EN 54-16

PROMATRIX 8000

En Installer checklist

DYNACORD
GERMAN ENGINEERING EXCELLENCE

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DYNACORD has made a great effort for the design and manufacturing of the components and also supplies all documentation that enables the assembly of a safe and high quality voice alarm unit in accordance with EN 54-16. DYNACORD has made up this list of requirements, based on the standard, which needs to be filled in and subsequently signed off by both parties. The signed paper has the nature of a certificate and can have significant meaning in the case of a legal investigation of the liability issue for personal injuries.

- The safety of the system in accordance with EN 54-16 in an alarm and emergency application does not only depend on component safety, but also highly on the installation engineer and the operator. For example, the sound pressure level of the system depends on the installation. Moreover, the system should only be installed and operated by qualified personnel.

- Modifications of the system should only be executed by authorized persons in accordance with the safety concept and need to be registered in the system documentation.

- If EN 54 devices and non-EN 54 devices (e.g. a CD player for background music) are assembled in one cabinet, it must be marked which devices belong to EN54 and which devices do not.

- Only use a Power-Supply- and Battery-Backup-Power-Supply-System that is certified acc. EN54-4, in combination with the VACIE acc. EN54-16 and is part of the Declaration of Performance (DoP) of the PROMATRIX 8000 System (e.g. PLN-24CH12).

- The end-user must maintain a journal for the system.

- The installer is responsible for security measures to prevent improper use of the system.

- DYNACORD refuses any liability for damage that might result from non-observance of these instructions.

- The installer has to ensure that he uses certified firmware running on the devices. Information, which firmware versions are applicable can be seen at the web page

Note **The EN 54-16 is a harmonized European standard referring to building products, for an installation the project-depending country-specific standards must be observed.**

Herewith the undersigned states that she/he has processed for her/him applicable requirements, as specified in this document, in an adequate way and has confirmed this fact by signing the right most column of each requirement.

Installer		**End-User**	
Name		Name	
Signature		Signature	
Date		Date	
Place		Place	

The installer is only allowed to affix a VACIE label on the applied cabinet of a PROMATRIX 8000 system, wherein the controller has been installed, after the installer has completed, dated and signed the checklist for EN 54-16 and has clearly indicated on the VACIE label the year in which the VACIE label actually has been affixed on the cabinet. A copy of the completed checklist is to be returned to the regional Bosch office. To ensure compliance to classification IP30 of EN 60529, make sure that the selected cabinet is compliant, and also pay attention to cable glands, ventilation grilles and connection to the wall. Keep in mind that access to the controlling and indicating equipment (e.g. PVA-15CST) is access level 2 (protected by a lock) and that the rear of the equipment is access level 3 (protected by a different or additional lock).

Cabinets (19“ racks) that are allowed within this EN54-16 system certification according European building products regulation (CPR) are listed on the Declaration of performance (DoP). Please refer to this document to ensure the correct cabinet(19“ rack) is used and refer to the manufacturer's site, instructions for use and sales technicians for information on correct IP30 compliant mounting and accessories that are needed to safeguard all aspects of the selected cabinet(19“ rack). The installer must ensure that all open areas and holes of the used cabinet(s) (19“ rack)s which do not comply with IP30 are closed. Use compatible cable glands, climate control, etc. Calculate ample climate control (temperature dependent ventilation) for the cabinet (19“ rack), power supply(ies) and charger(s). Use the fan pack with thermal control.

1. List of authorized end-users

Name:		Name:	
Name:		Name:	
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2. EN 54-16

2.1 4 General requirements

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
4.1	General		
4.1.1	If an optional function with requirements is included in the VACIE, then all the corresponding requirements shall be met.	The following optional functions, with requirements, are included in PROMATRIX 8000 from software Version IRIS-Net V2.7.0 upwards • Audible warning (7.3) • Phased evacuation (7.5) • Manual silencing of the voice alarm condition (7.6.2) • Manual reset of the voice alarm condition (7.7.2) • Voice alarm condition output (7.9) • Indication of faults related to the transmission path to the CIE (8.3) • Indication of fault related to voice alarm zones (8.4) • Voice alarm manual control (10) • Emergency microphone(s) (12)	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		• Redundant power amplifiers (13.14) The following optional functions with requirements are not included in PROMATRIX 8000 and are not used: • Delay(s) to entering the voice alarm condition (7.4) • Output to fire alarm devices (7.8) • Disabled condition (9) • Interface to external control device(s) (11)	
4.1.2	If functions other than those specified in this European Standard are provided for the VACIE, they shall not jeopardize compliance with any requirements of this European Standard.	The installer has to ensure that additional functions like background music do not influence compliance. For other functions such as announcements, chimes or stored messages the priority must be observed.	
4.2	Combined VACIE and CIE		No signature necessary in this line.
	When the VACIE and CIE are combined they may share common indications, manual controls and outputs (see Annex F). In this case, the following shall apply:		No signature necessary in this line.
	a) a single fault in the CIE shall not adversely affect the mandatory functions of the VACIE;		No signature necessary in this line.
	b) indication(s) and manual control(s) of the voice alarm condition shall be clearly identifiable, with the exception of the optional audible warning.		No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
4.3	Power supply		
	Power supply equipment, external or included in the VACIE, shall comply with the requirements of EN 54-4. NOTE The power supply may be shared with that of the fire detection and fire alarm system.	It is the responsibility of the installer to use power supplies and battery charging equipment in accordance with EN 54-4 and which is also certified together with the DYNACORD EN54-16 VACIE The installer has to ensure that the capacity of power supplies operates with sufficient headroom.	

2.2 5 General requirements for indications

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
5.1	Display and functional conditions		
5.1.1	The VACIE shall be capable of unambiguously indicating the following functional conditions, as described in Clauses 6 to 9: – quiescent condition; – voice alarm condition; – fault warning condition; – disablement condition (option with requirements).	The emergency CALL STATIONs indicate the “voice alarm condition” (must be configured) with the red LED (Alarm) and the “fault warning condition” with the yellow LED (Fault). If both LED are off the system is in the “quiescent condition” and the green LED (Power) must be on. The PROMATRIX 8000 system does not support the “disablement condition”. The installer has to ensure that the cabinet provides the required indications. This can be solved e.g. by including a CALL STATION into the cabinet.	
5.1.2	The VACIE shall be capable of being simultaneously in any combination of the following functional conditions on different voice alarm zones: – voice alarm condition; – fault warning condition; – disablement condition (option with requirements).	The PROMATRIX system is capable of being simultaneously in the “voice alarm condition” and in the “fault warning condition”.	No signature necessary in this line.
5.2	Indication display		
	All mandatory indications shall be clearly identifiable, except where otherwise specified in this European Standard.	Mandatory indications are clearly identifiable by system default.	No signature necessary in this line.
5.3	Indication on alphanumeric displays		

