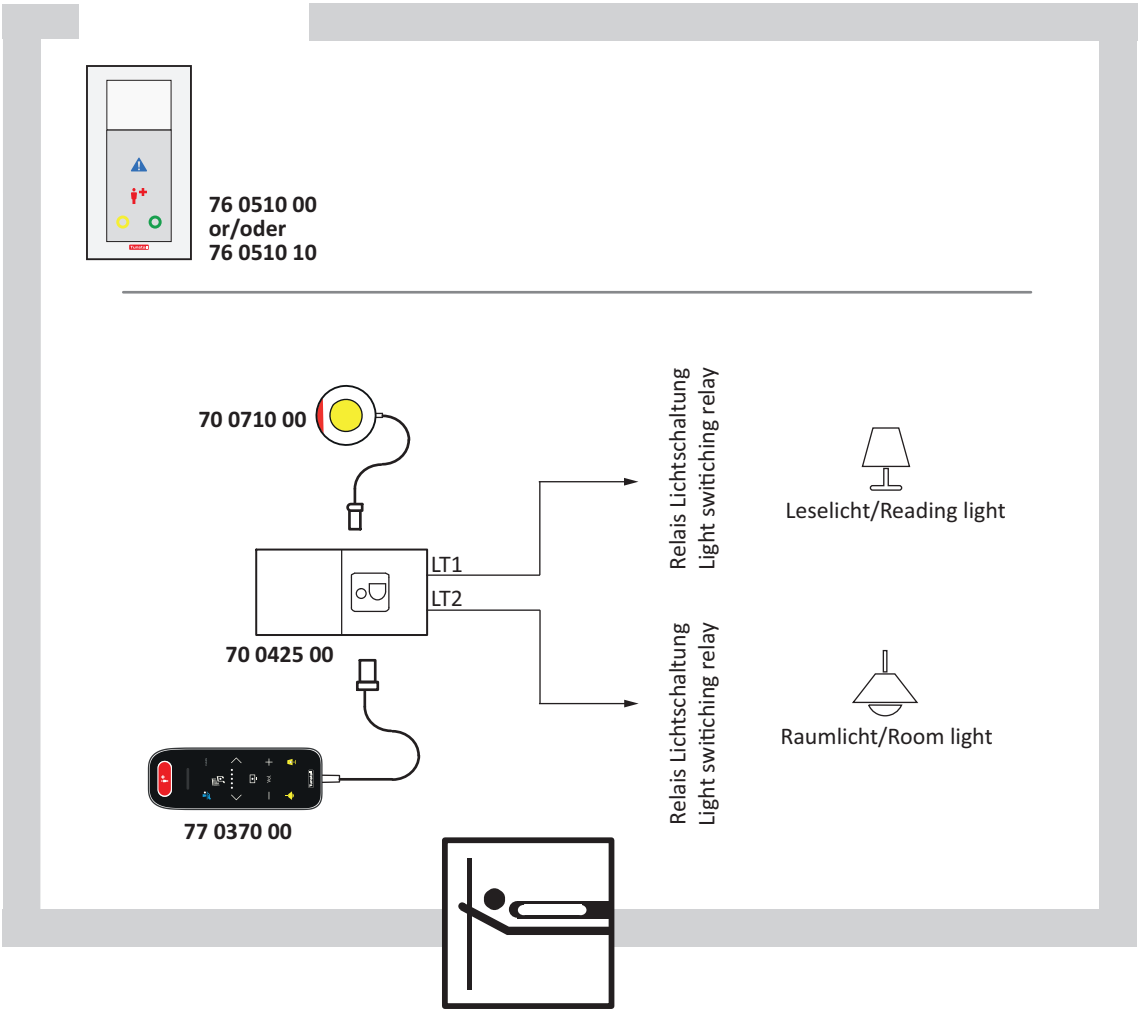
Per bed (no bedside speech)		
	Connection socket with call switch **or** Connection socket with call switch, bedhead unit	70 0171 60 ... 70 0171 50
	Pear push switch incl. call and light switch, 2 m **or** Pear push switch incl. 2 call switches, 2 m **or** Pear push switch incl. call & 2 light switches	70 0710 00 70 0711 00 70 0712 00

In the WC room		
	Optional additional installation in the room as direction indicator for a WC call: Room lamp cardiac alarm, WC	77 0170 01
	WC cancel button for cancelling WC calls/WC emergencies (e.g. cancel switch/WC)	77 0213 00 ...
	It must be possible to reach a call device from the washbasin, WC, shower, bathtub, selection: Pull cord call switch insert Pull cord call switch/WC Call switch/WC Pneumatic call switch/WC	. 29 0707 20F 77 0215 01 ... 77 0211 01 ... 77 0216 01 ...

In the seating area (optional)		
	Call device (e.g. call switch)	77 0211 00 ...

6.1.1. Patient room: Lighting control

Figure 19. Patient room: Lighting control



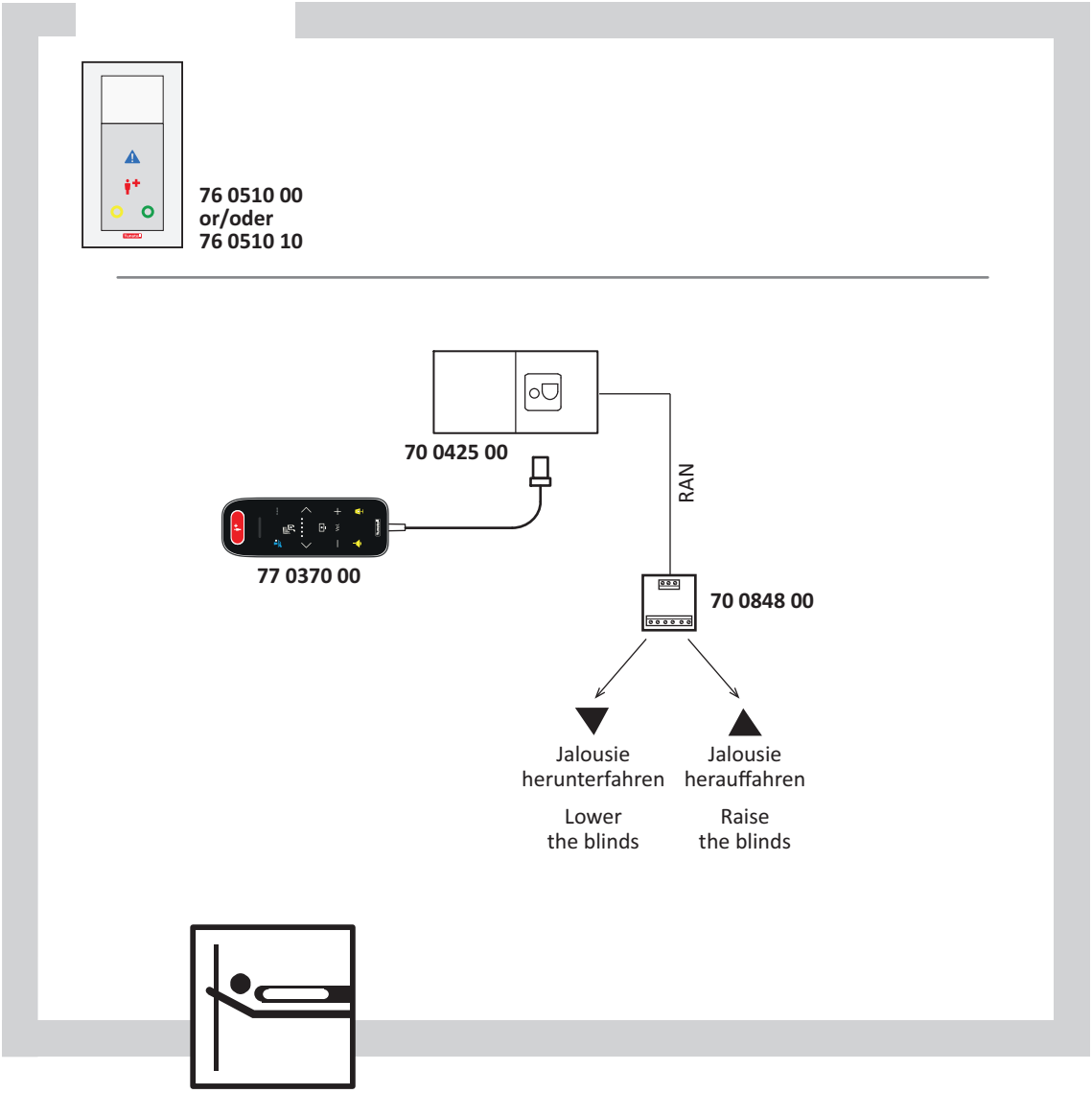
The connection socket combi (70 0425 00) and the connection socket combi, bedhead unit (70 0435 00) have one output for a reading light and one output for the room light. The ePat®lite (77 0370 00) and the patient handset (74 0747 00) have two light buttons to control both outputs. The pear push switch incl. call and light switch (70 0710 00, 70 0710 01) has a light button to control one of the outputs.

The connection socket with call switch (70 0171 60...) and connection socket with call switch, bedhead unit (70 0171 50) have one output for a reading light and one output for the room light. The pear push switch incl. call & 2 light switches (70 0712 00) has two light buttons to control both outputs. The pear push switch incl. call and light switch (70 0710 00, 70 0710 01) has one light button to control one of the outputs.

NOTE! When selecting the relays for lighting control, safe isolation with 2 x MOPP in accordance with DIN EN 60601-1 must be observed, see Section 17: “Lighting control” (page 275).

6.1.2. Patient room: Blinds control

Figure 20. Patient room: Blinds control



The connection socket combi (70 0425 00) and connection socket combi, bedhead unit (70 0435 00), together with the RAN interface universal (70 0848 00), enable blinds control using the ePat®lite (77 0370 00) or patient handset (74 0747 00).

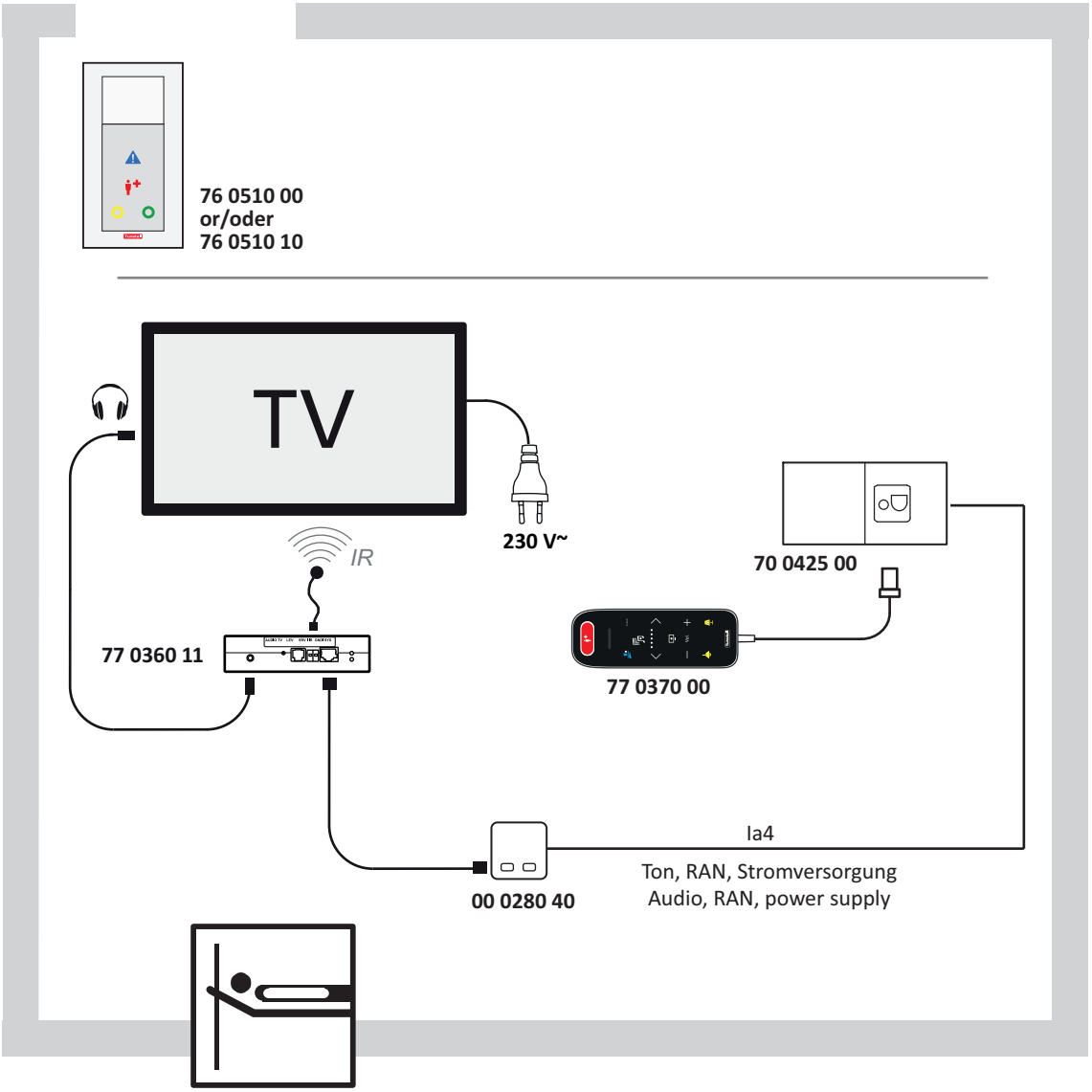
The relays connected to the RAN interface universal must have their own power supply, be controllable by a normally open contact and be safely isolated using 2 x MOPP according to DIN EN 60601-1, see Section 16: “Electrical safety” (page 265). Maximum contact load: 60 mA / 24 V.

NOTE! A patient handset (74 0747 00) can be used for either “entertainment” or “blinds control”. Both functions cannot be provided on the same device.

6.1.3. Patient room: TV connection

Commercially available TV set: Audio transmission & control by ePat®lite or patient handset

Figure 21. Commercially available TV set: Audio transmission & control by ePat®lite or patient handset



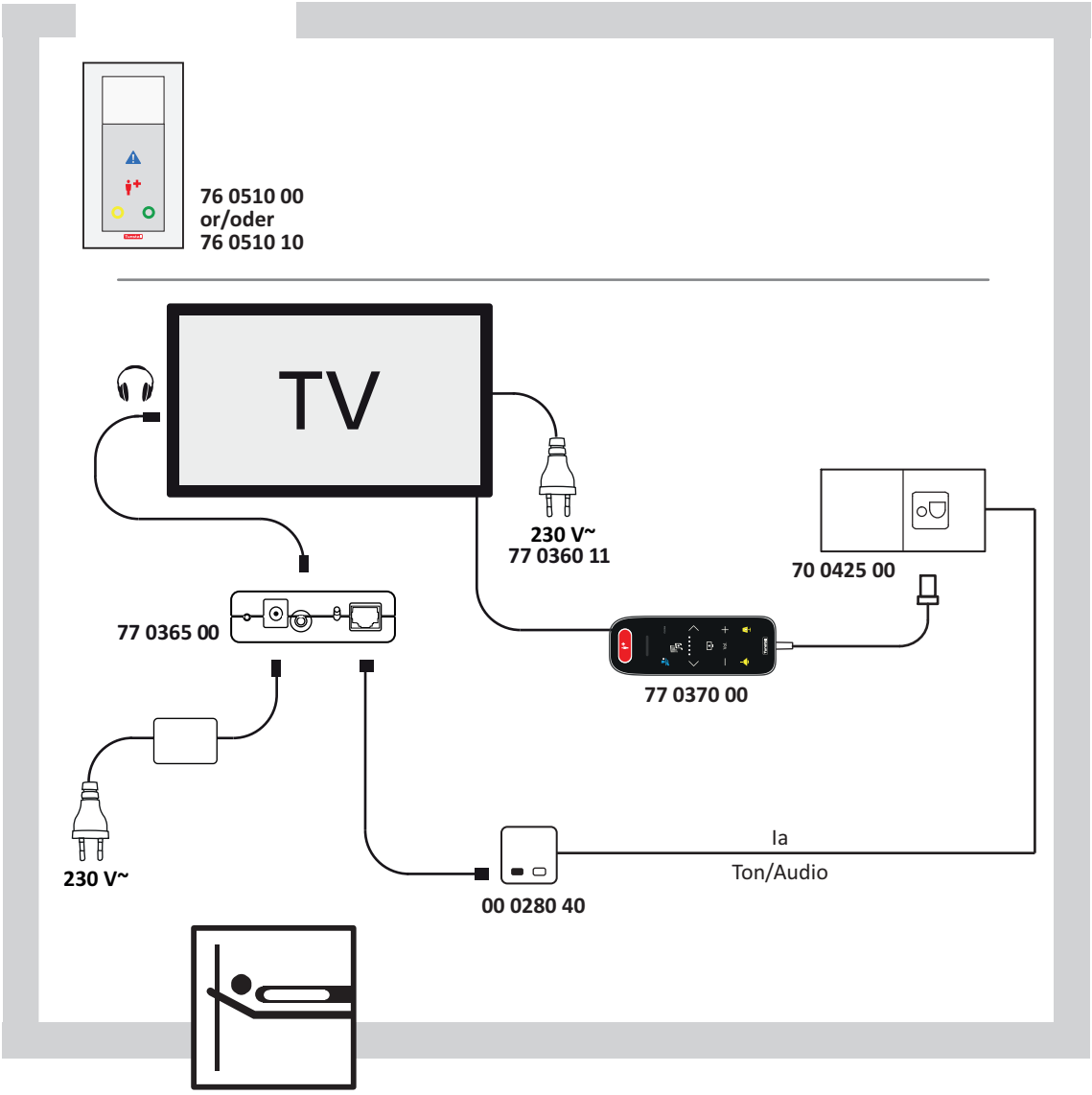
The connection socket combi (70 0425 00) and connection socket combi, bedhead unit (70 0435 00), together with the IR TV control module universal (77 0360 11), enable the transmission of TV audio and control of the TV using the ePat®lite (77 0370 00) or patient handset (74 0747 00).

The IR TV control module universal (77 0360 11) supports a variety of commercially available TV sets (e.g. from Samsung, Philips and LG). Model information available upon request. The TV is controlled using infrared signals. To configure the IR TV control module universal, one IR TV control module installation kit (77 0360 40) is required for each nurse call system.

NOTE! The IR TV control module universal contains a safe separating point with 2 x MOPP according to DIN EN 60601-1.

Commercially available TV set: Audio transmission by ePat®lite or patient handset

Figure 22. Commercially available TV set: Audio transmission by ePat®lite or patient handset



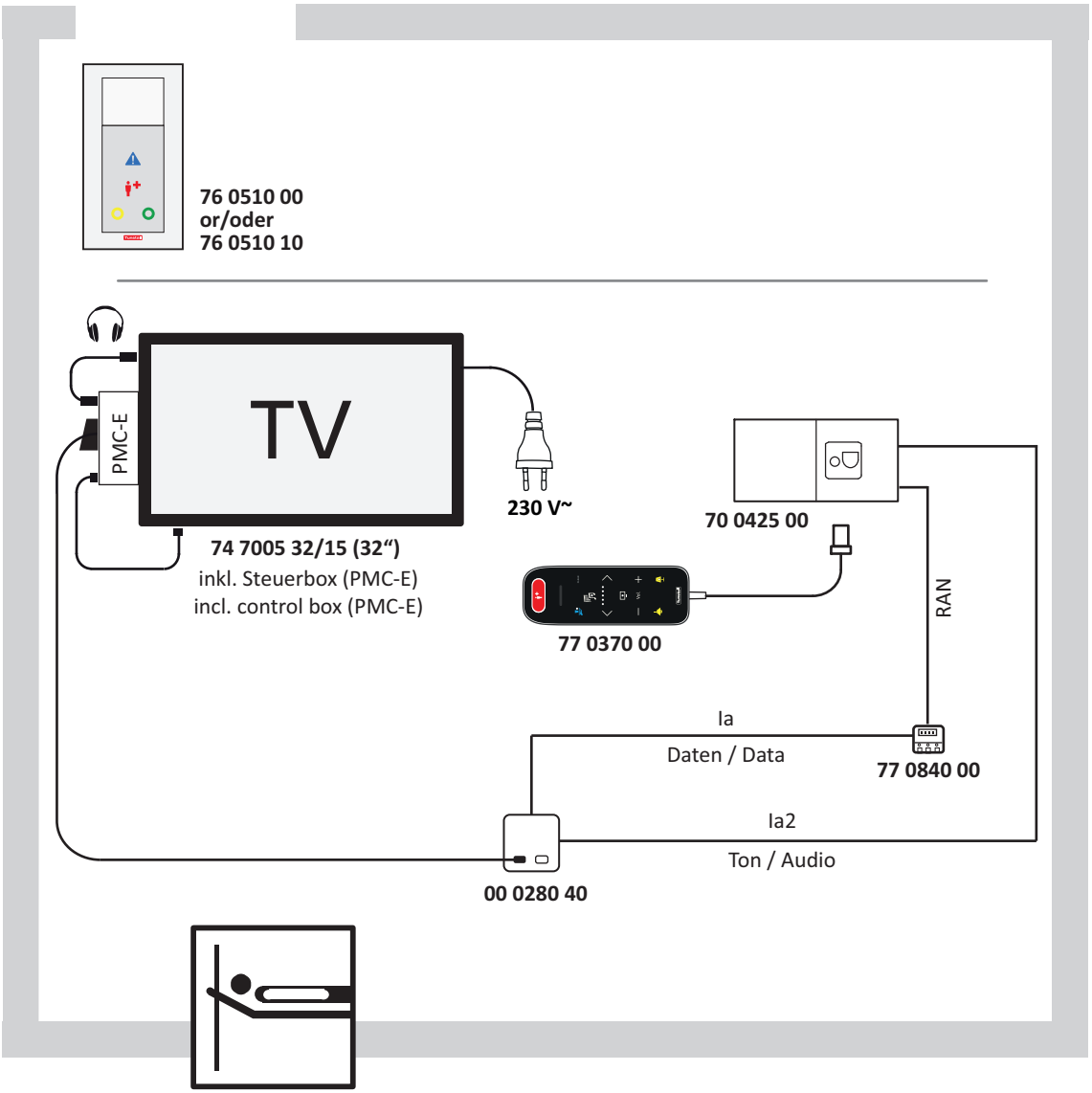
The connection socket combi (70 0425 00) and connection socket combi, bedhead unit (70 0435 00), together with the TV audio amplifier (77 0365 00), enable the transmission of TV audio to the ePat®lite (77 0370 00) or patient handset (74 0747 00).

NOTE! The TV audio amplifier contains a safe separating point with 2 x MOPP according to DIN EN 60601-1.

NOTE! The TV set is not controlled by the patient device.

LED TV set professional

Figure 23. LED TV set professional



The connection socket combi (70 0425 00) and connection socket combi, bedhead unit (70 0435 00) can be used to control the TV set together with the ePat®lite (77 0370 00) or patient handset (74 0747 00) and the RAN interface (77 0840 00). TV sets are available in several sizes.

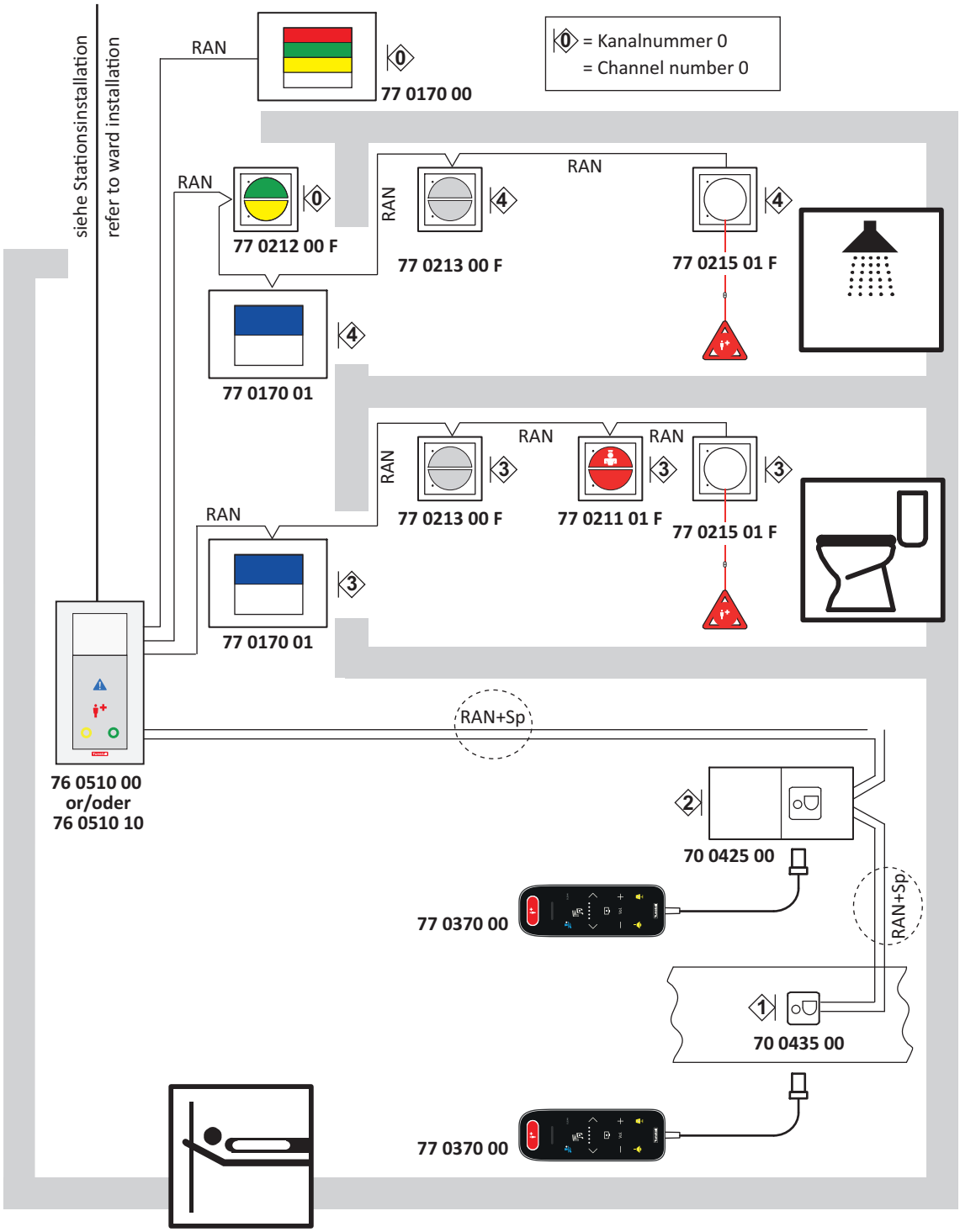
The TV installation kit (74 7002 56/15) is required once per project for programming.

The LED TV sets are prepared for use with standard VESA wall mounts. Three different wall mounts can be obtained from Tunstall (74 7002 80, 74 7002 81, 74 7002 82).

NOTE! The PMC-E contains a safe separating point with 2 x MOPP according to DIN EN 60601-1.

6.1.4. Patient room: Separate shower and WC

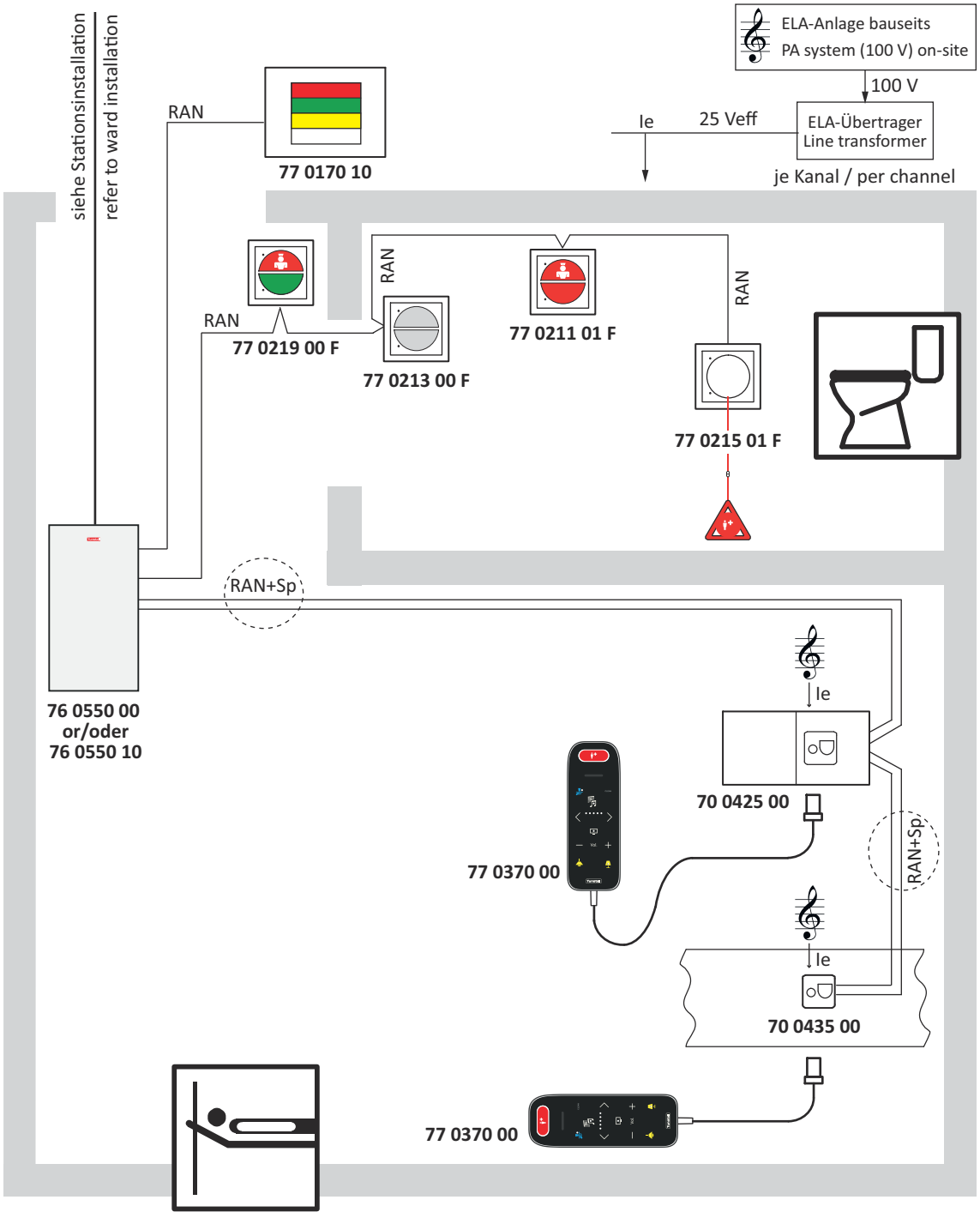
Figure 24. Patient room: Separate shower and WC



Separate call cancellation per cabin; common room lamp (77 0170 00) in the corridor and separate room lamps (77 0170 01) in the room (channel coding) with additional signalling per cabin. Maximum of 7 channels per ComTerminal^{IP}. Channel numbers 1 to 6 can be used for bed numbers 1 to 6.

6.1.5. Patient room with ConnectionTerminal IP (no text display and no answering of forwarded calls)

Figure 25. Patient room with ConnectionTerminal IP (no text display and no answering of forwarded calls)



NOTE! When connecting non-system devices to the nurse call system, safe isolation must be maintained using 2 x MOPP in accordance with DIN EN 60601-1, see Section 16: “Electrical safety” (page 265).

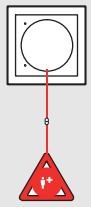
Back boxes and connectors: Section 6.6: “Back boxes, connectors” (page 86), ward installation: Section 6.7: “Ward installation” (page 89), cable legend: Section 6.8: “Cable legend” (page 91).

Per room		
	ConnectionTerminal IP, PoE (Power supply = PoE+) **or** ConnectionTerminal IP, 24V DC (Power supply = 24 V DC)	76 0550 00 76 0550 10
	Staff presence combination with call tone	77 0219 00...
	Room lamp, 4 sections **or** Room lamp, 3 sections	77 0170 10 77 0170 00

Per bed (bedside speech)		
	Connection socket combi **or** Connection socket combi, bedhead unit	70 0425 00 70 0435 00
	ePat®lite or Patient handset	77 0370 00 74 0747 00

Per bed (no bedside speech)		
	Connection socket with call switch **or** Connection socket with call switch, bedhead unit	70 0171 60 ... 70 0171 50
	Pear push switch incl. call and light switch, 2 m **or** Pear push switch incl. 2 call switches, 2 m **or** Pear push switch incl. call & 2 light switches	70 0710 00 70 0711 00 70 0712 00

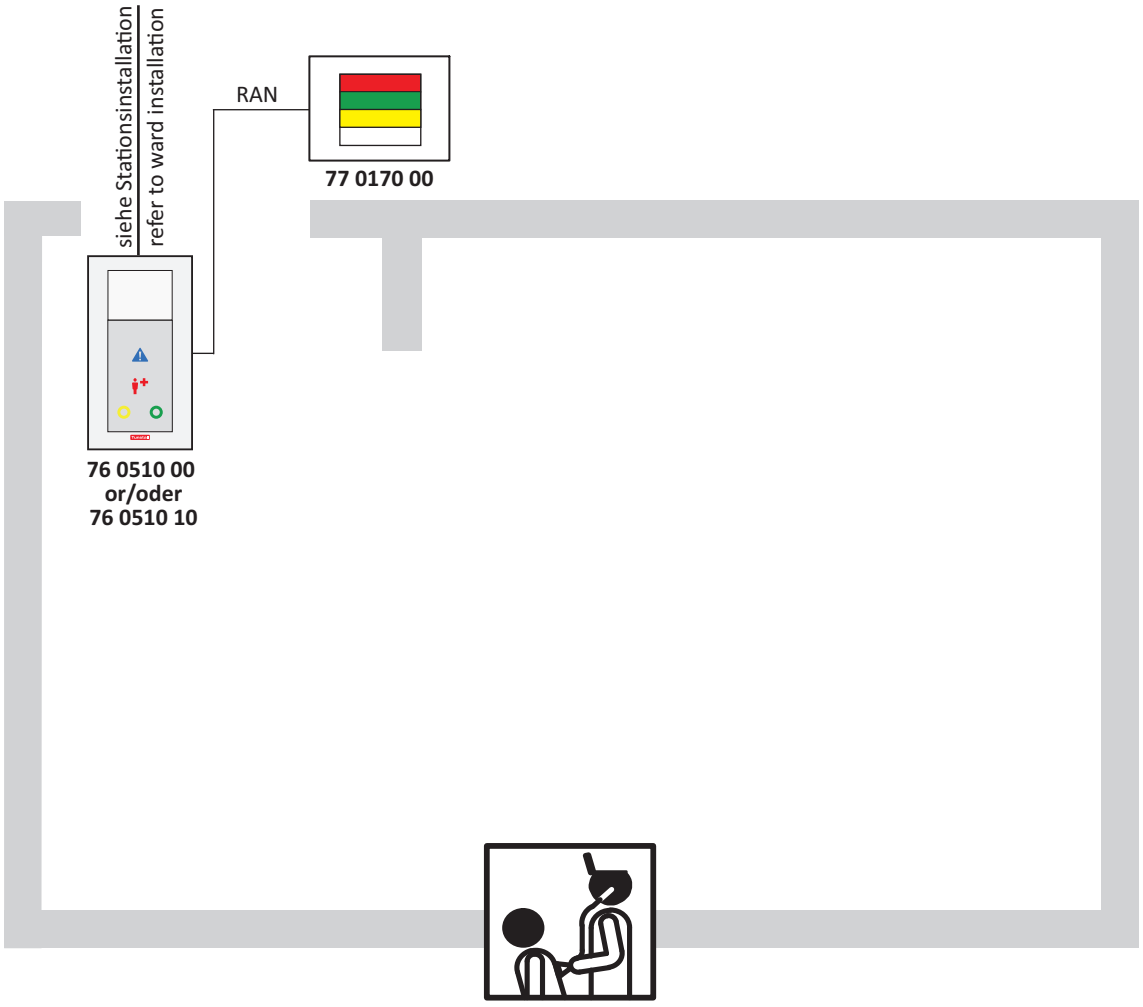
In the WC room		
	Optional additional installation in the room as direction indicator for a WC call: Room lamp cardiac alarm, WC	77 0170 01
	WC cancel button for cancelling WC calls/WC emergencies (e.g. cancel switch/WC)	77 0213 00 ...

In the WC room		
	It must be possible to reach a call device from the washbasin, WC, shower, bathtub, selection: Pull cord call switch insert Pull cord call switch/WC Call switch/WC Pneumatic call switch/WC	. 29 0707 20F 77 0215 01 ... 77 0211 01 ... 77 0216 01 ...

In the seating area (optional)		
	Call device (e.g. call switch)	77 0211 00 ...

6.2. Function room

Figure 26. Function room

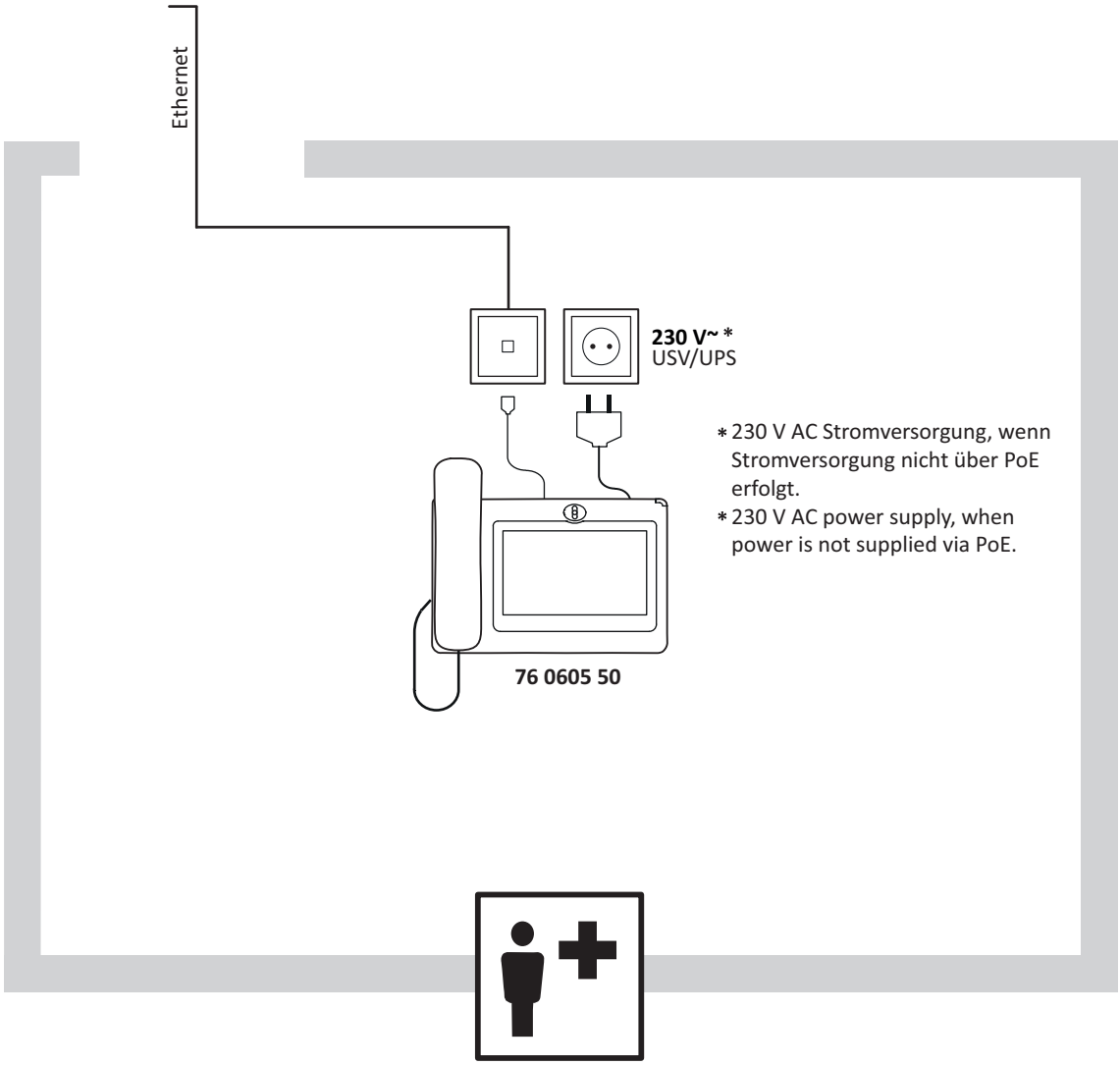


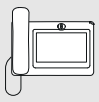
Back boxes and connectors: Section 6.6: “Back boxes, connectors” (page 86), ward installation: Section 6.7: “Ward installation” (page 89), cable legend: Section 6.8: “Cable legend” (page 91).

