Comfort, the Intelligent Home System

Comfort Compliance to EN50131 and PD6662

Contents

Introduction

EN50131

The European Standards, EN50131, was introduced as a common standard for intrusion alarm standards in European countries It was the intention that the EN50131 would enable:

- Ease of sale by equipment manufacturers in all countries
- Ease of movement for installers to work in any country
- Ease of judgment for customers to assess the quality of products in any country

However, problems arose while creating the standard due to the varying standards used across different countries. What has resulted is a standard that is far from completion and a confusing series of sections of the standard which contain contradictions and the many BSIA guidelines which will probably baffle most installers.

Within EN50131, there was supposed to be the following parts:

- EN50131-1 – Generic Requirements
- EN50131-2 – Intrusion Detection
- EN50131-3 – Control and Indicating Equipment (i.e. Control panel and keypads)
- EN50313-4 – Warning Devices
- EN50131-5 – Interconnections
- EN50131-6 – Power Supplies
- EN50131-7 – Applications Guidelines

EN50131 replaces the British Standards BS4737, BS7042, and BS6799, which were supposed to be withdrawn on 1st October 2005. However, DD243:2004 still applies.

The most recent version of EN50131 is a draft version – prEN50131-1:2004 which takes the place of the earlier EN50131-1:1997. This ‘mature draft’, which states the generic requirements for Intruder and Hold-up Alarm Systems, was due to be replaced in late 2005/early 2006.

PD6662:2004

PD6662:2004 ("Scheme for the application of European Standards for Intruder and Hold-ip alarm systems") is the Published Document in the UK which shows how the implementation of European Standards for Intruder Alarm Systems is to be implmented in the UK. Compliance with PD6662:2004 allows EN50131 to be adopted in the UK.

Rather than implement the published standard EN50131-1:1997, PD6662 calls up the latest draft of the revision currently being carried out – prEN50131-1:2004.

To comply to alarm confirmation requirements (DD243), the plan was for security equipment to be compliant to both PD6662:2004 and DD243:2004.

To provide guidance to the interpretation of some of the clauses in PD6662:2004 and prEN50131-1:2004 which could have been misinterpreted, BSIA Form No. 171 (Guideline for the use of the PD6662:2004 scheme for the implementation of prEN50131-1:2004) was prepared. This document attempted to clarify areas of ambiguity in the former 2 documents.
The Installer is advised to obtain the standards and various guidelines and be familiar with all the requirements.

Comfort Compliance to EN50131 and PD6662

Comfort is able to comply with EN50131 and /or the PD6662 implementation with the relevant firmware versions for Comfort and Keypads. However it depends on the Installer to make the correct settings in Comfigurator and to do the overall system design including selection of components.
The part number CP9000-ULT/EN03 with the EN03 enclosure is the Comfort part number which is EN50131/PD6662 compliant
Comfort Ultra II firmware 5.106 and above is required for compliance to the European standards. Comfigurator 2.2.0 and above is required to configure the relevant settings
KP04 Keypad Firmware version 1.08e and KP03 version 22e is required for compliance. These keypads have been given a new part number KP04E and KP03E to distinuguish them from keypads without this "feature". KP04 and KP03 without the E-suffix will still be available for non-compliant installations. The EN50131 label will be affixed on all keypads which are EN50131-compliant.
This document focusses mainly on the aspects of the standards affecting Comfort and how Comfort implements the standards. In general the task for Installers to comply may be daunting given the incomplete nature, the number of documents and difficulty of finding the correct advice among the documents including EN50131 parts, PD6662, and the various guidelines issued.
A Comfigurator template pd6662.cct will be provided with the essential settings for compliance related to Comfort. The relevant settingsare

- Modules & Settings > Uncheck "Show Alarms", check "Entry Dial Delay"

- Security > Arming & Disarming > Away Arming Method “Final Door Arm” or “Exit Terminator” (Using Door Station)
- Control > Keypad : Check “Need Code” box for AWAY, NIGHT, DAY arming keys
- Tamper Alarm must turn on the BELL only when set. The Tamper Alarm Siren Type is changed to Trouble so it does not turn on the BELL output. The Tamper Alarm Response turns on the BELL if the Security system is SET. Require Engineer Reset action is assigned to Tamper Alarm Response
- PD6662 Table E.2 says that Mains Fault does not require an Engineer Reset. For Grade 3, Tamper and Fault alarms require an Engineer to Reset. In Comfort, the Response “Require Engineer Reset” is assigned to Tamper, Zone Trouble and Communications Failure Fault alarms. This means that when these alarms occur, the user cannot set the system again until an Engineer Reset is performed, ie the Engineer signs in with Engineer Code.. Grade 2 systems do not require Engineer Reset