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	Where an alphanumeric display is used to display indications relating to different functional conditions these may be displayed at the same time. However, for each functional condition there shall be only one window, in which all of the information relating to that functional condition is grouped.	The LC display of the emergency CALL STATIONs indicates status conditions and fault details of the system. If a fault occurs in the system, the faults are displayed automatically. The information related to emergency has precedence over the faults information. NOTE: See chapter 8.	
5.4	Indication of the supply of power		
5.4.1	A visible indication shall be given by means of a separate discrete light-emitting indicator while the VACIE is supplied with power.	Each PROMATRIX 8000 system component has a green power LED. The LED is on when the component is supplied with power.	No signature necessary in this line.
5.4.2	Where the VACIE is distributed in more than one 19“ rack, an indication of supply of power to the cabinet (19“ rack) shall be given on each distributed 19“ rack.	Each PROMATRIX 8000 system component has a green power LED. The LED is on when the component is supplied with power.	No signature necessary in this line.
5.5	Additional indications		
	Where additional indications are provided, they shall be clearly identifiable and shall not override the primary indication of the VACIE.	All of the additional indications are clearly identified (description in the User manuals of the PROMATRIX 8000 system); since the fault warning indication and the voice alarm indication always do have separate indicators, the primary indications are not overridden. The display of the CALL STATION offers a menu that is also used for other indications than indication of the voice alarm and/or fault warning condition. The Installation and User Instructions of the PROMATRIX 8000 system CALL STATIONs clearly identifies the other indications of the menu. The other menus do not override the emergency and faults information.	No signature necessary in this line.

2.3 6 The quiescent condition

Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
Any kind of system information may be displayed during the quiescent condition. However, no indications shall be given which could be confused with indications used in the: – voice alarm condition, or – fault warning condition, or – disablement condition (option with requirements).	All of the additional indications are clearly identified (description in the User manuals of the PROMATRIX 8000 system); since the fault warning indication and the voice alarm indication always do have separate indicators, the primary indications are not overridden.	No signature necessary in this line.

2.4 7 The voice alarm condition

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
7.1	Reception and processing of fire signals		
7.1.1	The VACIE shall be capable of receiving and processing alarm signals from the CIE or from manual control on the VACIE or both, and causing the appropriate voice alarm outputs to be activated within 3 s or on expiry of any delay period (see 7.4). NOTE See Annex E for additional information relating to the interface between the VACIE and the CIE.	The installer has to ensure the maximum 3-second delay time is observed. NOTE: Task Engine Debounce/Timer/Supervision Block.	
7.1.2	The mandatory indications and/or outputs shall not be falsified by multiple alarm signals received simultaneously from the CIE and/or manual controls.	The PROMATRIX 8000 system offers 100 discrete priorities. Correct configuration assures that mandatory indications, and outputs behave consistently when multiple alarm signals are received simultaneously from the CIE and/or manual controls.	
7.1.3	Where the VACIE and CIE are in separate 19“ racks, failure of the transmission path between the CIE and the VACIE shall not result in any loss of control or any change of state of the VACIE, unless option 8.3 is used.	PROMATRIX is an autonomous subsystem that can operate without connection to the CIE. The effect of the failure of the transmission path between the CIE and the PROMATRIX system is limited to fault reporting and losing interaction between the CIE and the PROMATRIX system. The installer has to ensure that a fault of the transmission path starts or stops an alarm signal/ alarm message.	
7.2	Indication of the voice alarm condition		
7.2.1	The presence of a voice alarm condition shall be indicated on the VACIE, without prior manual intervention, by:		No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	a) a visible indication by means of a separate discrete light emitting indicator (the General Voice Alarm Activated indicator) and	A voice alarm condition is indicated on the PROMATRIX 8000 system by a red LED (Alarm) indicator on all emergency CALL STATIONs. The installer has to ensure to configure the alarm condition accordingly.	
	b) a visible indication for each activated voice alarm zone where manual controls are provided (see 10.2);	For manual control only all call possible.	
	NOTE This may be by means of separate discrete indicators or an alphanumeric display as specified in 13.8.		No signature necessary in this line.
	c) an optional audible indication, as specified in 7.3.		
7.2.2	The audible warning shall be capable of being silenced at access level 1 or 2.	The installer has to ensure that the audible warning can be silenced at access level 1 or 2.	
7.3	Audible warning (option with requirements)		
	The audible warning of the voice alarm condition (see 7.2.1 c)) may be the same as that for the fault warning condition. If they are different, the voice alarm condition warning shall have priority.	For audible warning the emergency CALL STATION uses a different frequency than for fault warning. Audible warning has a higher priority than fault warning. NOTE: Regarding the sound pressure level, see requirement 13.10.2.	No signature necessary in this line.
7.5	Phased evacuation (option with requirements)		
	The VACIE may have a provision to phase the warning signals to the emergency loudspeaker zones. The facility shall be configurable at access level 3. There may be	Phased evacuation is possible by using different control contacts from CIE. Every contact represents an emergency zone. The installer has to ensure to configure the correct	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	provision to switch on and switch off the phased evacuation sequence by means of a manual operation at access level 2 (see Annex A for information on access levels).	settings at the DPM 8016 "PAGINGS" dialog. If a system needs the provision to switch on and switch off the phased evacuation sequence by means of a manual operation, the installer has to configure the Task Engine accordingly. We suggest to label the button with "P-EVAC OFF".	
7.6	Silencing of the voice alarm condition		
7.6.1	Silencing of the voice alarm condition from the CIE		No signature necessary in this line.
7.6.1.1	Where the voice alarm condition has been triggered from the CIE, the VACIE shall respond appropriately to a silence instruction from the CIE.	Voice alarm triggered from the CIE can also be silenced from the CIE. The installer has to ensure to configure the system according the requirement.	
7.6.1.2	The silencing procedure may allow for the completion of messages in the process of being broadcast.	The silencing will be done immediately or after being broadcasted.	
7.6.2	Manual silencing of the voice alarm condition (option with requirements)		
	It may be possible to manually silence the voice alarm message from the VACIE at access level 2. In this case, following manual silencing, it shall be possible to re-activate the voice alarm message at access level 2.	The installer has to configure the system accordingly.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
7.7	Reset of the voice alarm condition		
7.7.1	Reset of the voice alarm condition from the CIE		No signature necessary in this line.
	Where the voice alarm condition has been triggered from the CIE, the VACIE shall respond appropriately to a reset instruction from the CIE.	The installer has to ensure that a separate input from the CIE is configured for resetting the alarm condition.	
7.7.2	Manual reset of the voice alarm condition (option with requirements)		No signature necessary in this line.
7.7.2.1	It may be possible to reset the voice alarm condition from the VACIE at access level 2 by means of a separate manual control. In this case, this control shall be used only for reset and may be the same as that used for reset from the fault warning condition.	The installer has to ensure to configure a separate CALL STATION button to reset the voice alarm condition. This manual reset function must have a higher priority than the CIE contact.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
7.7.2.2	Following a manual reset operation, the indication of the correct functional condition corresponding to any received signals shall either remain or be re- established within 20 s.	After a reset operation, the PROMATRIX 8000 system will immediately indicate the functional condition it is currently in. It will also immediately respond to received signals that will bring it into another functional condition. The installer has to ensure not to add too much delay.	
7.9	Voice alarm condition output (option with requirements)		
	The VACIE may have provision for transmitting a signal that is in the voice alarm condition. In this case, it shall activate the output only in the voice alarm condition.	The installer has to ensure that the PROMATRIX 8000 system transmits a signal that it is in the voice alarm condition via control output contact which has to be configured.	