Per room		
	ComTerminal^{IP}, PoE (power supply = PoE+) **or** ComTerminal^{IP}, 24V (power supply = 24 V DC)	76 0510 00 76 0510 10
	Room lamp, 4 sections **or** Room lamp, 3 sections	77 0170 10 77 0170 00

6.3. Nurse station

Figure 27. Nurse station

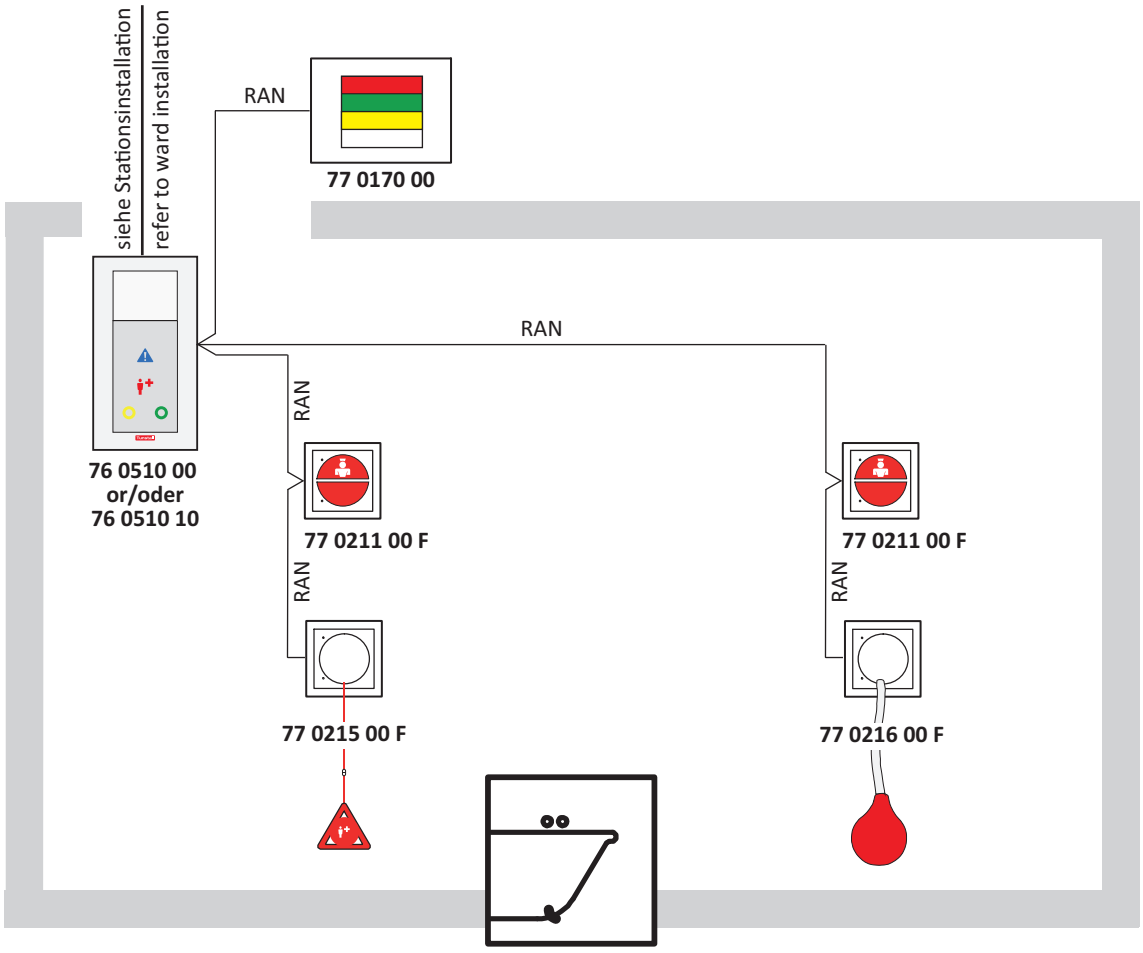


Per room		
	ComStation^{IP}	76 0605 50

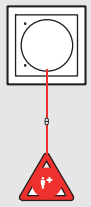
6.4. Ward bathroom

6.4.1. Ward bathroom with speech, with ComTerminal^{IP}

Figure 28. Ward bathroom with speech, with ComTerminal^{IP}

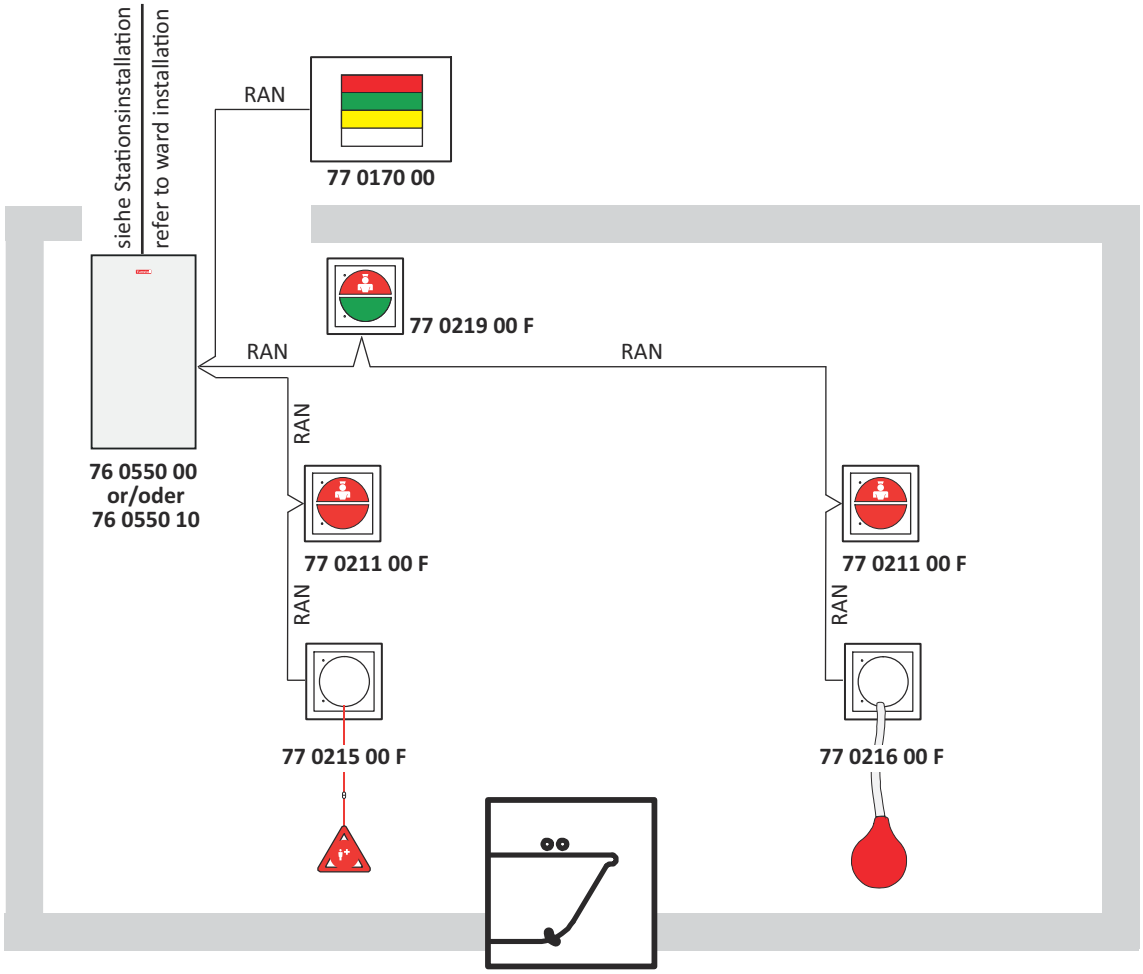


Per room		
	ComTerminal^{IP}, PoE (power supply = PoE+) **or** ComTerminal^{IP}, 24V (power supply = 24 V DC)	76 0510 00 76 0510 10
	Room lamp, 4 sections **or** Room lamp, 3 sections	77 0170 10 77 0170 00

Per location in bathroom/WC		
	Pull cord call switch insert, suitable for shower, toilet	29 0707 20F
	Pull cord call switch/WC, suitable for shower, toilet	77 0215 01 ...
	Call switch/WC, suitable for washbasin	77 0211 01 ...
	Pneumatic call switch/WC, suitable for bathtub	77 0216 01 ...

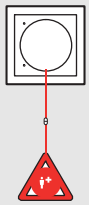
6.4.2. Ward bathroom without speech, with ConnectionTerminal IP

Figure 29. Ward bathroom without speech, with ConnectionTerminal IP



Per room		
	ConnectionTerminal IP, PoE (Power supply = PoE+) **or**	76 0550 00
	ConnectionTerminal IP, 24V DC (Power supply = 24 V DC)	76 0550 10

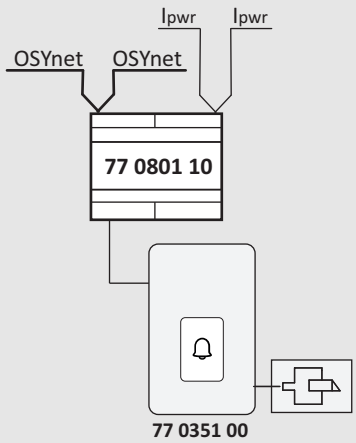
Per room		
	Room lamp, 4 sections **or** Room lamp, 3 sections	77 0170 10 77 0170 00
	Staff presence combination with call tone	77 0219 00...

Per location in bathroom/WC		
	Pull cord call switch insert, suitable for shower, toilet Pull cord call switch/WC, suitable for shower, toilet Call switch/WC, suitable for washbasin Pneumatic call switch/WC, suitable for bathtub	29 0707 20F 77 0215 01 ... 77 0211 01 ... 77 0216 01 ...

6.5. Corridor

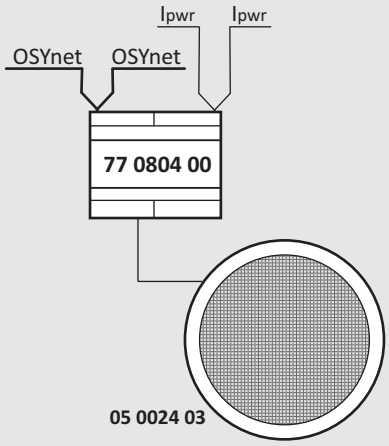
Corridor display^{IP}

The Corridor display^{IP} Alpha 16 (76 0150 00) or Corridor display^{IP} Alpha 16, double-sided (76 0160 00) is connected to the IP network of the nurse call system. Power is supplied either via PoE+ or via the 24 V DC power supply of the nurse call system (cable: Ipwr).



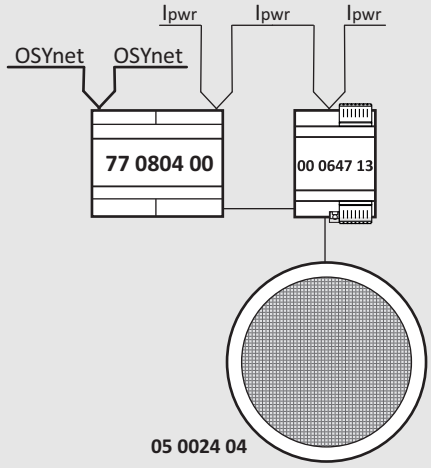
Door entry speaker 2

One door entry speaker 2 (77 0351 00) can be connected per OSYlink-Door entry speaker 2 (77 0801 10). A door opener can be connected to the door entry speaker 2. The OSYlink-Door entry speaker 2 is connected to the OSYnet group bus. Power is supplied via the 24 V DC power supply of the nurse call system (cable: Ipwr).



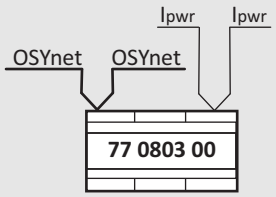
Loudspeaker with announcement interface

A maximum of 5 loudspeakers with announcement interface (05 0024 02 or 05 0024 03) can be connected per OSYlink-Announcement (77 0804 00). OSYlink-Announcement is connected to the OSYnet group bus. Power is supplied via the 24 V DC power supply of the nurse call system (cable: Ipwr).



Speakers via 100 V audio amplifier

A maximum of four 1-channel audio amplifiers 100V/25W (00 0647 13) can be connected per OSYlink-Announcement (77 0804 00). A maximum of four loudspeakers (05 0024 04) can be connected per 1-channel audio amplifier 100V/25W (00 0647 13). OSYlink-Announcement is connected to the OSYnet group bus. Power is supplied via the 24 V DC power supply of the nurse call system (cable: Ipwr).



Third-party systems or technical equipment

Third-party systems or technical equipment can be connected to the nurse call system via OSYlink-Universal (77 0803 00). OSYlink-Universal is connected to the OSYnet group bus. Power is supplied via the 24 V DC power supply of the nurse call system (cable: Ipwr).

6.6. Back boxes, connectors

Table 12. Back boxes, connectors

		Back boxes					Connectors
		solid wall		partition wall			
		1-gang	2-gang	1-gang	2-gang		
		17 0100 00	**17 0410 00**	**17 5100 00**	**17 5400 00**	**70 0807 00**	
	77 0211 00...[a.]	Call switch	•		•		•
	77 0211 01...[a.]	Call switch/WC	•		•		•
	77 0212 00...[a.]	Staff presence switch	•		•		•
	77 0213 00...[a.]	Cancel switch/WC	•		•		•
	77 0214 00...[a.]	Cardiac alarm switch	•		•		•
	77 0217 00...[a.]	Call switch/WC with cancel switch	•		•		•
	77 0218 00...[a.]	Call switch with privacy switch	•		•		•
	77 0219 00...[a.]	Staff presence combination with call tone	•		•		•
	77 0215 00...[a.]	Pull cord call switch	•		•		•
	77 0215 01...[a.]	Pull cord call switch/WC	•		•		•
	29 0707 20F + frame	Pull cord call switch insert	•		•		-

			Back boxes				Connectors
			solid wall		partition wall		
			1-gang	2-gang	1-gang	2-gang	
			17 0100 00	**17 0410 00**	**17 5100 00**	**17 5400 00**	**70 0807 00**
	77 0216 00...[a.]	Pneumatic call switch	•		•		•
	77 0216 01...[a.]	Pneumatic call switch/WC	•		•		•
	70 0171 60...[a.]	Connection socket with call switch	•		•		00 0211 37 + Cable: 50 0308 02
	70 0171 50	Connection socket with call switch, bedhead unit	Installed in medical supply unit				00 0211 37 + Cable: 50 0308 02
	70 0425 00	Connection socket combi		•		•	-
	70 0435 00	Connection socket combi, bedhead unit	Installed in medical supply unit				Cable: 50 0308 02
	76 0510 00	ComTerminal^{IP}, PoE		•		•	-
	76 0510 10	ComTerminal^{IP}, 24V		•		•	-
	76 0550 00	ConnectionTerminal IP, PoE		•		•	-

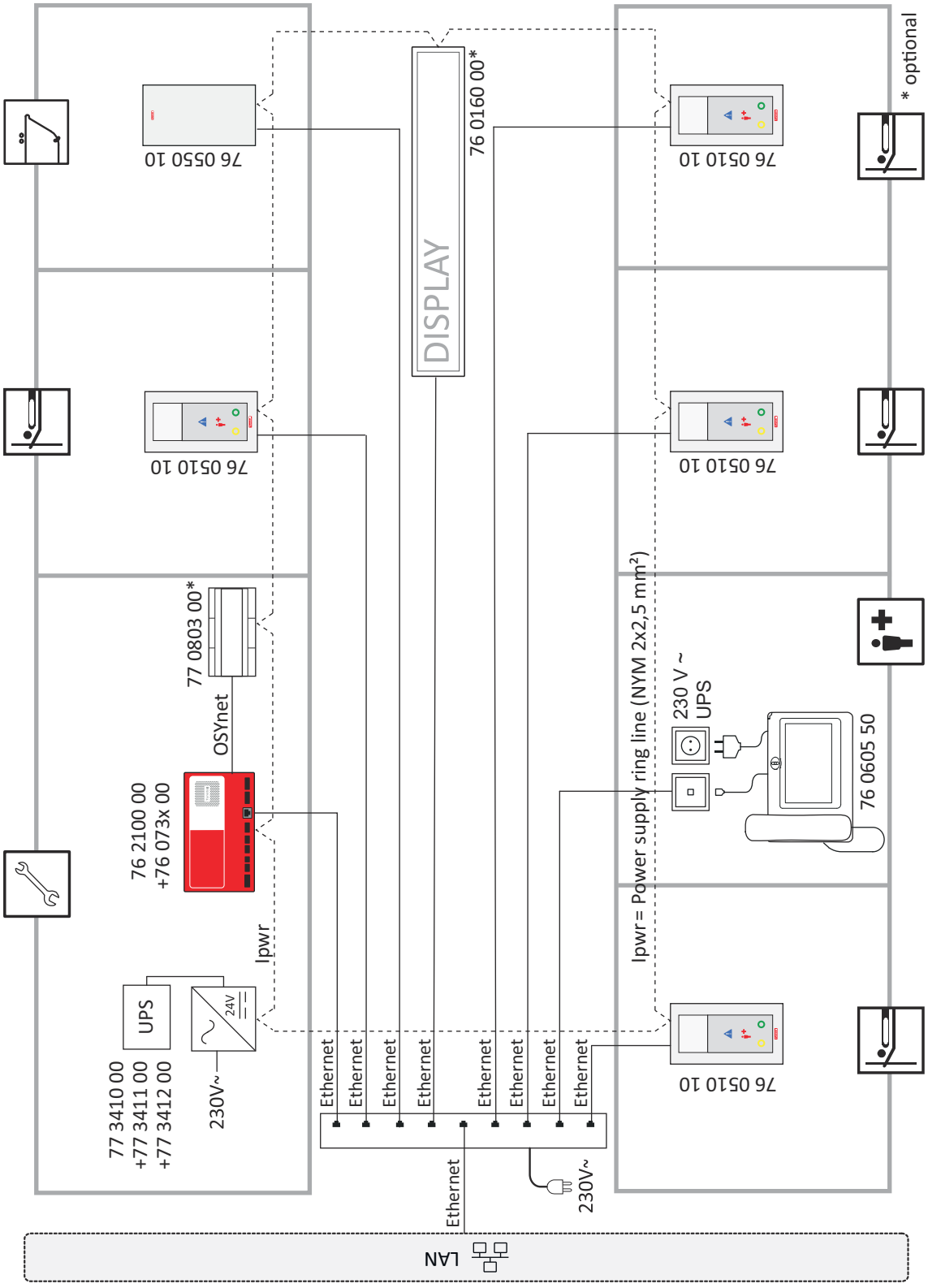
			Back boxes				Connectors
			solid wall		partition wall		
			1-gang	2-gang	1-gang	2-gang	
			17 0100 00	**17 0410 00**	**17 5100 00**	**17 5400 00**	**70 0807 00**
	76 0550 10	ConnectionTerminal IP, 24V DC		•		•	-
	77 0170 00	Room lamp, 3 sections	•		•		•
	77 0170 01	Room lamp, 4 sections	•		•		•
	77 0171 00	Room lamp, 3 sections, with doorplate	•		•		•
	77 0171 10	Room lamp, 4 sections, with doorplate	•		•		•
	77 0175 00	Room lamp, 3 sections, glass decor	•		•		•
	77 0175 01	Room lamp cardiac alarm, WC, glass decor	•		•		•
	77 0175 10	Room lamp, 4 sections, glass decor	•		•		•

[a] ... = A, C, F

6.7. Ward installation

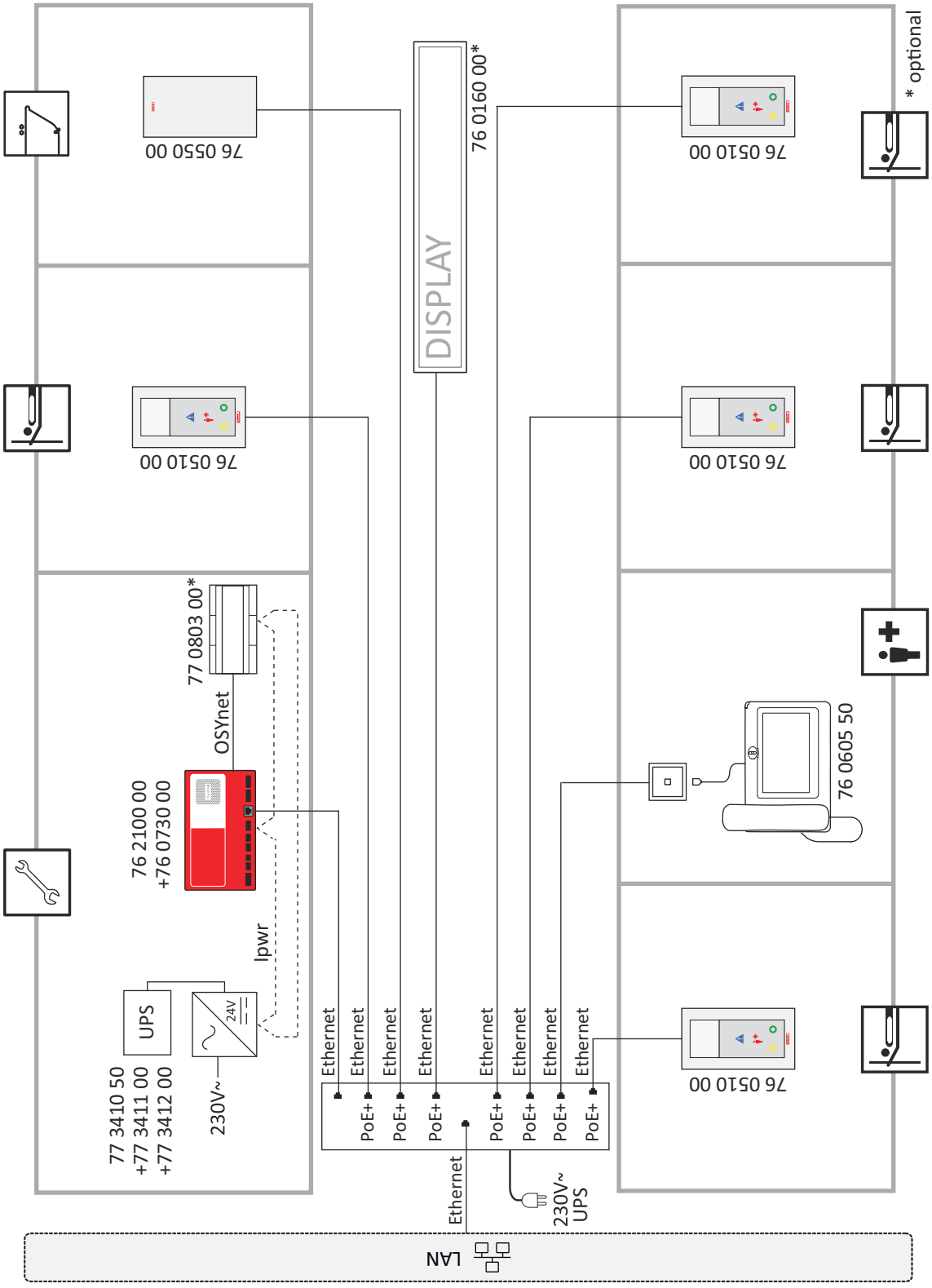
6.7.1. Installation example with 24 V DC power supply

Figure 30. Installation example for ward with 24 V DC power supply



6.7.2. Installation example with PoE+ power supply

Figure 31. Installation example for ward with PoE+ power supply



6.8. Cable legend

To make working with installation plans easier, Tunstall has introduced an extended cable legend. The cables are classified according to their areas of application. Corresponding cable types are assigned to each area of application. These are minimum requirements.

Table 13. Cable legend

Identifier	Designation	Cable type
Ethernet	IP network of the nurse call system	• Min. CAT5e, shielded **Cable for PoE/PoE+:** • Min. CAT5e, shielded, Ø min. 0.64 mm (22 AWG)
OSYnet	OSYnet group bus	**Preferred cables:** • CAT7 (22 AWG), Ø = 0.64 mm • J-Y(St)Y 4x2x0.8 **Optional cables:** • Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG) • J-Y(St)Y 4x2x0.6
RAN	RAN room bus	**Preferred cable:** • J-Y(St)Y 2x2x0.8 **Optional cables:** • Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG)
RAN+Sp	RAN room bus and speech line	The speech line and RAN must be shielded from each other. **Preferred cables:** • 2x J-Y(St)Y 2x2x0.8 **Optional cables:** • 2x CAT5/CAT6, shielded, Ø min. 0.57 mm (23 AWG) • 1x CAT5/CAT6 S/FTP, Ø min. 0.57 mm (23 AWG) • 1x CAT7, Ø min. 0.57 mm (23 AWG)
Ipwr	Power cable	NYM 2x2.5 mm²
Ie	Entertainment cables	2x IYY per channel or similar cables (one pair required per programme)

Identifier	Designation	Cable type
Ia	General cables	J-Y(St)Y 2x2x0.8
Ia2	General cables	J-Y(St)Y 2x2x0.6
Ia4	General cables	J-Y(St)Y 4x2x0.6

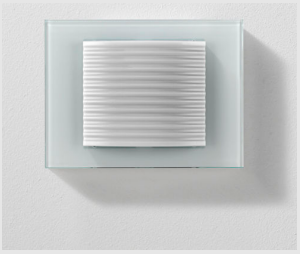
7. Product overview

Contents

7.1. Signal lamps, corridor displays

Room lamp, 3 sections	77 0170 00
Signal lamp with three light sections for visual signalling of all call types and presences (2 staff groups). • Red LED: All call types • Green LED: Presence 1 • Yellow LED: Presence 2 • Connection to the room bus (RAN) • Dimensions (HxWxD): 110 x 150 x 40 mm	

Room lamp, 3 sections, with doorplate	77 0171 00
Same as 77 0170 00, but also includes doorplate for the room designation. • Dimensions (HxWxD): 190 x 150 x 40 mm • Labelling field (HxW): approx. 70 x 92 mm	

Room lamp, 3 sections	77 0175 00
Glass decor Same as 77 0170 00, but with decorative glass frame. • Dimensions (HxWxD): 110 x 150 x 40 mm	

Room lamp cardiac alarm, WC

77 0170 01

Signal lamp with three light sections as a supplement to room lamp 77 0170 00 or 77 0171 00 for visual signalling of alarms and WC calls.

- Blue LED: Alarm
- Blue LED: Alarm
- White LED: WC call
- Connection to the room bus (RAN)
- Dimensions (HxWxD): 110 x 150 x 40 mm

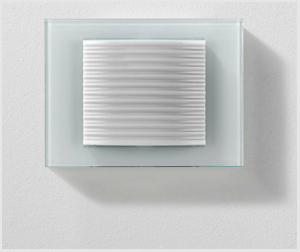
Room lamp, 4 sections

77 0175 10

Glass decor

As for 77 0170 10, but with decorative glass frame.

- Dimensions (HxWxD): 110 x 150 x 40 mm



Room lamp, 4 sections

77 0170 10

Signal lamp with four light sections for visual signalling of all call types and presences (2 staff groups) and WC call as individual display.

- Red LED: All call types
- Green LED: Presence 1
- Yellow LED: Presence 2
- White LED: WC call
- Connection to the room bus (RAN)
- Dimensions (HxWxD): 110 x 150 x 40 mm

Room lamp, 4 sections, with doorplate

77 0171 10

Same as 77 0170 10, but also includes doorplate for the room designation.

- Dimensions (HxWxD): 190 x 150 x 40 mm
- Labelling field (HxW): approx. 70 x 92 mm

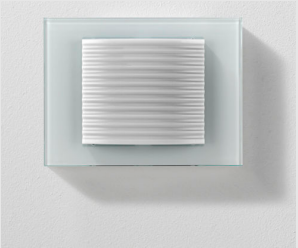
Room lamp cardiac alarm, WC

77 0175 01

Glass decor

Same as 77 0170 01, but with decorative glass frame to complement room lamp 77 0175 00.

- Dimensions (HxWxD): 110 x 150 x 40 mm

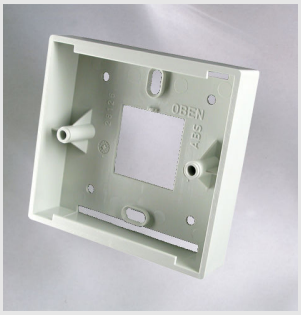


Surface mounting frame

00 0281 26

for room lamps 77... and 78...

- Material: ABS
- Dimensions (HxWxD): 80 x 86 x 21 mm



Doorplate universal

77 0189 00

Doorplate without light sections, for room designation.

- Dimensions (HxWxD): 190 x 150 x 40 mm
- Labelling field (HxW): approx. 70 x 92 mm

Corridor display^{IP} Alpha 16

76 0150 00

Display for alphanumeric indication of calls and system information. Tone generator for acoustic signals, loudspeaker for announcements.

Intended for installation in corridors or duty rooms.

- Single-sided design
- 16 characters, alphanumeric
- “Keyholes” for wall mounting
- Connection to the IP network of the nurse call system, RJ45 socket on the device
- Power supply via PoE+ or via 24 V DC supply of the nurse call system
- Dimensions (HxWxD): 125 x 785 x 55 mm

Corridor display^{IP} Alpha 16, double-sided

76 0160 00

Same as 76 0150 00, but double-sided version. Incl. ceiling suspension fixtures, 50 cm long, adjustable steplessly.

- Dimensions (HxWxD): 145 x 785 x 55 mm

Extension set for ceiling suspension, 50cm

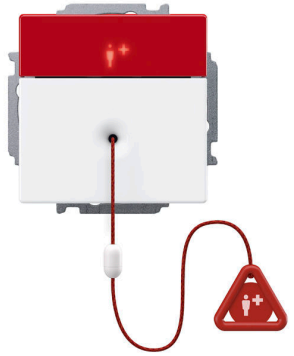
19 0780 05

for corridor displays 19078416, 29078412, 76016000

For extending the ceiling suspension by 50 cm.

- 2 rope connectors, with wire rope holders on both sides for rope diameters 1.0 to 1.5 mm
- 2 extension ropes, 50 cm

7.2. Switches

Pull cord call switch insert	29 0707 20F
excl. frame Switch insert with a red call switch and a pull cord for raising calls or WC calls by pulling the cord. When presence is switched on, an emergency call is raised. Cancel function can be optionally configured for WC calls. However, an additional cancel switch/WC must be installed to comply with the German standard DIN VDE 0834. • 2.5 m long call cord incl. call handle (red) with symbol • Call button (red) • Connection to the room bus (RAN) • Dimensions (HxW): 71 x 71 mm NOTE! Frame must be ordered separately.	

Call switch	77 0211 00 F
Water-protected switch for raising calls. When presence is switched on, an emergency call is raised. • 2 call buttons (red) • Connection to the room bus (RAN) • Dimensions (HxW): 80 x 80 x 36 mm	

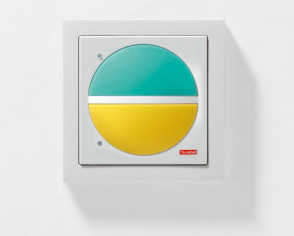
Call switch	77 0211 00 A
Same as 77 0211 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Call switch	77 0211 00 C
Same as 77 0211 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Call switch/WC	77 0211 01 F
Water-protected switch for raising WC calls. When presence is switched on, a WC emergency is raised. • 2 call buttons (red) • Connection to the room bus (RAN) • Dimensions (HxW): 80 x 80 x 36 mm	

Call switch/WC	77 0211 01 A
Same as 77 0211 01 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Call switch	77 0211 01 C
Same as 77 0211 01 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Staff presence switch	77 0212 00 F
Water-protected switch for switching on/off presence for 2 staff groups. • 1 presence button for staff 1 (green) • 1 presence button staff 2 (yellow) • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

Staff presence switch	77 0212 00 A
Same as 77 0212 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Staff presence switch	77 0212 00 C
Same as 77 0212 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Cancel switch/WC	77 0213 00 F
Water-protected switch for cancelling WC calls and WC emergencies. • 2 WC cancel buttons (grey) • Acoustic signalling of forwarded calls • Connection to the room bus (RAN) • Dimensions (HxW): 80 x 80 x 36 mm	

Cancel switch/WC	77 0213 00 A
Same as 77 0213 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Cancel switch/WC	77 0213 00 C
Same as 77 0213 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Cardiac alarm switch	77 0214 00 F
Water-protected switch for raising alarms. • 2 cardiac alarm buttons (blue) • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

Cardiac alarm switch	77 0214 00 A
Same as 77 0214 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Cardiac alarm switch	77 0214 00 C
Same as 77 0214 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Pull cord call switch	77 0215 00 F
Water-protected switch for raising calls using a pull cord. When presence is switched on, an emergency call is raised. • 2.5 m long call cord incl. call handle (red) with symbol • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 56 mm	

Pull cord call switch	77 0215 00 A
Same as 77 0215 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 56 mm	

Pull cord call switch	77 0215 00 C
Same as 77 0215 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 56 mm	

Pull cord call switch/WC	77 0215 01 F
Water-protected switch for raising WC calls using a pull cord. When presence is switched on, a WC emergency is raised. • 2.5 m long call cord incl. call handle (red) with symbol • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 56 mm	

Pull cord call switch/WC	77 0215 01 A
Same as 77 0215 01 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 56 mm	

Pull cord call switch/WC	77 0215 01 C
Same as 77 0215 01 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 56 mm	

Pneumatic call switch	77 0216 00 F
Water-protected switch for raising calls by squeezing the elastic ball. When presence is switched on, an emergency call is raised. • 2 m air hose with red ball made of soft PVC • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 56 mm	

Pneumatic call switch	77 0216 00 A
Same as 77 0216 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 56 mm	

Pneumatic call switch	77 0216 00 C
Same as 77 0216 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 56 mm	

Pneumatic call switch/WC	77 0216 01 F
Water-protected switch for raising calls by squeezing the elastic ball. When presence is switched on, a WC emergency is raised. • 2 m air hose with red ball made of soft PVC • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 56 mm	

Pneumatic call switch/WC	77 0216 01 A
Same as 77 0216 01 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 56 mm	

Pneumatic call switch/WC	77 0216 01 C
Same as 77 0216 01 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 56 mm	

Call switch/WC with cancel switch	77 0217 00 F
Water-protected switch for raising WC calls. When presence is switched on, a WC emergency is raised. Cancel button for cancelling WC calls and WC emergencies. • 1 call button (red) • 1 WC cancel button (grey) • Acoustic signalling of forwarded calls • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

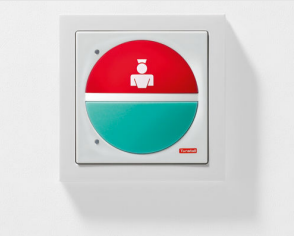
Call switch/WC with cancel switch	77 0217 00 A
Same as 77 0217 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Call switch/WC with cancel switch	77 0217 00 C
Same as 77 0217 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Call switch with privacy switch	77 0217 00 F
Water-protected switch for raising calls. When presence is switched on, an emergency call is raised. Privacy button for local switching of the privacy function. • 1 call button (red) • 1 privacy button (grey) • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

Call switch with privacy switch	77 0218 00 A
Same as 77 0218 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Call switch with privacy switch	77 0218 00 C
Same as 77 0218 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Staff presence combination with call tone	77 0219 00 F
Water-protected switch for switching on/off staff presence. 1 call button for raising calls. When presence is switched on, an emergency call is raised. • 1 call button (red) • 1 presence button for staff 1 (green) • Acoustic signalling of forwarded calls • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

Staff presence combination with call tone	77 0219 00 A
Same as 77 0219 00 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Staff presence combination with call tone	77 0219 00 C
Same as 77 0219 00 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Surface mounting box 1-gang for frame F	77 0210 55
E.g. for surface mounting of switches from the 77 021x xx F product series. • Surface mounting box 1-gang, incl. required fittings • Colour: Studio White • Housing material: Polycarbonate • Dimensions (HxWxD): 80 x 80 x 42 mm	

Call switch cover	77 0210 63
Switch cover for call switches with frame A or F. • Housing material: Plastic • Colour: Transparent/clear • Weight: 79 g	 *Switch not included*

7.3. Room terminals

ComTerminal^{IP}, PoE	76 0510 00
Communication terminal with VoIP technology for use in patient rooms, duty rooms and function rooms. • Operating front made of real glass with integrated touch display, sensor buttons and indicators • Surface mounting, plug-in electronic components • Integrated connection field • Red call button with symbol, location light and reassurance light • Blue cardiac alarm button with symbol, location light and reassurance light, configurable • Green presence button for staff 1, with reminder light • Yellow presence button for staff 2, with reminder light • High-quality 3.5" touch display, illuminated, for handling and displaying calls and information messages • High-quality loudspeakers and sensitive microphone • Configuration menu • Function monitoring with display of operating status • Moisture-protected overall design • Closed, smooth surface, easy to clean and disinfect • Room bus (RAN) for connecting additional operating elements and displays • Connection to IP network of the nurse call system (incl. PoE+). • The Ethernet port is equipped with an internal separating point with 2 x MOPP according to DIN EN 60601-1 (data and power supply) • Power supply via PoE+ • Dimensions (HxWxD): 205 x 110 x 34 mm	

ComTerminal^{IP}, 24V	76 0510 10
Communication terminal with VoIP technology for use in patient rooms, duty rooms and function rooms. • Operating front made of real glass with integrated touch display, sensor buttons and indicators • Surface mounting, plug-in electronic components • Integrated connection field • Red call button with symbol, location light and reassurance light • Blue cardiac alarm button with symbol, location light and reassurance light, configurable • Green presence button for staff 1, with reminder light • Yellow presence button for staff 2, with reminder light • High-quality 3.5" touch display, illuminated, for handling and displaying calls and information messages • High-quality loudspeakers and sensitive microphone • Configuration menu • Function monitoring with display of operating status • Moisture-protected overall design • Closed, smooth surface, easy to clean and disinfect • Room bus (RAN) for connecting additional operating elements and displays • Connection to IP network of the nurse call system. • Power supply via 24 V DC supply of the nurse call system • Dimensions (HxWxD): 205 x 110 x 34 mm	

ConnectionTerminal IP, PoE with VoIP and bedside speech	76 0550 00
ConnectionTerminal IP with VoIP technology for use in patient rooms, duty rooms and function rooms. • Surface mounting, plug-in electronic components • Mounting outside of arm's reach • Integrated connection field • Excellent speech quality through VoIP technology for discreet speaking at the bedside • Integrated function monitoring • Moisture-protected overall design • Room bus (RAN) for connecting additional operating elements and displays • Connection to IP network of the nurse call system (incl. PoE+). • The Ethernet port is equipped with an internal separating point with 2 x MOPP according to DIN EN 60601-1 (data and power supply) • Power supply via PoE+ • Dimensions (HxWxD): 205 x 110 x 34 mm	

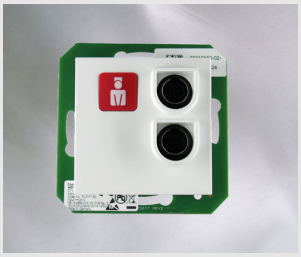
ConnectionTerminal IP, 24V DC with VoIP and bedside speech	76 0550 10
ConnectionTerminal IP with VoIP technology for use in patient rooms, duty rooms and function rooms. • Surface mounting, plug-in electronic components • Mounting outside of arm's reach • Integrated connection field • Excellent speech quality through VoIP technology for discreet speaking at the bedside • Integrated function monitoring • Moisture-protected overall design • Room bus (RAN) for connecting additional operating elements and displays • Connection to the IP network of the nurse call system • Power supply via the 24 V DC supply of the nurse call system • Dimensions (HxWxD): 205 x 110 x 34 mm	

7.4. Connection sockets

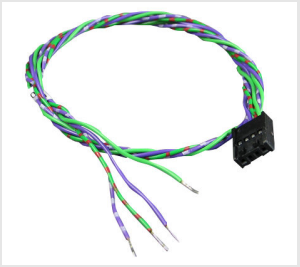
Connection socket with call switch	70 0171 60 F
for wall mounting. Connection socket for two call devices, with call button and additional external call input. • 1 call button (red) with symbol, location light and reassurance light • 2 identical sockets for connecting call devices (pear push switch, diagnostic device etc.) • 1 rear connection for an additional external call button with location light and reassurance light. Adjustment option NC/NO via DIP switch • 2 switching outputs for light control. When selecting light relays, observe the specifications provided by Tunstall. • Connection to the room bus (RAN) • Dimensions (HxWxD): 80 x 80 x 36 mm	

Connection socket with call switch	70 0171 60 C
Same as 70 0171 60 F, but with a glass frame. • Dimensions (HxWxD): 107 x 107 x 36 mm	

Connection socket with call switch	70 0171 60 A
Same as 70 0171 60 F, but with a wider frame. • Dimensions (HxWxD): 91 x 91 x 36 mm	

Connection socket with call switch, bedhead unit	70 0171 50
for installation in a medical supply unit. Connection socket for two call devices, with call button and additional external call input. • 1 call button (red) with symbol, location light and reassurance light • 2 identical sockets for connecting call devices (pear push switch, diagnostic device etc.) • 1 rear connection for an additional external call button with location light and reassurance light. Adjustment option NC/NO via DIP switch • 2 switching outputs for light control. When selecting light relays, observe the specifications provided by Tunstall. • Connection to the room bus (RAN) • Dimensions (HxWxD): 70.5 x 70.5 x 28 mm	

Button cap white, call button	19 9102 40
for connection socket with call switch White button cap with red call symbol as a replacement for the red button cap with white call symbol; optional when installing a connection socket with call switch 70 0171 50 or 70 0171 60... in a medical supply unit. • Dimensions (HxWxD): 15 x 15 x 9.7 mm	

Connection cable	50 0308 02
E.g. for connection socket with call switch or connection socket with call switch, bedhead unit, for connecting a call device to the additional, external call input. • Length: 50 cm	

Connection socket combi	70 0425 00
Studio White for wall mounting. For connecting operating and call devices. • 1 socket for ePat®lite (77 0370 00) or patient handset (74 0747 00) • 1 socket for call device (pear push switch, diagnostic device etc.) • 2 switching outputs for light control. When selecting light relays, observe the specifications provided by Tunstall. • 5 entertainment programmes • Blinds control in conjunction with RAN interface universal (70 0848 00) • Connection for TV audio • TV control in conjunction with RAN interface (77 0840 00) • Connection to room bus (RAN) with speech • Dimensions (HxWxD): 90 x 181 x 10 mm	

Connection socket combi, bedhead unit	70 0435 00
Studio White for installation in a medical supply unit. For connecting operating and call devices. • 1 socket for ePat®lite (77 0370 00) or patient handset (74 0747 00) • 1 socket for call device (pear push switch, diagnostic device etc.) • 2 switching outputs for light control. When selecting light relays, observe the specifications provided by Tunstall. • 5 entertainment programmes • Blinds control in conjunction with RAN interface universal (70 0848 00) • Connection for TV audio • TV control in conjunction with RAN interface (77 0840 00) • Connection to room bus (RAN) with speech • Dimensions (HxWxD): 90 x 181 x 10 mm	

7.5. Patient devices

ePat®lite	77 0370 00
Communication and operating device with duplex speech facility for use at the patient's bedside. • Excellent speech quality, high-quality microphone and high-quality loudspeaker • Red call button with reassurance light and integrated location light • Light button for reading light with location light • Light button for room light • Audio transmission (TV/entertainment) optional • 2 buttons for volume control of TV/entertainment • Button to switch TV on/off, status display • Button for switching entertainment on/off and for switching on blinds mode, status display • 2 buttons for programme selection on TV/entertainment and lowering/raising the blind • Service call button (system function in preparation) • CLEAN button for locking the touch-sensitive user interface when cleaned during operation • 1 headphone jack (3.5 mm) for connecting standard headphones (32 ohms) • Connection cable with robust plug, cable length 2.5 m • Bracket to hold the ePat®lite • User interface with antibacterial properties • Moisture protection for easy cleaning and disinfection • Connection to connection socket combi (70 0425 00) or connection socket combi, bedhead unit (70 0435 00) • Dimensions (HxWxD): 173 x 65 x 27 mm	

Patient handset

74 0747 00

Communication and operating device with duplex speech facility for use at the patient's bedside.