Behaviour of EN50131-compliant Comfort

EN50131 imposes restrictions on the display and announcement of information on keypads and other visual devices in an alarm system. This degrades the functionality of Comfort which is most useful to users, for example

1. At Grade 3, Keypads will not be able to show the Set/Unset status on the LCD or the Home/Armed LEDs until the user signs in, and only for 30 seconds. Hence if you do not remember if the system has been armed, a simple glance at the keypad will not do.
2. When the system is unset, any trouble or alert condition is allowed to be displayed only as an ALERT indication, ie a flashing OFF (for Trouble) or ARM (Alert/Alarm) LED on the keypads, without the actual condition neing allowed to be displayed or announced. Power Failure or Low Battery conditions **cannot** be indicated on the AC LED steady or Flashing. The user must sign in to know exactly what the “alert” is
3. Zones which are activated cannot be displayed on the LCD keypad or announced eg it may be the Front door is announced whenever it is opened. But this is not allowed
4. When the system is SET, even Alert indications are not permitted, forcing the user to have to sign in to know what is happening. Another problem is, if the user signs in the code without the * prefix, the system will disarm, which is not desirable.
5. When the system is SET, display or announcement of intrusion zones is not allowed, as even an Alert Indication is not permitted. Even the siren sound on the keypads is NOT permitted (even though the Internal and external sirens may be sounding)
6. For an EN50131-compliant system, touchscreens and other GUIs which are permanently on should not be used otherwise they will violate these requirements

The effect of all these restrictions is to degrade the performance of Comfort (and other automation systems) and remove some of the more useful features to a user. The

intention is to inconvenience the burglar who is **already in the premises** by withholding information from him, a premise which is highly debatable.

Security Classifications

EN50131 differs to British Standards as:

- It applies to both hard-wired and wireless systems
- 'Risk Assessment' is needed to determine system designs

To determine the risk level involved in the installation, EN50131 has introduced the concept of Security Grades to reflect the likely intruder type and the effort likely to be put into a burglary.

Security Grades

There are four security grades with the new standards, which serves to provide an indication of the following:

- Extent of the system
- Signalling
- Tamper security

The four grades are:

- **Grade 1:**
  This is for installations with a low risk of thefts. The property is unlikely to attract intruders. It assumes that the theft is likely to be opportunistic rather than pre-planned.

- **Grade 2:**
  This is for installations with higher risk of thefts. The property is likely to contain items of interest to experienced thieves, who have basic knowledge of alarm systems, and are likely to be equipped with general range of tools and portable instruments such as multi-meters and bolt cutters. An option has also been created for lower risk Grade 2 systems, which are not monitored. This is classified as Grade 2X.
- **Grade 3:**
  This is for installations with substantial risk of thefts. The property is highly likely to be broken into and contain valuable items. The thief is also expected to be very experienced in intruder alarm systems.
- **Grade 4**
  This is for high-risk installations. Intruders are likely to have planned the theft in advance and possess instruments to alter part of the intruder alarm system to avoid detection and are unlikely to work alone.

How installers are supposed to assess the experience level of potential thieves for a property is not described

Note that it is not necessary to use the same grades for the various components of the intruder alarm system. If the installation is rated as Grade 2, then it would be acceptable to use a Grade 3 power supply. However, if the installation is rated as Grade 3, then using a Grade 2 power supply or keypad would downgrade the system to Grade 2.

It is suggested that the lowest grade which is applicable for a property should be used, instead of applying a higher grade than what is necessary.

Environmental Classes

An addition in the European Standards is the need for environmental classes, which will determine the location as to where the components of the intruder alarm are to be installed.

These four classes are:

- **Class I Indoor**, which is for indoor environments without environmental problems, such as residential areas and office. The operating environment would vary between +5˚C to +40˚C, 75% relative humidity (RH).
- **Class II Indoor-General**, which is for indoor environments that may be under the influence of draughts and condensation, such as warehouses and corridors. The operating environment would be within -10˚C to +50˚C, 75% RH.
- **Class III Outdoor-Sheltered**, which is meant for outdoor environments that are not directly affected by the elements, e.g. sheltered areas. The operating environment would be from -25˚C to +50˚C, 75% RH (30 days 85% to 95%)
- **Class IV Outdoor-General**, meant for outdoor environments that are fully susceptible to the effects of the elements. The operating environment would range from -25˚C to +60˚C, 75% RH (30 days 85% to 95%)

Comfort is classified as Class II

Access Levels

Under the European Standards, four levels of access to the system have been defined, based on their roles.