2.5 8 Fault warning condition

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
8.1	Reception and processing of fault signals		
8.1.1	The VACIE shall enter the fault warning condition when signals are received which, after any necessary processing, are interpreted as a fault.	When the PROMATRIX 8000 system receives a supervision fault signal (i.e. detects a fault in the system), the fault warning condition is entered. The installer has to ensure that	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		faults are configured accordingly.	
8.1.2	The VACIE shall be capable of simultaneously recognizing all of the faults specified in 8.2 and, if provided, in 8.3 unless this is prevented by: – the presence of an alarm output signal on the same voice alarm zone and/or – the disablement of the corresponding voice alarm zone or function.	The installer has to ensure to include only fault messages in the fault handling. The PROMATRIX 8000 system is capable of recognizing all of its system faults simultaneously. The PROMATRIX 8000 system is able to recognize faults in a voice alarm zone even when there is an alarm output signal on the zone.	
8.1.3	The VACIE shall enter the fault warning condition within 100 s of the occurrence of any fault, or the reception of a fault signal or within another time as specified in this European Standard or in other parts of EN 54.	The PROMATRIX 8000 system recognizes and reports all faults within the time defined in EN 54.The installer has to ensure that faults are configured accordingly.	
8.2	Indication of faults in specified functions		
8.2.1	The presence of faults in specified functions shall be indicated on the VACIE without prior manual intervention. The fault warning condition is established when the following are present:		No signature necessary in this line.
	a) a visible indication by means of a separate light emitting indicator (the general fault warning indicator),	The PROMATRIX 8000 system provides a visible indication when it is in the fault warning condition via the yellow LED (Fault) of the emergency CALL STATIONs, and via the yellow front panel LED (Fault) of the PROMATRIX 8000 CONTROLLER.	
	b) a visible indication for each recognized fault as specified in	The PROMATRIX 8000 system offers visual indication of	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	8.2.3, 8.2.4, 8.3 (if provided), 8.4 (if provided), and 8.5 and	individual faults at the LC display or via additional LEDs on emergency CALL STATIONS.	
	c) an audible indication, as specified in 8.6.	The PROMATRIX 8000 system provides an audible fault indication when it is in the fault warning condition via a sounder at the emergency CALL STATION. In case of a CALL STATION fault, it additionally indicates the fault warning condition via a sounder at the PROMATRIX 8000 CONTROLLER.	
8.2.2	If the indication is on an alphanumeric display, which cannot simultaneously indicate all of the faults because of its limited capacity, at least the following shall apply:		No signature necessary in this line.
	a) the presence of fault indications which have been suppressed shall be indicated;	The first line shows the total quantity of active faults, the other lines indicate fault details.	
	b) suppressed fault indications shall be capable of being displayed by means of a manual operation at access level 1 or 2 which interrogates only fault indications.	The next error is displayed each time you press the (ESC) fault button. After the last error, the display begins again from the beginning.	No signature necessary in this line.
8.2.3	The following faults shall be indicated by means of separate light emitting indicators and/or an alphanumeric display:		No signature necessary in this line.
	a) an indication at least common to any power supply fault resulting from: 1) a short circuit or an interruption in a transmission path to a power supply (item L of Figure 1 of EN 54-1:1996), where the power supply is contained in a different 19“ rack from that of the VACIE, and 2) the power supply faults as specified in EN 54-4;	The installer has to ensure that all Power faults are indicated on the LCD of the emergency CALL STATION.	
	b) an indication at least common to any earth fault of less than	The installer has to ensure that all Ground faults from the	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	50 kΩ which is capable of affecting a mandatory function, and which is not otherwise indicated as a fault of a supervised function;	amplifier outputs are indicated on the LCD of the emergency CALL STATION.	
	c) an indication of the rupture of any fuse within the VACIE, or the operation of any protective device within the VACIE which is capable of affecting a mandatory function in the fire alarm condition;	Every blown fuse or the operation of a protected device that affects a mandatory function will result in a fault since the mandatory functions are supervised.	
	d) an indication of any short circuit or interruption, at least common to all transmission paths between parts of the VACIE contained in more than one 19“ rack, which is capable of affecting a mandatory function and which is not otherwise indicated as a fault of a supervised function.	The installer has to ensure that the transmission paths between the cabinets are supervised if the cabinets used for one system are not mounted in one room.	
	NOTE These indications may be suppressed during the voice alarm condition.		No signature necessary in this line.
8.2.4	The following faults shall be indicated at least by means of the general fault warning indicator:		No signature necessary in this line.
	a) any short-circuit or interruption in a voice alarm transmission path between parts of the VACIE contained in more than one cabinet (19“ rack) even where the fault does not affect a mandatory function;	The installer has to ensure that the transmission paths between the cabinets are supervised if the cabinets used for one system are not mounted in one room.	
	b) any short circuit or interruption in the voice alarm transmission path to the emergency microphone capsule, if provided;	The installer has to ensure that the supervision of the emergency CALL STATION microphone is activated.	
	c) any short circuit or interruption in the voice alarm transmission path between the VACIE and loudspeakers	The installer has to ensure that the loudspeaker lines are permanently supervised:	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	even where the fault does not affect the operation of loudspeakers.	• DPA amplifiers by End-of-Line boards PLN-1EOL or EOL 8001 NOTE: For additional safety a daily, weekly or monthly impedance measurement can be used to find failures in the transmission path between short-circuit and interruption	
	d) any short circuit or interruption in the transmission path between the VACIE and fire alarm devices when used (see 7.8);	The installer has to ensure that the path to fire alarm devices is supervised. NOTE: E.g. with supervised control inputs.	
	e) failure of any power amplifier.	The installer has to ensure that the supervision of the amplifiers is activated.	
8.3	Indication of faults related to the transmission path to the CIE (option with requirements)		
	The VACIE may have provision for an indication of faults related to the transmission path to the CIE. In this case, the short circuit or interruption of the transmission path to the CIE shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display.	The installer has to ensure that the path to the CIE is supervised. NOTE: E.g. with supervised control inputs.	
8.4	Indication of faults related to voice alarm zones (option with requirements)		
	The VACIE may have provision for an indication of faults related to voice alarm zones. In this case the short circuit or interruption of a voice alarm transmission path between the VACIE and the loudspeakers in that zone shall be indicated by means of a separate light emitting indicator per zone	The PROMATRIX 8000 system is able to indicate each loudspeaker zone failure at the emergency CALL STATION display by indicating the zone number.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	and/or an alphanumeric display.		
8.5	System fault		
	A system fault is a fault as specified in 14.4 or 14.6 in the case of software controlled VACIE. A system fault may prevent requirements of this European Standard, other than those specified below, from being fulfilled. In the event of a system fault at least the following shall apply:		No signature necessary in this line.
	a) a system fault shall be visibly indicated by means of the general fault warning indicator and a separate light emitting indicator on the VACIE. These indications shall not be suppressed by any other functional condition of the VACIE and shall remain until a manual reset and/or another manual operation at access level 2 or 3;	The installer has to ensure that one button on the emergency CALL STATION needs to be configured as system fault reset. The yellow LED of this button indicates a system fault. The button needs to be clearly marked being related to system fault. NOTE: We recommend to label the system fault key: „System Fault“	
	b) a system fault shall be audibly indicated. This indication may be capable of being silenced.	The Installer has to enable the sounder of the emergency CALL STATION. The sounder can be silenced by pressing the fault (ESC) button.	
8.6	Audible indication		
8.6.1	The audible indication of faults required in 8.2 shall be capable of being silenced manually at access level 1 or 2 at the VACIE. The same manual operation may be used as for	The sounder in the emergency CALL STATION which is used for failure indication can be silenced by pressing the fault (ESC) button.	No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	silencing the voice alarm condition.		
8.6.2	The audible indication shall be silenced automatically if the VACIE is automatically reset from the fault warning condition.	If the PROMATRIX 8000 system is reset from the fault warning condition, the sounder is automatically silenced.	No signature necessary in this line.
8.6.3	If previously silenced, the audible indication shall resound for each newly recognized fault.	The sounder used for audible indication starts sounding again every time a new failure occurs.	No signature necessary in this line.
8.7	Reset of fault indications		
8.7.1	The indications of faults as required in 8.2 shall be capable of being reset:		No signature necessary in this line.
	a) automatically when faults are no longer recognized, and/or	The indication of faults is reset automatically when faults are no longer recognized.	No signature necessary in this line.
	b) by a manual operation at access level 2.	Reset of a system fault (watchdog) can be carried out via a dedicated configured CALL STATION button.	
8.7.2	Following reset as specified in 8.7.1, the indication of the correct functional conditions corresponding to any received signals shall either remain or be re-established within 20 s.	PROMATRIX 8000 fault indication will remain or be re-established within 20 sec.	No signature necessary in this line.
8.8	Transmission of the fault warning condition		
	The VACIE shall have provision for transmitting, by means of at least general fault signal, all faults specified in Clause 8. This fault signal shall also be given if the VACIE is de-energized.	There is a fixed defined potential free output contact at the PROMATRIX 8000 CONTROLLER (Ready Relays on Control Output Connector) which gives a collective fault signal. This contact is also active when the system is de-energized.	