- Excellent speech quality, high-quality microphone and high-quality loudspeaker
- Automatic volume switching depending on type of use
- Red call button with reassurance light and integrated location light
- Yellow light button for reading light with location light
- Yellow light button for room light
- 2 buttons for controlling the entertainment programmes or an external actuator (e.g. blinds control) depending on the installation of the connection socket.
- Audio transmission (TV/entertainment) optional
- 2 buttons for volume control of TV/entertainment
- 2 buttons for switching TV control systems, status display
- 1 headphone jack (3.5 mm) for connecting standard headphones (32 ohms)
- Connection cable with robust plug, cable length 2.5 m
- Ergonomic housing with all-round protective edge
- Moisture protection (IP54)
- Connection to connection socket combi (70 0425 00) or connection socket combi, bedhead unit (70 0435 00)
- Dimensions (HxWxD): 195.5 x 52 x 25 mm

Headphone

70 0801 00

Headphones with jack plug (3.5 mm) for connection to an ePat®lite or patient handset for discreet listening to entertainment/TV programmes.

- 1.8 m connection cable

Equipment and cable clamp — 70 0361 00

Protects all patient devices against tensile stress. Exact routing of all cables and equipment along the bed rail or bed trapeze. The equipment and cable clamp detaches from the rail automatically under tensile load.

- Packing unit: 10 pieces

ePat®/ePat®lite mounting bracket — 77 0380 00

Mounting bracket for storing an ePat® or ePat®lite. Can be used as a wall bracket or mounted on a bedside cabinet.

- Colour: RAL 9016, Traffic white
- Material: ASA/PC
- Dimensions (HxWxD): 110 x 69 x 33 mm

Patient handset bracket — 70 0800 00

for holding the patient handset

Wear-free plastic fixture with integrated facility for switching the volume when the handset is inserted.

- Can be mounted horizontally or vertically
- Colour: RAL 9018, Papyrus white
- Material: ABS
- Dimensions (HxWxD): 198 x 57 x 18 mm

Patient handset bed bracket Völker — 70 0800 10

for holding the patient handset

Wear-free plastic fixture with integrated facility for switching the volume when the handset is inserted. For mounting on a bed manufactured by Völker.

- Snaps directly onto a Völker bed.
- Colour: Light grey
- Material: ABS/PC
- Dimensions (HxWxD): 198 x 100 x 60 mm

Self-releasing adapter patient handset — 74 0812 50

Flexible adapter that automatically disconnects the cable connection between the ePat®lite or patient handset and the connection socket when placed under tension and thus protects against damage.

- 13-pin connector
- Dimensions (HxWxD): 17 x 17 x 120 mm

Pear push switch incl. call and light switch — 70 0710 00

for connection socket 700xxxxx

Moisture-protected call and light switch for raising calls and switching the reading light.

- Approx. 2 m flexible connection cable with plug for connection to a connection socket in the socket for pear push switch
- Dimensions (HxW): 60 x 20 mm

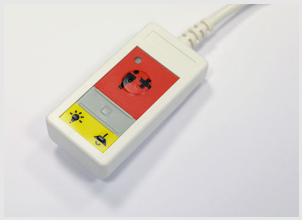
Pear push switch incl. call and light switch — 70 0710 01

for connection socket 700xxxxx

Same as 70 0710 00, but with approx. 4 m connecting cable.

Pear push switch incl. 2 call switches	70 0711 00
for connection socket 700xxxxx Moisture-protected call and light switch for raising calls and switching the reading light. • Approx. 2 m flexible connection cable with plug for connection to a connection socket in the socket for pear push switch • Dimensions (HxW): 60 x 20 mm	

Pear push switch incl. 2 call switches	70 0711 01
for connection socket 700xxxxx Same as 70 0711 00, but with approx. 4 m connecting cable.	

Pear push switch incl. call & 2 light switches	70 0712 00
for connection socket 70017150/60 Water-protected call and light switch for raising calls and switching the reading light and room light. • Approx. 3 m flexible connection cable with plug for connection to a connection socket with call button 70 0171 50, 70 0171 60 A, 70 0171 60 C or 70 0171 60 F • Dimensions (HxWxD): 70 x 35 x 10 mm	

Self-releasing adapter pear push switch	74 0812 51 A
Flexible adapter that automatically disconnects the cable connection between the pear push switch and connection socket when placed under tension and thus protects against damage. • 8-pin connector • Dimensions (HxWxD): 14 x 14 x 120 mm	

Sound detector

70 0790 01

for connection socket 700xxxxx

The sound detector uses a microphone to receive sounds made by the patient as a call and thus raises a call. A call can also be raised using the call button on the front.

- Microphone sensitivity control
- Noise filter adjustment control
- Call button (red) for raising calls manually
- Microphone ON/OFF button (grey)
- Approx. 2 m flexible connection cable with plug for connection to a connection socket in the socket for pear push switch
- Dimensions (HxWxD): 81 x 131 x 37 mm

Diagnostic connection cable

70 0812 10

for connection socket 700xxxxx

Connection cable for connecting a medical electrical device (ME device) to the nurse call system using a connection socket, order no. 70 xxxx xx, to raise a diagnostic call in the nurse call system in the event of alarms from the ME device.

WARNING! The transfer of alarms from ME devices (e.g. patient monitors) to the nurse call system serves only as supplementary, supporting information. This creates a distributed information system. The duty of care for operating such ME devices remains unaffected by the connection to the nurse call system.

- Free wire ends for connection to an ME device
- Plug for connection to a connection socket in the socket for pear push switch
- Cable length: 2 m

Sensor mat	Z 00 8002 02
for connection socket 700xxxxx Large mat that raises a call when stepped on or pressed. The mat can be placed in front of the bed, for example. If the patient leaves the bed or falls out of bed onto the mat, a call is raised in the nurse call system. • Large sensor area • Soft PVC, easy to clean • Approx. 4 m flexible connection cable with plug for connection to a connection socket in the socket for pear push switch • Dimensions (WxD): 1200 x 500 mm • Tread thickness: 4 mm	

Large-surface pneumatic switch	Z 00 8201 13
for connection socket 700xxxxx Large-surface pneumatic switch for raising calls. Only a very small actuation force is required to activate the switch. It is therefore well suited for illness-related disabilities that make activation difficult. • Red surface for raising calls, round, Ø 90 mm • When a call is raised, a visual reassurance light is displayed around the switch and the switch vibrates (vibration function can be deactivated). • Degree of protection: IP44 (do not use in wet rooms) • Approx. 2 m flexible connection cable with plug for connection to a connection socket in the socket for pear push switch • Dimensions (HxØ): 40 x 110 mm	

Breathing sensor set	Z 00 8201 40
for connection socket 700xxxxx Non-contact call sensor for raising a call by breathing. The breathing sensor enables people with very severe motor impairments to raise calls using breathing/blowing sounds. Even the slightest breath on the sensor raises a call. • Sensor unit for raising calls using breathing or blowing noises incl. approx. 2 m flexible connection cable and plug for connection to a connection socket in the socket for pear push switch • Universal clamp bracket with 60 cm bendable gooseneck • Integrated status display on the sensor head • Control module with status displays and other setting options • Installation: Clamp bracket • Dimensions of the sensor unit (HxWxD): 80 x 130 x 30 mm	

7.6. Radio-based call devices

Radio receiver-T — Z 00 8202 33

for connection socket 700xxxxx

Radio receiver with an operating frequency of 869.2125 MHz (social alarm frequency) for receiving signals from associated radio transmitters.

Plug for connection to a connection socket, order no. 70 00xx xx, in the socket for pear push switch. Triggering the radio transmitters raises the same call that would be raised using a pear push switch on the same connection socket.

NOTE! The radio transmission is not monitored. According to the German standard DIN VDE 0834, the radio transmitters must therefore be used only as additional call devices in connection with the nurse call system.

- Integrated antenna
- 64 radio transmitters programmable
- Master mode can be activated to receive signals from any number of radio transmitters
- If the battery of an assigned radio transmitter is low, the LED on the radio receiver flashes red
- If a reception block occurs, a fault is displayed on the radio receiver and a call is raised
- Radio range of up to 30 m, depending on the building structure
- Short connection cable with plug, approx. 16 cm
- Dimensions (HxWxD): 66 x 46 x 18 mm

Magnetic wall bracket — Z 00 8202 21

for radio receiver-T

for magnetic attachment of the radio receiver- T to the wall next to the connection socket.

- Dimensions (HxWxD): 64 x 40 x 12 mm

Radio receiver-T UP	Z 00 8202 35
with free wire ends Radio receiver with an operating frequency of 869.2125 MHz (social alarm frequency) for receiving signals from associated radio transmitters. **NOTE!** The radio transmission is not monitored. According to the German standard DIN VDE 0834, the radio transmitters must therefore be used only as additional call devices in connection with the nurse call system. • Flush mounting in 1-gang back box • Potential-free connection as NC or NO • Integrated antenna • 64 radio transmitters programmable • Master mode can be activated to receive signals from any number of radio transmitters • If the battery of an assigned radio transmitter is low, the LED on the radio receiver flashes red • If a reception block occurs, a fault is displayed on the radio receiver and a call is raised • Radio range of up to 30 m, depending on the building structure • Connection to the room bus (RAN) via the RAN interface (77 0840 00), order separately. Optional connection to the additional external call input of a connection socket with call switch (70 0171 60), order separately. • Frame with 55 mm internal dimension required, not included. When using a frame from the Flamenco range, an intermediate frame is required, i.e.: intermediate frame (77 0210 56) + frame F (77 0210 53) or frame A (77 0210 51) or frame C (77 0210 52) • Dimensions (HxWxD): 66 x 46 x 18 mm	

MyAmie — P68007/02

For use with radio receiver-T and T-UP

Small, watertight radio transmitter used to raise calls wirelessly. It is lightweight and can be worn in different ways. The MyAmie is delivered with a wrist strap and a neckcord.

- Red call button
- LED indicator lights up red when the call button is pressed
- Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure
- Neck cord, wrist strap
- Lithium battery, predicted battery life: 7 years
- When the battery is low, the LED on the radio receiver flashes red
- Dustproof and protected against the effects of temporary immersion in water (IP67)
- Dimensions (HxWxD): 14 x 27 x 36 mm

Neck cord MyAmie, white — D6702137

Spare part for MyAmie P68007/02 radio trigger.

- Packing unit: 10

Wrist strap (20 mm) MyAmie — D6702145

Spare part for MyAmie P68007/02 radio trigger.

- Material: 13% elastic polyamide-coated yarn, 87% polyester
- Packaging unit: 10
- Dimensions (LxW): approx. 210 x 20 mm

iVi™

P68005/47

For use with radio receiver-T and T-UP

A call button is used to raise emergency calls manually. Integrated, intelligent fall detection technology raises calls automatically in the event of a fall.

- Call button
- Call raised automatically in the event of a fall
- Adjustable sensitivity to falls
- Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure
- Lithium battery, replaceable, battery life: approx. 9 to 12 months
- When the battery is low, the LED on the radio receiver flashes red
- Dustproof and protected against the effects of temporary immersion in water (IP67)
- Brooch clip, neckcord, belt clip
- Dimensions (HxWxD): 58 x 38 x 14 mm

Universal sensor

61005/30

For use with radio receiver-T and T-UP

Universal sensor for transferring alarms from wired telecare sensors.

- Four buttons and LCD display for easy configuration
- NC or NO contacts (potential-free) can be connected
- Connection to the free wire ends of the 195 cm connection cable with RJ11 plug. Optional connection to the 3.5 mm jack socket
- Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure
- Expected life of the replaceable battery is approx. 5 years under normal conditions
- When the battery is low, the LED on the radio receiver flashes red
- Dimensions (HxWxD): 80 x 50 x 25 mm

Large-surface radio pneumatic switch

Z 00 8201 15

For use with radio receiver-T and T-UP

Wireless large-surface pneumatic switch for raising calls. Only a very small actuation force is required to activate the switch. It is therefore well suited for illness-related disabilities that make activation difficult.

- Red surface for raising calls, round, Ø 90 mm
- When a call is raised, a visual reassurance light is displayed around the switch and the switch vibrates (vibration function can be deactivated).
- Degree of protection: IP44 (do not use in wet rooms)
- Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure
- 3 V battery (CR2450), replaceable
- When the battery is low, the LED on the radio receiver flashes red
- Dimensions (HxØ): 40 x 110 mm

Wireless sensor mat

Z 00 8002 01

For use with radio receiver-T and T-UP

Large mat that raises a call when stepped on or pressed. The mat can be placed in front of the bed, for example. If the patient leaves the bed or falls out of bed onto the mat, a call is raised in the nurse call system.

- Large sensor area
- Soft PVC, easy to clean
- Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure
- When the battery is low, the LED on the radio receiver flashes red
- Replaceable battery (CR 2032)
- Dimensions (WxD): 1200 x 500 mm
- Tread thickness: 4 mm

Wireless step-on sensor mat CM	Z 00 8003 01
For use with radio receiver-T and T-UP Very sturdy, durable, non-slip and non-trip mat for raising calls, with bevelled edges and studded surface structure. The mat can be placed in front of the bed, for example. A call is raised if the patient leaves the bed or falls out of bed onto the mat. • Rectangular shape • Polyurethane, easy to clean • Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure • When the battery is low, the LED on the radio receiver flashes red • Replaceable battery (CR 2032) • Dimensions (WxD): 1.100 x 700 mm • Tread thickness: 9 mm	

Wireless step-on sensor mat NM	Z 00 8003 02
For use with radio receiver-T and T-UP Very sturdy, durable, non-slip and non-trip mat for raising calls, with bevelled edges and studded surface structure. The mat can be placed in front of the bed, for example. A call is raised if the patient leaves the bed or falls out of bed onto the mat. • Semicircular shape • Polyurethane, easy to clean • Radio range of up to 30 m in conjunction with radio receiver-T or -T UP, depending on the building structure • When the battery is low, the LED on the radio receiver flashes red • Replaceable battery (CR 2032) • Dimensions (WxD): 1.100 x 700 mm • Tread thickness: 9 mm	

7.7. Call handling consoles

ComStation^{IP}	76 0605 50
Ward console for displaying and handling calls and supporting the nursing organisation. Intended for table installation or wall mounting at the nurse station. • Ward console configured for standard ward operation • Call answering and call handling • Selective announcements with up to four defined presence-related groups of people • Switching ward couplings on and off • Switching shifts on and off • Display of system messages • Choice of free or discreet speaking • Capacitive 5-point wide SVGA touch display, 7", resolution 1024x600 pixels • App help • Connection to the IP network of the nurse call system using standard patch cable • Power supply via PoE or plug-in power supply • Dimensions (HxWxD): 84 x 252 x 211 mm	

ManagementCenter^{PC}

77 0610 00

Central console as a screen console for central handling of all functions of the nurse call system. Pre-equipped for connection to a separate IP-SystemManager with the VOIP GATE function module and the IP network of the nurse call system.

NOTE! IP-SystemManager and the VOIP GATE function module must be purchased separately.

- Speech communication via desk speech unit with handset
- Interface to system computer
- System computer (80 6010 00D)
- Monitor (80 6049 00)
- UPS 600 VA/360 W (21 9000 00)
- PrimusGlobal+ “ManagementCenter^{PC}” (77 0700 00)

Display and handling of the functions set up for the nurse call system

- Calls, emergency calls, alarms
- Display of call location
- Staff presence
- Bed identification 1–6
- Call status (fresh/answered)

Additional information

- Speech control and speech status
- Technical system messages
- Non-system messages via interfaces

Announcements

Flexible set-up of different announcement circuits, arranged according to rooms, wards and areas, in the form of individual or collective announcements, to all rooms or only to rooms with staff presence switched on.

Operating mode control

- Central/ward operation
- Ward coupling

Software support contract

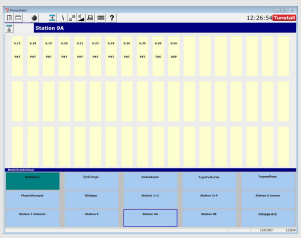
A fee-based software support contract must be concluded together with the purchase of the PrimusGlobal+ system software.

7.8. Application software and PC

Call recording Flamenco, complete set	50 1027 00
The Flamenco call recording complete set supports the creation of care documentation. It records all call data, staff presences and system events. The data is stored together with the time, date and information about its origin, such as the ward and room name. Data can be filtered and sorted using extensive selection criteria. To support further processing and analysis, data can be exported to commercially available office packages. Connection to the IP network of the nurse call system. **Equipment** • System computer (80 6010 00D) • Monitor (80 6049 00) • USP 600 VA/360 W (21 2900 00) • PrimusGlobal+ “Call Recording” (77 0710 00) **Software support contract** A fee-based software support contract must be concluded together with the purchase of the PrimusGlobal+ system software.	

PrimusGlobal module “Building Services”

45 1400 00



The PrimusGlobal software family is an effective addition to nurse call systems of the Flamenco system family. The PrimusGlobal module “Building Services” is an add-on to the basic package.

It supports building services by providing an information service that displays all system events from the nurse call system.

Equipment and functions

- Receipt and display of data from the nurse call system
- Visualisation in block graphics
- Parallel display of messages, system statuses and fault messages

System requirements

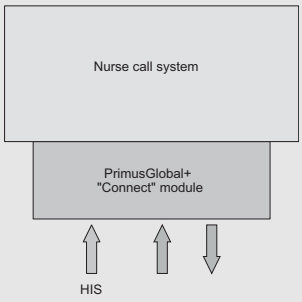
Existing installation of PrimusGlobal+ “Call Recording”, e.g. in the form of “Call recording Flamenco, complete set”.

Software support contract

A fee-based software support contract must be concluded together with the purchase of the PrimusGlobal+ system software.

PrimusGlobal+ “Connect” module

77 0720 00



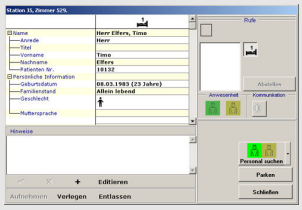
The PrimusGlobal software family provides an effective addition to nurse call systems of the Flamenco system family.

The PrimusGlobal+ “Connect” module is an add-on to PrimusGlobal+ “ManagementCenter”.

The “Connect” module provides interfaces to other systems, such as the Hospital Information System. Appropriate system drivers (e.g. system driver HL7) are used, depending on the respective application.

PrimusGlobal+ system driver HL7

77 0720 01

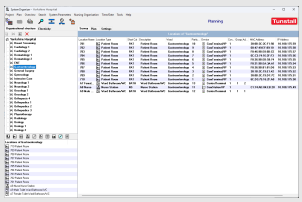


The nursing data and/or personal data used at call handling consoles within the nurse call system can be transferred from the Hospital Information System (HIS). The system driver HL7 establishes the connection between the Hospital Information System and the PrimusGlobal+ software family.

PrimusGlobal+ System set-up & configuration	77 0790 00
Basic installation of the PrimusGlobal+ software and set up of the relevant modules and system drivers required to use the software. The hardware is prepared and tested according to requirements. The hierarchical structure of the user interface is arranged according to specifications.	

PrimusGlobal+ Project data, block graphics	77 0790 01
Max. 36 rooms In addition to the system setup and configuration of PrimusGlobal+, the individual rooms must be configured according to the project-specific specifications. The project-specific data is set up, along with the designations of buildings, wards and rooms. The individual display elements, such as rooms and wards, are positioned and activated as block graphics.	

PrimusGlobal+ Project data, layout graphics	77 0790 02
Max. 36 rooms Same as 77 0790 01, but the individual display elements, such as rooms and wards, are positioned and activated as layout graphics. The layouts must be supplied by the client as a CAD file.	

SystemOrganizer	77 0750 00
Software for convenient planning and configuration of nurse call systems in the Flamenco system family. Extensive setting options with simple operation. **Operation** • Interactive, user-guided application • 5 user levels, password protection • 2 display levels (electrical, organisational structure) • Access to all system and project data via a tree structure • Organisation of multiple projects and archiving of data • Readout of project configuration for the current project, display of existing configuration • Plausibility checks during data entry **Prerequisites** • Microsoft Windows 11, Windows 10 (32 bit, 64 bit) • 10/100 Mbit LAN access • “SystemOrganizer” system training	

System computer	80 6010 00D
System computer for controlling a ManagementCenter^{PC} or operating self-sufficient software applications. The design corresponds to the standard equipment available at the time of delivery. Further details are available on request.	

Monitor	80 6049 00
The design corresponds to the standard equipment available at the time of delivery. Further details are available on request.	

7.9. TV

7.9.1. Connection of commercially available TV set

IR TV control module universal	77 0360 11
incl. cable set Interface for controlling a commercially available TV set using infrared signals. Support is provided for a large number of TV manufacturers and models (e.g. LG, Philips, Samsung). Integrated audio amplifier for controlling an operating device. The output volume can be controlled within defined, configured limits. When used, the audio levels must be coordinated with the end devices used. Consists of a control module and an IR transmitter unit for installation directly on the IR input of the TV set. The device type of the TV set must be known in order to configure the control signals. • The following IR signal modes are supported: RC5/RC5X (e.g. Philips), RC6, SAMSUNG, LG/NEC • Integrated interface to the room bus (RAN) • Safe separating point with integrated 2 x MOPP according to DIN EN 60601-1. • 2 LEDs for displaying the operating status • Incl. cable set • Dimensions (HxWxD): 35 x 135 x 90 mm	

IR TV control module installation kit	77 0360 40
for IR TV control module universal • Terminal program on a USB stick • Loader for transferring the configuration to other IR TV control modules quickly and conveniently • USB-to-TTL adapter cable	

TV audio amplifier	77 0365 00
Audio amplifier for distributing audio signals to up to 4 listening points/beds. Can be used in conjunction with TV sets with a headphone jack. All connecting cables and fastening materials required for operation are included. • Up to 4 listening points/beds • Safe separating point with integrated 2 x MOPP according to DIN EN 60601-1. • Potentiometer with external pin for volume control • External 12 V power supply. **NOTE!** Two sockets are required per TV set. • Power LED • Dimensions (HxWxD): 27 x 86 x 70 mm	

7.9.2. LED TV set professional

LED TV set professional 32"	74 7005 32/15
TV set suitable for use in the patient room. Ready for use with the nurse call system from the Flamenco system family. • Screen format: 16:9 • Screen size: 81 cm / 32 inches • Fixture for VESA wall bracket The design corresponds to the standard equipment available at the time of delivery. Further details are available on request.	 *Illustration similar to actual product*

LED TV set professional 40"	74 7005 40/15
Same as 74 7005 32/15, but: • Screen size: 100 cm / 40 inches	

LED TV set professional 48"	74 7005 48/15
Same as 74 7005 32/15, but: • Screen size: 121 cm / 48 inches	

TV installation kit	74 7002 56/15
for LED TV set professional	

Commissioning TV set	74 7009 00/15
Service	

TV wall mount “Base”	74 7002 80
• One pivot point • Can be tilted and rotated • VESA MIS-D, 100, MIS-D, 75 • Additional adapters for VESA MIS-E 200 x 200 mm	

TV wall mount “Advance”	74 7002 81
• Two pivot points • Can be tilted, rotated and extended • VESA MIS-D, 100, MIS-D, 75 • Additional brackets for VESA MIS-E 200 x 200 mm	

TV wall mount “Comfort”	74 7002 82
• Three pivot points • Can be tilted, rotated and extended • VESA MIS-D, 100, MIS-D, 75 • Additional brackets for VESA MISE 200 x 200 mm	

7.10. System add-ons

Loudspeaker with announcement interface	05 0024 02
Wall-mounted loudspeaker Wall-mounted loudspeaker with an all-metal design for speech announcements of the nurse call system. Intended for installation in corridors and large rooms. • Adjustable amplifier for announcements • Transformer for entertainment transmission • Quiescent current consumption: 80 mA • Connection to OSYlink-Announcement • Weight: 2.2 kg • Dimensions (HxWxD): 193 x 253 x 82 mm	

Loudspeaker set	05 0024 04
Ceiling installation Large, high-efficiency ceiling loudspeaker for speech announcements of the nurse call system. Intended for installation in corridors and large rooms. • Connection to 1-channel audio amplifier 100V/25W, not included • Weight: 2.06 kg • Diameter: 267 mm • Height: 135.5 mm • Ceiling cut-out: 243 mm	

Loudspeaker set with announcement interface

05 0024 03

Ceiling installation

Large, high-efficiency ceiling loudspeaker for speech announcements of the nurse call system. Intended for installation in corridors and large rooms.

- Adjustable amplifier for announcements
- Transformer for entertainment transmission
- Quiescent current consumption: 80 mA
- Connection to OSYlink-Announcement
- Weight: 2.36 kg
- Diameter: 267 mm
- Height: 135.5 mm
- Ceiling cut-out: 243 mm

1-channel audio amplifier 100V/25W

00 0647 13

Power amplifier ideal for use in professional PA systems with 100 V technology.

- 1-channel class D amplifier
- Summation amplifier input
- Volume control
- Mounting on top-hat rail (35 x 7.5 mm)
- Power supply: 24 V DC
- Quiescent power consumption: 0.79 W
- Impedance: 400 ohm / 100 W
- Ambient temperature: -20 °C to +40 °C
- Output power: max. 25 W
- Connection to OSYlink-Announcement
- Weight: 300 g
- Dimensions (HxWxD): 103 x 72 x 62 mm

OSYlink-Announcement L	77 0804 00
Interface for connecting loudspeakers with announcement interface (05 0024 02 or 05 0024 03) or 1-channel audio amplifier 100V/25W (00 0647 13) to the OSYnet group bus. Connection as a single device or in groups. • 1 audio output to control the active loudspeakers or the audio amplifiers • 1 potential-free switching output for controlling the connection identifier • 24 V DC power supply of the nurse call system • Mounting on wall or top-hat rail (35 x 7.5 mm), modular • Dimensions (HxWxD): 90 x 106 x 58 mm	

Door entry speaker 2

77 0351 00

for connection to OSYlink-Door entry speaker 2

Door entry speaker for convenient speech connection between entry door and nurse call system. Suitable for use on doors indoors and outdoors.

- High-quality housing with elegant glass front, 6 mm safety glass, white design
- 1 large call button
- Illumination of labelling field with maintenance-free LED technology
- Excellent speech quality
- Flat design with an installation height of only 28 mm
- Direct connection to OSYlink-Door entry speaker 2 (77 0801 10) via 2-wire connection
- Control of door opener
- Separation of door opener and nurse call system using 2 x MOPP according to DIN EN 60601-1
- Power supply: 24 V DC from OSYlink-Door entry speaker 2
- Dimensions (HxWxD): 220 x 138 x 28 mm

Requirements for door opener

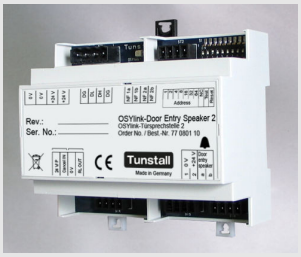
- Operating current type
- Operating voltage: 8–24 V DC
- Max. current consumption: 200 mA
- DC resistance: min. 42 ohm

OSYlink-Door entry speaker 2

77 0801 10

for door entry speaker 2

Interface for connecting a door entry speaker 2 (77 0351 00) to the OSYnet group bus.

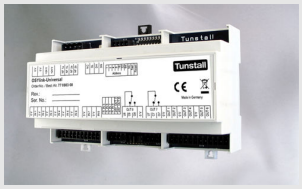


- 2-wire connection to door entry speaker 2 (data and speech)
- Mounting on wall or top-hat rail (35 x 7.5 mm), modular
- Input for local call cancellation in conjunction with a separate switch
- Dimensions (HxWxD): 90 x 106 x 58 mm

ESD protection cover “short”	00 0276 53
E.g. as protection for the OSYlink-Announcement L or OSYlink-Door entry speaker 2 if the device is not installed in a control cabinet. • Material: Plastic, transparent • Hook-and-loop fastening strip • Weight: 15 g • Dimensions (HxWxD): 155 x 125 x 50 mm	

7.11. Interfaces

7.11.1. Interfaces on the ward

OSYlink-Universal	77 0803 00
Interface for connecting third-party systems to the OSYnet group bus. • 4 monitored switching inputs: 2x call, emergency call, alarm • 1 standard switching input, collective announcement (all wards) • 1 standard switching input, collective announcement (all presences) • 1 standard switching input for raising a call, plus a standard switching input for cancelling this call. • 4 configurable electronic switching outputs. Factory setting: 2x call, emergency call, cardiac alarm • 1 electronic switching output, configurable • 1 electronic switching output, configurable with location light function (functionally assigned to the switching inputs for call raising) • 2 potential-free switching outputs, configurable (changeover contact, voltage source selectable via jumper) • Configuration of outputs using the SystemOrganizer • 24 V DC power supply of the nurse call system • Mounting on wall or top-hat rail (35 x 7.5 mm), modular • Dimensions (HxWxD): 90 x 160 x 58 mm	

OSYlink AS-CCS	77 0870 00
Interface for compatibly connecting the room terminals of a ward from the following legacy systems to the group bus OSYnet: EccoLine with speech, NewLine C201, NewLine, CCS 2000 G, CCS 1080 G, CCS 1080 W (data connection only for CCS 1080 W). • Configuration using the SystemOrganizer • 24 V DC power supply of the nurse call system • Mounting on wall or top-hat rail (35 x 7.5 mm), modular • Dimensions (HxWxD): 90 x 160 x 58 mm **IMPORTANT NOTE!** Existing projects are often very complex (project history, customized solutions, existing cabling etc.). The functions available in the individual projects must therefore be checked when using the OSYlink AS-CCS.	

ESD protection cover “long”	00 0276 54
E.g. as protection for the OSYlink-Universal or OSYlink AS-CCS if the device is not installed in a control cabinet. • Material: Plastic, transparent • Hook-and-loop fastening strip • Weight: 21 g • Dimensions (HxWxD): 155 x 180 x 50 mm	

7.11.2. Interfaces in the room

RAN interface	77 0840 00
Interface for connecting external devices to the room bus (RAN). Top-hat rail clip included. **Potential applications** • External call device raises call type “call”. • External call device raises call type “cardiac alarm”. • External call device raises call type “WC call”. • External presence detector switches presence 1. • TV set is controlled via ePat®lite or patient handset • Dimensions (HxWxD) without top-hat rail clip: 32 x 34 x 16 mm	

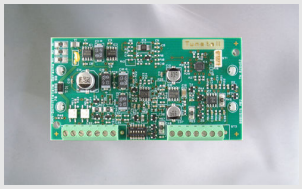
RAN interface with speech

77 0880 00

Interface for bed-by-bed connection of analogue speech systems to the room bus (RAN). Both telephones and other devices with speech capabilities can be used as operating devices, provided that the specifications for connection are complied with. In this case, approval of the device by Tunstall is required.

Mounting on a top-hat rail (35 x 7.5 mm) e.g. in the medical supply unit.

Dimensions (HxWxD) without fixing clips: 13 x 51 x 95 mm



RAN interface universal

70 0848 00

Interface for connecting external actuators controlled by an ePat®lite or patient handset, e.g. lowering/raising the blind. Transfer of signals in connection with the connection socket combi (70 0425 00) or connection socket combi, bedhead unit (70 0435 00).

- 2 potential-free NO contacts
- Maximum contact load: 60 mA / 24 V
- Control by one or all ePat®lite units or patient handsets in the room
- Connection to the room bus (RAN).
- Mounting on top-hat rail (35 x 7.5 mm)
- Dimensions (HxWxD): 76 x 72 x 41 mm

7.12. System control (hardware and software)

IP-SystemManager	76 2100 00
Decentralised control unit for operating a Flamenco $^{IP+}$, Flamenco^{IP} or Flamenco^{SE} call system for one organisational group (usually one ward). The number of IP-SystemManagers required for an entire system depends on the number of wards and the required central interfaces. All IP-SystemManagers are equipped with uniform hardware. The different functions are determined by the installed software (system module, function module) and a project-specific configuration. **System modules and function modules** Extensive system and function modules are available for the IP-SystemManager – from the basic light call function to complex interfaces. Individual software modules can be added at any time and the system expanded. The software modules are not included in the scope of delivery and must be purchased separately. **Setup and equipment** • Device for mounting on a top-hat rail (35 x 7.5 mm) with 2 top-hat rail clamps on the rear of the device • Can be installed in a 19" cabinet with optionally available accessories, space requirements: 3 Us • Remote access or system updates can be performed via the IP network • Later system extensions or system changes can be implemented without issues **Power supply** The IP-SystemManager is supplied with 24 V DC via the call system. Depending on the system design, a separate power supply can also be used. **Fault messages** All fault messages from the nurse call system are displayed on a specific IP-SystemManager of the nurse call system. This IP-SystemManager must be defined during system planning. **Connections (use depends on installed system modules and function modules)** • Ethernet port (10/100 Mbit LAN port RJ45); separating point with 2 x integrated MOPP according to DIN EN 60601-1.	