The four levels are:

- **Level 1**, where the system is can be viewed by any passer-by (who is considered a potential burglar by the standards)
- **Level 2**, where the system is accessed by a normal system user with User Code
- **Level 3**, where the system is accessed by an installer with Engineer Code
- **Level 4**, where the system is accessed by the manufacturer. Comfort has no equivalent for Level 4.

The level will affect the indication requirements by the European Standards.

Product Marking

With the introduction of the new European Standards, there has been a need for products to be marked. These only apply to products where the standard has been published and listed in PD 6662:2004.

Despite that, manufacturers are required to state that the component is suitable for use in a specific grade and environmental class.

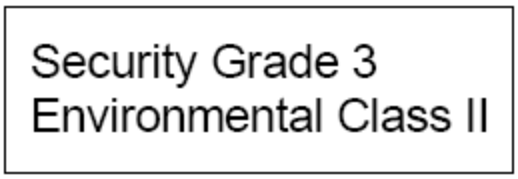
Besides that, each product must carry a label or code number, where the label is to be legible, durable and unambiguous.

Furthermore, every instruction manual or guide provided with each component is to have the following statement:

> *"This product is suitable for use in systems designed to comply with PD6662:2004 at grade 2 or 3 and environmental class II"*

As such, since Comfort may be compliant with Grade 2 and 3 as for different installations, this document will focus on how to install Comfort to comply with PD6662:2004 at Grade 2 and 3.

An example of the label to be included with every Comfort product would be as follow:



Recognition of Faults

(prEN50131-1 Table 1)

Faults	Grade 1	Grade 2	Grade 3
Detectors/Hold up Devices	M	M	M
PPS	M	M	M
APS	M	M	M
Interconnections	M	M	M
ATS	M	M	M
Warning Devices	M	M	M
“Other” Faults	OP	OP	OP

Note on Table I: This requirement does not imply detector, hold up ATS, WD is required to produce a dedicated fault output, for example, a WD fault can be derived from a failure of periodic communications

This requirement for I&HAS to recognise faults on WD, Detectors and holdup devices (as distinct from detection of Interconnection Faults) is obviously problematic for any I&HAS. Even though the note says that such detection can be derived from failure of periodic communications with the device, conventional detectors, holdup devices and WD do not communicate with the I&HAS except by contact closure. .BSIA Form 171 Issue 2 “Guideline for Implementation of PD6662” by BSIA says that faults can be derived from Interconnection methods, there is no interconnection method that can detect if a PIR stops working or a WD stops working due to an internal fault. In any case Interconnection faults are already mentioned separately in the table. Monitoring of interconnections can only detect open circuit and short circuit faults, not detector and WD faults as the table seems to specify.
Thus to fully implement the standard, each Detector, WD and other powered devices need to provide a fault output to a zone on the I&HAS. It is questionable how many devices are available from manufacturers which can provide this output.

Housing

PD6662:2004 (Annex B) has listed a series of requirements needed for the housing of the alarm system. The system should be housed in one or more separate enclosures, each container constructed from one or more of the following materials:

- Mild Steel of at least 1.2 mm in thickness
- Stainless Steel of at least 1 mm in thickness
- Polycarbonate of at least 3 mm in thickness
- Material offering durability, security of fixing, and resistance to attack by hand-held tools at least the equal of the previous few materials

I&HAS components shall provide means to prevent access to internal components to minimse the risk of tampering. Housings shall be sufficiently robust to prevent undetected access to internal components without visible damage.

In EN50131-6 for Power supplies, there are also factors to be considered for the triggering of the tamper devices for opening of the enclosure in a "normal manner" which presumably means opening the cover. This will also be determined by the Grades.

- For Grade 2, it should not be possible to introduce a tool of 2.5 mm diameter without the triggering of tamper devices.
- For Grade 3, it should not be possible to introduce a tool of 1.0 mm diameter without the triggering of tamper devices.

Tamper Detection – Means to be detected (prEN50131-1 Table 13)

Means	Grade 1	Grade 2	Grade 3
Open by normal means	M	M	M
Removal from mounting	Op	M	M
Penetration	Op	Op	Op

The EN03 Enclosure (dimensions 358 x 375 x 95 mm) has been designed to comply with the standards. Tamper protection against removal of the cover as well as removal from mounting is provided by two tamper switches.

Warning : Enclosures supplied by 3rd parties may not be EN50131-compliant, and should not be claimed as such.