2.6 10 Voice alarm manual control (option with requirements)

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
10.1	General requirements		
	The VACIE may have provision for manually activating the voice alarm output condition. If a voice alarm manual control is provided the following shall apply:	NOTE: We recommend to label the voice alarm manual control key: „Start Alarm“	No signature necessary in this line.
	a) a manual control which causes a voice alarm condition to be given shall only be accessible at access level 2 and	The Installer has to ensure to configure access level 2 for the manual control.	
	b) it shall be possible to activate each voice alarm zone individually and/or in one or several groups of voice alarm zones and	For manual control only all call possible.	
	c) the manual activation of a voice alarm zone shall not prevent the mandatory indications and outputs to other voice alarm zones.	For manual control only all call possible.	No signature necessary in this line.
10.2	Indication of the voice alarm zones in an activated condition		
	The indication for the voice alarm condition in the voice alarm zone(s) associated with each manual control shall be available without any manual action and shall not be suppressed. This indication shall be by means of:		No signature necessary in this line.
	a) a separate light emitting indicator (the General Voice Alarm Output activated indicator), and	The voice alarm condition is indicated on the PROMATRIX 8000 system by a red indicator on the emergency CALL STATIONS (the alarm LED). The installer has to ensure to configure the emergency CALL STATIONS accordingly.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	b) a separate light emitting indicator and/or alphanumeric display for each voice alarm zone and/or an indication for one or several groups of voice alarm zones.	For manual control only all call possible.	No signature necessary in this line.
	NOTE These indicators may not necessarily indicate which emergency message is being broadcast in each voice alarm zone.		No signature necessary in this line.
10.3	Indication of the voice alarm zones in fault condition		
	The indication for the fault condition of the VACIE, which would prevent the generation and transmission of the voice alarm signal to the voice alarm zone(s) associated with each manual control, shall be available without any manual action and shall not be suppressed. This indication shall be by:		No signature necessary in this line.
	a) a separate light emitting indicator (the general fault indicator), and	The fault condition is indicated on the PROMATRIX 8000 system by a yellow indicator on all emergency CALL STATIONS (the fault LED).	
	b) an indication for each voice alarm zone and/or an indication for one or several defined groups of zones.	Individual faults for each voice alarm zone are indicated at the emergency CALL STATION display. The installer has to ensure to configure the system accordingly.	

2.7 11 Interface to external control device(s) (option with requirements)

Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
The VACIE may have provision for interfacing to external control devices(s) such as standardized user interfaces required by local regulations. In this case, the following shall apply: a) the interface shall allow only access level 1 and 2 functions; b) the mandatory functions of the VACIE shall not be overridden; c) any short circuit, interruption or earth fault in the transmission path to the external device(s) shall: 1) not prevent the mandatory function of the VACIE and 2) be indicated on the VACIE, at least by means of the general fault warning indicator. NOTE The external control devices should comply with available local codes, European Standards or national standards.	Not supported	No signature necessary in this line.

2.8 12 Emergency microphone(s) (option with requirements)

Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
The VACIE may have provision for emergency microphone(s). In this case the emergency microphone(s) shall have:		No signature necessary in this line.
a) priority over all inputs, including pre-recorded messages;	An emergency microphone can be configured from 0 (lowest priority) to 100 (highest priority). The installer has to ensure that the priority of the emergency microphone is higher than the priorities of other signals including pre-recorded messages. Higher priorities overrule lower priorities in case of resource or destination conflicts. Calls with the same priority operate on a first come first serve basis.	
b) an emergency microphone control to open the microphone channel, at access level 2;	The Installer has to ensure to configure access level 2 for the emergency microphone.	
c) where a pre-announcement attention drawing signal is provided, an indicator adjacent to the microphone shall show when the signal has finished and live speech can commence;	An emergency CALL STATION has an LC display which indicates an active pre-chime. If the pre-chime signal has finished, the display shows "announcement". NOTE: Pre-announcement signal is mixed with live speech.	No signature necessary in this line.
d) when the emergency microphone control is operated, any audible indication that might interfere with the use of the microphone shall be automatically muted;	The sounder of the CALL STATION will be switched off automatically when a call is made. The installer has to ensure to switch off any loudspeaker near the emergency microphone.	
e) where the VACIE has provision for the connection of more than one emergency microphone, they shall be configurable for priority at access level 3 or 4 and only one emergency microphone shall be active at any one time.	An emergency microphone can be configured from 0 (lowest priority) to 100 (highest priority). Higher priorities overrule lower priorities in case of resource or destination conflicts. Calls with the same priority operate on a first come first serve basis.	