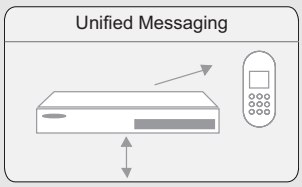
• OSYnet group bus connection • 2 serial RS-232 ports (ESPA 4.4.4), separating point according to DIN EN 60601-1 is not integrated! • Dimensions (HxWxD): 132 x 216 x 48 mm	

System module HEALTH	**76 0730 00**
System software for operating a nurse call system, intended for use in hospitals and comparable facilities. The system module HEALTH provides the functions required for a complete nurse call system and can be combined with other function modules. • Control of a nurse call system for one organisational group (usually one ward) • Functional properties according to the German standard DIN VDE 0834 • Installation on an IP-SystemManager **System support** To ensure that the system and system modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

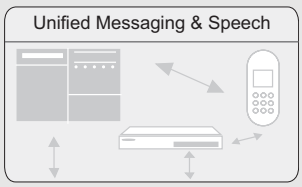
Software support System module HEALTH	**76 7130 00**
Price/year per installed module	

System module CARE	76 0735 00
System software for operating a nurse call system, intended for use in nursing homes and comparable facilities. The system module CARE provides the functions required for a complete nurse call system and can be combined with other function modules. • Control of a nurse call system for one organisational group (usually one ward) • Functional properties according to the German standard DIN VDE 0834 • Installation on an IP-SystemManager **System support** To ensure that the system and system modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

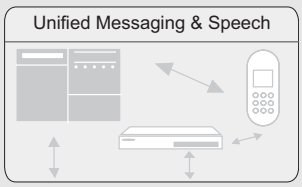
Software support System module CARE	76 7135 00
Price/year per installed module	

Function module UM/A	76 0740 00
System software for unidirectional coupling of PBX systems or pagers with the Flamenco^{IP+} or Flamenco^{IP} nurse call system. Messages from the nurse call system can be transferred to and displayed on mobile devices (e.g. DECT). • Display of messages from the nurse call system: Calls, emergency calls, cardiac alarms • Display of the location where the call was raised: Bed, room, ward • Acknowledgment of the message • Confirmation of call acceptance The function module is pre-installed on an IP-SystemManager on delivery (to be ordered separately). It makes the function available across the entire system. The physical connection of the PBX and/or a messaging server takes place directly via the LAN. The function module UM/A supports systems manufactured by Ascom. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

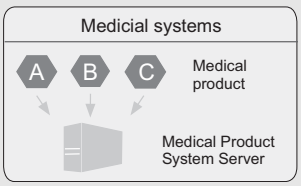
Software support Function module UM/UMS	76 7040 00
Price/year per installed module	

Function module UMS/A	76 0740 01
System software for unidirectional coupling of PBX systems or pagers with the Flamenco^{IP+} or Flamenco^{IP} nurse call system. The extended connection supports speech communication, SIP/ VoIP. Messages from the nurse call system can be transferred to and displayed on mobile devices (e.g. DECT). Speech communication is possible between the nurse call system and the PBX. • Display of messages from the nurse call system: Calls, emergency calls, cardiac alarms • Display of the location where the call was raised: Bed, room, ward • Acknowledgment of the message • Confirmation of call acceptance • Delete calls (if allowed) The function module is pre-installed on an IP-SystemManager on delivery (to be ordered separately). It makes the function available across the entire system. The physical connection of the PBX and/or a messaging server takes place directly via the LAN. The function module UMS/A supports systems manufactured by Ascom. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

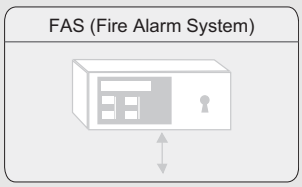
Software support Function module UM/UMS	76 7040 00
Price/year per installed module	

Function module UMS/T	76 0740 10
System software for unidirectional coupling of PBX systems or pagers with the Flamenco^{IP+} or Flamenco^{IP} nurse call system. The extended connection supports speech communication, SIP/ VoIP. Messages from the nurse call system can be transferred to and displayed on mobile devices (e.g. DECT). Speech communication is possible between the nurse call system and the PBX. • Display of messages from the nurse call system: Calls, emergency calls, cardiac alarms • Display of the location where the call was raised: Bed, room, ward • Acknowledgment of the message • Confirmation of call acceptance • Delete calls (if allowed) The function module is pre-installed on an IP-SystemManager on delivery (to be ordered separately). It makes the function available across the entire system. The physical connection of the PBX and/or a messaging server takes place directly via the LAN. The function module UMS/T supports systems manufactured by Tetronik. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

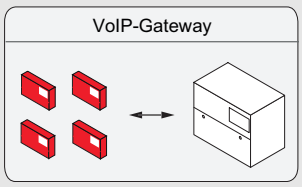
Software support Function module UM/UMS	76 7040 00
Price/year per installed module	

Function module MED	76 0741 00
System software intended for unidirectional coupling of medical electrical systems or electrical systems with the Flamenco^{IP+} or Flamenco^{IP} nurse call system. Pre-filtered messages are taken over and displayed by the nurse call system. The priorities, the display order and display location can be configured. The function module is pre-installed on an IP-SystemManager on delivery (to be ordered separately). It makes the function available across the entire system. Communication takes place using the ESPA 4.4.4 protocol via an RS-232 serial interface. The selection of transferred data and configuration activities is carried out in close consultation with the customer. **ATTENTION!** Observe the intended purpose. **NOTICE!** The IP SystemManager (to be ordered separately), which provides the MED function module, can only be included in the configuration file (= database) of the call system by Tunstall. Therefore, when ordering the MED function module, the customer must send the current configuration file (= database) to Tunstall. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

Software support Function module MED/FAS	76 7041 00
Price/year per installed module	

Function module FAS	76 0742 00
System software for unidirectional coupling of fire alarm systems with the Flamenco^{IP+} or Flamenco^{IP} nurse call system. Pre-filtered messages are taken over and displayed by the nurse call system. The priorities, the display order and display location can be configured. The function module is pre-installed on an IP-SystemManager on delivery (to be ordered separately). It makes the function available across the entire system. Communication takes place using the ESPA 4.4.4 protocol via an RS-232 serial interface. The selection of transferred data and configuration activities is carried out in close consultation with the customer. **NOTICE!** The IP SystemManager (to be ordered separately), which provides the FAS function module, can only be included in the configuration file (= database) of the call system by Tunstall. Therefore, when ordering the FAS function module, the customer must send the current configuration file (= database) to Tunstall. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

Software support Function module MED/FAS	76 7041 00
Price/year per installed module	

Function module VOIP GATE	76 0743 00
This gateway enables the speech coupling of a ManagementCenter with a Flamenco^{IP+} or Flamenco^{IP} application. An IP-SystemManager with function module VOIP GATE enables the connection of a ManagementCenter (i.e. a console workstation). This gateway enables the speech coupling of an OSY-ControlCenter (Flamenco system) with a Flamenco^{IP+} or Flamenco^{IP} application. An IP-SystemManager with function module VOIP GATE enables the connection of two speech lines of an OSY ControlCenter. Communication takes place via the NF port of the IP-SystemManager. Depending on the number of desired speech connections, several IP-SystemManagers may be required. **NOTICE!** The IP SystemManager (to be ordered separately), which provides the VOIP GATE function module, can only be included in the configuration file (= database) of the call system by Tunstall. Therefore, when ordering the VOIP GATE function module, the customer must send the current configuration file (= database) to Tunstall. **System support** To ensure that the system and function modules remain up to date, the conclusion of a software support contract is mandatory. The annual costs incurred include the rights of use and regular software support in the form of security updates to ensure system integrity.	

Software support Function module VOIP GATE	76 7042 00
Price/year per installed module	

7.13. Power supply

Power supply unit 10A, DIN rail	77 3410 00

Power supply unit for supplying power to the nurse call system with safety extra-low voltage (SELV).

The number of rooms or individual components that can be connected is project specific.

2 x MOPP according to EN 60601-1.

EMC tested according to EN 60601-1-2.

Multi-range input, suitable for international use. Protected against short-circuit and overload.

DC-ok LED and DC-ok relay contact for further fault processing.

Intended to be mounted on a top-hat rail (35 x 7.5 mm) in an enclosure that protects against electrical, mechanical and fire hazards. The power supply is designed for convection cooling and does not require an external fan.

- Weight: 620 g
- Dimensions (HxWxD): 124 x 39 x 117 mm

Input

- Nominal voltage: 100–240 V AC (-15%/+10%)
- Input frequency: 50–60 Hz ±6%

Output

- Nominal current: 10 A
- Nominal voltage: 24 V DC
- Adjustment range: 24–28 V DC
- Output power: 240 W

Permissible environmental conditions

- Ambient temperature: -25 °C to +70 °C
- Relative humidity: 5 to 95% (non-condensing)

NOTICE! The conducted emissions of the power supply unit can be up to 12 dB higher than the average limits for direct current connections in accordance with EN 61000-6-3.

Power supply unit 5A, DIN rail

77 3410 50

Power supply unit for supplying power to the nurse call system with safety extra-low voltage (SELV).

The number of components that can be connected is project specific.

2 x MOPP according to EN 60601-1.

EMC tested according to EN 60601-1-2.

Multi-range input, suitable for international use. Protected against short-circuit and overload.

DC-ok LED and DC-ok relay contact for further fault processing.

Intended to be mounted on a top-hat rail (35 x 7.5 mm) in an enclosure that protects against electrical, mechanical and fire hazards. The power supply is designed for convection cooling and does not require an external fan.

- Weight: 620 g
- Dimensions (HxWxD): 124 x 32 x 102 mm

Input

- Nominal voltage: 100–240 V AC (-15%/+10%)
- Input frequency: 50–60 Hz ±6%

Output

- Nominal current: 5.0–4.3 A
- Nominal voltage: 24 V DC
- Adjustment range: 24–28 V DC

Permissible environmental conditions

- Ambient temperature: -25 °C to +60 °C
- Relative humidity: 5 to 95% (non-condensing)

Illustration similar to actual product

UPS Control unit 10A

77 3411 00

for power supply units, order no. 77 3410 xx

UPS control unit used in combination with a 24 V DC power supply unit and an external 12 V battery to cover power failures. If the supply voltage fails, the energy stored in the battery is transferred to the load in a controlled process.

Use together with power supply unit 10A, DIN rail (77 3410 00) and battery module (77 3412 00) for uninterrupted operation, with 60 minutes of backup supply at 80% load.

Use together with power supply unit 5A, DIN rail (77 3410 50) and battery module (77 3412 00) for uninterrupted operation, with 150 minutes of backup supply at 80% load.

Excellent battery management for charging and monitoring the external battery, as well as for a stable output voltage over the entire period of battery operation.

Comprehensive diagnostic and monitoring functions, including a “Replace battery” signal.

Protected against short-circuit and overload.

Intended to be mounted on a top-hat rail (35 x 7.5 mm) in an enclosure that protects against electrical, mechanical and fire hazards. The device is designed for convection cooling and does not require an external fan.

- Weight: 530 g
- Dimensions (HxWxD): 124 x 49 x 117 mm

Input

- Nominal voltage: 24 V DC (-20%/+25%)

Output in mains mode

- Output current: nom. 15 A
- Output power: nom. 360 W
- Output voltage: Input voltage minus 230 mV (at 10 A load)

Output in battery mode

- Output current: 10 A
- Output voltage: 22.25 V DC (at 10 A load)
- Battery voltage: nom. 12 V DC
- Power failure bridging time with power supply unit 10A, DIN rail (77 3410 00) and battery module (77 3412 00):
  - At nominal current 10 A: typ. 55 minutes
  - At 80% load: typ. 60 minutes

- Power failure bridging time with power supply unit 5A, DIN rail (77 3410 50) and battery module (77 3412 00):
  - At nominal current 5 A: typ. 130 minutes
  - At 80% load: typ. 150 minutes
- Battery charging time: typ. 17 hours

Permissible environmental conditions

- Ambient temperature: -25 °C to +70 °C
- Relative humidity: 5 to 95% (non-condensing)

Battery module

77 3412 00

for UPS Control unit 10A (77 3411 00)

Module incl. battery, bracket, cables and fuse that is used in combination with a 24 V DC power supply unit (77 3410 xx) and a UPS Control unit 10A (77 3411 00) to bridge power failures.

Long-life battery: 10 to 12 years according to EUROBAT. In a typical application, it is recommended to replace the battery at least once every 5 years.

Low space requirement. Easy access to the terminals and fuse.

Intended for installation in an enclosure that protects against electrical, mechanical and fire hazards. Ensure adequate ventilation in accordance with EN 62485-2.

- Weight: 10.1 kg (incl. battery)
- Dimensions (HxWxD): 179 x 214 x 158 mm

Battery properties

- Battery type: VRLA, lead acid
- Battery voltage: 12 V DC
- Battery capacity: approx. 26 Ah
- Battery current: max. 30 A when discharging, max. 5.5 A when charging
- Self-discharge rate: 3% per month at 20 °C
- Battery fuse: 30 A (ATOF)

Permissible environmental conditions

- Ambient temperature:
  - When charging: -10 to +50 °C
  - When discharging: -15 to +60 °C
  - During transport and storage: -20 to +50 °C (storage above 25 °C may affect performance and battery life)
- Relative humidity: 5 to 95% (non-condensing)

DC-UPS with capacitor storage 24V, 6kWs

77 3413 00

for power supply units, order no. 77 3410 xx

DC UPS with built-in storage capacitors that, in combination with a 24 V DC power supply unit, are used to bridge short-term power failures or voltage fluctuations. If the supply voltage fails, the energy stored in the capacitors is released to the load in a regulated process. Suitable for nurse call systems with a central UPS power supply.

Use together with power supply unit 10A, DIN rail (77 3410 00) for short-term uninterrupted operation, with 16.5 seconds of backup supply.

Use together with power supply unit 5A, DIN rail (77 3410 50) for short-term uninterrupted operation, with 39 seconds of backup supply.

Extensive diagnostic and monitoring functions.

Protected against short-circuit and overload.

Intended to be mounted on a top-hat rail (35 x 7.5 mm) in an enclosure that protects against electrical, mechanical and fire hazards. The device is designed for convection cooling and does not require an external fan.

- Weight: 1150 g
- Dimensions (HxWxD): 124 x 126 x 117 mm

Input

- Nominal voltage: 24 V DC (-20%/+25%)

Output in mains mode

- Output current: nom. 15 A
- Output power: nom. 360 W
- Output voltage: Input voltage minus 230 mV (at 10 A load)

Output in buffer mode

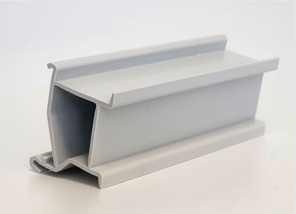
- Output current: max. 15 A
- Output voltage: 22.25 V DC (at 10 A load)
- Bridging time at nominal current 10A: typ. 16.5 seconds
- Bridging time at nominal current 5A: typ. 39 seconds
- Charging time when the capacitor is completely discharged: typ. 16 minutes
- Charging time after discharge with 5 A until buffering stops: typ. 4.5 minutes

Permissible environmental conditions • Ambient temperature: -40 °C to +60 °C • Relative humidity: 5 to 95% (non-condensing)	

7.14. Installation

Terminating resistor 120Ω	00 0040 76
as bus termination in the last bus user of the OSYnet group bus.	

Over-voltage protection circuit	70 0890 97
	

DIN rail raiser HAGER HYA036	76 0900 04
for insulated mounting of modular devices Required accessory for insulated mounting of UPS Control unit 10A (77 3411 00) or DC-UPS with capacitor storage 24V, 6kWs (77 3413 00). • Length: 106 mm • Packing unit: 3 pieces • For insulated mounting, a distance to earthed parts of min. 1 cm must be maintained. • Max. 2 DIN rail raisers can be mounted in a mounting set for 10" wall mounting cabinet (76 0900 02) • Max. 4 DIN rail raisers can be mounted in a 19" mounting set (76 0900 01) • Dimensions (HxWxD): 42 x 106 x 35 mm	

Network isolator LAN

76 5000 00

External network isolator for galvanic network isolation with 2 x MOPP according to DIN EN 60601-1.

- Dielectric strength of signal and shielding: 5 kV
- Operating mode: Continuous operation
- Data throughput: 10/100/1000 MBit/s
- Connections: 2x RJ45
- Conformity: IEEE 802.3
- **Fulfilled standards**
  - Safety: DIN EN / IEC 60601-1 3rd
  - EMC: DIN EN / IEC 60601-1-2
- Weight: approx. 50 g
- Dimensions (HxWxD): 23 x 29 x 65 mm

RS-232 isolator 2xMOPP, 4kV

76 5000 10

4 kV galvanically isolated RS-232 isolator provides protection against external influences in compliance with the standard DIN EN 60601-1(-2).

- 2 x MOPP / 230 V AC
- 4 kV galvanic isolation
- 15 kV ESD protection
- Supply voltage: 100–240 AC (via supplied plug-in power supply)
- Power consumption: 3 W (via supplied plug-in power supply)
- Standard: DIN EN 60601-1, DIN EN 60601-1-2
- Weight: approx. 350 g (incl. power supply unit & D-sub extension)
- Dimensions (HxWxD): 150 x 80 x 30 mm

NTP TimeServer/DCF M150

77 0910 12

The TimeServer is used to receive time signals by means of DCF77 signals.

It is designed as a stand-alone version and enables time signals to be transferred via Ethernet using the SNTP protocol.

It updates the system time automatically when used in conjunction with a system from the Flamenco system family and a connection to the IP network of the nurse call system.

- Aluminium profile housing for mounting on top-hat rail (35 x 7.5 mm)
- Max. voltage range: 20–60 V DC
- Power consumption: 20 W
- Receiving antenna in waterproof housing for outdoor use
- Web-based status and configuration program, plus graphical configuration tool for console access
- Dimensions (HxWxD): 105 x 126 x 189 mm
- NOTE! If the device is connected to the 24 V DC power supply of the nurse call system, the LAN port must be connected via a separating device with 2 x MOPP according to DIN EN 60601-1 (e.g. network isolator LAN (76 5000 00))

SPD module for network cables

77 4900 02

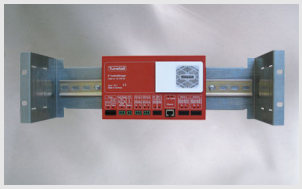
DPA M CLE RJ45B 48

Fully shielded class E surge arrester, tested according to EN 61643-21, for universal use according to EN 50173 for all data services up to 48 DC for protecting 4 wire pairs of data network interfaces via RJ 45 sockets, for distributors or single-workstation applications, space-saving, width 19 mm.

- Maximum continuous DC voltage: 48 V
- Nominal current: 1 A
- C2 nominal discharge current (8/20) Ad-PG, total: 10 kA
- Mounting on top-hat rail (35 x 7.5 mm)
- Dimensions (HxWxD): 75 x 19 x 36 mm

7.15. Accessories

7.15.1. Wall mounting cabinets and mounting sets

19" Mounting set	76 0900 01
Mounting set for installing power supply modules or control technology devices of the nurse call system in a 19" system cabinet or 19" wall mounting cabinet. Width of top-hat rail: 425 mm. Frame made of sheet steel with top-hat rail and front cover. Integrated cable catch, strain relief and required accessories are included. • Mounting type: 19", 3U • Colour: Zinc-coated frame, red front cover. • Frame material: Zinc-coated sheet steel • Top-hat rail: 35 x 7.5 mm, width: 425 mm • Dimensions (HxWxD): 132.5 x 482.6 x 180 mm	

Mounting set for 10" wall mounting cabinet	76 0900 02
Mounting set for installing power supply modules or control technology devices of the nurse call system in a 10" wall mounting cabinet. Width of top-hat rail: 203 mm. Frame made of sheet steel with top-hat rail. Integrated cable catch, strain relief and required accessories are included. • Mounting type: 10", 3U • Frame material: Zinc-coated sheet steel • Top-hat rail: 35 x 7.5 mm, width: 203 mm • Dimensions (HxWxD): 132.5 x 260 x 180 mm	

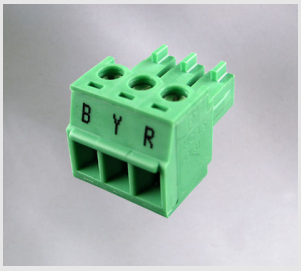
10" Wall mounting cabinet, 6U, GD	77 3510 06
Wall mounting cabinet for installing power supply modules or control technology devices of the call system. • Viewing door made of safety glass, lockable • 254 mm (10") profile rails mounted on the front inside the cabinet, adjustable depth • Cable feed with brush strip at the top, with plastic cover on the base • Ventilation slots for active and passive ventilation • Weight: 5.5 kg • Dimensions (HxWxD): 330 x 312 x 300 mm	

19" Wall mounting cabinet, 7U, GD	77 3519 07
Wall mounting cabinet for installing power supply modules or control technology devices of the call system. • Lockable safety glass door with metal struts on the sides • 483 mm (19") profile rails mounted on the front inside the cabinet, adjustable depth • Cable feed on the back and base with plastic cover and at the top with sliding cover • Top is pre-prepared to accommodate a fan element (punched-out mounts) • Ventilation slots for active and passive ventilation • Weight: 17 kg • Dimensions (HxWxD): 420 x 600 x 450 mm	

19" Wall mounting cabinet, 12U, GD	77 3519 12
Wall mounting cabinet for installing power supply modules or control technology devices of the call system. • Lockable safety glass door with metal struts on the sides • 483 mm (19") profile rails mounted on the front inside the cabinet, adjustable depth • Cable feed on the back and base with plastic cover and at the top with sliding cover • Top is pre-prepared to accommodate a fan element (punched-out mounts) • Ventilation slots for active and passive ventilation • Weight: 25 kg • Dimensions (HxWxD): 643 x 600 x 450 mm	

7.15.2. Connectors

Connector, 5-pole	00 0211 37
E.g. for connection socket with call switch Pluggable screw connector, e.g. for connecting the connection socket with call switch (70 0171 60...), the connection socket with call switch, bedhead unit (70 0171 50) or for using an RS-232 connection of an IP-SystemManager. • Screw plug-in connection up to 1.5 mm² • Reverse polarity protection • Dimensions (HxWxD): 10 x 20 x 19 mm	

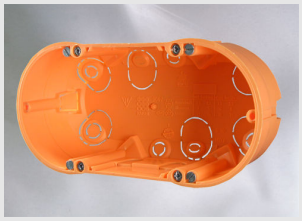
Connector, 3-pole	70 0807 00
Pluggable connector for connecting the switches and room lamps with RAN connection to the room bus (RAN). • Labelled connectors • Screw connection up to 1.5 mm² • Anti-twist protection • Dimensions (HxWxD): 10 x 11 x 15 mm	

7.15.3. Back boxes

Back box solid wall, 1-gang	**17 0100 00**
Installation opening: Ø 60 mm Depth: 46 mm	

Back box solid wall, 2-gang	**17 0410 00**
Installation opening: 140 x 60 x 42 mm, oval Without separating strip	

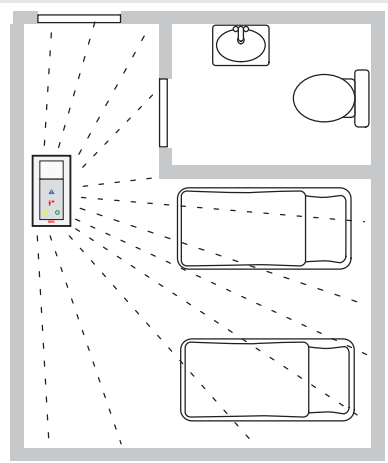
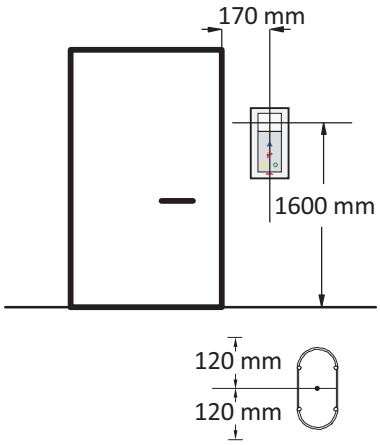
Back box partition wall, 1-gang	**17 5100 00**
Burr hole: Ø 68 mm Depth: 47 mm	

Back box partition wall, 2-gang	**17 5400 00**
Burr hole: Ø 2 x 68 mm, oval Depth: 47 mm, centre distance: 71 mm, without separating strip	

8. Mounting positions

Contents

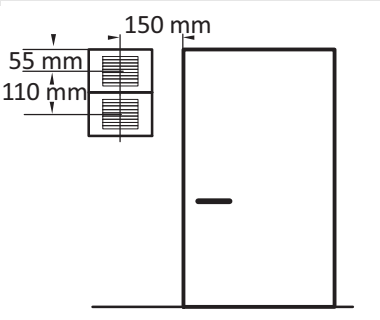
8.1. Room terminals

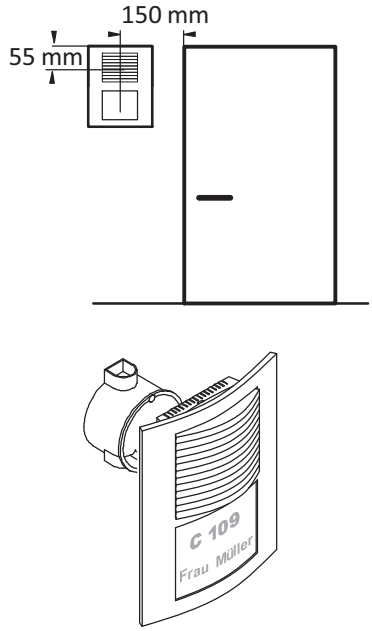
76 0510 00, 76 0510 10	ComTerminal^{IP}, PoE; ComTerminal^{IP}, 24V
  	• Mounting on 2-gang back box. Attention! The ComTerminal^{IP} requires a minimum of 120 mm space above and below the centre point of the back box. • Install in an acoustically favourable position to ensure good speech connection via the ComTerminal^{IP} from all points in the room. • Install close to the door where possible, so that nursing staff can reach the presence button in the ComTerminal^{IP} easily when entering and leaving the room. If the ComTerminal^{IP} is not installed in the entrance area, a separate presence switch (77 0212 00...) must be installed in the entrance area. • The display must be clearly in the field of view. • To ensure that the device display is easy to read, it must not be exposed to direct sunlight. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 150–170 cm.

76 0550 00, 76 0550 10	ConnectionTerminal IP, PoE; ConnectionTerminal IP, 24V DC

- Dimensions (HxWxD): 205 x 110 x 34 mm
- Mounting on 2-gang back box
- Installation outside the arm's reach of nursing staff and patients
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Fixed installation, for example in the cavity above the suspended ceiling
- The lost heat may need to be dissipated by forced-air ventilation.
- Ambient temperature range: +5 to +40 °C.
- Relative humidity: 0 to 85% (non-condensing).

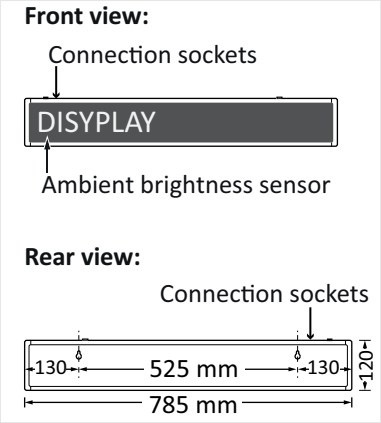
8.2. Room lamps, corridor displays

77 0170 00, 77 0170 01, 77 0170 10, 77 0175 00, 77 0175 01, 77 0175 10	Room lamp
	• Mounting on a 1-gang back box. • It must be possible to assign the room lamp to the room uniquely. • The ability to see light from of the room lamp must not be impaired by extraneous light. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 150–250 cm.

77 0171 00, 77 0171 10	Room lamp with doorplate
	• Mounting on a 1-gang back box. NOTE! The back box sits behind the lamp and not behind the doorplate. • It must be possible to assign the room lamp with doorplate to the room uniquely. • The ability to see light from of the room lamp with doorplate must not be impaired by extraneous light. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 150–250 cm.

76 0150 00

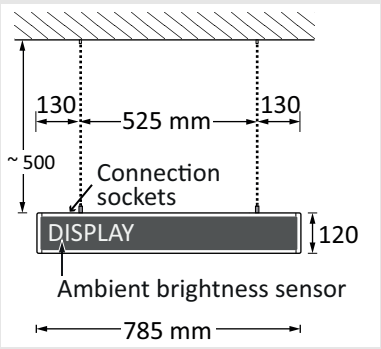
Corridor display^{IP} Alpha 16



- Wall suspension using the keyhole-shaped openings on the rear of the unit.
- An unobstructed view of the display must be ensured up to a distance of 20 m.
- A distance of at least 50 cm must be maintained from the walls to the left and right of the Corridor display^{IP}because loudspeakers are integrated in both housing caps.
- The ability to see the display must not be impaired by extraneous light.
- Pay attention to the position of the ambient brightness sensor. This sensor adjusts the brightness of the display automatically.
- Installation height above the floor according to the German standard DIN VDE 0834-1 = 150–250 cm.

76 0160 00

Corridor display^{IP} Alpha 16, double-sided

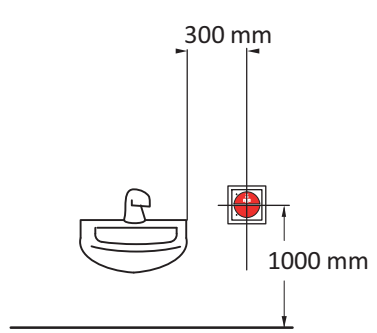


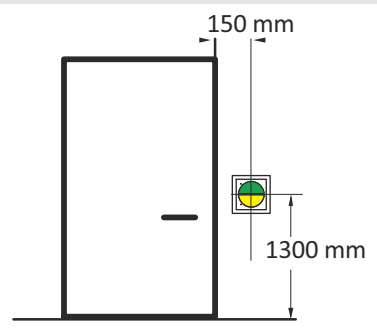
- An unobstructed view of the display must be ensured up to a distance of 20 m.
- A distance of at least 50 cm must be maintained from the walls to the left and right of the Corridor display^{IP} because loudspeakers are integrated in both housing caps.
- The ability to see the display must not be impaired by extraneous light.
- Pay attention to the position of the ambient brightness sensor. This sensor adjusts the brightness of the display automatically.
- ATTENTION! An ambient brightness sensor is present only on the shown side of the double-sided Corridor display^{IP}.
- If necessary, use the extension set for ceiling suspension, 50 cm (19 0780 05), which must be ordered separately.
- Installation height above the floor according to the German standard DIN VDE 0834-1 = 150–250 cm.

8.3. Switches

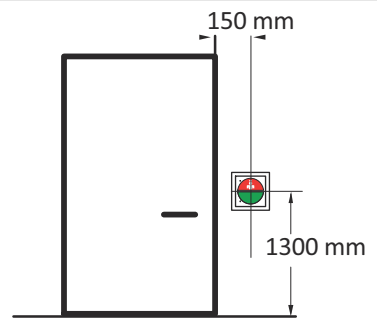
For all switches, the following applies:

- Multiframes are available for cases where switches need to be installed one above the other.
- Devices of the nurse call system and low-voltage system (e.g., switches or sockets) must not be covered with the same cover plate. A shared cover is permissible if the insulation and contact protection functions are retained after the external cover is removed.

77 0211 00 ..., 77 0211 01 ...	**Call switch**
	• Mounting on a 1-gang back box. • The call switch must be easy for the patient to reach (e.g. next to the washbasin). • In WCs and wet rooms, the special provisions of the German standard DIN VDE 0100 must be observed. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

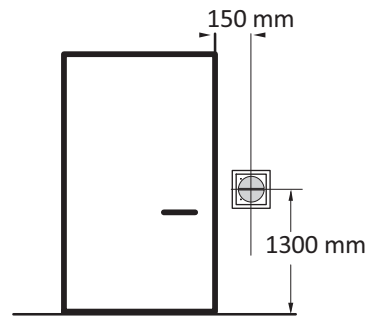
77 0212 00 ...	**Staff presence switch**
	• Mounting on a 1-gang back box. • Install close to the door, so that nursing staff can reach the presence button easily when entering and leaving the room. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

77 0219 00 ... Staff presence switch



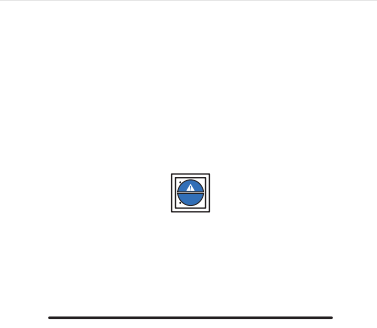
- Mounting on a 1-gang back box.
- Install close to the door, so that nursing staff can reach the presence button easily when entering and leaving the room.
- Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

77 0213 00 ..., 77 0217 00 ... Cancel switch/WC



- Mounting on a 1-gang back box.
- Install next to the door in the WC (the same room in which the WC call was raised) that is to be cancelled using this cancel switch/WC.
- In WCs and wet rooms, the special provisions of the German standard DIN VDE 0100 must be observed.
- Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

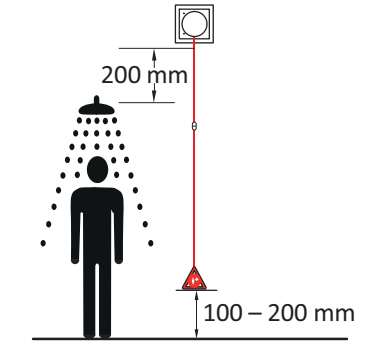
77 0214 00 ... Cardiac alarm switch



- Mounting on a 1-gang back box.
- The cardiac alarm switch must be within easy reach of the nursing staff.
- Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.
- If necessary, the cardiac alarm switch can be protected by a transparent cover (77 0210 63).

77 0215 00 ..., 77 0215 01 ...

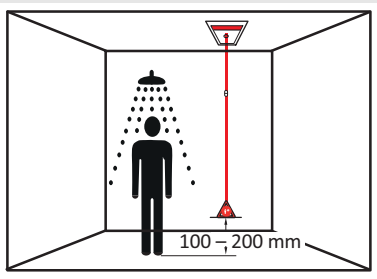
Pull cord call switch in bathroom/WC (wall mounting)



- Mounting on a 1-gang back box.
- In WCs and wet rooms, the special provisions of the German standard DIN VDE 0100 must be observed.
- Pull cord call switches in shower cubicles must be installed at least 200 mm above the highest possible position of the shower head.
- The call handle must be easy for the patient to reach.
- The pull cord must also be accessible to people lying on the floor. Therefore, the call handle must be between 100 mm and 200 mm above the floor.

29 0707 20F

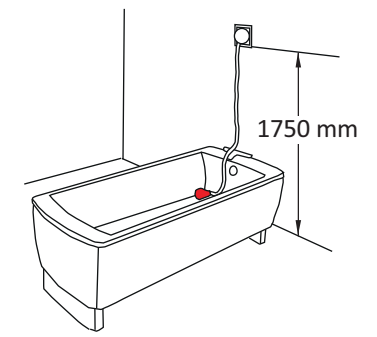
Pull cord call switch insert in bathroom/WC (ceiling mounting)



- Mounting on a 1-gang back box.
- In WCs and wet rooms, the special provisions of the German standard DIN VDE 0100 must be observed.
- The call handle must be easy for the patient to reach.
- The call handle must be easy for the patient to reach.
- The pull cord must also be accessible to people lying on the floor. Therefore, the call handle must be between 100 mm and 200 mm above the floor.

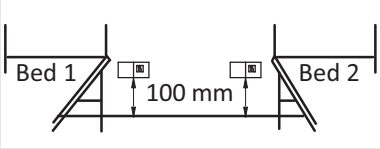
77 0216 00 ..., 77 0216 01 ...

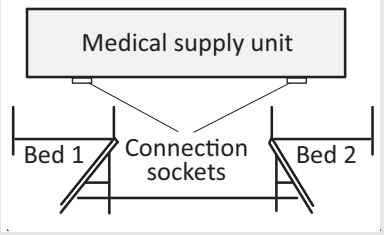
Pneumatic call switch

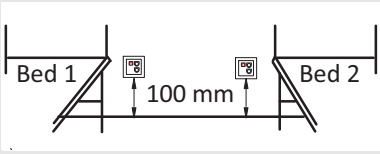


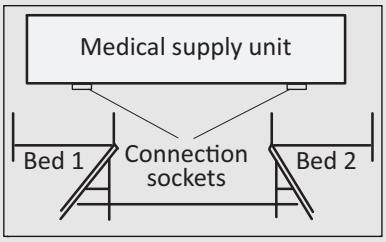
- Mounting on a 1-gang back box.
- In WCs and wet rooms, the special provisions of the German standard DIN VDE 0100 must be observed.
- The rubber ball must be easy to reach.

8.4. Connection sockets

70 0425 00	Connection socket combi
	• Wall installation. • Mounting on a 2-gang back box. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

70 0435 00	Connection socket combi, bedhead unit
	• Install in the medical supply unit. • The connection sockets are usually installed by the manufacturer of the medical supply unit. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 160–180 cm.

70 0171 60 ...	Connection socket with call switch
	• Wall installation. • Mounting on a 1-gang back box. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–150 cm.

70 0171 50	Connection socket with call switch, bedhead unit
	• Install in the medical supply unit. • The connection sockets are usually installed by the manufacturer of the medical supply unit. • Installation height above the floor according to the German standard DIN VDE 0834-1 = 160–180 cm.

8.5. System control

8.5.1. IP-SystemManager

76 2100 00	IP-SystemManager

- Dimensions (HxWxD): 132 x 216 x 48 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- The IP-SystemManager must be protected against unintentional contact, e.g. by installing it in a 19" wall mounting cabinet, 7U, GD (77 3519 07).
- If installed in control cabinets or similar equipment, the lost heat may need to be dissipated by forced-air ventilation.
- Mounting on top-hat rail (35 x 7.5 mm), e.g. with 19" mounting set (76 0900 01), width of the top-hat rail: 425 mm.
- Distributors used for the nurse call system must not simultaneously be used for the low-voltage system. Separation between the nurse call system and low-voltage system in one housing is not sufficient. Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–220 cm, except for control cabinets.
- Ambient temperature range: +5 to +40 °C.
- Relative humidity: 0 to 85% (non-condensing).

8.5.2. OSYlink modules

77 0803 00, 77 0870 00	OSYlink-Universal, OSYlink AS-CCS

- Dimensions (HxWxD): 90 x 160 x 58 mm
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- The OSYlink module must be protected against unintentional contact, e.g. by installing it in a 19" wall mounting cabinet, 7U, GD (77 3519 07) or by fitting an ESD protection cover “long” (00 0276 54) if the OSYlink module is not installed in a control cabinet.
- If installed in control cabinets or similar equipment, the lost heat may need to be dissipated by forced-air ventilation.
- Mounting on top-hat rail (35 x 7.5 mm), e.g. with 19" mounting set (76 0900 01), width of the top-hat rail: 425 mm.
- Distributors used for the nurse call system must not simultaneously be used for the low-voltage system. Separation between the nurse call system and low-voltage system in one housing is not sufficient. Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–220 cm, except for control cabinets.
- Ambient temperature range: +5 to +40 °C.
- Relative humidity: 0 to 85% (non-condensing).

77 0801 10, 77 0804 00	OSYlink-Door entry speaker 2, OSYlink-Announcement

- Dimensions (HxWxD): 90 x 106 x 58 mm
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- The OSYlink module must be protected against unintentional contact, e.g. by installing it in a 19" wall mounting cabinet, 7U, GD (77 3519 07) or by fitting an ESD protection cover “short” (00 0276 53) if the OSYlink module is not installed in a control cabinet.
- If installed in control cabinets or similar equipment, the lost heat may need to be dissipated by forced-air ventilation.
- Mounting on top-hat rail (35 x 7.5 mm), e.g. with 19" mounting set (76 0900 01), width of the top-hat rail: 425 mm.
- Distributors used for the nurse call system must not simultaneously be used for the low-voltage system. Separation between the nurse call system and low-voltage system in one housing is not sufficient. Installation height above the floor according to the German standard DIN VDE 0834-1 = 70–220 cm, except for control cabinets.
- Ambient temperature range: +5 to +40 °C.
- Relative humidity: 0 to 85% (non-condensing).

8.6. 24 V DC power supply

77 3410 00	Power supply unit 10A, DIN rail

- Dimensions (HxWxD): 124 x 39 x 117 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Heat dissipation must not be hindered.
- Install in an enclosure that protects against electrical, mechanical and fire hazards, e.g. 10" Wall mounting cabinet, 6U, GD (77 3510 06), 19" Wall mounting cabinet, 7U, GD (77 3519 07) or 19" Wall mounting cabinet, 12U, GD (77 3519 12).
- Mount on top-hat rail (35 x 7.5 mm), e.g. with mounting set for 10" wall mounting cabinet (76 0900 02), width of top-hat rail 203 mm or with 19" mounting set (76 0900 01), width of top-hat rail: 425 mm.
- Ambient temperature range: -25 to +70 °C
- Relative humidity: 5 to 95% (non-condensing).

77 3410 50	Power supply unit 5A, DIN rail

- Dimensions (HxWxD): 124 x 32 x 102 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Heat dissipation must not be hindered.
- Install in an enclosure that protects against electrical, mechanical and fire hazards, e.g. 10" Wall mounting cabinet, 6U, GD (77 3510 06), 19" Wall mounting cabinet, 7U, GD (77 3519 07) or 19" Wall mounting cabinet, 12U, GD (77 3519 12).
- Mount on top-hat rail (35 x 7.5 mm), e.g. with mounting set for 10" wall mounting cabinet (76 0900 02), width of top-hat rail 203 mm or with 19" mounting set (76 0900 01), width of top-hat rail: 425 mm.
- Ambient temperature range: -25 to +60 °C
- Relative humidity: 5 to 95% (non-condensing).

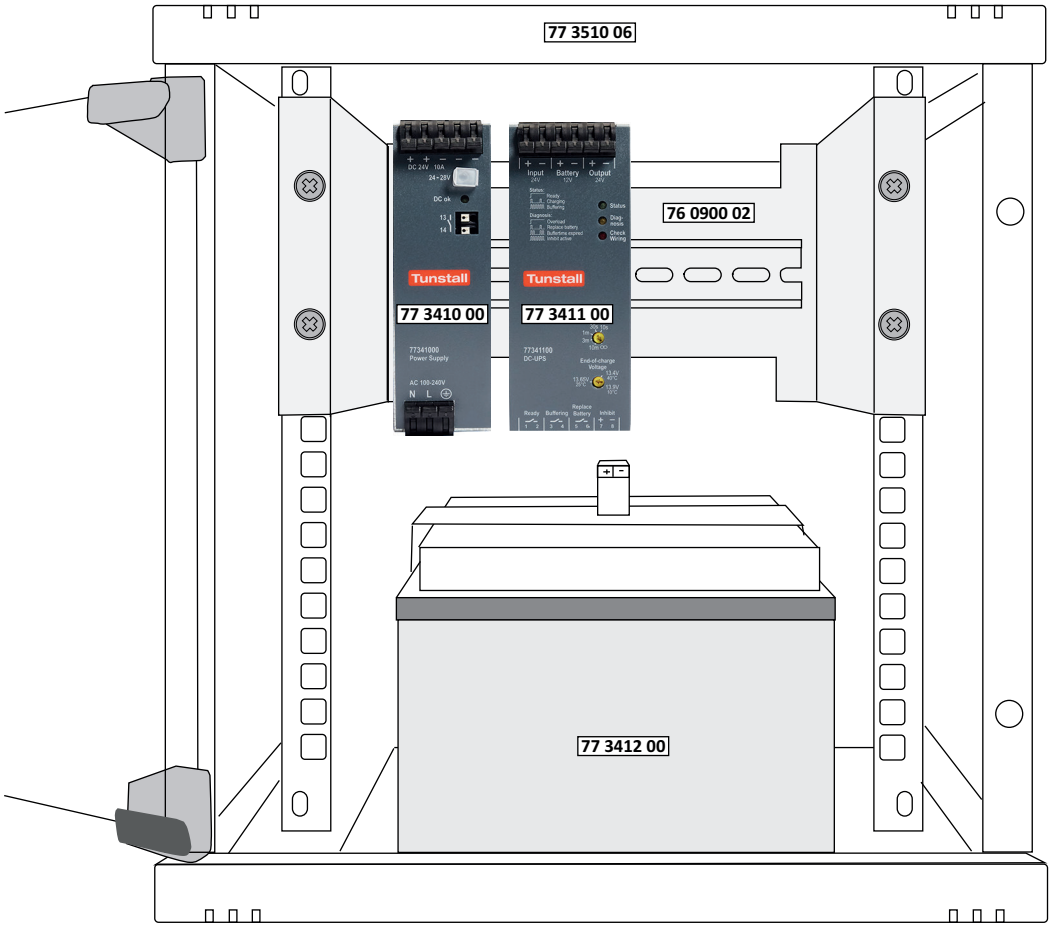
77 3411 00	UPS Control unit 10A

- Dimensions (HxWxD): 124 x 49 x 117 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Heat dissipation must not be hindered.
- Install in an enclosure that protects against electrical, mechanical and fire hazards, e.g. 10" Wall mounting cabinet, 6U, GD (77 3510 06), 19" Wall mounting cabinet, 7U, GD (77 3519 07) or 19" Wall mounting cabinet, 12U, GD (77 3519 12).
- Mount on top-hat rail (35 x 7.5 mm), e.g. with mounting set for 10" wall mounting cabinet (76 0900 02), width of top-hat rail 203 mm or with 19" mounting set (76 0900 01), width of top-hat rail: 425 mm.
- Install insulated from the protective earth (PE), e.g. by mounting on a DIN rail raiser HAGER HYA036 (order no. 76 0900 04, width 106 mm). In addition, a distance of 10 mm must be maintained from the insulated mounted device to all earthed surfaces and devices.
- A 10" Wall mounting cabinet, 6U, GD (77 3510 06) with mounting set for 10" wall mounting cabinet (76 0900 02) will hold a power supply unit 10A, DIN rail (77 3410 00) with UPS Control unit 10A (77 3411 00) and battery module (77 3412 00).
- A 19" Wall mounting cabinet, 7U, GD (77 3519 07) with mounting set for 19" wall mounting cabinet (76 0900 01) will hold two power supply units 10A, DIN rail (77 3410 00), each with a UPS Control unit 10A (77 3411 00) and battery module (77 3412 00).
- Ambient temperature range: -25 to +70 °C
- Relative humidity: 5 to 95% (non-condensing).

77 3412 00	Battery module

- Dimensions (HxWxD): 179 x 214 x 158 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Install in a cool location within an enclosure that protects against electrical, mechanical and fire hazards, e.g. 10" Wall mounting cabinet, 6U, GD (77 3510 06), 19" Wall mounting cabinet, 7U, GD (77 3519 07) or 19" Wall mounting cabinet, 12U, GD (77 3519 12). Ensure adequate ventilation by following the requirements of EN 50272-2.
- Ambient temperature range when charging: -10 to +50 °C.
- Ambient temperature range when discharging: -15 to +60 °C.
- Relative humidity: 5 to 95% (non-condensing).

Figure 32. Modular power supply in 10" wall-mounted cabinet



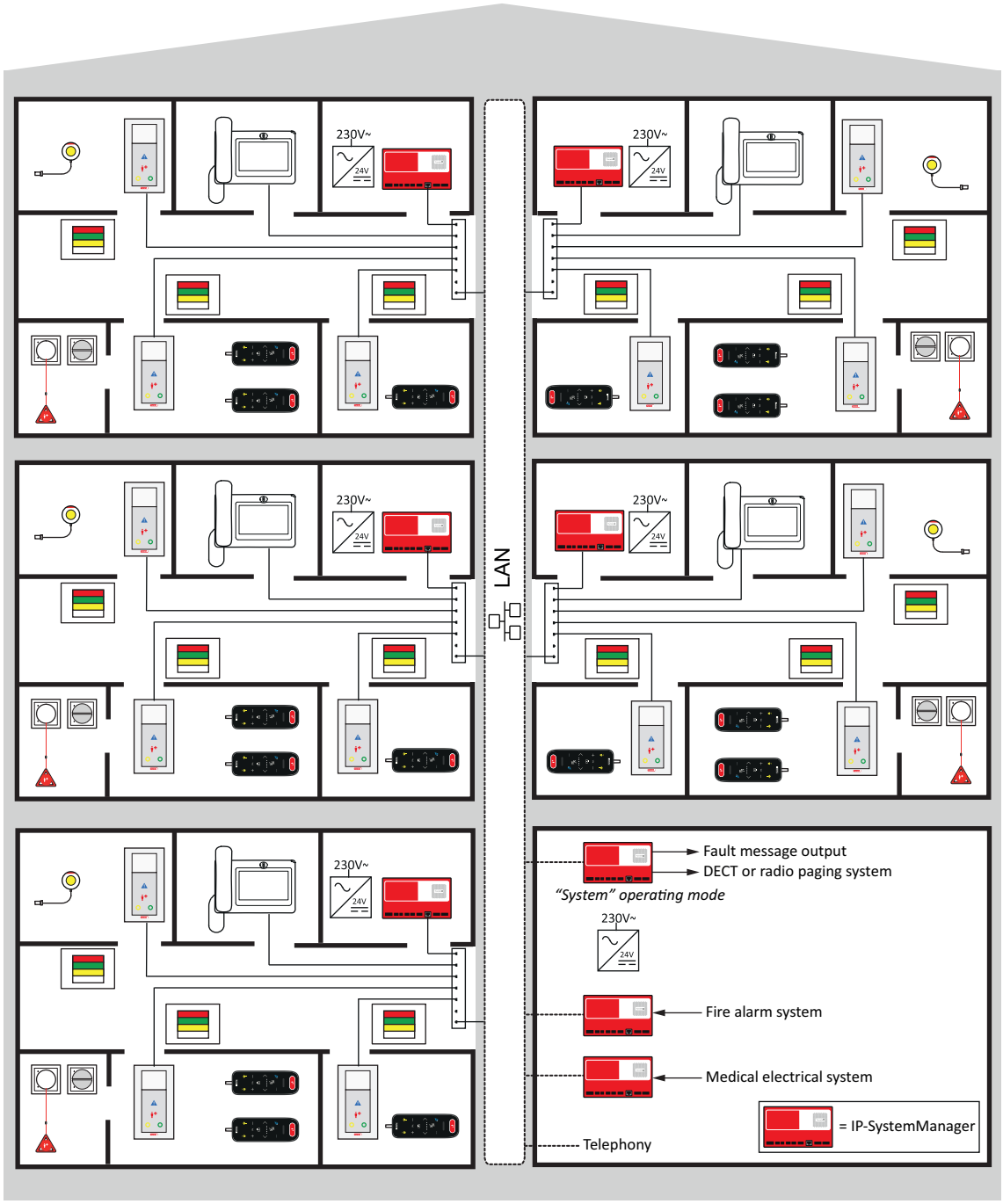
77 3413 00	DC-UPS with capacitor storage 24V, 6kWs

- Dimensions (HxWxD): 124 x 126 x 117 mm
- Install only in dry rooms.
- Must be accessible for authorised persons at all times (minimum maintenance access width of 60 cm).
- Heat dissipation must not be hindered.
- Install in an enclosure that protects against electrical, mechanical and fire hazards, e.g. 10" Wall mounting cabinet, 6U, GD (77 3510 06), 19" Wall mounting cabinet, 7U, GD (77 3519 07) or 19" Wall mounting cabinet, 12U, GD (77 3519 12).
- Mount on top-hat rail (35 x 7.5 mm), e.g. with mounting set for 10" wall mounting cabinet (76 0900 02), width of top-hat rail 203 mm or with 19" mounting set (76 0900 01), width of top-hat rail: 425 mm.
- Install insulated from the protective earth (PE), e.g. by mounting on two DIN rail raisers HAGER HYA036 (order no. 76 0900 04, width 106 mm). In addition, a distance of 10 mm must be maintained from the insulated mounted device to all earthed surfaces and devices.
- A 10" Wall mounting cabinet, 6U, GD (77 3510 06) with mounting set for 10" wall mounting cabinet (76 0900 02) will hold a power supply unit 10A, DIN rail (77 3410 00) with DC-UPS with capacitor storage 24V, 6kWs (77 3413 00).
- A 19" Wall mounting cabinet, 7U, GD (77 3519 07) with 19" Mounting set (76 0900 01) will hold two power supply units 10A, DIN rail (77 3410 00), each with DC-UPS with capacitor storage 24V, 6kWs (77 3413 00).
- Ambient temperature range: -40 to +60 °C.
- Relative humidity: 5 to 95% (non-condensing).

9. System structure

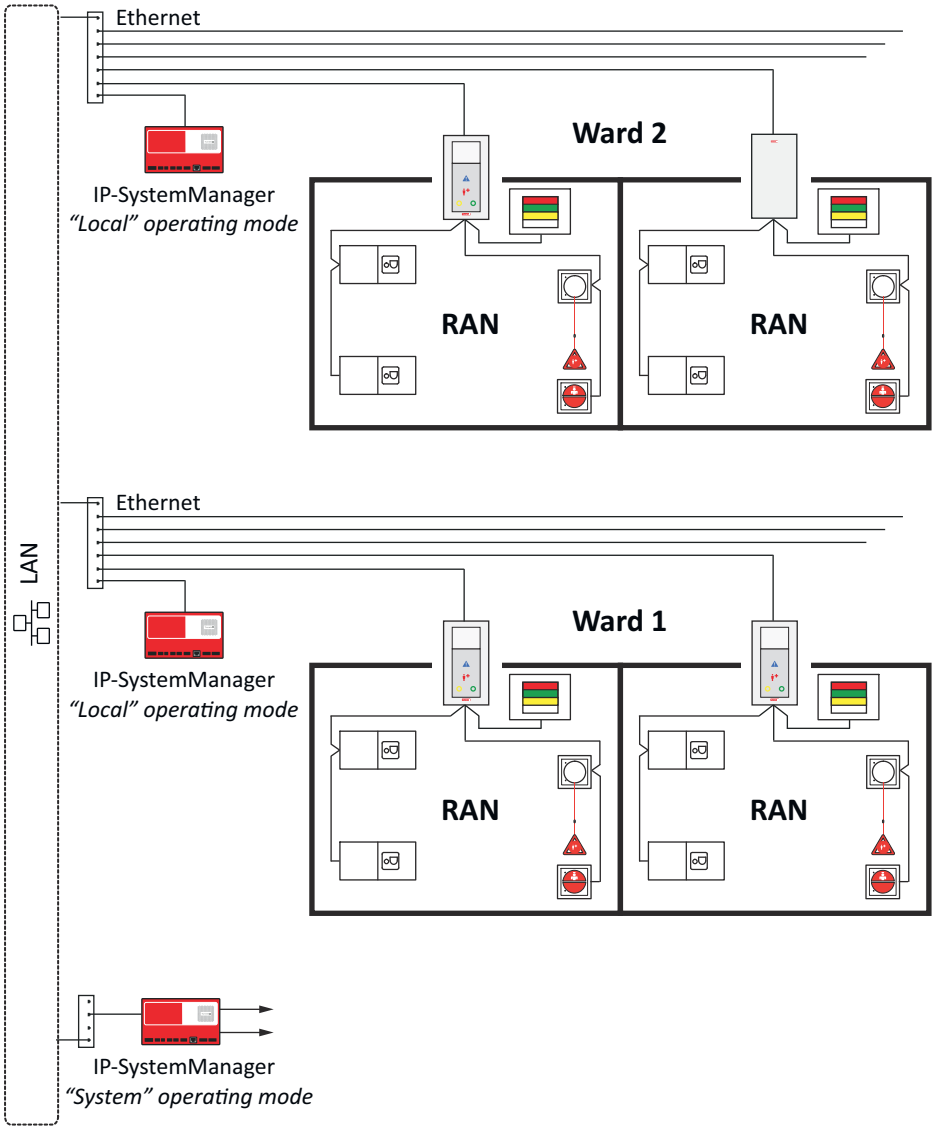
Contents

Figure 33. System overview



9.1. System structure

Figure 34. System structure



In the rooms, all devices are networked through an intelligent RAN (Room Area Network) room bus. The RAN room bus is connected to the room terminal (ComTerminal^{IP} or ConnectionTerminal IP).

Starting from the RAN room bus, the connection to the next hierarchical level of the system is established through an IP gateway in the room terminal. These gateways form the connection to the ward's IP network infrastructure with the assigned system control unit, the IP-SystemManager.

Each IP-SystemManager provides the complete nurse call function for a ward.

Multiple IP-SystemManagers are connected through an IP network infrastructure to form a complete system with speech connection and cross-ward functions such as ward coupling. The network can be set up exclusively for the nurse call system or as part of the existing IP infrastructure on site.

For the connection of external systems such as a fire alarm system, additional IP-System-Managers are integrated into the IP network.

9.2. IP-SystemManager control unit

Figure 35. IP-SystemManager (76 2100 00)

The nurse call system is controlled through several decentralised IP-SystemManagers. All IP-SystemManagers of the nurse call system use an IP network (LAN) to communicate with each other, as well as with external devices or systems (e.g. PBX) that are connected to the nurse call system via the IP network.

All IP-SystemManagers are equipped with uniform hardware and differ through the installed software modules in the form of system and function modules. The software modules provide functions and enable the IP-SystemManager connections required for these functions.

The IP-SystemManagers are delivered with the ordered software modules. The configuration of the IP-SystemManager with the project-specific data must be carried out by the customer using the SystemOrganizer software. The configuration is saved in the form of a project-specific database on all IP-SystemManagers of the call system. Tunstall offers user trainings for the SystemOrganizer.

9.3. IP network

The decentralised IP-SystemManager control units are connected to each other via an IP network. This is referred to as the IP backbone of the nurse call system.

The devices on the ward are also connected to each other via an IP network. This network is called the ward IP network.

Both data and speech (VoIP) are transmitted through the IP network.

9.3.1. IP backbone of the nurse call system

The connection between wards – that is, the connection of IP-SystemManagers, the connection of IP-SystemManagers with special functions and the connection of external IP-based devices and systems (e.g. PBX) and a possible ManagementCenter^{PC} – is made using the IP backbone of the nurse call system.

The IP backbone can be designed as an IP network reserved solely for the nurse call system, or it can use the general IP infrastructure, i.e. a standardised cabling network (DIN/EN 50173) and standard network components.

9.3.2. IP networks for the wards

The nurse call system for each ward has a dedicated IP line network. The IP-SystemManager control unit for the ward, the room terminals (ComTerminal^{IP}, ConnectionTerminals IP), the call handling consoles (ComStation^{IP}) and the Corridor displays^{IP} Alpha 16 are connected to a switch that is used exclusively for the nurse call system.

The decentralised process organisation must ensure the handling of calls and faults, as well as the escalation within this area required by the German standard DIN VDE 0834.

9.4. Power supply options

There are room terminals for 24 V DC power supply and room terminals for PoE+ supply. That means the ComTerminals^{IP} and ConnectionTerminals IP are each available in a version for 24 V DC and for PoE+.

The corridor displays^{IP} can be supplied either with 24 V DC or with PoE+.

The ComStation^{IP} can be powered with PoE or with an included 230 V AC power supply unit.

The IP-SystemManager, i.e. the control unit per ward, as well as the OSYlink interface modules and announcement loudspeakers must be supplied with 24 V DC.

24 V DC power supply units are installed decentrally, i.e. on the wards. The power supply cable (Ipwr = NYM 2x2.5 mm²) is laid as a ring to which the ward devices for 24 V supply are connected. If room terminals with PoE+ supply are used, there is no need to lay a power supply ring through the entire ward.

10. Mixed systems/system upgrade

Contents

The Flamenco $^{IP+}$, Flamenco^{IP} and Flamenco systems are compatible. This means that wards using different systems can be operated together in one nurse call system. Devices from the different systems can also be mixed at the ward level.

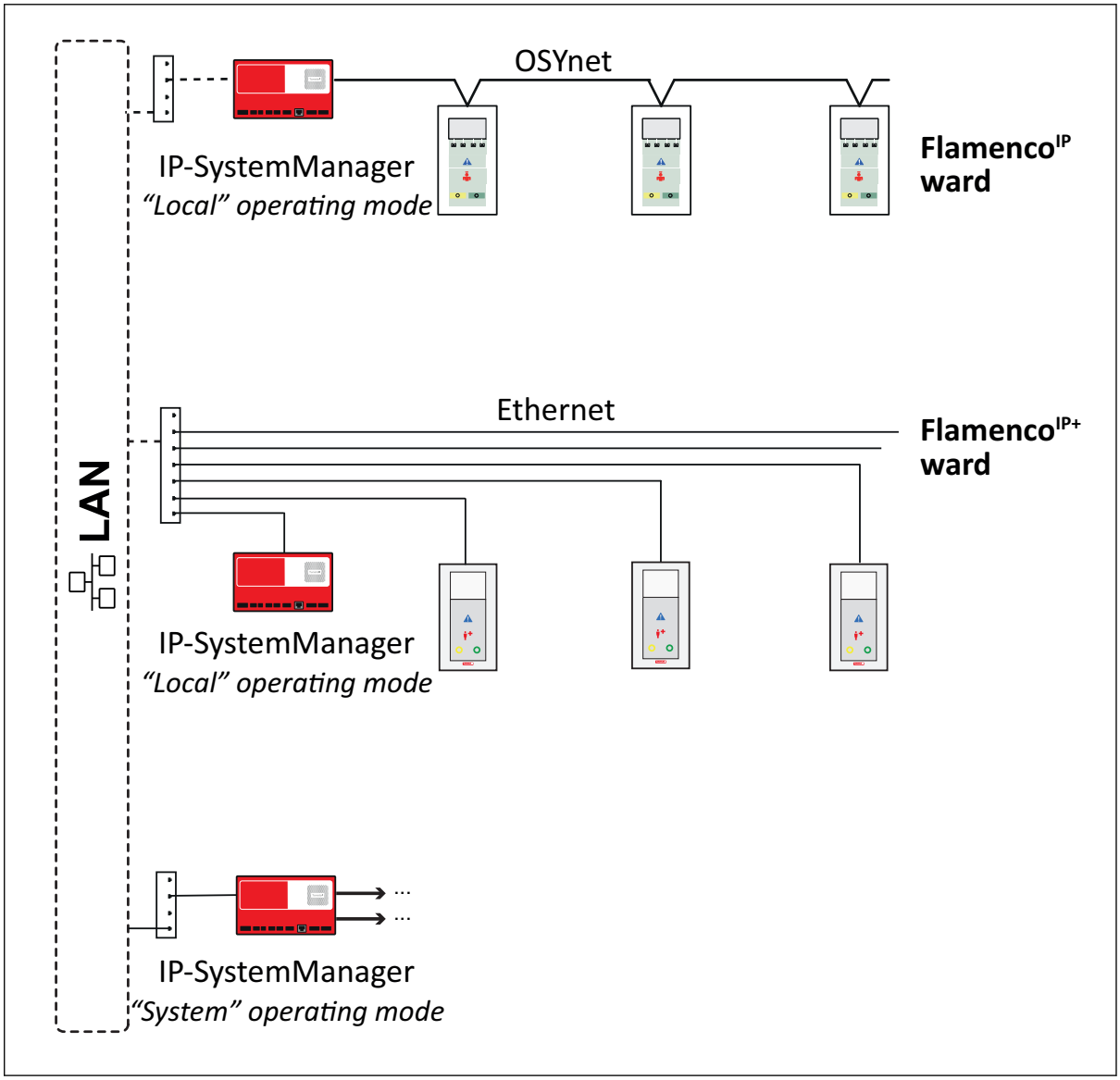
However, arbitrary mixing is not possible. This chapter presents some application examples. Before you implement a specific application, discuss it with your contact at Tunstall and clarify whether it is technically feasible.

Flamenco^{IP+} also supports the ward-by-ward upgrading of hospitals that have previously used older Tunstall systems. For more information, see Section 10.3: “Integration of legacy EccoLine systems with speech” (page 197)

10.1. Nurse call system with Flamenco^{IP+} and Flamenco^{IP} wards

It is possible to operate wards with Flamenco^{IP+} and wards with Flamenco^{IP} together in one nurse call system. The IP-SystemManagers of the Flamenco^{IP+} and Flamenco^{IP} systems are identical (i.e. equipped with identical hardware and software). Whether the terminals and other components on the ward are connected to the Ethernet (Flamenco^{IP+}) or to the OSYnet group bus (Flamenco^{IP}) is irrelevant for the functions provided.

Figure 36. Nurse call system with Flamenco^{IP+} and Flamenco^{IP} wards



10.1.1. General conditions

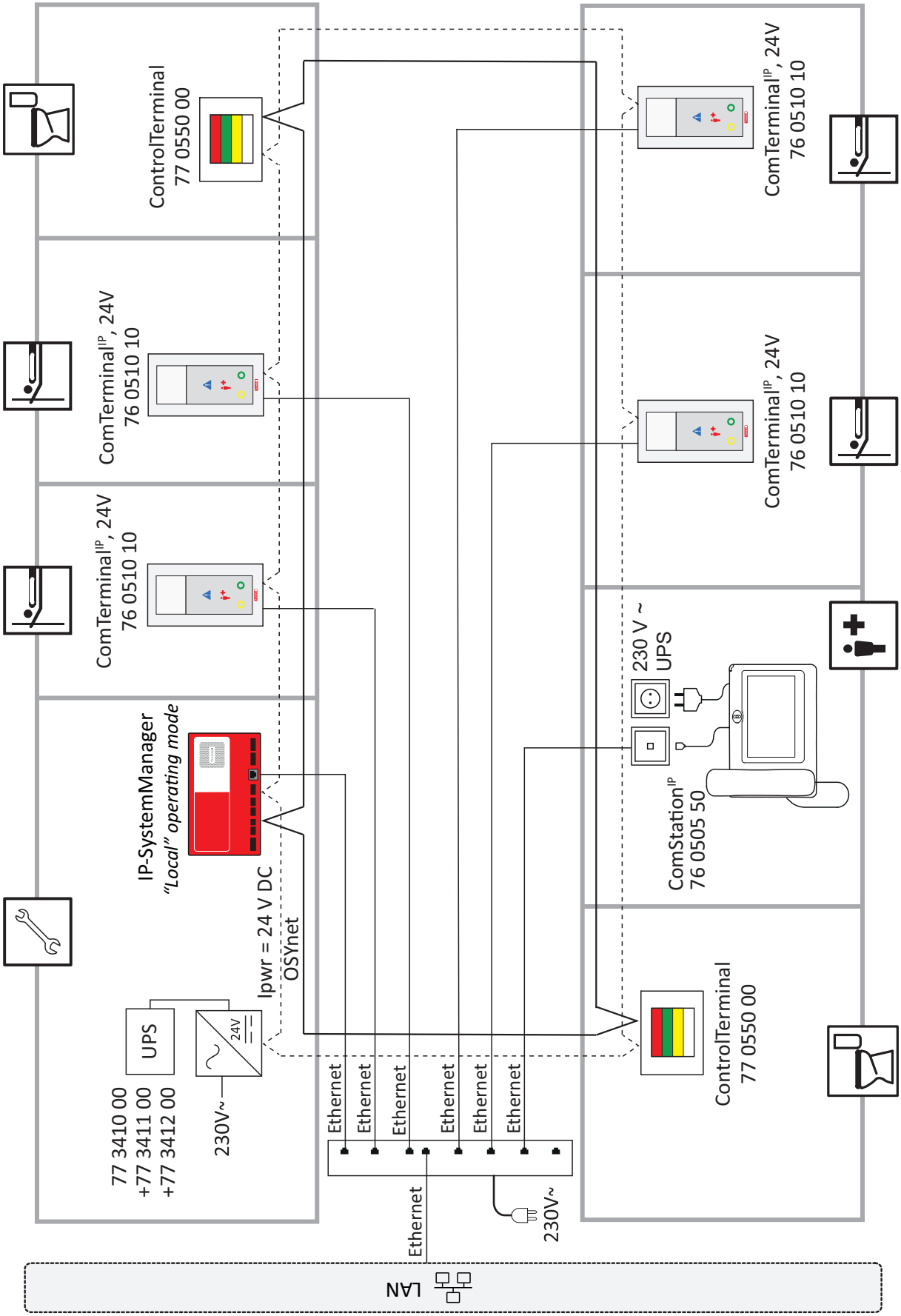
- The system limits must be observed (e.g. the maximum number of wards).
- The network connections between the IP-SystemManagers must meet the requirements for an IP backbone.

- The network connections on the Flamenco^{IP+} wards must meet the requirements for the ward's IP network.

10.2. Ward with ComTerminals^{IP} and terminals without speech

It is possible to install terminals without speech on Flamenco^{IP+} wards (i.e. on wards with ComTerminals^{IP}). The ComTerminals^{IP} are connected to the ward's switch via Ethernet. The terminals without speech (e.g. ControlTerminals Flamenco, 77 0550 00) are connected to the ward's IP-SystemManager via the OSYnet group bus.

Figure 37. Ward with ComTerminals^{IP} and terminals without speech



10.2.1. General conditions

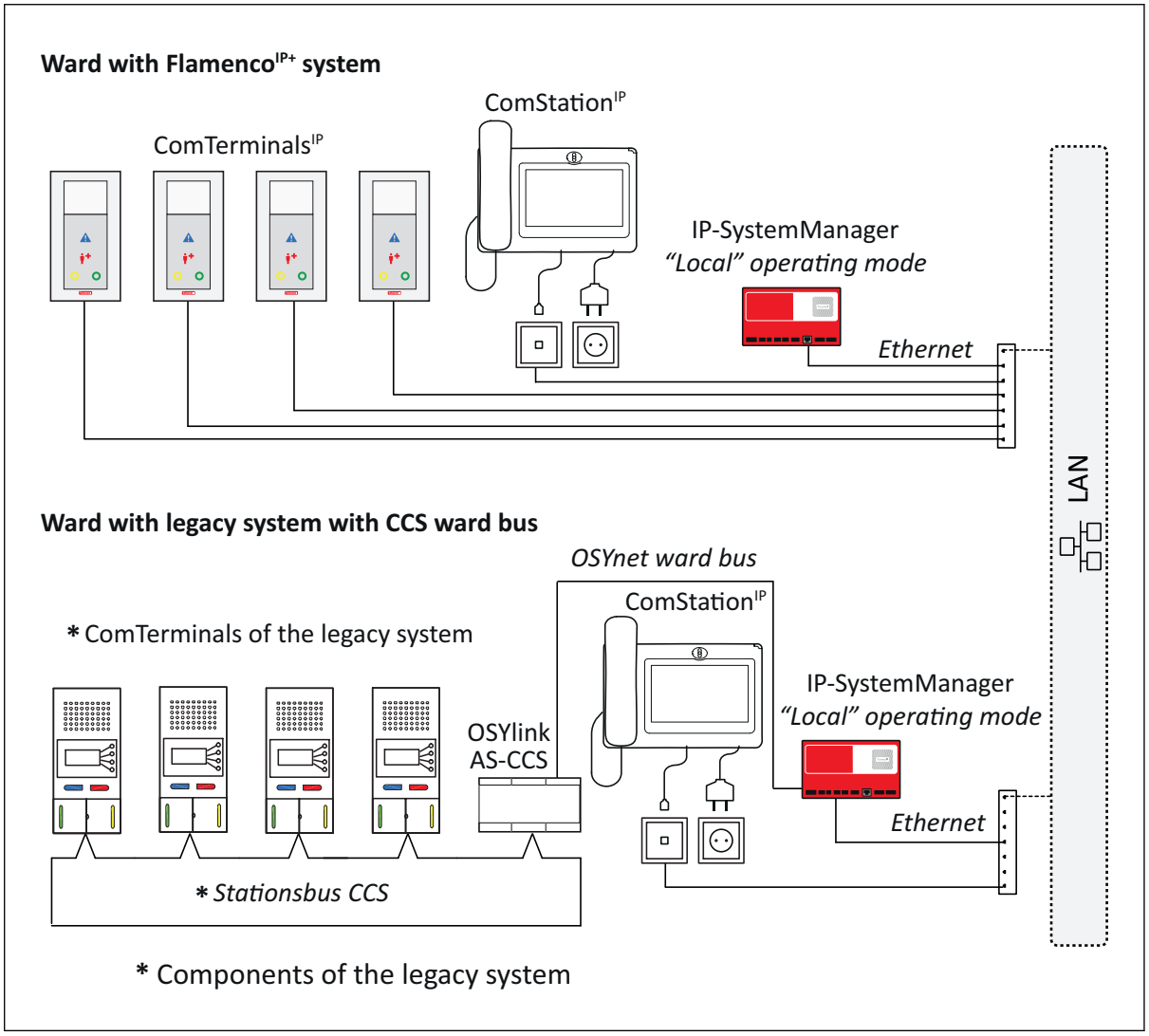
- The system limits (e.g. max. number of locations per ward), must be observed.
- The switch on the ward and the connection to the ComTerminals^{IP} are subject to the requirements for a ward IP network.

  The network connections between the IP-SystemManagers must meet the requirements for an IP backbone.
- The max. copper cable length between the individual^{IP} and the switch on the ward is 90 m.
- An OSYnet cable must be laid for the terminals without speech on the OSYnet.
- The terminals without speech must be supplied with power via an adequately dimensioned 24 V DC power supply unit. For this purpose, a 24 V DC power supply cable (Ipwr) must be laid on the ward. “ComTerminals^{IP}, 24V” are connected to the same 24V DC power supply cable. “ComTerminals^{IP}, PoE” are supplied with PoE+ via Ethernet.

10.3. Integration of legacy EccoLine systems with speech

Many hospitals are being converted from old nurse call technology to more modern systems on a ward-by-ward basis. Flamenco^{IP+} supports this process in the following ways: Wards on which ComTerminals belonging to EccoLine with speech systems are still installed can be compatibly be connected to the Flamenco^{IP+} nurse call system. In this legacy system, the ComTerminals are connected to the CCS ward bus cable. This ward bus cable continues to be used for the connection. Note that only the ComTerminals and room peripherals of the legacy system can be used with Flamenco^{IP+}. All other system components, such as call handling consoles, must be replaced by solutions belonging to the Flamenco^{IP+} system.

Figure 38. Ward with CCS ward bus connected to Flamenco^{IP+} nurse call system



To connect the ComTerminals of a ward with the legacy EccoLine system with speech to Flamenco^{IP+}, an IP-SystemManager control unit and an OSYlink AS-CCS interface module (77 0870 00) are installed on the ward. The IP-SystemManager is connected to the other control units of the Flamenco^{IP+} nurse call system via the IP network. The OSYlink AS-CCS interface module (77 0870 00) is connected to the IP-SystemManager. The CCS ward bus cable with the old ComTerminals is connected to the OSYlink AS-CCS.

The entire system is configured using the SystemOrganizer.

OSYlink AS-CCS converts the data and speech signals of the ComTerminals in the legacy EccoLine system into signals compatible with the Flamenco^{IP+} system. This enables individual wards that use legacy technology to be operated within a Flamenco^{IP+} system environment.

NOTICE
Existing projects are often very complex (project history, customized solutions, existing cabling etc.). The functions available in the individual projects must therefore be checked when using the OSYlink AS-CCS.

NOTICE
Not all functions of Flamenco^{IP+} are available in the connected legacy system.

11. System control

Contents

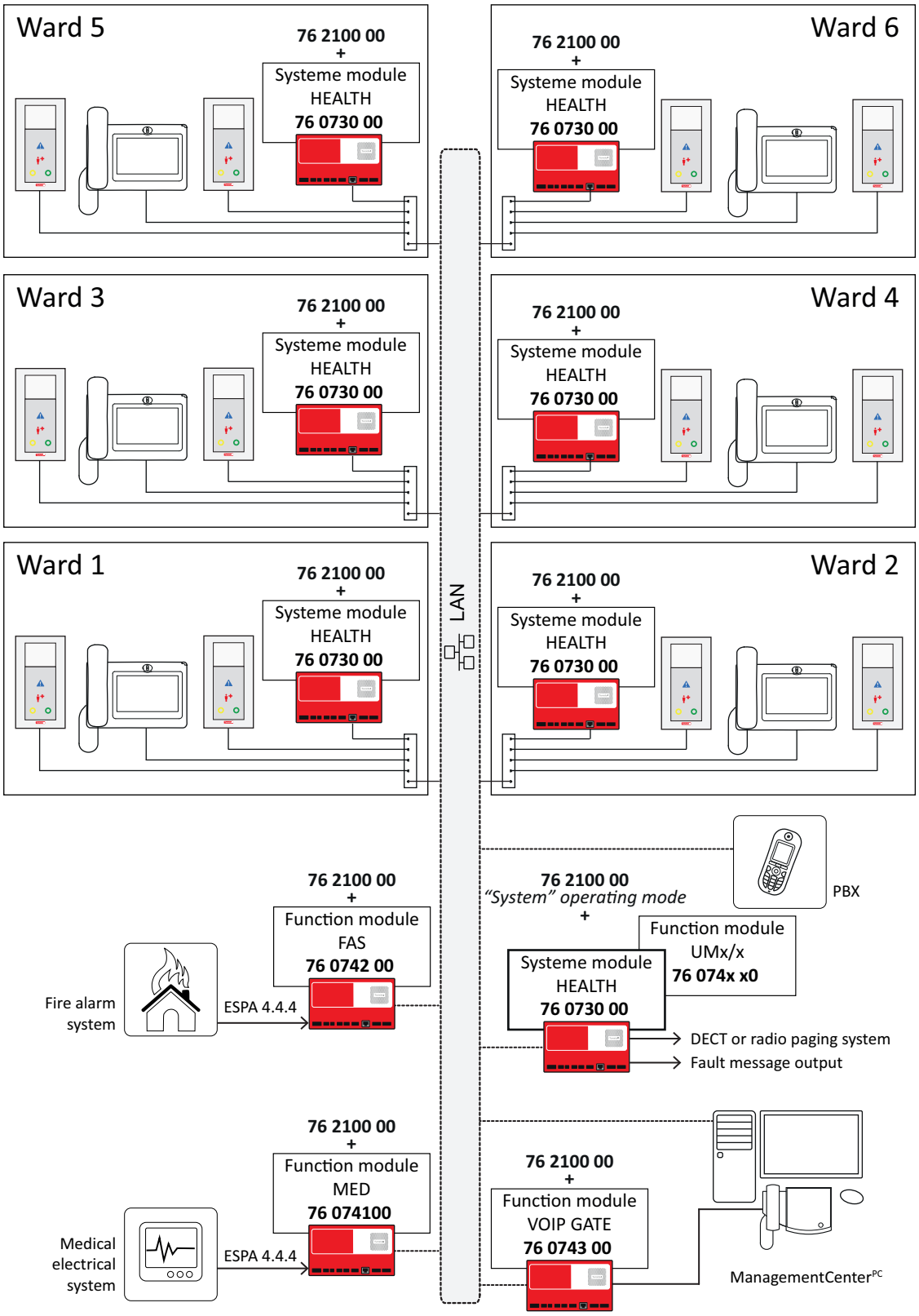
The nurse call system is controlled through several decentralised IP-SystemManagers. All IP-SystemManagers of the nurse call system use an IP network (LAN) to communicate with each other, as well as with external devices or systems (e.g. PBX) that are connected to the nurse call system via the IP network.

All IP-SystemManagers are equipped with uniform hardware and differ through the installed software modules in the form of system and function modules. The software modules provide functions and enable the IP-SystemManager connections required for these functions.

The IP-SystemManagers are delivered with the ordered software modules. The configuration of the IP-SystemManager with the project-specific data must be carried out by the customer using the SystemOrganizer software. The configuration is saved in the form of a project-specific database on all IP-SystemManagers of the call system. Tunstall offers user trainings for the SystemOrganizer.

11.1. Overview

Figure 39. System control – overview



11.2. Calculating control components

For each nurse call system, a maximum of 63 IP-SystemManagers can be installed.

11.2.1. One IP-SystemManager per ward

An IP-SystemManager is required to control the nurse call operation of an organisational group (i.e. usually a ward).

According to the German standard DIN VDE 0834, an organisational group is a group of rooms that comprise an organisational unit. An autonomous organisational group consists of all rooms that can be managed by one person when there is minimal staffing.

You must therefore provide one IP-SystemManager per ward.

Software module

A system module must be installed on each IP-SystemManager used to control the nurse call operation of an organisational group. Choose between:

- System module HEALTH (76 0730 00) for use in hospitals and comparable facilities
- System module CARE (76 0735 00) for use in nursing homes and comparable facilities

Installation location

The IP-SystemManager must be installed on the ward.