2.9 13 Design requirements

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
13.1	General requirements and manufacturer's declarations		
13.1.1	The VACIE shall comply with the design requirements of this clause, where relevant to the technology used. Some requirements can be verified by testing. Others can only be verified by inspection of the design and its accompanying documentation because of the impracticability of testing all of the possible combinations of functions and of establishing the long-term reliability of the VACIE.		No signature necessary in this line.
13.1.2	In order to assist the process of design inspection, the manufacturer shall declare the following in writing:		No signature necessary in this line.
	a) that the design has been carried out in accordance with a quality management system which incorporates a set of rules for the design of all elements of the VACIE;	The DYNACORD development department responsible for development/maintenance of the PROMATRIX 8000 system - part of the EVI Audio GmbH (Member of DYNACORD group) - works according to ISO 9001.	No signature necessary in this line.
	b) that the components of the VACIE have been selected for the intended purpose and are expected to operate within their specification when the environmental conditions outside the cabinet (19“ rack) of the VACIE comply with Class 3k5 of EN 60721-3-3:1995 as amended by EN 60721-3-3:1995/A2:1997.	The components of the PROMATRIX 8000 system operate within their specification within the specified environmental conditions (Class 3k5 of EN 60721-3-3:1995 + A2:1997). It is the responsibility of the installer that other parts of the system, e.g. the 19” racks, comply with this requirement.	No signature necessary in this line.
13.2	Documentation		
13.2.1	The manufacturer shall prepare installation and user documentation which shall be submitted for assessment together with the VACIE. This shall comprise at least the	The PROMATRIX 8000 user manuals, the installer checklist and the applicable application notes are provided.	No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	following:		
	a) a general description of the equipment, including a list of 1) the optional functions with requirements of this European Standard, 2) the functions relating to other parts of EN 54, and 3) the ancillary functions not required by this European Standard, if any;	The user manual of the PROMATRIX 8000 CONTROLLER contains a general description of the PROMATRIX 8000 system. The installer checklist (this document) describes all functions related to EN 54-16. The application note Technical_Bulletin_PROMATRIX8000_WIRES contains a detailed overview for compliant system wiring.	No signature necessary in this line.
	b) technical specifications of the inputs and outputs of the VACIE, sufficient to permit an assessment of the mechanical, electrical, and software compatibility with other components of the system (e.g. as described in EN 54-1), including where relevant: 1) the power requirements for recommended operation, 2) the maximum number of voice alarm zones, 3) information concerning the connection of emergency microphones, 4) the maximum and minimum electrical ratings for each input and output, 5) information on the communication parameters employed on each transmission path, 6) recommended cable parameters for each transmission path, and	The inputs and outputs for audio and control are described in the user manual and additional application note including the technical data, system functions, configuration instructions, compliancy to standards. The additional application note named: Technical_Bulletin_PROMATRIX8000_WIRES is made	No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	7) fuse ratings;	available on the Dynacord website. It provides a detailed overview about cable types to be used for EN54-16 compliant wiring.	
	c) specified means to limit the consequences of fault (see 13.5.2);	The user manual describes all means to limit the consequences of a fault.	No signature necessary in this line.
	d) configuring and commissioning instructions;	Configuring and commissioning instructions are included in the User Manual and in the IRIS-Net software help file.	No signature necessary in this line.
	e) operating instructions;	Operating instructions are included in the user manual.	No signature necessary in this line.
	f) maintenance information.	Maintenance information of the PROMATRIX 8000 system is included in the user manual.	No signature necessary in this line.
13.2.2	The manufacturer shall prepare design documentation that shall be submitted for assessment together with the VACIE. This documentation shall include drawings, parts lists, block diagrams, circuit diagrams and a functional description to such an extent that compliance with this European Standard may be checked and that a general assessment of the mechanical and electrical design is made possible.	All of the mentioned design documentation is available as for inspection by testing authorities.	No signature necessary in this line.
13.3	Mechanical design requirements		
13.3.1	The cabinet (19“ rack) of the VACIE shall be of robust construction consistent with the method of installation recommended in the documentation. It shall meet at least classification IP30 of EN 60529:1991 as amended by EN	The emergency CALL STATION complies with this requirement. The installer has to ensure to implement this requirement for 19” units, by means of using a correct 19” frame, meeting at least classification IP30 of EN	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	60529:1991/A1:2000.	60529:1991+A1:2000.	
13.3.2	All interconnections and settings inside the cabinet (19“ rack) shall be accessible at level 3.	The installer has to ensure to install the system in a compliant 19” rack with restricted access to the rear panels.	
13.3.3	The VACIE may be housed in more than one 19“ rack. If the documentation shows that the 19“ racks may be installed in locations distributed within the protected premises, then all of the mandatory manual controls and indicators shall be on one cabinet (19“ rack) or on 19“ racks declared to be only suitable for mounting adjacent to each other.	The mandatory controls and indicators are located on the emergency CALL STATION. The PROMATRIX 8000 system can be configured as a networked system. In case of a networked system, the collected fault warning condition from all connected controllers will be indicated as collected fault via the fault LED on the network master controller.	
13.3.4	All mandatory manual controls and light emitting indicators shall be clearly labeled to indicate their purpose. The labels shall be legible at 0.8 m distance in an ambient light intensity from 100 lux to 500 lux.	The emergency CALL STATION has paper slots next to each of its programmable buttons. The installer has to ensure providing proper labels that fit into these paper slots and implement this requirement.	
13.3.5	The terminations for transmission paths and the fuses shall be clearly labeled.	All terminations for transmission paths are clearly labeled on all of the PROMATRIX 8000 system elements (near the relevant connectors).	No signature necessary in this line.
13.4	Electrical and other design requirements		
13.4.1	The processing of signals shall give the highest priority to the voice alarm condition.	Signals within the PROMATRIX 8000 system have a configured priority. The installer has to ensure to give the voice alarm signals the highest priority.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
13.4.2	Transitions between the main and the standby power sources shall not change any indications and/or the state of any outputs, except those relating to the power supplies.	Transition between the main and standby power sources does not change any of the indications and/or state of any outputs of the PROMATRIX 8000 system, except for the fault warning indication in order to report the failure of a power source.	No signature necessary in this line.
13.4.3	If the VACIE has provision for disconnecting or adjusting the main or the standby power source, this shall only be possible at access level 3 or 4.	The installer has to ensure that these items are only accessible at access level 3 or 4.	
13.5	Integrity of transmission paths		
13.5.1	A fault in any voice alarm transmission path between the VACIE and other components of the voice alarm system shall not affect the correct functioning of the VACIE or of any other voice alarm transmission path.	The PROMATRIX 8000 system has the following voice alarm transmission paths between itself and other parts of the voice alarm system: – transmission path between CIE and PROMATRIX 8000 system via input contact, – transmission path between PROMATRIX 8000 system and the loudspeaker(s), – transmission path between PROMATRIX 8000 controller and emergency PAGING STATION, – Transition path between PROMATRIX 8000 Controllers (multiple VACIE) via Ethernet. If there is a fault in the transmission path between the CIE and an input contact of the PROMATRIX 8000 system, the configured action of the input contact will not be automatically activated or deactivated. The correct functioning of the PROMATRIX 8000 system or of any other voice alarm	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		transmission path is therefore not affected. The fault will be reported. If there is a fault in the transmission path between the PROMATRIX 8000 system, i.e. the amplifier outputs and the loudspeaker(s), the loudspeaker(s) will not be able to produce the intended audio signal. However, the fault will not affect the correct functioning of the PROMATRIX 8000 system or any other voice alarm transmission path. The fault will be reported only.	
13.5.2	A short circuit or an interruption in the transmission path to the loudspeaker(s) shall not affect more than one voice alarm zone for longer than 100 s following the occurrence of the fault.	The installer has to ensure to install the system accordingly.	
13.5.3	A single short circuit or an interruption in any voice alarm transmission path between distributed 19“ racks of a VACIE shall not prevent the activation of a voice alarm output condition to more than one voice alarm zone for longer than 100 s following the occurrence of the fault.		No signature necessary in this line.
13.5.4	If the VACIE is designed to be used with a power supply (item L of Figure 1 of EN 54-1:1996) contained in a separate cabinet (19“ rack), then an interface shall be provided for at least two voice alarm transmission paths to the power supply, such that a short circuit or an interruption in one does not affect the other.	If a 19”-cabinet (rack) or adjacent cabinets provide enough space for the battery and/or charger, the installer can install the complete PSE (power supply equipment) as referred in EN 54-4 in one cabinet. In that case, this requirement is not applicable. In case the installer installs the backup part of the PSE (battery and charger) in a separate cabinet, PROMATRIX 8000 provides a separate DC-backup connection on the PROMATRIX 8000 units (Amplifiers). This implies that a PROMATRIX 8000 installation will always have two separate power paths to the power supply: one for mains and one for	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		DC backup. Both will not influence each other. For parts that do have only 24V DC connectors (e.g. PROMATRIX 8000 CONTROLLER), the PSE needs to be in the same rack. It is the responsibility of the installer to let the installation comply with this requirement.	
13.6	Accessibility of indications and controls		
	Four access levels shall be provided on the VACIE, from access level 1 (most accessible) to access level 4 (i.e. least accessible). Manual controls at a given access level shall not be accessible at a lower access level. The following shall apply:	The Installer has to ensure to configure the access levels described below. **Access level 1** is intended for operational users of the PROMATRIX 8000 system. It provides direct operational access to the unrestricted functionality of the PROMATRIX 8000 system via: – Input contacts of system components that have level 1 functionality – The front panel menu of system components (LED indications, acknowledge button) – A non-emergency CALL STATION **Access level 2** is intended for advanced operational users of the PROMATRIX 8000 system. It provides operational access to the system after gaining access to a physical part of the system. Access level 2 is enforced for the access level 1 access points by means of physical access control, which	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		restricts access to persons that possess the physical access device (e.g. key, access card, etc.). – Input contacts with physical access control; the system components offering the input contacts are located in a room/ cabinet that is not generally accessible. – An emergency CALL STATION with physical access control over the lock key. The key switch has to be connected so the key can be removed in locked position only. Use pin 1 and pin 2 of the key switch. – An emergency CALL STATION with physical access control; the CALL STATION is located in a room/housing that is not generally accessible.	
		Access level 3 is intended for installers and/or configurators of the PROMATRIX 8000 system. It provides access for hardware configuration and installation of the PROMATRIX 8000 system after physical access to the rear of the 19” rack. – Physical access control by means of installing the system elements in a restricted environment, such as placing the 19” units in a 19” rack with key lock. This type of access can be used for physical diagnosis of the system, e.g. inspect interconnections.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
		Access level 4 is intended for maintenance personnel of the PROMATRIX 8000 system. It provides software configuration and firmware upgrade of the PROMATRIX 8000 system components after logical identification. This level of access is offered through: – The IRIS-Net PC software. At access level 4, specialized configuration software is needed.	
	a) all mandatory indications shall be visible at access level 1 without prior manual intervention (e.g. the need to open a door);	All mandatory indications are placed on the emergency CALL STATION. The installer has to ensure to mount the emergency CALL STATION on a suitable place. E.g. behind a glass door.	
	b) manual controls at access level 1 shall be accessible without special procedures;	The installer has to ensure to enable access level 1 controls without special procedures.	
	c) indications and manual controls that are mandatory at access level 1 shall also be accessible at access level 2;	All PROMATRIX 8000 indications (LEDs, equipment connected to output contacts, front panel indication, LC display) and manual controls (input contacts, CALL STATION buttons) that are accessible at access level 1 are also accessible at access level 2.	
	d) entry to access level 2 shall be restricted by a special procedure;	The installer has to ensure to enable access level 2 controls with special procedures.	
	e) entry to access level 3 shall be restricted by a special	Entry to access level 3 is restricted by limiting access to the rear of the 19” rack. Correct configuration and installation	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	procedure, differing from that for access level 2;	(physical access control) will ensure that the special procedure differs from that of access level 2. The system administrator should define different users in IRIS-Net. The installer should ensure that the physical access procedure differs from that of the physical access procedure of access level 2.	
	f) the entry to access level 4 shall be restricted by special means which are not part of the VACIE.	The IRIS-Net PC software. At access level 4, specialized configuration software is needed.	
	NOTE Further access levels are permitted provided that they are distinct from the access levels described in this standard.		
13.7	Indications by means of light-emitting indicators		
13.7.1	Mandatory indications from light emitting indicators shall be visible in an ambient light intensity up to 500 lux, at any angle up to 22.5° from a line through the indicator perpendicular to its mounting surface: – at 3 m distance for the general indications of functional condition, – at 3 m distance for the indication of the supply of power, and – at 0.8 m distance for other indications.	The emergency CALL STATION fulfills the requirements. The installer has to ensure to put the emergency CALL STATION on a place where the requirements are also met, e.g. installation behind a class door. No dark glass. Avoid installation on top or bottom of the 19” rack.	
13.7.2	If flashing indications are used, both the on period and the off period shall be greater than or equal to 0.25 s, and the	The emergency CALL STATION fulfils the requirements.	No signature necessary in this