The copper cable length between the IP-SystemManager and the nearest active IP network component (e.g. switch) must not exceed 90 m.

11.2.2. One IP-SystemManager with “System” operating mode

Out of all IP-SystemManagers installed in the nurse call system, a single IP-SystemManager must be set to “System” operating mode. This is generally a separate IP-SystemManager. The IP-SystemManager set to “System” operating mode must be defined during system planning.

The IP-SystemManager with “System” operating mode manages and coordinates cross-ward functions (like ward coupling), the speech communication of the nurse call system and higher-level system messages.

All fault messages issued by the nurse call system are displayed on the IP-SystemManager with “System” operating mode. The IP-SystemManager with “System” operating mode provides a centralised ESPA 4.4.4 interface for connecting a radio paging system or DECT system.

Software module

The same system module installed on the IP-SystemManagers for nurse call operation (i.e. HEALTH or CARE) must be installed on the IP-SystemManager with “System” operating mode:

- System module HEALTH (76 0730 00) for use in hospitals and comparable facilities
- System module CARE (76 0735 00) for use in nursing homes and comparable facilities

A function module must additionally be installed on the IP-SystemManager with “System” operating mode if a PBX and/or messaging server is to be coupled with the nurse call system through the IP network. Depending on the desired connection, select the following:

- Function module UM/A (76 0740 00) for messaging with systems manufactured by Ascom
- Function module UMS/A (76 0740 01) for messaging and speech connections with systems manufactured by Ascom
- Function module UMS/T (76 0740 10) for messaging and speech connections with systems manufactured by Tetronik

Installation location

Since all fault messages from the nurse call system are displayed on the IP-SystemManager with “System” operating mode, it should be installed in a central technology room.

The copper cable length between the IP-SystemManager and the nearest active IP network component (e.g. switch) must not exceed 90 m.

The PBX and/or the messaging server must be connected to the same IP network as the IP-SystemManager. The maximum cable length depends on the type of connection to the IP network.

11.2.3. One IP-SystemManager per ManagementCenter^{PC}

If a ManagementCenter^{PC} is to be installed in the nurse call system, an additional IP-SystemManager must be installed.

This IP-SystemManager is used to connect the speech line of the ManagementCenter^{PC} to the nurse call system. The function module VOIP GATE (76 0743 00) must be installed on the IP-SystemManager used to connect the ManagementCenter^{PC}.

Installation location

The IP-SystemManager with the function module VOIP GATE should be installed in the vicinity of the speech unit of the ManagementCenter.

The copper cable length between the IP-SystemManager and the nearest active IP network component (e.g. switch) must not exceed 90 m.

11.2.4. One IP-SystemManager for each medical electrical system

If a medical electrical system is to be connected to the nurse call system (i.e. if messages of the medical electrical system are to be displayed in the nurse call system), an additional IP-SystemManager is required.

The function module MED (76 0741 00) must be installed on this IP-SystemManager.

Installation location

The medical electrical system is connected to the nurse call system through an RS-232 interface (ESPA 4.4.4) of the IP-SystemManager with function module MED. The cable length between the IP-SystemManager and the connection point of the medical electrical system must therefore not exceed 10 m.

The copper cable length between the IP-SystemManager and the nearest active IP network component (e.g. switch) must not exceed 90 m.

11.2.5. One IP-SystemManager per fire alarm system

If a fire alarm system is to be connected to the nurse call system (i.e. if messages of the fire alarm system are to be displayed in the nurse call system), an additional IP-SystemManager is required.

The function module FAS (76 0742 00) must be installed on this IP-SystemManager.

Installation location

The fire alarm system is connected to the nurse call system through an RS-232 interface (ESPA 4.4.4) of the IP-SystemManager with function module FAS. The cable length between the IP-SystemManager and the connection point of the fire alarm system must therefore not exceed 10 m.

The copper cable length between the IP-SystemManager and the nearest active IP network component (e.g. switch) must not exceed 90 m.

11.2.6. Overview of the hardware and software of the control units

Table 14. Required control units for a Flamenco^{IP+} nurse call system

		Software on the IP-SystemManager	
Function	**IP-SystemManager (76 2100 00)**	**Application**	**Software module**
Nurse call operation of a ward	1 per ward	Hospital	System module HEALTH (76 0730 00)
Cross-ward functions, speech communication, connection for ESPA 4.4.4 (DECT/radio paging system), system messages	1 per nurse call system, “System” operating mode	Hospital	System module HEALTH (76 0730 00)
		Nursing home	System module CARE (76 0735 00)
Connection of PBX and/or messaging server		Ascom messaging	Function module UM/A (76 0740 00)
		Ascom messaging + speech connection	Function module UMS/A (76 0740 01)
		Tetronik messaging + speech connection	Function module UMS/T (76 0740 10)
ManagementCenter speech connection	1 per ManagementCenter		Function module VOIP GATE (76 0743 00)
Connecting a medical electrical system	1 per medical electrical system		Function module MED (76 0741 00)
Connecting a fire alarm system	1 per fire alarm system		Function module FAS (76 0742 00)

11.3. Security and software support

Tunstall prioritises on the security of its systems as an elementary component of its service and safety concept. Since systems may be networked through IT/IP infrastructures that are not always fully known, cyber security is an important topic. Regular system and security updates are essential for ensuring system integrity. This is the only way to guarantee that the nurse call system can be operated securely over many years and always meet current security standards.

Ensuring that our systems remain secure is of prime importance to us. To ensure compliance with fundamental quality and security rules, Tunstall strongly recommends the conclusion of a software support contact that covers all system and function modules. Especially when operating in a networked world with many unknown actors, this fee-based service gives you certainty that your system is always up to date with the best possible protection. Details of the software support available for individual system components can be found in Section 7.12: “System control (hardware and software)” (page 146).

12. IP network

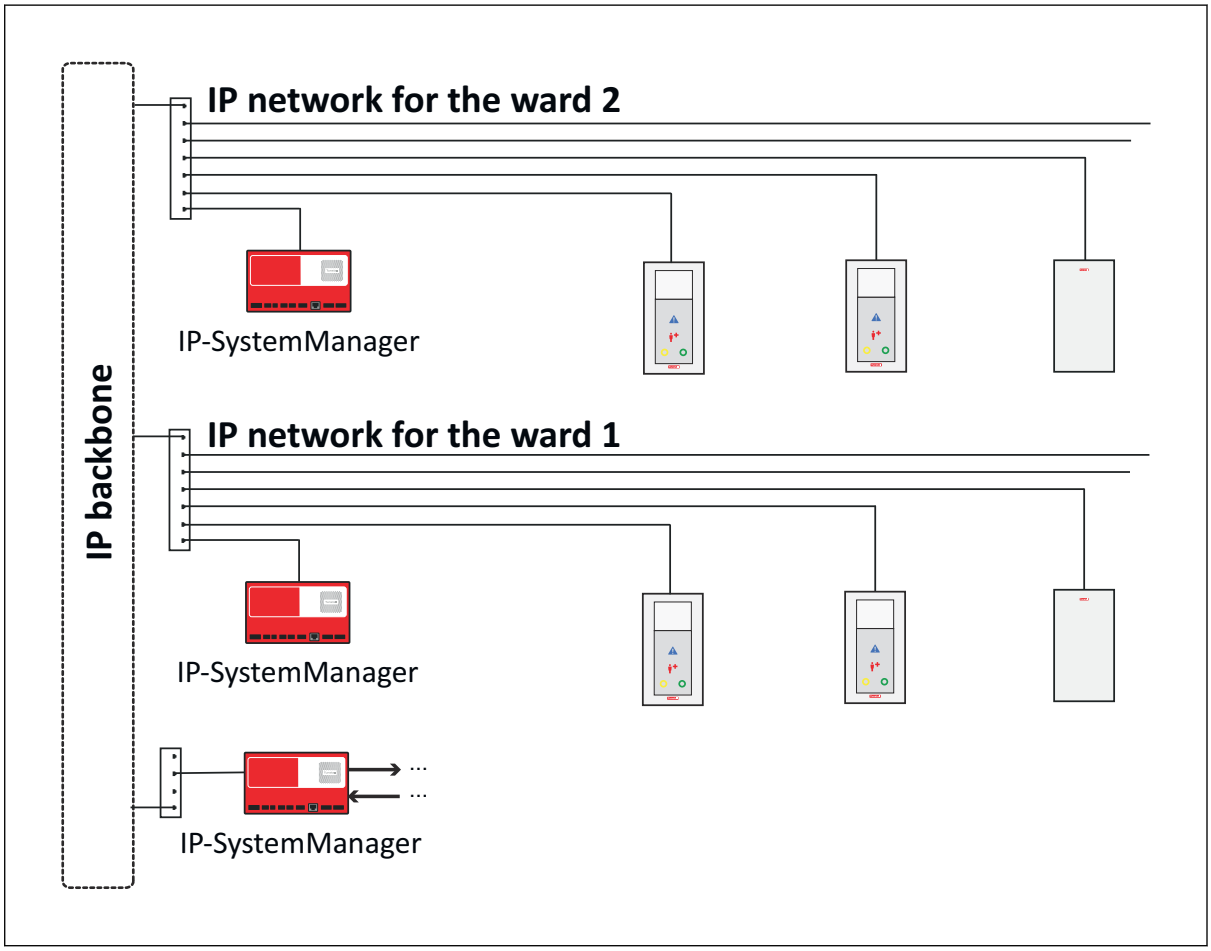
Contents

12.1. Introduction

Both data and speech (VoIP) are transmitted through the IP network. For the nurse call system, a basic distinction can be made between two types of IP networks:

- IP networks for the wards
- IP backbone of the nurse call system (for connecting wards with each other)

Figure 40. IP backbone and IP networks for the wards



12.1.1. IP networks for the wards

The nurse call system for each ward has a dedicated IP line network. The IP-SystemManager control unit for the ward, the room terminals (ComTerminal^{IP}, ConnectionTerminals IP), the call handling consoles (ComStation^{IP}) and the Corridor displays^{IP} are connected to a switch that is used exclusively for the nurse call system.

The decentralised process organisation must ensure the handling of calls and faults, as well as the escalation within this area required by the German standard DIN VDE 0834 .

12.1.2. IP backbone of the nurse call system

The connection between wards, i.e. of the IP-SystemManagers, the connection of IP-System Managers with special functions and the connection of external IP-based devices and systems (e.g. PBX) and a possible ManagementCenter^{PC} is made using the IP backbone of the nurse call system.

The IP backbone can be designed as an IP network reserved solely for the nurse call system, or it can use the general IP infrastructure, i.e. a standardised cabling network (DIN/EN 50173) and standard network components.

12.1.3. About the following sections

The following sections describe the basic requirements placed on a network and individual components for enabling the secure communication of the nurse call system.

These are minimum requirements that may need to be coordinated with the relevant IT manager or with other departments. The IT team and other departments may also place additional requirements on the nurse call system in order to use it together with existing networks securely. The requirements and specifications for system setup and use can be used for the risk analysis according to DIN EN 80001-1.

12.2. General requirements, responsibilities and system security

12.2.1. Intended purpose

The intended purpose of the nurse call system is to summon or locate people. Various trigger devices and signalling devices are used for this purpose.

Due to the greater or lesser risk posed to callers in the event of a system fault, a reliable system monitoring function has been integrated. This monitors all devices and transmission routes required for passing on information when a call is raised. Faults are displayed to the responsible staff immediately.

The nurse call system can be used as a component of a distributed information system. Its use in combination with active medical devices does not, however, replace the regulations for staff and the duty of proper supervision during the operation of such devices.

In addition to creating safety for patients and staff, the nurse call system is used to provide effective support for the care organisation. For this purpose, the system can be expanded with extensive interfaces to further systems.

Limitations

- The nurse call system is not a social alarm system according to the DIN EN 50134 (VDE 0830-4) series of standards.
- The nurse call system is not a medical product or an accessory to medical products and does not comply with Directive 93/42/EEC or Regulation (EU) 2017/745.
- The nurse call system does not fulfil the conditions for use as a distributed alarm system.

12.2.2. Responsibility Agreement

As the system manufacturer, Tunstall assumes responsibility for the following tasks within the Responsibility Agreement, insofar as such an agreement has been concluded:

- Delivery of the components of a nurse call system for setting up a system in accordance with the version of the German standard DIN VDE 0834 valid at the time of delivery
- Definition of the intended purpose and areas of application
- Description of possible application limitations
- Provision of all technical and functional documents required for the safe setup and safe operation of the nurse call system
- Information on requirements for integration into an IT network
- Information regarding hazardous situations that may occur if the required properties of the IT network are not provided
- As the manufacturer, Tunstall assumes no responsibility for the on-site network if the nurse call system is set up as a network-supported system

12.2.3. Electrical safety

The nurse call system is set up in accordance with the system isolation principle according to the German standard DIN VDE 0834. In the case of system isolation, the entire nurse call system is designed in accordance with 2 x MOPP according to DIN EN 60601-1. This applies both to the power supply and all other interfaces and connections to external devices and system components.

The only exceptions are the “ComTerminal^{IP}, PoE” (76 0510 00) and "ConnectionTerminal IP, PoE" (76 0550 00) room terminals supplied by PoE+. These room terminals supplied by PoE+ have safe isolation according to DIN EN 60601-1. Flamenco^{IP+} nurse call systems in which all room terminals are “ComTerminals^{IP}, PoE” (76 0510 00) or "ConnectionTerminals IP, PoE" can be set up according to the principle of local isolation. Under the principle of local isolation, all devices in the nurse call system that can come into contact with patients are individually designed according to 2 x MOPP according to DIN EN 60601-1 or connected to the rest of the nurse call system via a separating device with 2 x MOPP according to DIN EN 60601-1.

12.2.4. Purpose of integrating the IP backbone of the nurse call system into the general IT infrastructure

The IP backbone of the nurse call system can be integrated into the general IT infrastructure if there is no viable way to set up the system in a conventional manner. For example, this could be because the system is being expanded across several buildings or due to the number of cable connections required, which would result in enormous costs. Another reason would be the simplified system support and organisation of updates, as well as centralised fault management.

IT networks are increasingly used for nurse call systems, as long as the necessary security requirements can be fulfilled.

12.2.5. Basic system setup and structure

The nurse call system is an independent and intrinsically safe system and can use existing or newly created networks for communication between subsystems and/or components. The actual medium used (copper, fibre-optic) is irrelevant for the system functions.

For network-based communication, the nurse call system uses the network-specific services, which must be coordinated in detail.

The requirements of the applicable German standard DIN VDE 0834 must be observed during system setup.

12.2.6. System monitoring and operational safety

The relevant components and transmission paths, including any network connections used, are permanently monitored through the regular exchange of data (at least every 30 seconds). Faults are reported immediately (local display per organisational group, i.e. usually per ward; contacts; central display via PrimusGlobal+). If the PrimusGlobal+ “Call recording” software is installed (e.g. as 50 1027 00), all system-relevant events are recorded for subsequent evaluation.

12.2.7. Possible hazardous situations due to faults in the IP backbone

The nurse call system features a multistage safety concept. If the network infrastructure of the IP backbone fails, all local control units (in the form of the IP-SystemManagers) continue to work autonomously. The individual organisational groups (usually wards) based on an IP-SystemManager take over the basic function of the nurse call system and the local indications on displays and call handling consoles are retained.

The connections between the individual organisational groups fail and a speech connection is no longer possible (e.g. for an alarm announcement).

In case of partial failures or temporary network faults, only the segments that have failed are affected, as long as the other transmission paths remain usable.

An interruption to the network structure may also be related to a firmware update for the network components (e.g. switch update), which can take several minutes.

Once the connections that were lost are restored, the nurse call system continues to work with its full scope of functions and using the previous system settings.

12.2.8. Cyber security of the entire system

Since the system involves the use of networks and the possibility of remote access for updates, remote support and system services, a special focus should be placed on cyber security. To ensure system integrity and data protection within the nurse call system, Tunstall provides fee-based software support in the form of a software support contract, together with the corresponding security patches.

The access to the system and protective mechanisms used must be designed and set up in consultation with the persons responsible for the IT systems. The operator is responsible for the security of the network itself and any possible connections to medical networks.

12.3. Separate IP network for the nurse call system per ward

Cables belonging to the structured building cabling can be used for the nurse call system's own IP network on each ward, but Tunstall's specifications regarding cable types, cable cross-sections and cable lengths must be observed. Particular attention must be paid to the clear identification of sockets and patch cables to ensure clear assignment to the nurse call system on a permanent basis.

When using active network components, the following must be kept in mind:

- Only devices certified by Tunstall with approval for the intended area of use may be used.
- Use of these devices is permitted only within the nurse call system and they must be marked as components of the nurse call system.
- The devices must be connected to the supply voltage using their own, separately fused circuit that is used exclusively for devices of the nurse call system and is supplied with a UPS/emergency power accordingly (DIN VDE 0834 point 5.2.2).

12.4. Requirements for integration into networks

Flamenco^{IP+} nurse call systems are nurse call systems in accordance with the German standard DIN VDE 0834. The IP backbone of the nurse call system can be integrated into existing network structures, as long as they meet the requisite standards. The nurse call system can be integrated into an existing network infrastructure in order, for example, to expand the system to new areas using previously existing infrastructures, to integrate existing systems (telephony, alarm emission) or to support system management (e.g. remote maintenance).

Even though the nurse call system can be integrated into existing infrastructures without issues, some services (e.g. DHCP) are provided by the Flamenco^{IP+} nurse call system.

12.4.1. Physical connection

The components of the IP backbone of the nurse call system can, in principle, be activated in any Ethernet infrastructure based on the standard IEEE 802.3 (VLAN tags according to 802.1q are not supported by the components/end devices).

Activation takes place using 10Base-T/100Base-TX switchports that must support autosensing of the operating modes.

12.4.2. Flamenco^{IP} subnets (Flamenco domains)

To avoid interference effects caused by external network components, all components of the nurse call system must be operated in their own subnets (broadcast domains/LANs/VLANs/LISs) according to the planning documents. These subnets are referred to as Flamenco domains below.

The communication between the system components is implemented through Internet Protocol Version 4 (IPv4) and uses both unicast/broadcast and multicast.

Individual Flamenco domains (subnets) can be connected using existing network infrastructures to support the expansion of the system to additional building areas.

To ensure problem-free integration of the IP backbone system into existing infrastructures, the following conditions must be fulfilled:

1. All system components of the nurse call system must be able to communicate with each other without restrictions and with protocol transparency.
2. Communication with the infrastructure services used (NTP, SIP, etc.) must be possible without restrictions and with protocol transparency.
3. If the SystemOrganizer or ManagementCenter^{PC} is located outside a Flamenco domain, communication between the Flamenco domains and these components must be possible without restrictions and with protocol transparency.
4. Network traffic not listed under points 1–3 must not be present in the Flamenco domains.
5. To ensure that the system components function without issues, especially in regard to speech integration, a functional IPv4 multicast integration is required. IGMP Version 3 must be supported within the Flamenco domains, and IPv4 multicast routing must be supported across the entire infrastructure.

6. If the IP SystemManager is in a different subnet than the IP end device (Corridor display^{IP}, ComTerminal^{IP}, ComStation^{IP}; ConnectionTerminal IP), IGMP must be active on the switches involved (entire communication path).
7. Compliance with the transmission quality requirements within the network (bandwidth, latency, jitter, packet loss) must be guaranteed through the implementation of suitable QoS configurations as necessary, see Section 12.8.1: “QoS requirements” (page 220).
8. If remote support of the system is planned, unrestricted communication is required between the remote support station and the components of the IP backbone. From the remote support station, it must also be possible to access end devices in the IT infrastructure on which the system software is operated. The requirements on the transmission quality (item 6) do not have to be met for the remote support station.
9. An overview of the communication relationships and the used ports of the nurse call system is provided in the appendix to this chapter, see Section 12.9: “Communication relationships in the Flamenco^{IP+} system” (page 224).

12.4.3. Network services in the existing infrastructure, NTP

To ensure that a centralised, precise time source is available for the entire nurse call system, the components of the system can retrieve their time information from an NTP server. This uses NTP Version 2 (unicast, no authentication).

12.5. Notes on suitable switches

Switches are required to establish a network infrastructure on a ward.

Depending on the power supply concept, switches with or without a PoE+ power supply are used.

The range of switches available is subject to technical developments and consequently may change. Therefore, Tunstall can only indicate the general requirements for switches and is unable to provide details about individual manufacturers or the specification of individual models.

12.5.1. General safety

During installation, care must be taken to ensure that the network components of the nurse call system are clearly marked as such. This applies to switches, patch panels, patch cables, network sockets, etc.

Even for nurse call systems based on network technology, work on the nurse call system is permitted to be carried out only by a nurse call system specialist in accordance with the German standard DIN VDE 0834-1. The operator must ensure this through organisational measures. The network components, especially switches and patch panels, must therefore be protected against unauthorised access. For this purpose, Tunstall recommends the use of lockable network cabinets and other technical equipment.

Depending on the structure of the nurse call system network, the switches must be protected against failure. With PoE switches in particular, a failure of the primary power supply according to the German standard DIN VDE 0834-1 must be protected with a UPS so that the power supply of the patient rooms functions as the smallest autonomously functioning unit of a nurse call system.

There is no need to protect a non-PoE switch if it is ensured that the patient rooms function as the smallest self-sufficient unit of a nurse call system.

Redundant network planning is also possible.

12.5.2. Data security

The German standard DIN VDE 0834-1 does not include any special regulations for the use of switches. However, they are part of the nurse call system and must therefore comply with the requirements of the German standard DIN VDE O834-1.

Data security is therefore the responsibility of the operator. In many cases, general IT security regulations and procedures already exist for this purpose that include or take into account the legal regulations applicable to the respective facility.

12.5.3. Hardware requirements

19-inch IT switches and industrial switches for mounting on top-hat rail are equally suitable for use in the nurse call system. The switches must be permanently installable. General specifications and procedures from the field of IT network technology must also be applied in this regard.

When selecting switches, especially for installations with room terminals with a PoE+ power supply, it is important to ensure that the switches have sufficient ports and PoE+ ports. For PoE switches, the output power of the switch must be sufficient for the power consumption of the connected devices. For a corresponding calculation aid, see Section 13.3: “Power over Ethernet” (page 237).

We recommend that you individually mark the patch cables that provide PoE+ for the patient rooms. The same applies to the switch, if not available on the device.

12.6. Nurse call system software on provided end devices

12.6.1. SystemOrganizer

The SystemOrganizer software is the configuration tool for the nurse call system. It enables the complete configuration of the system.

- Operating system: Microsoft Windows 11
- CPU: 1 gigahertz (GHz), 32-bit (x86) processor
- Memory: 1 GB RAM (32 bit)
- Free hard disk space: 16 GB available storage space

12.6.2. PrimusGlobal+ “Call Recording”

Software to support care documentation.

Permanent recording of all system events (calls, presences, etc.) with time, date and corresponding information about the data origin, such as ward and room name.

It is possible to select the locations to be analysed (wards, rooms, etc.) and filter the data by the time of the event or by event type (calls, presences, other events).

- Operating system: Microsoft Windows 11
- CPU: 1 gigahertz (GHz), 32-bit (x86) processor
- Memory: 1 GB RAM (32 bit)
- Free hard disk space: 32 GB available storage space

12.6.3. PrimusGlobal+ “ManagementCenter”

Software for a central console as a screen console for central handling of all functions of the nurse call system.

Calls from several wards can be displayed.

- Operating system: Microsoft Windows 11
- CPU: 1 gigahertz (GHz), 32-bit (x86) processor
- Memory: 1 GB RAM (32 bit)
- Free hard disk space: 32 GB available storage space

12.7. Networking with external systems

12.7.1. Telephony systems

The connection to an existing telephony system enables speech connections to be established between the devices in the nurse call system and telephony devices. For the integration of the PBX into the network, an alarm server is additionally required. This alarm server manages the connection between the nurse call system and the PBX. The physical connection of the alarm server and PBX to the nurse call system is established through the LAN, see Section 12.8.2: “Speech networking of the nurse call system” (page 221).

12.7.2. Alarm systems in the LAN

The nurse call system supports the connection of external alarm systems through the interfaces of the IP-SystemManager.

12.8. Appendices

12.8.1. QoS requirements

The following requirements apply for the transmission of speech between the Flamenco domains:

- Packet loss: < 1%
- Latency (one-way): < 150 ms
- Average jitter (one-way): < 30 ms
- Bandwidth: 100 Kbit per speech connection

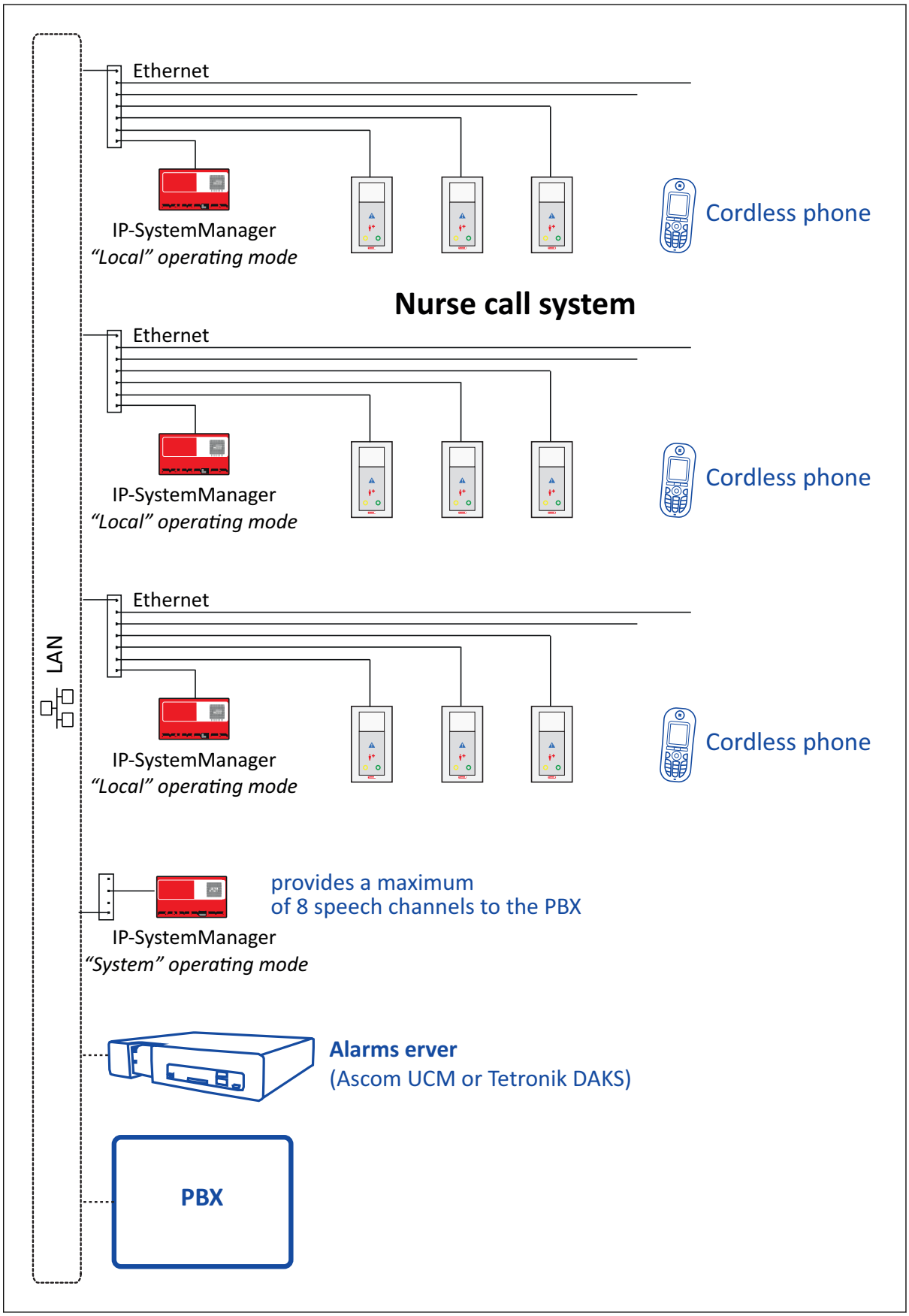
The speech data and signalling data is already flagged by the nurse call system components so that it receives priority handling within the network infrastructure. The DiffServ method (DSCP – Differentiated Services Code Point) is used for this and the corresponding DSCP markings must be retained between the Flamenco domains.

The following DSCP values are used for the transmission of speech and signalling data:

- VoIP speech data DSCP EF
- VoIP signalling DSCP AF31

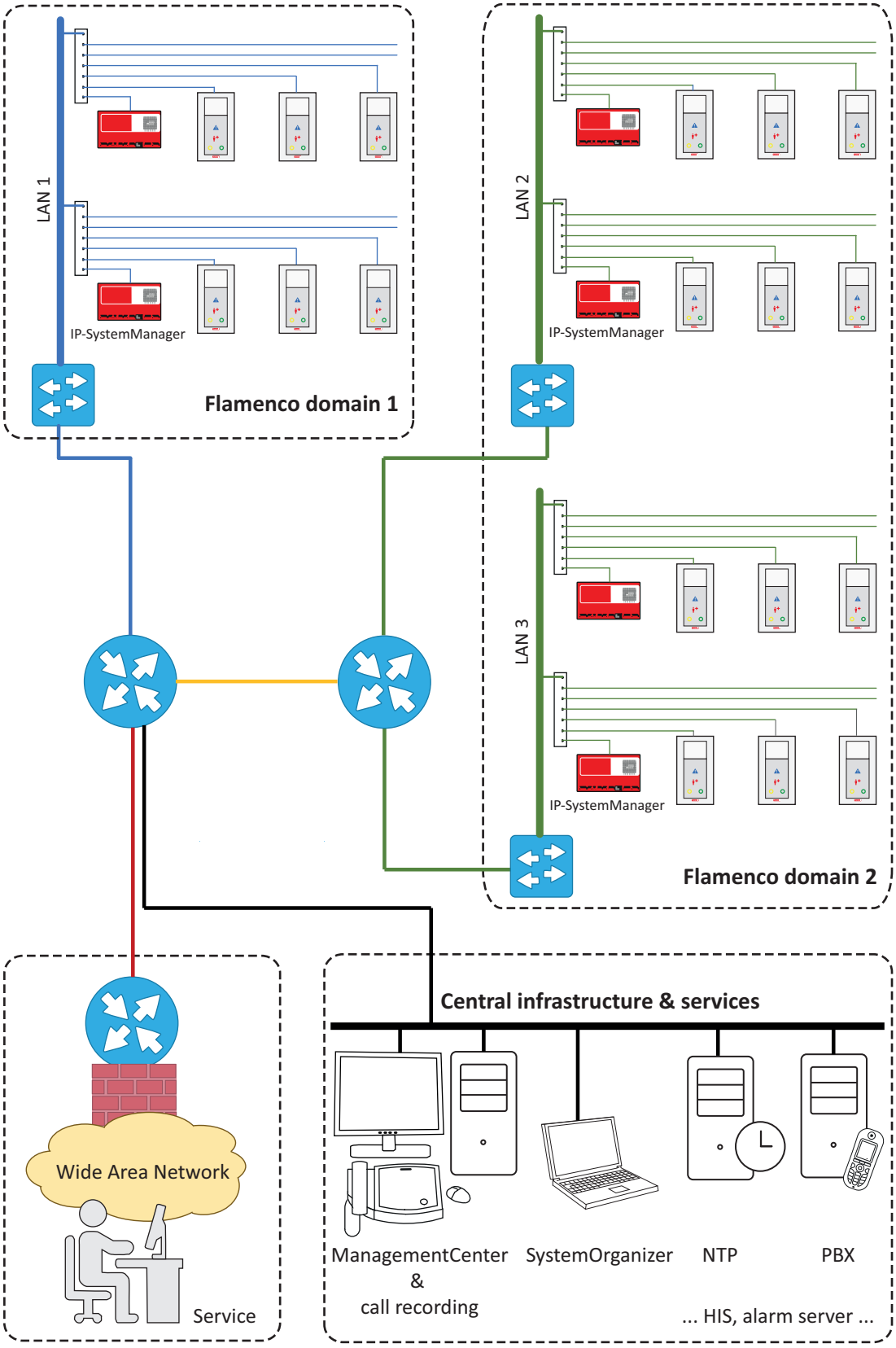
12.8.2. Speech networking of the nurse call system

Figure 41. Speech networking of the Flamenco^{IP+} nurse call system



12.8.3. Example integration in a general IT infrastructure

Figure 42. Example integration in a general IT infrastructure



12.8.4. Port releases required for remote support

Tunstall dials in remotely via VPN access or directly via TeamViewer.

Depending on the type of access, the following ports are required for remote support:

Table 15. Port releases required for remote support

Access	Protocol	Port
TeamViewer	TCP (UDP)	80/443/(5938)

For troubleshooting via remote support (e.g. pinging devices), the Internet Control Message Protocol (ICMP) must be enabled in the network or enabled on a temporary basis.

12.9. Communication relationships in the Flamenco^{IP+} system

Table 16. Communication relationships in the Flamenco^{IP+} system

Source			Destination				
System component	**Protocol**	**Port**	**System component**	**Port**	**Application**	**Comments**	**Type**
IP-SystemManager	UDP	≥ 1024	NTP server	123	NTP	Synchronisation with an external time server	Flamenco – external services
IP-SystemManager	TCP	≥ 1024	IP-SystemManager	4700	Message server	The IP-SystemManagers establish a network of client/server connections among themselves.	Flamenco – inter-domain communication
IP-SystemManager	TCP	≥ 1024	Call handling PC	4700 - 4799	Message server	Client/server connection to the call handling PC	Flamenco – external services
IP-SystemManager	TCP	≥ 1024	IP-SystemManager	4800	TimeSync	The time is synchronised across devices using a TCP socket connection.	Flamenco – inter-domain communication
IP-SystemManager	UDP	≥ 1024	IP-SystemManager	5060, 5061	SIP	Cross-ward speech connections via SIP	Flamenco – inter-domain communication
IP-SystemManager	UDP	5060, 5061	IP devices	5060, 5061	SIP	Speech connections to IP devices via SIP. Registrations and call signalling take place on this port.	Flamenco - Inter-domain communication

Source			Destination				
System component	**Protocol**	**Port**	**System component**	**Port**	**Application**	**Comments**	**Type**
IP devices	UDP	4000 - 4999	IP devices	4000 - 4999	RTP	The speech data is transmitted peer-to-peer in this port range.	Flamenco - inter-domain communication
IP-SystemManager	MCAST	≥ 1024	IP-SystemManager	5555	RTP	Streams speech for announcements to multicast addresses. Default: 239.255.255.245-239.255.255.252.	Flamenco – inter-domain communication
Config PC	TCP	≥ 1024	IP-SystemManager	21	FTP	Used for configuration with the SystemOrganizer	Flamenco – external services
IP-SystemManager	TCP	≥ 1024	Config PC	20	FTP	Used for configuration with the SystemOrganizer	Flamenco – external services
Config PC	TCP	≥ 1024	IP-SystemManager	23	Telnet	Used for configuration with the SystemOrganizer	Flamenco – external services
Config PC	TCP	≥ 1024	IP-SystemManager	22	SSH/SCP	Used for configuration with the SystemOrganizer	Flamenco – external services
IP devices	UDP	≥ 1024	IP-SystemManager	67	DHCP	Request IP addresses for nurse call system	Flamenco – inter-domain communication

Source			Destination					
System component	**Protocol**	**Port**	**System component**	**Port**	**Application**	**Comments**	**Type**
IP-SystemManager	UDP	≥ 1024	IP devices	68	DHCP	Assignment of IP addresses for the IP devices in the nurse call system	Flamenco – inter-domain communication

13. Power supply

Contents

13.1. Power supply options

There are room terminals for 24 V DC power supply and room terminals for PoE+ supply. That means the ComTerminals^{IP} and ConnectionTerminals IP are each available in a version for 24 V DC and for PoE+.

The corridor displays^{IP} can be supplied either with 24 V DC or with PoE+.

The ComStation^{IP} can be powered with PoE or with an included 230 V AC power supply unit.

The IP-SystemManager, i.e. the control unit per ward, as well as the OSYlink interface modules and announcement loudspeakers must be supplied with 24 V DC.

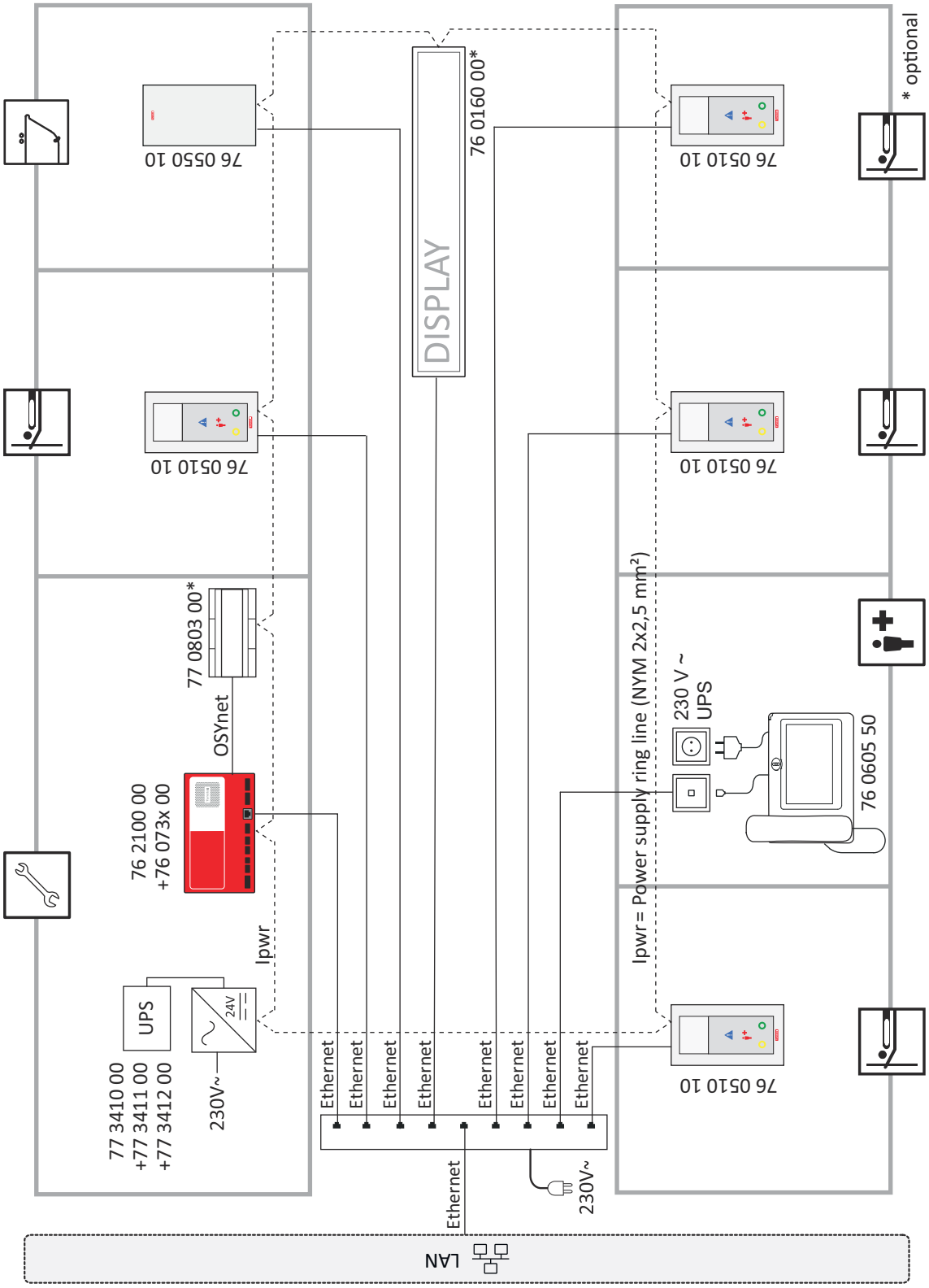
24 V DC power supply units are installed decentrally, i.e. on the wards. The power supply cable (Ipwr = NYM 2x2.5 mm²) is laid as a ring to which the ward devices for 24 V supply are connected. If room terminals with PoE+ supply are used, there is no need to lay a power supply ring through the entire ward.

Table 17. Power supply options for products of the nurse call system

Product		**Power supply options**		
Designation	**Order no.**	**24 V DC**	**PoE+**	**230 V AC**
ComTerminal^{IP}, PoE	76 0510 00		•	
ComTerminal^{IP}, 24V	76 0510 10	•		
ConnectionTerminal IP, PoE	76 0550 00		•	
ConnectionTerminal IP, 24V DC	76 0550 10	•		
ComStation^{IP}	76 0605 50		• PoE	•
Corridor display^{IP} Alpha 16	76 0150 00	•	•	
Corridor display^{IP} Alpha 16, double-sided	76 0160 00	•	•	
Loudspeaker with announcement interface	05 0024 02	•		
Loudspeaker with announcement interface	05 0024 03	•		
1-channel audio amplifier 100V/25W	00 0647 13	•		
IP-SystemManager	76 2100 00	•		
OSYlink-Door entry speaker 2	77 0801 10	•		
OSYlink-Universal	77 0803 00	•		
OSYlink-Announcement	77 0804 00	•		
OSYlink AS-CCS	77 0870 00	•		

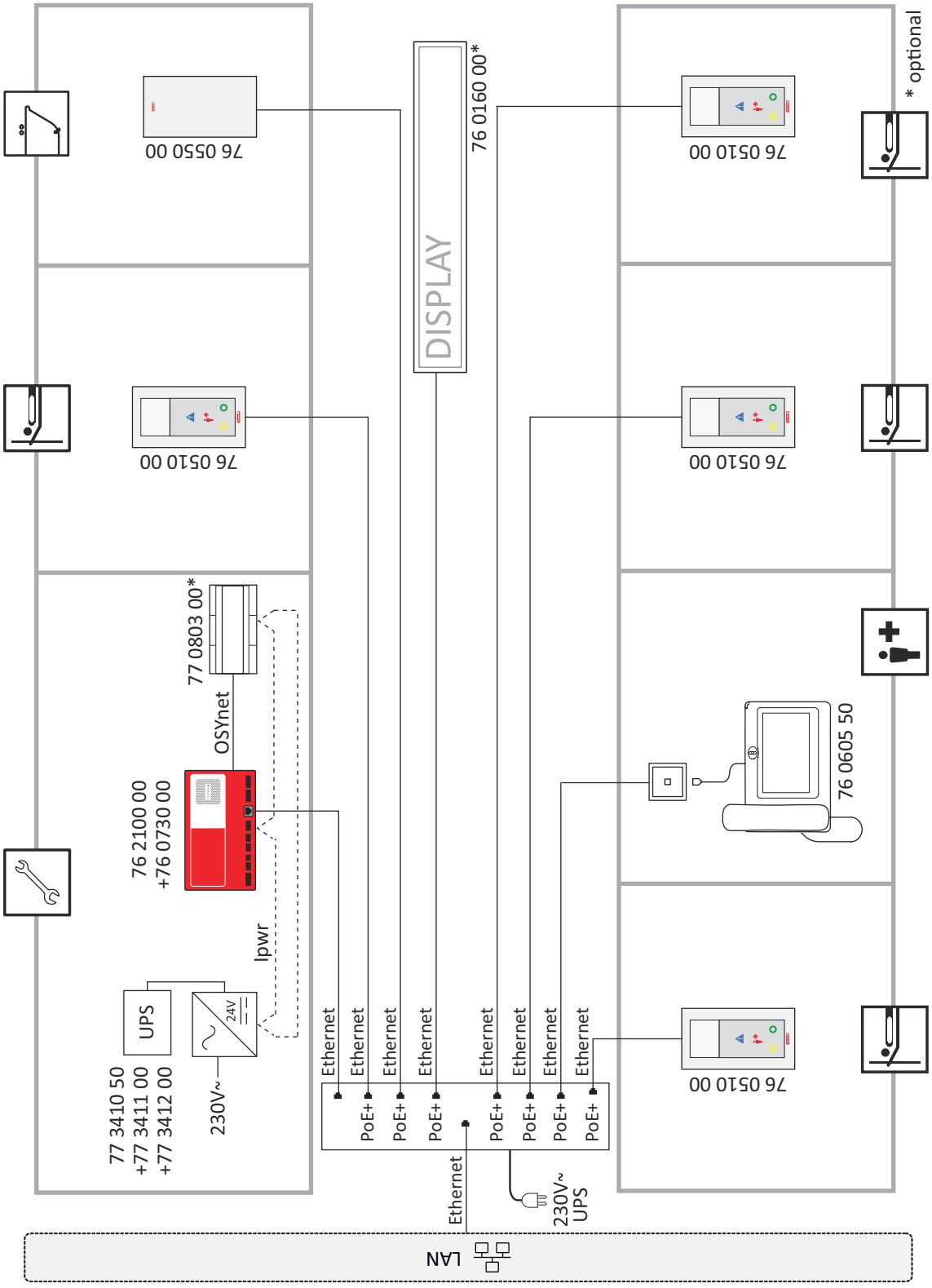
13.1.1. Installation example with 24 V DC power supply

Figure 43. Installation example for ward with 24 V DC power supply



13.1.2. Installation example with PoE+ power supply

Figure 44. Installation example for ward with PoE+ power supply



13.2. 24 V DC power supply

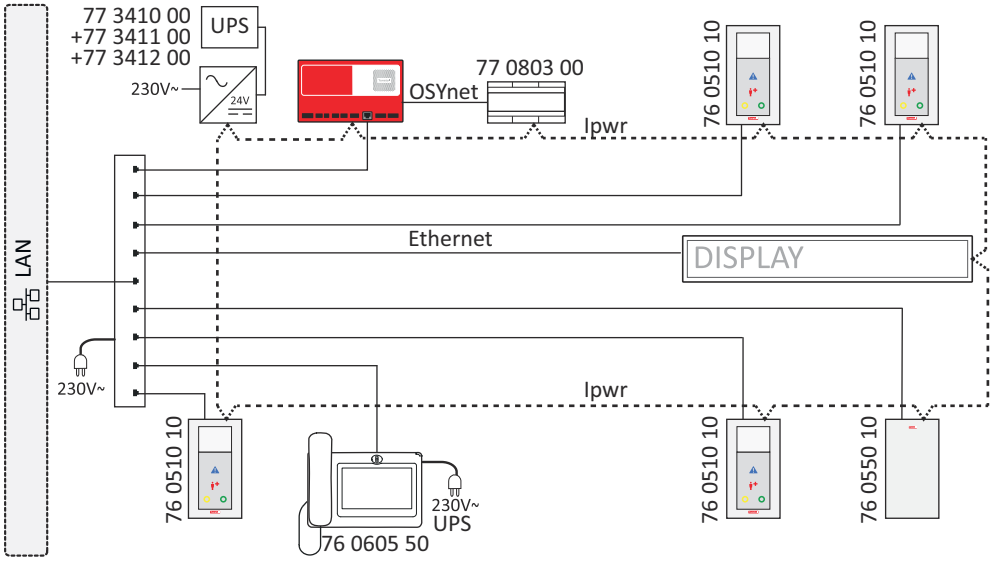
The 24 V DC power supply of the nurse call system is provided by locally installed power supply units: Power supply unit 10A, DIN rail (77 3410 00).

The Ipwr power supply cable is laid as a ring. Potential for confusing with the cables of the low-voltage system must be excluded by means of suitable colour selection, cable markings and appropriate laying of the extra-low voltage lines.

In all cases, the power supply must be connected to the mains supply voltage (230 V AC) via its own protective measure and with a fixed connection.

13.2.1. Power supply ring line (Ipwr)

Figure 45. Power supply ring line (Ipwr)



The Ipwr power supply cable is laid as a ring. To avoid unnecessary voltage drops, the power supply unit should be connected to the rooms, i.e. room terminals („ComTerminals^{IP}, 24V“ (76 0510 10) or "ConnectionTerminals IP, 24V DC" (76 0550 10), with the shortest possible cable paths.

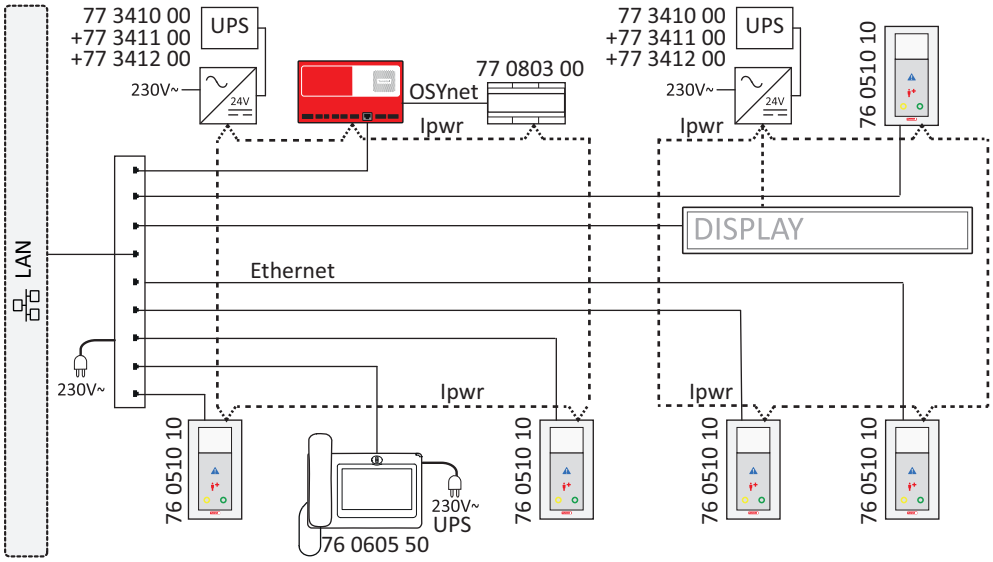
The voltage drop from the power supply unit to the most electrically remote room must not exceed 4 V at maximum load. In the case of greater voltage drops, an additional stub line can be laid from the power supply unit or a cross-connection can be laid within the +24 V ring line. If these measures do not provide a solution, a second power supply unit must be installed. Connection of the devices in parallel is not permitted.

A cable cross-section of 2.5 mm² must be laid for Ipwr. Depending on the laying method, single conductors (NYA 2.5 mm² for +24 V and 0 V) or a common cable (NYM 2x2.5 mm²) can be laid.

13.2.2. Installation of two power supply units per ward

If two power supply units are required to power the devices on a ward, a second power supply ring must be installed.

Figure 46. Two power supply units per ward



13.2.3. Calculation of current consumption per ward

If a ward is to be supplied with 24 V DC, you must check whether current requirement of the ward can be supplied by one power supply unit or whether a second power supply unit is required.

Calculation basis for the current requirement of a ward that is supplied with a 24 V DC power supply unit

To easily calculate the current requirement of a ward, first add up the quiescent current consumption values of all devices supplied by the 24 V DC power supply unit. To do this, take the current consumption from the following table.

The additional current requirement to the quiescent current consumption can be stated simplified as 1 A per ward. This corresponds to approximately 5 calls, 5 presences and one speech connection.

The power supply unit should be utilised to a maximum of 80%. Since the power supply units (77 3410 00) have a maximum load of 10 A, the 80% load is 8 A.

The following table shows the current consumption values of the devices that are to be supplied by the 24 V DC power supply unit. The values are average values and may vary slightly in individual cases. The total current consumption of the system varies depending on the functions used.

Table 18. Current consumption of devices that must be powered by the 24 V DC power supply unit

Order no.	Product name	Quiescent current consumption	Maximum current consumption
00 0647 13	1-channel audio amplifier 100V/25W	33 mA	
05 0024 02	Loudspeaker with announcement interface	80 mA	
05 0024 03	Loudspeaker with announcement interface	80 mA	
29 0707 20F	Pull cord call switch insert	10 mA	approx. 25 mA
70 0171 50, 70 0171 60...	Connection socket with call switch , bedhead unit *or* Connection socket with call switch	21 mA	
70 0425 00, 70 0435 00	Connection socket combi *or* Connection socket combi, bedhead unit	30 mA	
70 07xx 0x	Pear push switch	1 mA	8 mA
70 0790 01	Sound detector	30 mA	
70 0848 00	RAN interface universal	12 mA	
74 0747 00	Patient handset	20 mA	Current consumption during entertainment transmission: up to 85 mA
76 0150 00	Corridor display^{IP} Alpha 16	130 mA	Current consumption for call: 440 mA
76 0160 00	Corridor display^{IP} Alpha 16, double-sided	140 mA	Current consumption for call: 450 mA
76 0510 10	ComTerminal^{IP}, 24V	132 mA	All LEDs on: 280 mA
76 0550 10	ConnectionTerminal IP, 24V DC	95 mA	
76 2100 00	IP-SystemManager	120 mA	

Order no.	Product name	Quiescent current consumption	Maximum current consumption
76 6308 01	Network Switch, 8 port, unmanaged, 24V DC, 8x RJ45, QoS, DIN rail	Current consumption: 130 mA	
77 017x xx	Room lamp *or* room lamp with doorplate	20 mA	20 mA + 10 mA per illuminated light section
77 02x 0x...	Switch	10 mA	approx. 25 mA
77 02x 0x...	Switch with call tone function	10 mA	approx. 50 mA
77 0360 11	IR TV control module universal	23 mA	During data transfer, briefly: 45 mA
77 0370 00	ePat®lite	40 mA	Current consumption during entertainment transmission: up to 100 mA
77 0801 10	OSYlink-Door entry speaker 2 + door entry speaker 2 (77 0351 00) + door opener	80 mA	Current consumption during speech connection: 130 mA Max. current consumption (= door opener actuation) = 400 mA
77 0803 00	OSYlink-Universal	40 mA	100 mA
77 0804 00	OSYlink-Announcement	32 mA	60 mA
77 0840 00	RAN interface	8 mA	10 mA after a call is raised
77 0870 00	OSYlink AS-CCS	Max. current consumption = 90 mA	
77 0880 00	RAN interface with speech	26 mA	64 mA during speech connection
Z 00 8002 02	Sensor mat	10 mA	
Z 00 8201 13	Large-surface pneumatic switch	16 mA	

Order no.	Product name	Quiescent current consumption	Maximum current consumption
Z 00 8201 40	Breathing sensor set	200 mA	
Z 00 8202 33	Radio receiver-T	12 mA	
Z 00 8202 35	Radio receiver-T UP	12 mA	

Example calculation for 20 two-bed rooms with ePat®lite and WC

		Quiescent current consumption	
Number	**Device**	**Per device**	**Per 20 rooms**
20	ComTerminal^{IP}, 24V	132 mA	2,640 mA
20	Room lamp, 4 sections	20 mA	400 mA
40	Connection socket combi, bedhead unit	30 mA	1,200 mA
40	ePat®lite	40 mA	1,600 mA
20	Pull cord call switch/WC	10 mA	200 mA
20	Cancel switch/WC	10 mA	200 mA
1	Corridor display^{IP} Alpha 16, double-sided	140 mA	140 mA
1	IP-SystemManager	120 mA	120 mA
Total (quiescent current consumption):			6.500 mA
Additional current consumption:			1,000 mA
Total (quiescent current consumption + additional current demand):			**7.500 mA**

80% utilisation of a power supply unit (100% utilisation: 10 A) = 8 A

Result: One power supply unit is required for the above 20 two-bed rooms with ePat®lite and WC.

Example calculation for 25 two-bed rooms with patient handset and WC

		Quiescent current consumption	
Number	**Device**	**Per device**	**Per 25 rooms**
25	ComTerminal^{IP}, 24V	132 mA	3,300 mA
25	Room lamp, 4 sections	20 mA	500 mA
50	Connection socket combi, bedhead unit	30 mA	1,500 mA
50	Patient handset	20 mA	1,000 mA
25	Pull cord call switch/WC	10 mA	250 mA
25	Cancel switch/WC	10 mA	250 mA
1	Corridor display^{IP} Alpha 16, double-sided	140 mA	140 mA
1	IP-SystemManager	120 mA	120 mA
Total (quiescent current consumption):			7.060 mA
Additional current consumption:			1,000 mA
Total (quiescent current consumption + additional current demand):			**8.060 mA**

80% utilisation of a power supply unit (100% utilisation: 10 A) = 8 A

Result: One power supply unit is required for the above 25 two-bed rooms with patient handset and WC.

13.2.4. Backup power supply

The German standard DIN VDE 0834-1 requires a backup power supply. If no backup power supply system is present, comparable measures must be taken.

For this purpose, the power supply unit 10A, DIN rail (77 3410 00) can be supplemented on a modular basis with the UPS Control unit 10A (77 3411 00) and the battery module (77 3412 00) to provide a backup supply for 60 minutes at 80% load.

The failure of the general power supply (230 V AC) must be clearly reported to a responsible party. For projects, responsibility must be defined between the operator, planner and installer in advance. The operator must take appropriate technical and organisational measures to ensure safe operation even after one hour has elapsed.

13.3. Power over Ethernet

Table 19. Power over Ethernet - power at the powered device

Procedure	Standard	Feed-in power	Power at the powered device (PD) with 100 m cable length
PoE	IEEE 802.3af	15,4 W (48 V DC)	12,95 W (48 V DC)
PoE+	IEEE 802.3at	30 W (48 V DC)	25,5 W (48 V DC)

13.3.1. Power consumption of the devices to be supplied with PoE(+)

The ComStation^{IP} (76 0605 50) has a power consumption of approx. 11 W when used and can be operated with PoE.

The Corridor display^{IP} Alpha 16 (76 0160 00) has a power consumption of 12 W when a call is raised and must be operated with PoE+.

The Corridor display^{IP} Alpha 16, double-sided (76 0150 00) has a power consumption of 13 W when a call is raised and must be operated with PoE+.

Table 20. Power consumption of ComStation^{IP} and corridor displays^{IP}

Order no.	Product name	Quiescent power consumption	Maximum power consumption	Procedure
76 0150 00	Corridor display^{IP} Alpha 16	3.80 W	Power consumption when a call is raised: 12.00 W	PoE+
76 0160 00	Corridor display^{IP} Alpha 16, double-sided	4.30 W	Power consumption when a call is raised: 13.00 W	PoE+
76 0605 50	ComStation^{IP}	Power consumption: approx. 11.00 W		PoE

13.3.2. Calculation of current consumption per room, i.e. per PoE+ port

The room terminals “ComTerminal^{IP}, PoE" (76 0510 00) and "ConnectionTerminal IP, PoE” (76 0550 00) must be connected to PoE+ ports. The room terminal and the devices connected to it in the room, i.e. the room peripherals, are supplied with the power provided at the PoE+ port. Therefore, when planning the room peripherals, you must ensure that the current consumption in the room does not exceed the available current.

NOTICE
If the actual current consumption exceeds the available current, all devices connected to the PoE+ port fail and restart after a waiting time. This waiting time is determined by the PoE+ switch, so it depends on the switch used.

Table 21. Calculation of the current available for the room peripherals

Room terminal	Current available in the room with PoE+	Max. current consumption of the room terminal	Current available for room peripherals
ComTerminal^{IP}, PoE	895 mA at 24 V DC	280 mA at 24 V DC	895 mA - 280 mA = 615 mA
ConnectionTerminal IP, PoE	895 mA at 24 V DC	95 mA at 24 V DC	895 mA - 95 mA = 800 mA

Calculation basis for the current consumption of the room peripherals

615 mA are available for the room peripherals in a room with a "ComTerminal^{IP}, PoE" (76 0510 00).

800 mA are available for the room peripherals in a room with "ConnectionTerminal IP, PoE" (76 0550 00).

To calculate the current consumption of the room's peripherals, you basically have to add up the maximum current consumption of all devices in the room. This would mean simultaneity of all electricity-consuming actions.

However, to simplify things, you can assume that the following functions of patient devices (ePat$^{®lite}$, Patient handset, pear push switch) cannot be carried out at the same time: switching lights, controlling TV, controlling blinds. You therefore only need to take one of these functions into account for each patient device, namely the function with the highest maximum current consumption. You must therefore add this value to the maximum current consumption of the patient device.

The following table shows the current consumption of the room peripherals. The values are averages and may vary slightly in individual cases.

Table 22. Current consumption of the room peripherals (without “switch light”, “control TV” and “control blinds” functions)

Order no.	Product name	Quiescent current consumption	Maximum current consumption
70 0171 50, 70 0171 60...	Connection socket with call switch *or* Connection socket with call switch, bedhead unit	21 mA	
70 0425 00, 70 0435 00,	Connection socket combi or Connection socket combi, bedhead unit	30 mA	

Order no.	Product name	Quiescent current consumption	Maximum current consumption
70 07xx 0x	Pear push switch	1 mA	8 mA
70 0790 01	Sound detector	30 mA	
74 0747 00	Patient handset	20 mA	Current consumption during entertainment transmission: up to 85 mA
77 017x xx	Room lamp, 3 sections with or without doorplate	20 mA	50 mA
77 017x xx	Room lamp, 4 sections with or without doorplate	20 mA	60 mA
77 02xx 0x..., 29 0707 20F	Switch	10 mA	approx. 25 mA
77 02xx 0x...	Switch with call tone function	10 mA	approx. 50 mA
77 0370 00	ePat®lite	40 mA	Current consumption during entertainment transmission: up to 100 mA
77 0840 00	RAN interface	8 mA	10 mA
77 0880 00	RAN interface with speech	26 mA	64 mA during speech connection
Z 00 8002 02	Sensor mat	10 mA	
Z 00 8201 13	Large-surface pneumatic switch	16 mA	
Z 00 8201 40	Breathing sensor set	200 mA	
Z 00 8202 33	Radio receiver-T	12 mA	
Z 00 8202 35	Radio receiver-T UP	12 mA	

Table 23. Current consumption for the “switch light”, “control TV” and “control blinds” functions

Function	Order no.	Product name	Quiescent current consumption	Maximum current consumption
Switch light	Relay for light switching			Max. current consumption of the relay actually used (e.g. 40 mA)
Control TV	77 0360 11	IR TV control module universal	23 mA	45 mA
Control the blinds	70 0848 00	RAN interface Universal	12 mA	12 mA plus max. current consumption of the relay actually used (e.g. 40 mA)
	Relay for blinds control			

Example calculation: 2-bed room with "ComTerminal^{IP}, PoE" and with ePat$^{®lite}$ (including switching the light, controlling the TV and controlling the blinds) per bed and WC

		Max. current consumption	
Number	**Device**	**Per device**	**Per room**
1	Room lamp, 4 sections	60 mA	60 mA
2	Connection socket combi, bedhead unit	30 mA	60 mA
2	ePat$^{®lite}$	100 mA	200 mA
2	“Switch light”, “Control TV” and “Control blinds” functions	45 mA	90 mA
1	Pull cord call switch/WC	25 mA	25 mA
1	Cancel switch/WC with active call tone	50 mA	50 mA
		Total:	**485 mA**

Result: In a room with “ComTerminal^{IP}“PoE”, 615 mA are available for the room peripherals. 485 mA are required for the room peripherals listed. That is possible.

Example calculation: 3-bed room with "ComTerminal^{IP}, PoE" and with Patient handset (including switching light and controlling TV) per bed and WC

		Max. power consumption	
Number	**Device**	**Per device**	**Per room**
1	Room lamp, 4 sections	60 mA	60 mA
3	Connection socket combi, bedhead unit	30 mA	90 mA
3	Patient handset (incl. entertainment transmission)	85 mA	255 mA
3	“Switch light” and “TV control” functions	45 mA	135 mA
1	Pull cord call switch/WC	25 mA	25 mA
1	Call switch/WC with cancel switch	25 mA	25 mA
		Total:	**590 mA**

Result: In a room with “ComTerminalIP“PoE”, 615 mA are available for the room peripherals. 590 mA are required for the room peripherals listed. That is possible.

Example calculation: Recovery room with "ConnectionTerminal IP, PoE" with 5 beds, each equipped with a connection socket, pear push switch, room lamp and presence switch

		Max. current consumption	
Number	**Device**	**per device**	**per room**
6	Room lamp, 3 sections	50 mA	300 mA
5	Connection socket with call switch, bedhead unit	21 mA	105 mA
5	Pear push switch	8 mA	40 mA
5	Staff presence combinations with call tone	50 mA	250 mA
		Total:	**695 mA**

Result: In a room with "ConnectionTerminal IP, PoE”, 800 mA are available for the room peripherals. 695 mA are required for the room peripherals listed. That is possible.

13.3.3. Power supply of the nurse call system

To supply the nurse call system from the general power supply, dedicated supply circuits must be formed with their own overcurrent protection devices with or without residual current devices (RCD). The connection of non-system equipment to these circuits is not permitted.

The power supply devices (PoE+ switch, PoE+ injector) for generating the safety extra-low voltage must be hardwired to the general power supply. An all-pole switching device on site must be provided for system shutdown.

The power supply devices (PoE+ switch, PoE+ injector) for generating the extra-low voltage for the nurse call system must comply with DIN EN 62368 for systems with local isolation.

13.3.4. Backup power supply

In the event of a fault in the general power supply, nurse call systems must be supplied from a power source for safety purposes in accordance with DIN VDE 0100-200 and DIN VDE 0100-560. This power source must take over the supply of the nurse call system no later than 15 seconds after the power failure and maintain operation for at least one hour.

The failure of the general power supply (230 V AC) must be clearly reported to a responsible party. For projects, responsibility must be defined between the operator, planner and installer in advance. The operator must take appropriate technical and organisational measures to ensure safe operation even after one hour has elapsed.

13.4. 230 V AC

The ComStation^{IP} (76 0605 50) and active network components (switches etc.) can be operated with 230 V AC.

In the event of a fault in the general power supply, nurse call systems must be supplied from a power source for safety purposes in accordance with DIN VDE 0100-200 and DIN VDE 0100-560. This power source must take over the supply of the nurse call system no later than 15 seconds after the power failure and maintain operation for at least one hour. The failure of the general power supply (230 V AC) must be clearly reported to a responsible party. For projects, responsibility must be defined between the operator, planner and installer in advance. The operator must take appropriate technical and organisational measures to ensure safe operation even after one hour has elapsed.

14. Cables

Contents

14.1. Cable legend

To make working with installation plans easier, Tunstall has introduced an extended cable legend. The cables are classified according to their areas of application. Corresponding cable types are assigned to each area of application. These are minimum requirements.

Table 24. Cable legend

Identifier	Designation	Cable type
Ethernet	IP network of the nurse call system	• Min. CAT5e, shielded **Cable for PoE/PoE+:** • Min. CAT5e, shielded, Ø min. 0.64 mm (22 AWG)
OSYnet	OSYnet group bus	**Preferred cables:** • CAT7 (22 AWG), Ø = 0.64 mm • J-Y(St)Y 4x2x0.8 **Optional cables:** • Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG) • J-Y(St)Y 4x2x0.6
RAN	RAN room bus	**Preferred cable:** • J-Y(St)Y 2x2x0.8 **Optional cables:** • Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG)
RAN+Sp	RAN room bus and speech line	The speech line and RAN must be shielded from each other. **Preferred cables:** • 2x J-Y(St)Y 2x2x0.8 **Optional cables:** • 2x CAT5/CAT6, shielded, Ø min. 0.57 mm (23 AWG) • 1x CAT5/CAT6 S/FTP, Ø min. 0.57 mm (23 AWG) • 1x CAT7, Ø min. 0.57 mm (23 AWG)
Ipwr	Power cable	NYM 2x2.5 mm²
Ie	Entertainment cables	2x IYY per channel or similar cables (one pair required per programme)

Identifier	Designation	Cable type
Ia	General cables	J-Y(St)Y 2x2x0.8
Ia2	General cables	J-Y(St)Y 2x2x0.6
Ia4	General cables	J-Y(St)Y 4x2x0.6

14.2. Ethernet

The Ethernet of the nurse call system on each ward must have its own cable network. The IP networks on the wards are connected via a dedicated IP network reserved for the nurse call system or via the general IT infrastructure.

Cables belonging to the structured building cabling may be used for the nurse call system's own IP network on each ward, but Tunstall's specifications regarding cable types, cable cross-sections and cable lengths must be observed.

- Cables that are not used for PoE/PoE+: Min. CAT5e, shielded.
- Cables used for PoE or PoE+ must additionally have a diameter of at least 0.64 mm: Min. CAT5e, shielded, Ø min. 0.64 mm (22 AWG).
- The copper cable length between IP-based devices (IP-SystemManager, ComTerminal^{IP}, ConnectionTerminal IP, ComStation^{IP}, Corridor display^{IP} Alpha 16) and the nearest active network component (e.g. switch) must not exceed 90 m.

Sockets and patch cords must be clearly marked to ensure clear assignment to the nurse call system on a permanent basis.

14.2.1. Overvoltage protection

The German standard DIN VDE 0834-1 stipulates that cables of the nurse call system that emerge from the building must be provided with overvoltage protection at the emerging point in accordance with DIN EN 50468.

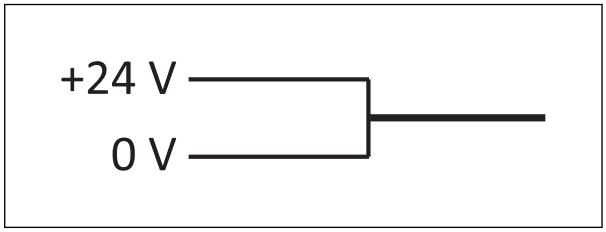
Fibre-optic cables are usually laid for the Ethernet connection of the nurse call system between two buildings. Overvoltage protection is not required. However, if copper cables are used for the Ethernet connection of the nurse call system between two buildings, overvoltage protection is required.

14.3. 24 V DC power supply cables (Ipwr)

The power supply of all devices that must be supplied with 24 V DC is provided by a separate network, e.g. with NYM 2x2.5 mm² cables.

A cable cross-section of 2.5 mm² must be laid. Single conductors (NYA 2.5 mm² for +24 V and 0 V) or a common cable (NYM 2x2.5 mm²) can be laid.

Figure 47. NYM 2x2.5 mm²



The Ipwr power supply cable is laid as a ring. To avoid unnecessary voltage drops, the power supply unit should be connected to the rooms over the shortest possible cable paths.

The voltage drop from the power supply unit to the most electrically remote room must not exceed 4 V at maximum load.

In the case of greater voltage drops, an additional stub line can be laid from the power supply unit or a cross-connection can be laid within the +24 V ring line. If these measures do not provide a solution, a second power supply unit must be installed. When installing a second power supply unit, the power supply ring must be separated into two separate rings. Connection of the devices in parallel is not permitted.

14.4. OSYnet group bus

The following interface modules are connected to the IP-SystemManager via the OSYnet group bus:

- OSYlink-Door entry speaker 2 (77 0801 10)
- OSYlink-Universal (77 0803 00)
- OSYlink-Announcement (77 0804 00)
- OSYlink AS-CCS (77 0870 00)

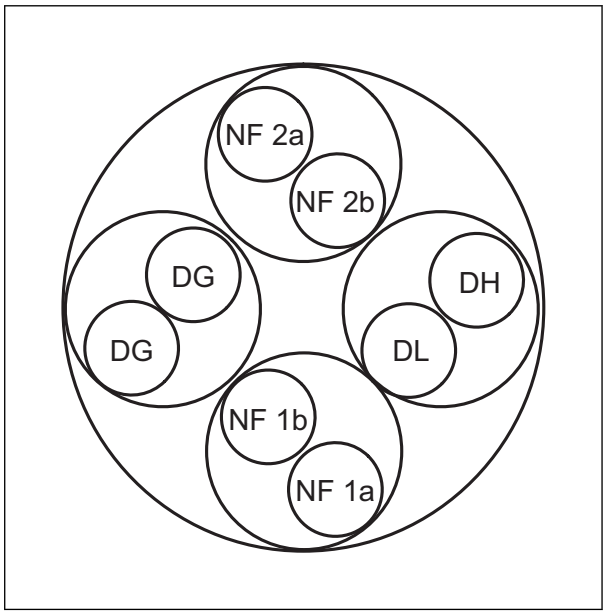
The following cable types are recommended for the OSYnet group bus:

- CAT7 (22 AWG), Ø = 0.64 mm
- J-Y(St)Y 4x2x0.8

The following cables types can be used as an option:

- Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG)
- J-Y(St)Y 4x2x0.6

Figure 48. Cable cross-section for OSYnet



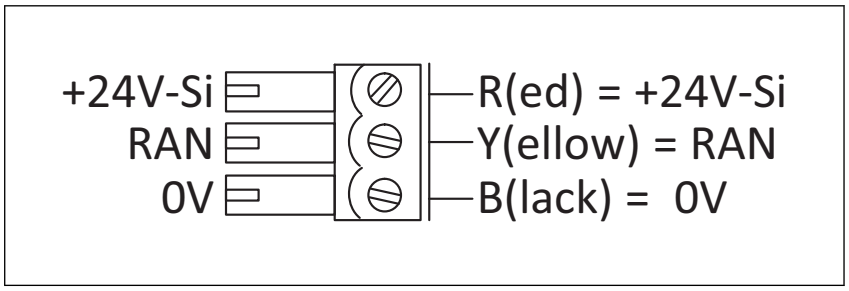
NOTICE
No stub lines may be laid for the OSYnet group bus.

The maximum permitted cable length of the OSYnet group bus is 700 m.

14.5. RAN room bus

The RAN (room area network; cable type RAN) connects all components within a room. Three wires of the type J-Y(St)Y 2x2x0.8 (cable = RAN) are required for the data connection.

Figure 49. Wires of the RAN room bus



NOTICE
The total length of all RAN lines connected to a room terminal (ComTerminal^{IP} or ConnectionTerminal IP) must not exceed 50 m. The maximum permitted number of RAN users is 30.

Devices used for speech transmission must additionally be wired with a speech line, i.e. 2x J-Y(St)Y 2x2x0.8 (cable type = RAN+Sp). The use of a cable 4x J-Y(St)Y 2x2x0.8 is not permitted because the speech line and RAN must be shielded against each other.

All devices with a RAN connection can be wired as desired (star, bus or mesh). Later extensions of the RAN line network are possible from any device, regardless of its function. However, additional devices with speech transmission require an additional speech line.

Try to divide the RAN connections into functional groups. This arrangement is more convenient for servicing purposes (see Section 14.5.3: “Easy to service” (page 253)).

The type of installation does not affect the RAN function.

14.5.1. Optional: Use of CAT cables

Optionally, CAT cables can be used for the RAN room bus (line type RAN) and for the RAN room bus with additional speech line (line type RAN+Sp):

RAN room bus (line type RAN):

- Min. CAT5, shielded, Ø min. 0.57 mm (23 AWG)

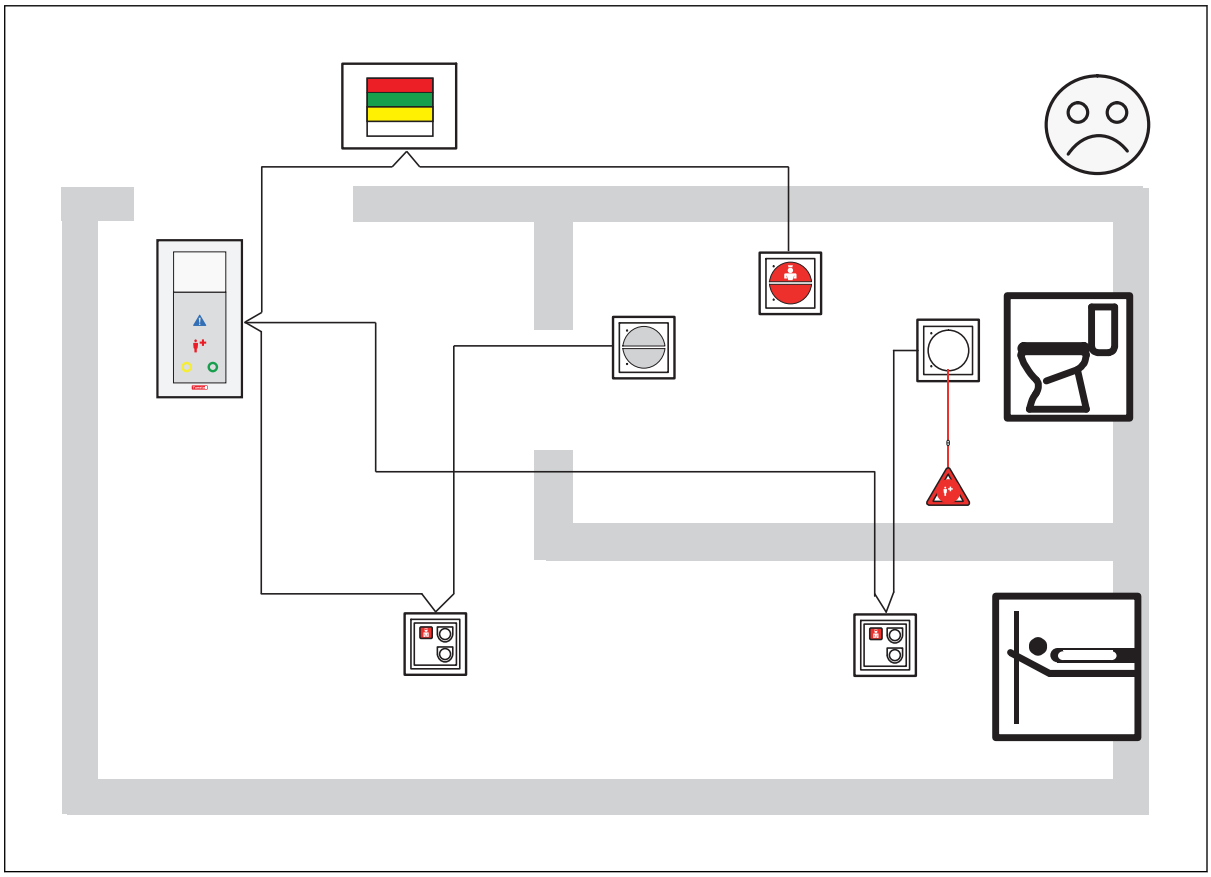
RAN room bus with additional speech line (line type RAN+Sp):

- 2x CAT5/CAT6, shielded, Ø min. 0.57 mm (23 AWG)
- 1x CAT5/CAT6 S/FTP, Ø min. 0.57 mm (23 AWG)
- 1x CAT7, Ø min. 0.57 mm (23 AWG)

14.5.2. Difficult to service

Unclear = poor installation

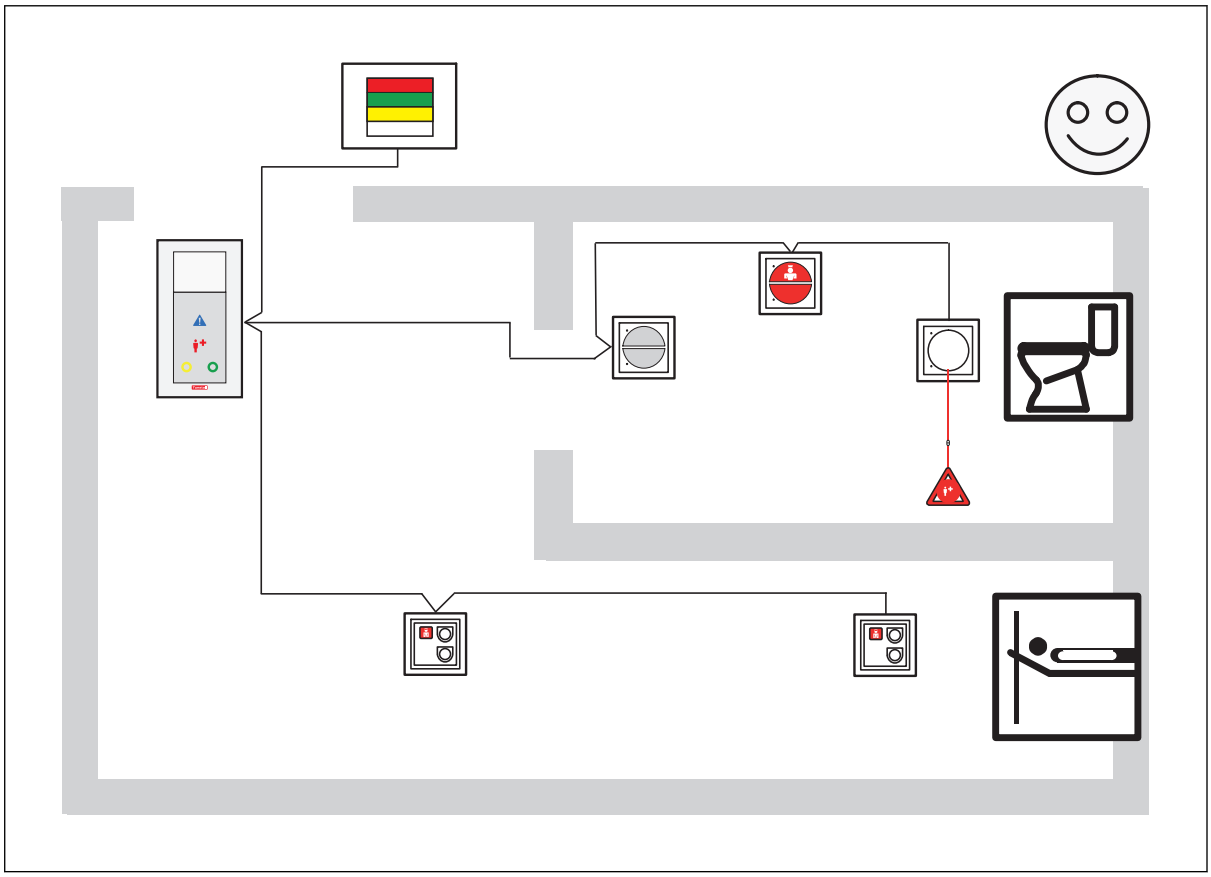
Figure 50. RAN room bus installation that is difficult to service



14.5.3. Easy to service

Clear = good installation

Figure 51. RAN room bus installation that is easy to service



14.6. Electromagnetic compatibility (EMC)

All components of the nurse call system comply with the limit values for electromagnetic compatibility (EMC). Nevertheless, in individual cases and under certain conditions, insufficient interference suppression of consumers (e.g. in medical supply units) may lead to faults in the nurse call system.