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	frequencies of flash shall not be less than: – 1 Hz for voice alarm indications, and – 0.2 Hz for fault indications.		line.
13.7.3	If the same light emitting indicators are used for the indication of specific faults and disablements, fault indications shall be flashing and disablement indications shall be steady.		No signature necessary in this line.
13.8	Indications on alphanumeric displays		
13.8.1	If an alphanumeric display consists of elements or segments, the failure of one of these shall not affect the interpretation of the displayed information.	The LCD of the emergency CALL STATION does not consist of elements or segments.	No signature necessary in this line.
13.8.2	If an alphanumeric display is used to display mandatory indications, it shall be clear and unambiguous.	The display of the emergency CALL STATION is used for indicating the different statuses. Therefore each displayed information has a separate term.	No signature necessary in this line.
13.8.3	Mandatory indications on an alphanumeric display shall be legible for at least one hour following the display of a new indication of the voice alarm condition and at least 5 minutes for fault or disablement conditions, at 0.8 m distance, in ambient light intensities from 5 to 500 lux, at any angle from the normal to the plane of the display up to: – 22.5º when viewed from each side, and – 15º when viewed from above and below.	The emergency CALL STATION fulfills the requirements and the indication stays on as long as the system is in the corresponding condition. The installer has to ensure to put the emergency CALL STATION on a place where the requirements are also met, e.g. installation behind a glass door. No dark glass. Avoid installation on top or bottom of the 19” rack.	
13.9	Indication colors		
13.9.1	The colors of the general and specific indications from light emitting indicators shall be:		No signature necessary in this line.