Care must be taken to ensure that appropriate precautions are taken on-site to prevent such external interference. In some cases, the external interference can be avoided by installing interference suppression elements (varistor circuits). The varistor circuits can be obtained from the manufacturers. Tunstall offers a 230 V over-voltage protection circuit (70 0890 97) for this purpose.

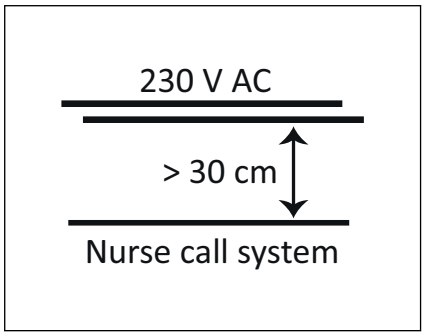
The EMC behaviour of different medical supply units may differ greatly. Even two supply units of the same type can behave differently if they have been wired differently. Nurse call systems usually extend over a wide area and their EMC behaviour is significantly influenced by the design of the cable network. This must also be borne in mind when retrofitting or converting existing medical supply units.

14.6.1. Distance to cables with dangerous voltage

Cables used by the nurse call system must not be laid together with cables of the low-voltage system or other systems with dangerous voltage in common cables, pipes or installation ducts.

The cables of the nurse call system and the low-voltage system must be laid using a minimum spacing of 30 cm; for shorter distances of less than 10 m, spacing of 10 cm is considered as sufficient.

Figure 52. Distance to cables of the low-voltage system



In medical supply units, the provisions of DIN EN ISO 11197 apply to the laying of cables for the nurse call system.

15. System security

Contents

15.1. Partial failure of the nurse call system

15.1.1. Failure of a ComTerminal^{IP} or ConnectionTerminal IP room terminal

If a ComTerminal^{IP} or a ConnectionTerminal IP incl. power supply fails, all devices in the room fail. If the power supply of the room terminal is maintained and only the data line is affected, the call switch and room lamp are intelligent enough to process messages and display them at least on the room lamp.

The failure of the room terminal is displayed on the ComStation^{IP} for the ward and – if available – on the ManagementCenter^{PC} together with an indication of the fault location so that the nursing staff are notified immediately.

The remaining room terminals on the ward continue to operate.

This fault is also indicated by the fault LED (collective indicator) on the IP-SystemManager for the ward and can be signalled via a device connected to its fault relay output.

Faults from all wards are additionally displayed on the IP-SystemManager with “System” operating mode (collective indicator), see Section 11.2.2: “One IP-SystemManager with “System” operating mode” (page 201).

15.1.2. Failure of a device on the RAN room bus

All elements that can raise a call and their transmission paths are monitored. Faults in the transmission of calls are immediately displayed on the ComStation^{IP} for the ward and – if available – on the ManagementCenter^{PC} together with an indication of the fault location so that the nursing staff are notified immediately.

The integrated test function in the ComTerminal^{IP} makes it easy to locate a defective room bus user.

This fault is also indicated by the fault LED (collective indicator) on the IP-SystemManager for the ward and can be signalled via a device connected to its fault relay output.

Faults from all wards are additionally displayed on the IP-SystemManager with “System” operating mode (collective indicator), see Section 11.2.2: “One IP-SystemManager with “System” operating mode” (page 201).

15.1.3. Failure of a ComStation^{IP}

If the ComStation^{IP} fails, the ward switches to call forwarding mode, i.e. calls that have been raised are displayed in rooms of the ward where presence is switched on.

The failure of the ComStation^{IP} is displayed on the ManagementCenter^{PC}, if present.

This fault is also indicated by the fault LED (collective indicator) on the IP-SystemManager for the ward and can be signalled via a device connected to its fault relay output.

Faults from all wards are additionally displayed on the IP-SystemManager with “System” operating mode (collective indicator), see .

15.1.4. Failure of ward Ethernet

If the Ethernet on a ward with “ComTerminal^{IP}, 24V” (76 0510 10) or "ConnectionTerminal IP, 24V DC" (76 0550 10) fails, the room functions remain active. A raised call continues to be displayed on the room lamp. The device on which the call was raised can be identified by the reassurance light. The ComStation^{IP} displays the failure of the ward Ethernet.

If the Ethernet on a ward with “ComTerminal^{IP}, PoE” (76 0510 00) or "ConnectionTerminal IP, PoE" (76 0550 00) fails, the entire nurse call system for the ward fails. Patient care must be ensured by other means! The operator must define and derive measures for this situation in a risk analysis. Faults from all wards are additionally displayed on the IP-SystemManager with “System” operating mode (collective indicator), see Section 11.2.2: “One IP-SystemManager with “System” operating mode” (page 201).

15.2. Failure of control units (IP-SystemManagers)

If one IP-SystemManager fails, the other IP-SystemManagers of the nurse call system continue to operate.

The ward with the failed IP-SystemManager switches to minimum operation (i.e. display of calls on the room lamps, call cancellation at the call location). Signalling on the room lamp is guaranteed by the room terminal (ComTerminal^{IP} or ConnectionTerminal IP).

If an IP-SystemManager fails, the “Power” LED display on the device extinguishes. The ComStation^{IP} displays the failure of the ward IP-SystemManager. The fault is displayed on the IP-SystemManager with “System” operating mode (collective indicator), see Section 11.2.2: “One IP-SystemManager with “System” operating mode” (page 201).

15.2.1. Failure of the IP-SystemManager with “System” operating mode

A failure of the IP-SystemManager with “System” operating mode does not impair the basic nurse call functions. If this IP-SystemManager fails, the individual wards continue to work without the cross-ward functions. Speech communication, however, is no longer available. External systems connected through centralised interfaces or through the IP network are no longer available.

This fault is indicated by the fault LED (collective indicator) on the IP-SystemManager with “System” operating mode and can be signalled via a device connected to its fault relay output.

Call handling at the ManagementCenter is no longer possible. The ManagementCenter^{PC} indicates the fault immediately.

15.2.2. Failure during ward coupling

If several wards are coupled, note that calls are not detected if a ward fails and the nurse station is unoccupied. The operator must define and derive measures for this situation in a risk analysis.

15.3. Failure of the IP backbone

A failure of the IP backbone (i.e. the higher-level network that connects all IP-SystemManagers), does not affect the basic nurse call functions.

If the IP backbone fails, the individual wards continue to work without the cross-ward functions. Speech communication, however, is no longer available.

External systems connected through centralised interfaces or the IP backbone are no longer available.

The IP-SystemManager with “System” operating mode indicates a fault. The failure of the IP backbone can be seen on every IP-SystemManager.

Call handling at the ManagementCenter^{PC} is no longer possible. The ManagementCenter^{PC} indicates the fault immediately.

15.4. Collective indicator for faults in the nurse call system

The IP-SystemManager with “System” operating mode is vital for system security. During the planning of the nurse call system, the IP-SystemManager to be assigned “System” operating mode must be decided.

All fault messages of the nurse call system are displayed on this IP-SystemManager.

This takes the form of an LED display on the IP-SystemManager and a fault message output (potential-free changeover contact). This output must be used in such a way that a nurse call system specialist or a technician trained by a specialist is informed immediately about the displayed fault. For example, an acoustic fault display can be connected to the fault message output.

15.5. Power supply failure

If the power supply fails, existing calls and status information are saved and are not lost. Configuration data is saved in the system in a redundant manner.

Table 25. Power supply options for products of the nurse call system

Product		Power supply options		
Designation	**Order no.**	**24 V DC**	**PoE+**	**230 V AC**
ComTerminal^{IP}, PoE	76 0510 00		•	
ComTerminal^{IP}, 24V	76 0510 10	•		
ConnectionTerminal IP, PoE	76 0550 00		•	
ConnectionTerminal IP, 24V DC	76 0550 10	•		
ComStation^{IP}	76 0605 50		• PoE	•
Corridor display^{IP} Alpha 16	76 0150 00	•	•	
Corridor display^{IP} Alpha 16, double-sided	76 0160 00	•	•	
Loudspeaker with announcement interface	05 0024 02	•		
Loudspeaker with announcement interface	05 0024 03	•		
1-channel audio amplifier 100V/25W	00 0647 13	•		
IP-SystemManager	76 2100 00	•		
OSYlink-Door entry speaker 2	77 0801 10	•		
OSYlink-Universal	77 0803 00	•		
OSYlink-Announcement	77 0804 00	•		
OSYlink AS-CCS	77 0870 00	•		

15.5.1. Time between voltage recovery and proper functioning

The time between voltage recovery after a complete mains power failure and the proper functioning of the nurse call system is a maximum of two minutes, depending on the system design. An appropriately dimensioned backup supply bridges mains power failures.

15.5.2. Backup power supply

In buildings without a backup power supply, operation of the nurse call system must be maintained by other means.

The German standard DIN VDE 0834-1 requires the operator to guarantee continued safe operation even after one hour has passed.

The German standard DIN VDE 0834-1 requires the operator and planner to determine the power source for safety purposes prior to planning the nurse call system.

For this purpose, the power supplies for the 24 V DC supply can be expanded using a UPS control unit and a battery module. At 80% load, this provides one hour of backup supply, see Section 13.2: “24 V DC power supply” (page 231).

The failure of PoE and devices connected to 230 V AC must be backed up by separate uninterruptible power supply units.

15.5.3. Fault signalling

The 24 V DC power supply units (77 3410 00, 77 3410 50) of the Flamenco^{IP+} nurse call system indicate the failure of the mains power supply through the extinguishing of an LED indicator. The green “DC OK” LED signals an output voltage above 90% of the set voltage.

The “DC OK” relay contact is closed when the output voltage is above 90% of the set output voltage (i.e. when the “DC OK” LED is on). The contact opens as soon as the output voltage drops by more than 10% below the set output voltage (i.e. if the “DC OK” LED goes out). Switching capacities: max. 60 V DC 0.3 A; 30 V DC 1 A; 30 V AC 0.5 A for resistive loads.

This contact must be used to clearly indicate the failure of the mains power supply to a responsible party (e.g. by connecting an acoustic fault indicator). Responsibility must be determined by the planner, operator and installer as early as the planning stage.

The failure of the mains power supply for PoE power sources must also be clearly reported to a responsible party (e.g. by connecting an acoustic fault indicator). Responsibility must be determined by the planner, operator and installer as early as the planning stage.

15.6. Failure of connected systems

In most application cases, the Flamenco^{IP+} nurse call system is connected to other systems. Nevertheless, the nurse call system remains an independent system. This means that if the PBX, television systems or other interfaces fail, the nurse call system continues to function autonomously.

15.7. Responsibility for fault signalling

The operator of the nurse call system must instruct staff to report all functional irregularities, failures and faults.

If faults occur, nurse call system specialists or persons trained by such specialists must take measures to avert risks and initiate the elimination of faults.

16. Electrical safety

Contents

16.1. Solution approaches

The German standard DIN VDE 0834 stipulates that nurse call systems must meet the 2 x MOPP protection requirements of DIN EN 60601-1 with regard to electrical safety. MOPP (Means of Patient Protection) is a protective measure intended to reduce the risk of electric shock for the patient.

There are two ways to achieve this electrical safety:

- System isolation
- Local isolation

16.1.1. System isolation

System isolation means that the entire nurse call system is designed in accordance with 2 x MOPP according to DIN EN 60601-1. This applies both to the power supply and all other interfaces and connections to external devices and system components. Nurse call systems from the Flamenco system family (i.e. Flamenco^{IP+}, Flamenco^{IP} and Flamenco) are built according to the principle of system isolation. The only exceptions are the room terminals supplied by PoE+ as described in the following section “Local isolation”.

16.1.2. Local isolation

The principle of local isolation means that all devices in the nurse call system that can come into contact with patients are individually designed according to 2 x MOPP according to DIN EN 60601-1 or connected to the rest of the nurse call system via a separating device with 2 x MOPP according to DIN EN 60601-1.

The “ComTerminal^{IP}, PoE” (76 0510 00) and "ConnectionTerminal IP, PoE" (76 0550 00) room terminals, which are supplied by PoE+, has safe isolation with 2 x MOPP according to DIN EN 60601-1. Flamenco^{IP+} nurse call systems in which all room terminals are “ComTerminals^{IP}, PoE” (76 0510 00) or "ConnectionTerminals IP, PoE" (76 0550 00) can be set up according to the principle of local isolation.

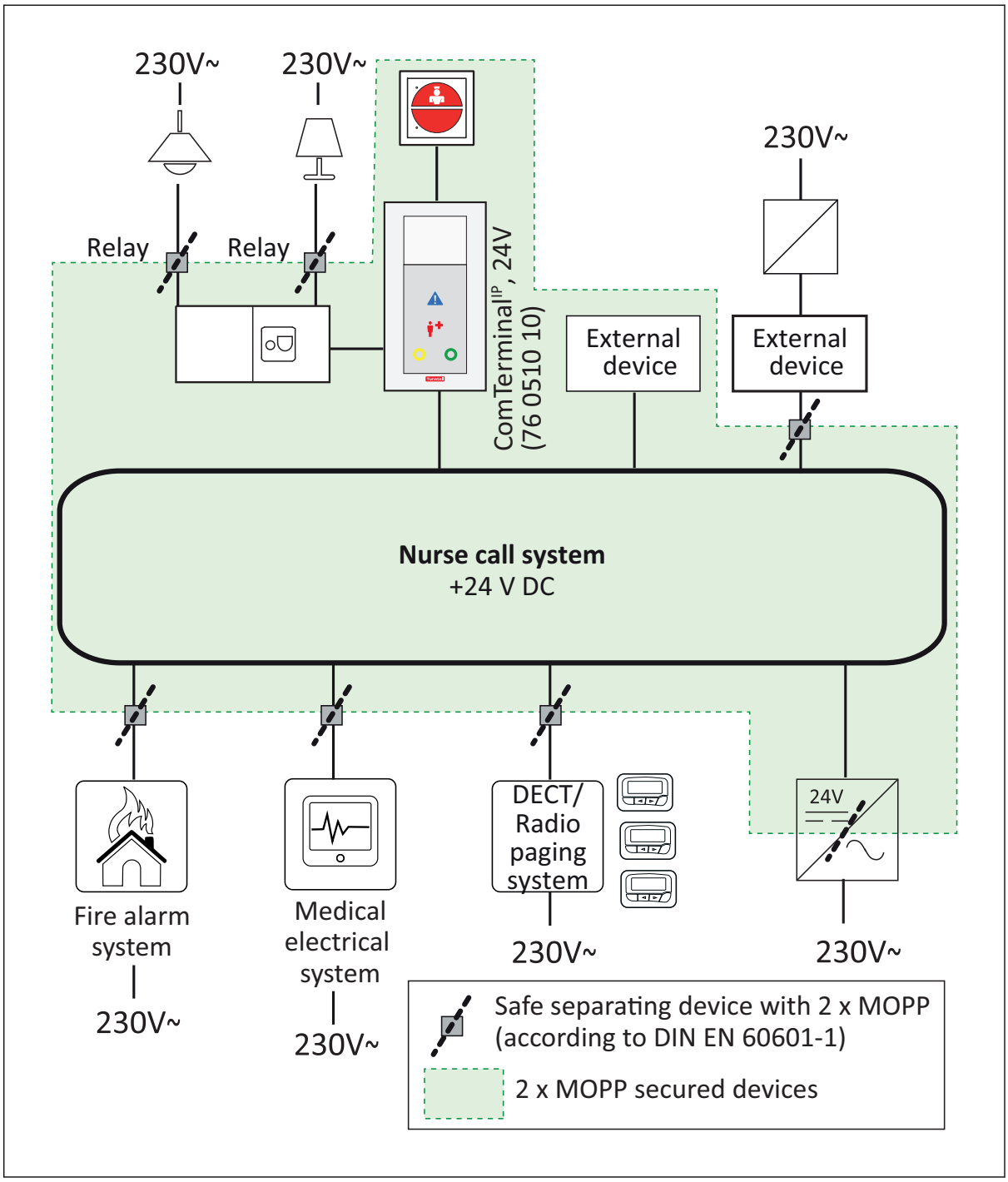
CAUTION
If at least one room terminal (“ComTerminal^{IP}, 24V”, "ConnectionTerminal IP, 24V DC", ComTerminal Flamenco, RoomTerminal Flamenco, ControlTerminal Flamenco) is connected to the 24 V DC power supply of the nurse call system or if at least one room terminal of a legacy system is connected to the OSYnet group bus of the IP-SystemManager via an OSYlink AS-CCS module, the system is not permitted to be set up according to the principle of local isolation and must instead be set up according to the principle of system isolation.

16.2. System isolation in the Flamenco system family

Nurse call systems from the Flamenco system family are built according to the principle of system isolation. For an exception, see Section 16.3: “Local isolation in Flamenco^{IP+} with room terminals with PoE+ supply” (page 271).

The power supply units for generating the low voltage – i.e. power supply unit 10A, DIN rail (77 3410 00) and power supply unit 5A, DIN rail (77 3410 50) – are equipped with safe isolation with 2 x MOPP in accordance with DIN EN 60601-1. Non-system devices that are connected to the general power supply may be connected to the nurse call system only via safe isolation with 2 x MOPP in accordance with DIN EN 60601-1. If such a separating point is not present in the device, it is necessary to install a separate separating device.

Figure 53. System isolation in Flamenco^{IP+} with "ComTerminal^{IP}, 24V" (76 0510 10) or "ConnectionTerminal IP, 24V DC" (76 0550 10)



16.2.1. Connection of non-system devices to the room terminal

Non-system devices that are connected to the general power supply may be connected to the room terminal (e.g. "ComTerminal^{IP}, 24V") only via interfaces that include safe isolation with 2 x MOPP in accordance with DIN EN 60601-1.

Relays for lighting control

When selecting the relays for lighting control, safe isolation must be maintained to 2 x MOPP in accordance with DIN EN 60601-1, see Section 17: “Lighting control” (page 275).

Diagnostic call

Medical electrical devices can be connected to the socket for pear push switch of connection sockets via the diagnostic connection cable (70 0812 10) to raise diagnostic calls. Medical electrical devices have their own power supply according to DIN EN 60601-1 and have internal galvanic isolation. Galvanic isolation from the nurse call system is therefore not required.

RAN interfaces

If an external device with its own power supply or with a connection to an external power supply network is connected to a RAN interface, a separating device with 2 x MOPP according to DIN EN 60601-1 must be interconnected.

16.2.2. Connection of non-system devices to the OSYnet group bus

OSYlink modules

If an external device with its own power supply or with a connection to an external power supply network is connected to an OSYlink module, a separating device with 2 x MOPP according to DIN EN 60601-1 must be interconnected.

The door entry speaker 2 (77 0351 00) is supplied with power via the OSYlink-Door entry speaker 2 (77 0801 10) and contains a separating point to the door opener with 2 x MOPP according to DIN EN 60601-1 to secure the use of the door entry speaker 2 with a door opener.

16.2.3. Connection of non-system devices to the IP-SystemManager

Connection to the IP network

The Ethernet port of the IP-SystemManager already has an integrated separating point with 2 x MOPP according to DIN EN 60601-1. An external separating device is therefore not required.

RS-232 port

The two serial ports (e.g. for ESPA 4.4.4) of the IP-SystemManager are not equipped with separating points according to DIN 60601-1. If these outputs are used, a separating device with 2 x MOPP according to DIN 60601-1 must therefore be interconnected. The RS-232 isolator 2xMOPP, 4kV (76 5000 10) is suitable as a separating device.

The serial connections are required for connecting:

- DECT/radio paging system
- Fire alarm system
- Medical electrical system

16.3. Local isolation in Flamenco^{IP+} with room terminals with PoE+ supply

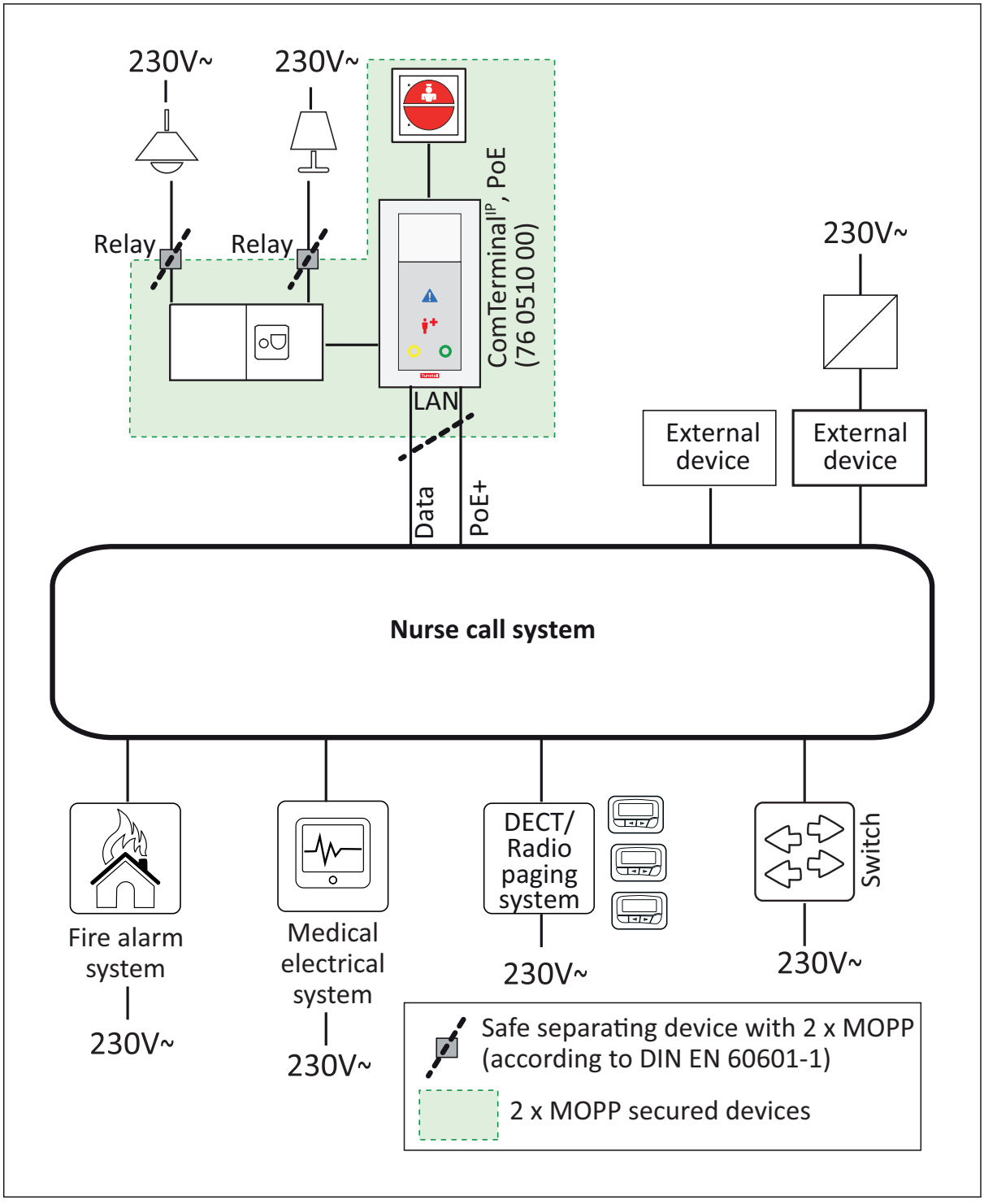
Flamenco^{IP+} nurse call systems in which all room terminals are “ComTerminals^{IP}, PoE” (76 0510 00) or "ConnectionTerminals IP, PoE"(76 0550 00) can be set up according to the principle of local isolation.

CAUTION
If at least one room terminal (“ComTerminal^{IP}, 24V”, "ConnectionTerminal IP, 24V DC", ComTerminal Flamenco, RoomTerminal Flamenco, ControlTerminal Flamenco) is connected to the 24 V DC power supply of the nurse call system or if at least one room terminal of a legacy system is connected to the OSYnet group bus of the IP-SystemManager via an OSYlink AS-CCS module, the system is not permitted to be set up according to the principle of local isolation and must instead be set up according to the principle of system isolation.

“ComTerminals^{IP}, PoE” (76 0510 00) and "ConnectionTerminals IP, PoE" (76 0550 00) are designed with 2 x MOPP according to DIN EN 60601-1. Non-system devices that are connected to the general power supply may be connected to these room terminals only via safe isolation with 2 x MOPP in accordance with DIN EN 60601-1. If such a separating point is not present in the device, it is necessary to install a separate separating device.

The power supply devices (PoE+ switch, PoE+ injector) for generating the extra-low voltage for the nurse call system must comply with DIN EN 62368 for systems with local isolation.

Figure 54. Local isolation in Flamenco^{IP+} with room terminals with PoE+ supply



16.3.1. Connection of non-system devices to the room terminal with PoE+ supply

Non-system devices that are connected to the general power supply may be connected to the “ComTerminal^{IP}, PoE” (76 0510 00) and the "ConnectionTerminal IP, PoE" (76 0550 00) only via safe interfaces that include safe isolation with 2 x MOPP in accordance with DIN EN 60601-1.

Relays for lighting control

When selecting the relays for lighting control, safe isolation must be maintained to 2 x MOPP in accordance with DIN EN 60601-1, see Section 17: “Lighting control” (page 275).

Diagnostic call

Medical electrical devices can be connected to the socket for pear push switch of connection sockets via the diagnostic connection cable (70 0812 10) to raise diagnostic calls. Medical electrical devices have their own power supply according to DIN EN 60601-1 and have internal galvanic isolation. Galvanic isolation from the nurse call system is therefore not required.

RAN interfaces

If an external device with its own power supply or with a connection to an external power supply network is connected to a RAN interface, a separating device with 2 x MOPP according to DIN EN 60601-1 must be interconnected.

17. Lighting control

Contents

The patient devices ePat®lite (77 0370 00), patient handset (74 0747 00) and pear push switch incl. call & 2 light switches (70 0712 00) are equipped with two buttons for switching two light sources (reading light, room light). The pear push switch incl. call and light switch ((70 0710 00, 70 0710 01) includes one switch to turn the light on and off.

Table 26. Devices for lighting control

Connection socket	ePat®lite (77 0370 00), patient handset (74 0747 00)	Pear push switch incl. call and light switch (70 0710 0x)	Pear push switch incl. call & 2 light switches (70 0712 00)
Connection socket combi (70 0425 00)	• Switch two light sources (room light and reading light) on/off (without dimming) • Dim two light sources (room light and reading light)	• Switch one light source (room light or reading light) on/off (without dimming) • Dim one light source (room light or reading light)	-
Connection socket combi, bedhead unit (70 0435 00)			-
Connection socket with call switch (70 0171 60...)	-		• Switch two light sources (room light and reading light) on/off (without dimming) • Dim two light sources (room light and reading light)
Connection socket with call switch, bedhead unit (70 0171 50)	-		

The switching outputs provide an output voltage of 24 V DC and a current of max. 40 mA, which is taken from the power supply of the room terminal. The potential refers to the 0 V connection of the room terminal. The switching pulse (24 V DC, max. 40 mA) supplied by the outputs lasts for as long as the button on the operating device (pear push switch, ePat®lite, patient handset) is pressed.

When selecting light relays, observe the technical connection conditions described in the following sections.

17.1. Application: Switching lights on/off (without dimming)

WARNING
The use of inadmissible relays can endanger people's lives!

- Use only light relays that meet all the requirements set out in this chapter.
- When upgrading patient rooms, note that many relays used in old systems no longer meet current requirements and must therefore be replaced.

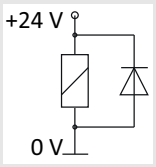
Requirements on the light relays used: Switching lights on/off (without dimming)		
Relay type	• Pulse relay (electronic) • Pulse relay (mechanical)	
Nominal control voltage	24 V DC	
Control voltage range	18–26 V DC	
Maximum current consumption	40 mA	
Freewheeling diode		When using mechanical relays, a freewheeling diode (e.g. 1N4002) directly on the relay is essential.
Potential separation	Safe isolation with 2 x MOPP according to DIN EN 60601-1 must be provided.	

Figure 55. Example connection of pulse relay (electronic)

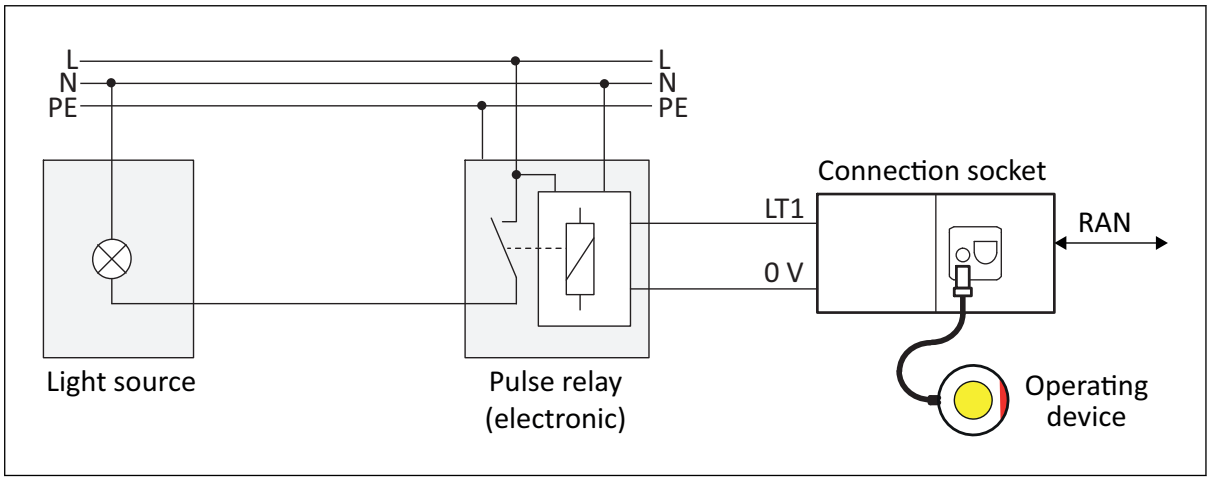
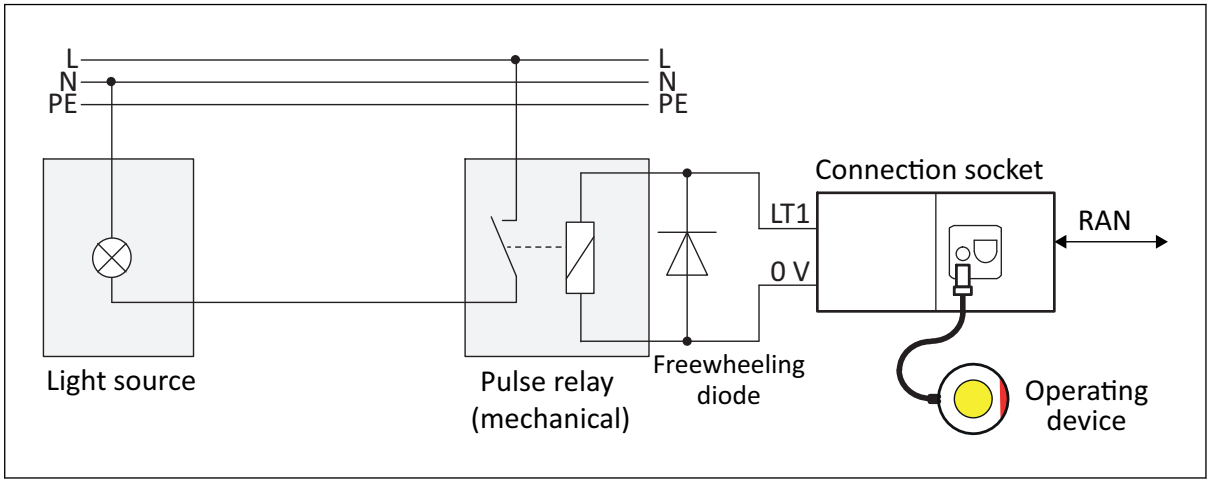


Figure 56. Example connection of pulse relay (mechanical)



17.2. Application: Dimming the light

WARNING
The use of inadmissible relays can endanger people's lives!

- Use only light relays that meet all the requirements set out in this chapter.
- When upgrading patient rooms, note that many relays used in old systems no longer meet current requirements and must therefore be replaced.

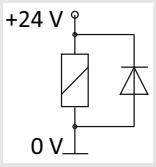
Requirements on the light relays used: Dimming the light	
Relay type	• Switching relay (electronic) • Switching relay (mechanical)
Nominal control voltage	24 V DC
Control voltage range	18–26 V DC
Maximum current consumption	40 mA
Freewheeling diode	 When using mechanical relays, a freewheeling diode (e.g. 1N4002) directly on the relay is essential.
Potential separation	Safe isolation with 2 x MOPP according to DIN EN 60601-1 must be provided.
Ballast	For the dimming function, a corresponding dimmable ballast is required (e.g. OSRAM DALI).

Figure 57. Example connection of switching relay (electronic)

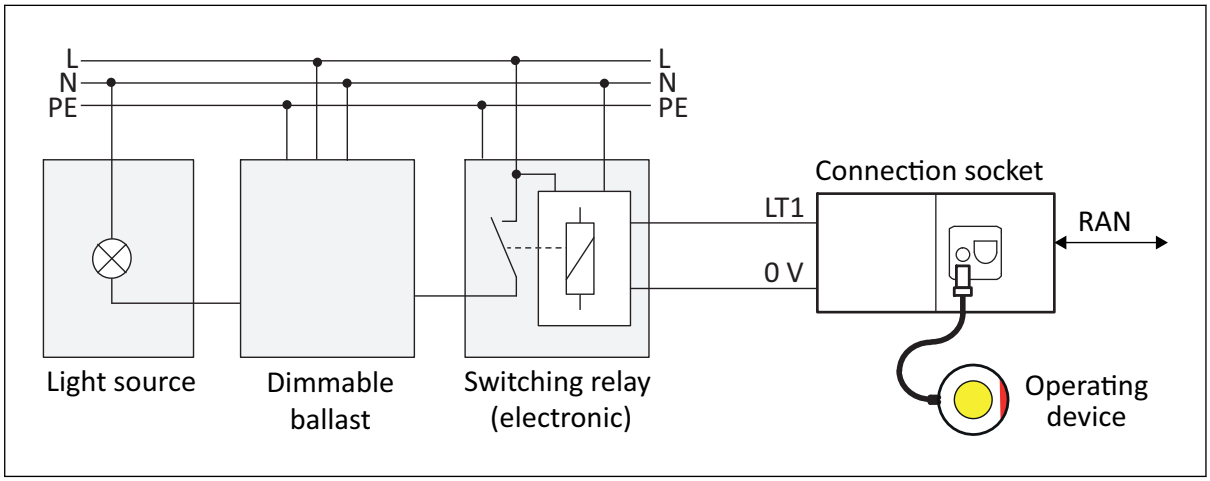
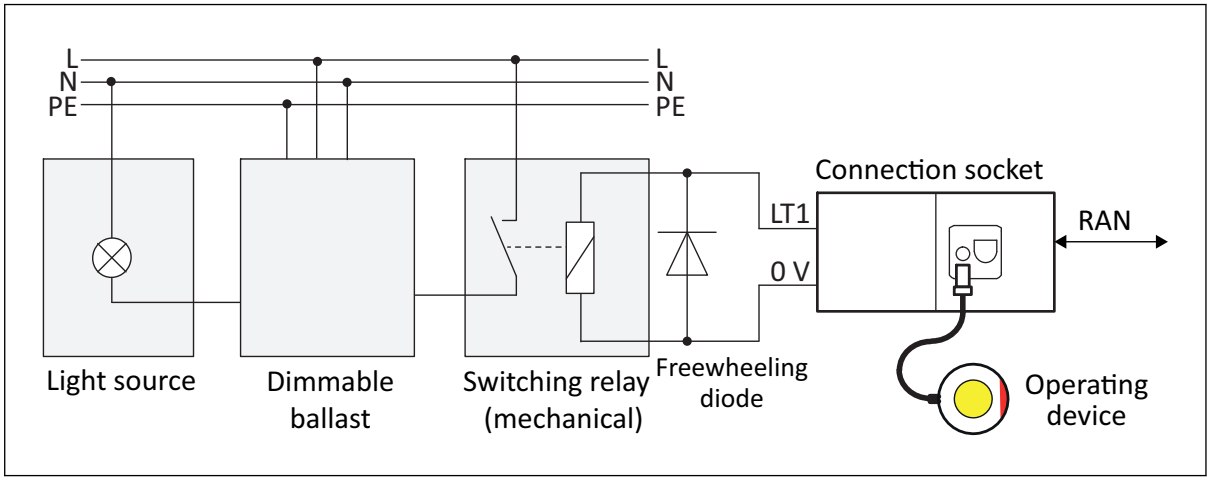


Figure 58. Example connection of switching relay (mechanical)



Redefining Connected Care & Health

For over 65 years, Tunstall Healthcare has pioneered the use of technology to support those requiring care & health intervention to live independently in their chosen home setting. The aim is to balance independence with reassurance, and provide tailored support which meets individuals' needs now and in the future.

Our solutions and services enable independent living, by defining new models of care and creating connected global healthcare solutions which support more than five million people daily.

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