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	a) red for indications of voice alarms;	The alarm LED of the emergency CALL STATIONS is on (red) when the system is in the voice alarm condition.	No signature necessary in this line.
	b) yellow for indications of: 1) fault warnings, and 2) disablements;	The Fault LED of the emergency CALL STATIONS is on (yellow) when the system is in the fault warning condition.	No signature necessary in this line.
	c) green for the indication that the VACIE is supplied with power.	All light emitting indicators of the PROMATRIX 8000 system that indicate power supply are green.	No signature necessary in this line.
	NOTE Where voice alarm automatic message status indicators are provided, it might be advantageous to indicate the difference between evacuation and alert messages. In this case, red may be used for emergency messages and yellow may be used for alert messages.		No signature necessary in this line.
13.9.2	The use of different colors is not necessary for indications on alphanumeric displays. However, if different colors are used for different indications, the colors used shall be as specified in 13.9.1.	The LCD used in the emergency CALL STATION does not use different colors for indications.	No signature necessary in this line.
13.10	Audible indications		
13.10.1	Audible indicators shall be part of the VACIE. The same device may be used for voice alarm zone activated and fault warning indications.	The sounder in the emergency CALL STATION will be used for both indications.	No signature necessary in this line.
13.10.2	The minimum sound pressure level, measured under anechoic conditions at a distance of 1 m, with any access door(s) on the VACIE closed, shall be:	The emergency CALL STATION fulfills the requirements. The installer has to ensure to put the emergency CALL STATION on a place where the requirements are also met,	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	– 60 dBA for the voice alarm condition, and – 50 dBA for the fault warning condition.	e.g. installation behind a glass door.	
13.11	Indicator testing		
	All mandatory visible and audible indicators shall be testable by a manual operation at access level 1 or 2.	PROMATRIX 8000 provides an LED test via the menu and the LED test can programmed direct access via in button on the emergency CALL STATION at access level 1. This indicator test is a local test. When activated all indications on that emergency CALL STATION and all its connected emergency CALL STATION EXTENSIONS are switched on to visually and audible check the indicators.	No signature necessary in this line.
13.12	Audio performance		
13.12.1	Output power The VACIE output power shall be as declared by the manufacturer.	The output power of the amplifier elements of the PROMATRIX 8000 system are specified in the data sheets and user manuals.	No signature necessary in this line.
13.12.2	Signal-to-noise ratio The VACIE shall have an A-weighted signal-to-noise ratio of at least 45 dB according to IEC.	The A-weighted signal-to-noise ratio of the PROMATRIX 8000 amplifiers is specified in the data sheets and in the manuals. The signal-to-noise ratio is above 100 dB. The complete signal chain from microphone to loudspeaker is compliant to this clause.	No signature necessary in this line.
13.12.3	Frequency response The frequency response of the VACIE shall fit within the non-shaded area in Figure 1 – VACIE frequency response limits without microphone(s) for sound sources without microphone(s) (e.g. message store) and Figure 2 – VACIE	The default settings of the audio filters in IRIS-Net ensure the correct frequency response of all sound paths. If the default settings are edited in IRIS-Net, the installer has to ensure that the frequency response still fits within the non-shaded area in Figure 1 and 2.	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	frequency response limits with microphone(s) for sound sources with microphone(s). NOTE 1 The frequency response limits exclude loudspeakers. NOTE 2 A bandwidth of 400 Hz to 4 kHz is sufficient to achieve acceptable intelligibility in some acoustic environments. However, a higher frequency limit may be necessary to achieve acceptable intelligibility in more difficult acoustic environments due, for example, to the masking effect caused by reverberation and/or ambient noise.		
13.13	Message store(s)		
	Pre-recorded messages shall be stored in non-volatile memory that retains the messages when all power sources are removed. NOTE Tapes or magnetic or optical data disks for the storage of emergency messages are not considered suitable at the time of drafting this European Standard (see Annex C).	The pre-recorded messages are digitally stored on an EEPROM/Flash in uncompressed format (PCM, 16- bit). This EEPROM/Flash retains the messages when all power sources are removed.	
13.14	Redundant power amplifiers (option with requirements)		
13.14.1	The VACIE may have provision for at least one spare power amplifier. In this case:		No signature necessary in this line.
	a) in the event of the failure of a power amplifier, the faulty amplifier shall be capable of being replaced automatically with	The installer has to ensure to configure spare amplifier	

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
	a spare amplifier within 10 s of the fault being detected; NOTE This can be achieved, for example, by switching or by permanently connected parallel amplifiers.	switching accordingly.	
	b) the spare power amplifier(s) shall have at least the same functionality and output power as the replaced amplifier.	The installer has to ensure to include a spare amplifier with at least the same output power.	
13.14.2	Every fault of an amplifier shall be indicated by the general fault warning indicator as specified in 8.2.	The installer has to ensure to enable supervision on the spare amplifier.	
13.14.3	Supervision of the spare amplifier(s) shall be maintained during the functional condition whilst the VACIE is powered by either the mains or standby power supplies.	Supervision on spare amplifiers works with both conditions.	No signature necessary in this line.

2.10 14 Additional design requirements for software controlled VACIE

	Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
14.1	General requirements and manufacturer's declarations		
	In order to fulfill requirements of this European Standard the VACIE may contain elements which are controlled by software. In this case, the VACIE shall comply with the requirements of Clause 14 as well as those of Clause 13, where relevant to the technology used.	The PROMATRIX 8000 system is controlled by compliant software.	No signature necessary in this line.
14.2	Software documentation		
14.2.1	The manufacturer shall prepare documentation that gives an overview of the software design, which shall be submitted for assessment together with the VACIE. This documentation shall be in sufficient detail for the design to be inspected for compliance with this European Standard and shall comprise at least the following: a) functional description, using a clear methodology appropriate to the nature of the software, e.g. graphical representations of the system design, data flows and control flows and of the main program flow, including: 1) a brief description of each module and the tasks it performs, 2)the way in which the modules interact, 3) the way in which the modules are called, including any interrupt processing, and 4) the overall hierarchy of the program; b) a description of which areas of memory are used for the various purposes (e.g. the program, site specific data and running data);	Design and development documents have been provided and approved by an accredited and notified certification authority acc. CPR.	No signature necessary in this line.

	c) a description of how the software interacts with the hardware of the VACIE. Where dynamic memory management is employed, a separation shall be implemented between the program, site specific data and running data and this shall be described in connection with the method of memory allocation.		
14.2.2	The manufacturer shall prepare and maintain detailed design documentation. This need not be submitted for assessment but shall be available for inspection in a manner which respects the manufacturer's rights of confidentiality. This documentation shall comprise at least the following: a) a description of each module of the program, as it is implemented in the source code of the program, containing: 1) the name of the module, and 2) the identification of the author(s); b) the source code listing, including all global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized; c) details of any software tools used in the preparation of the program (e.g. high level design tools, compilers, assemblers).	Documents have been inspected and approved by an accredited and notified certification authority acc. CPR.	No signature necessary in this line.
14.3	Software design		
	In order to ensure the reliability of the VACIE the following requirements for software design shall apply: a) the software shall have a modular structure;	PROMATRIX 8000 is built on a modular structure.	No signature necessary in this line.

	b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause an error in the program execution; c) the software shall be designed to avoid the occurrence of a deadlock in the program flow.	Not relevant, there is no manually or automatically generated data. PROMATRIX 8000 is equipped with a watchdog which will signalize a deadlock and automatically carry out a reset.	
14.4	Program monitoring (see also Annex C)		
14.4.1	The execution of the software program shall be monitored as under 14.4.2 or 14.4.3. If routines associated with the main functions of the program are no longer executed, either or both of the following shall apply: a) the VACIE shall indicate a system fault (as in 8.3); b) the VACIE shall enter the fault warning condition and indicate faults of affected supervised functions (as in 8.2.3, 8.2.4, 8.3, 8.4 and 8.5), where only these functions are affected.	Upon activation of a watchdog, a fault is reported after restart of the failing component. A system fault is indicated when entering the fault condition. Upon activation of a watchdog, a fault is reported after restart of the failing component indicating the failing component.	No signature necessary in this line.
14.4.2	If the software program executes in one processor, the execution of the routines in 14.4.1, it shall be monitored by a monitoring device as in 14.4.4.	All processors used in the PROMATRIX 8000 system are either guarded by a hardware watchdog or are monitored by a processor that is guarded by a hardware watchdog.	No signature necessary in this line.
14.4.3	If the software program executes in more than one processor, the execution of the routines in 14.4.1 shall be monitored in each processor. A monitoring device as in 14.4.4 shall be associated with one or more processors, and at least one such processor shall monitor the functioning of any processor	The network controller is responsible for monitoring all processors in the system. Upon failure of one of the processors, either due to a watchdog failure or due to a communication failure a fault is generated. Failure of the network controller itself will cause the system fault output	No signature necessary in this line.

	not associated with such a monitoring device.	contact to be de-activated to indicate a system fault.	
14.4.4	The monitoring device of 14.4.2 and 14.4.3 shall have a time-base independent of that of the monitored system. The functioning of the monitoring device, and the signaling of a fault warning, shall not be prevented by a failure in the execution of the program of the monitored system.	All components that have a processor have an external watchdog.	No signature necessary in this line.
14.4.5	In the event of a system fault as specified in 14.4.1 a) or 14.6, those parts of the VACIE affected shall enter a safe state not later than the indication of the system fault. This safe state shall not result in the false activation of mandatory outputs.	Safe state is included at all components.	No signature necessary in this line.
14.5	The storage of programs and data (see also Annex C)		
14.5.1	All executable code and data necessary to comply with this European Standard shall be held in memory that is capable of continuous, unmaintained, reliable operation for a period of at least 10 years.	According to the datasheet of the memory more than 10 years.	No signature necessary in this line.
14.5.2	For each software program, the following requirements shall apply:		No signature necessary in this line.
	a) the program shall be held in non-volatile memory, which can only be written to at access level 4, and	The program is stored in a non-volatile memory. Configuration requires access level 4.	No signature necessary in this line.
	b) it shall be possible to identify the version reference or references of the program at access level 3. The version reference or references shall be in accordance with the documentation of 14.2.1.	Version reference can be read out at access level 3.	No signature necessary in this line.
14.5.3	For site-specific data, including emergency message(s), the following requirements shall apply:		No signature necessary in this line.

	a) the alteration of site specific data shall only be possible at access level 3 or 4;	The installer is responsible to maintain the site data.	
	b) the alteration of site specific data shall not affect the structure of the program;	The configuration is a data set that cannot alter the program itself.	No signature necessary in this line.
	c) if stored in read-write memory, there shall be a mechanism which prevents the memory being written to during normal operation at access level 1 or 2, such that its contents are protected during a failure in program execution;	There is an EEPROM/Flash which holds configuration and program data. This is copied to RAM. This RAM is used during operation. The EEPROM/Flash is supervised.	No signature necessary in this line.
	d) it shall be possible to either read or interrogate the site specific data at access level 2 or 3, or the site specific data shall be given a version reference that shall be updated when each set of alterations is carried out;	With specialized software at access level 3 the configuration can be read out.	No signature necessary in this line.
	e) if the site specific data has a version reference, it shall be possible to identify this at access level 2 or 3.	No version reference.	No signature necessary in this line.
14.6	Monitoring of memory contents		
	The contents of the memories containing the site specific data shall be automatically checked at intervals not exceeding 1 h. The checking device shall signal a system fault if a corruption of the memory contents is detected.	There is a checksum on this data which is checked every 1 hour.	No signature necessary in this line.

2.11 15 Marking

Clause/Requirement EN 54-16:2008	**Compliance**	**Signature**
The VACIE shall be marked with the following information, which shall be legible at access level 1:	Marking the PROMATRIX 8000 system with the number of this European standard (which is legible at access level 1) is the responsibility of the installer, since the installer will have to install and configure the system properly in order to let the installation comply with this standard. A label for correct marking is provided with the system and must be correctly filled in and attached to the rack.	
a) the number of this European Standard, i.e. EN 54-16;	The EN54-16 and EN54-4 is visible on the label.	No signature necessary in this line.
b) the name or trademark of the manufacturer or supplier;	The name “DYNACORD” is visible on the label.	No signature necessary in this line.
c) the type number or other designation of the VACIE.	The type number “PROMATRIX 8000” is visible on the label	No signature necessary in this line.
It shall be possible to identify a code or number that identifies the production period of the VACIE at access level 1 or 2 or 3.	The rack label has a date indication. The installer has to ensure that the year of installation is clearly marked and that is identifiable at access level 1, 2 or 3.	
NOTE Where ZA.3 covers the same information as this clause, the requirements of this clause are met.		No signature necessary in this line.

2.12 16 Tests

All applicable tests are carried out in an accredited and notified test lab.

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