Setting and Unsetting

Under the new European Standards, the requirements for Resetting, Setting and Unsetting the intruder alarm system with regards to the User Access Levels have been spelt out.

Entry & Exit Routes

The arrangement of the Entry and Exit paths should be made in accordance with DD243:2004. When the Setting and Unsetting is carried out in two stages, the distance between the two points should be as short as possible, e.g. initiating on the keypad near the front door, followed by completion by closing the final door.

Setting

For Setting, its requirements are as spelt out:

- Setting may be initiated within the specified premises and completed outside, such as the pressing the Away button on the keypad and completing arming with the closing of the final door.
- The entire Setting procedure may be completed outside using suitable Portable Ancillary Equipment (perhaps with the Exit Terminator option via the Door Station).
- Timed Setting is allowed under EN50131, but not under DD243:2004. For compliance to both EN50131 and DD243:2004, the Final Arming Option should **NOT** be set to “After Exit Delay”.
- Audible or visible indication of initiation and completion should be given (like the beeps and announcement heard on the keypad).
- There shall be a transitory indication to show that the system has changed to a set state (prEN50131-1 8.3.7)
- Indication of set and unset state is not permitted in Grade 3 other than the transitory indication

Prevention of Setting

Prevention of Setting Conditions	Grade 2	Grade 3
Intrusion Detector Active	M	M
Hold up Detector active	M	M
Movement Detector Masked	Op	M
Movement Detector Range Reduction	Op	Op
Detector Fault	M	M
Tamper	M	M
Interconnection Faults	M	M
PPS Fault	M	M
APS Fault	M	M
ATS Fault	M	M
Other Faults	M	M

From prEN50131-1 Table 4

M = Mandatory. Op = Optional

I&HAS systems must be prevented from setting under the conditions shown in the table above.

However Table 8 of prEN50131-1 shows that these conditons can be overriden by Access Level 2 Users ie everyone that signs in.

The keypad quick arm keys should have the “Code Required” box checked so that a valid user code is required to arm. All the above faults are announced to the users and are recorded in the event log, so the user can proceed to override by arming the system.

Unsetting

For Unsetting, its requirements are as described as follow:

- Unsetting may be initiated outside the specified premises and completed inside, such as opening the Entry Door and disarming on the keypad.
- The entire Unsetting procedure may be completed outside using suitable Portable Ancillary Equipment.
- If Unsetting is completed inside the supervised area, the CIE should be sited next to the final exit point and out of view of unauthorised persons.
- Completion of Unsetting should require “a single deliberate action” by the User to Unset. This allows confirmation to be notified, if 2 circuits that are not on the entry path activate following an Entry Alarm.
- The Unsetting procedure must be completed with a maximum time of 45 seconds, which can be set by Comfort. Consideration should be given to the location of the equipment, so as to allow the user to Unset the system. Hence the Entry Time should be set to a max of 30 seconds and Entry Warning time to 15 seconds
- Audible or visible indication of initiation and completion should be given (like the beeps and announcement heard on the keypad).
- When a user deviates from the entry path during the unsetting procedure, the alarm condition shall not be generated until the exit timer expires
- Remote notification shall not take place until the local alarm has operated for a minimum of 30 seconds. In Comfigurator 2.2.0 Modules and Settings, check the box “Entry Dial Delay” to enable this feature

BSIA Form 171 issue 2 Annex A illustates the Entry alarm and deviation timing diagrams

Restoring

The following table shows the requirements for Grades 2 and 3 compliant:

Table 1: Alarms and Faults Restoring Requirements for Grades 2 and 3

Alarms/Faults	Grade 2	Grade 3
Intruder and Hold-up Alarms	Level 2 or Level 3	Level 2 or Level 3
Tamper	Level 2 or Level 3	Level 3 (Engineer)
Fault	Level 2 or Level 3	Level 3 (Engineer)
Mains Fault (PD6662)	Level 2	Level 2

PD6662 Table E.2 says that Mains Fault does not require an Engineer Rreset
For Grade 3, Tamper and Fault alarms require an Engineer to Reset. In Comfort, the Response “Require Engineer Reset” is assigned to Tamper and the relevant Fault alarms. This means that when these alarms occur, the user cannot set the system again until an Engineer Reset is performed, ie the Engineer signs in with Engineer Code.
Grade 2 systems do not require Engineer Reset

Anti Masking for Detectors

Under the Standards, PIRs must bear the appropriate EN compliant label. Anti-masking is not a requirement for Grade 2 but is for Grade 3.
The selection of anti-masking PIRs should be carefully considered, as the experience of such devices in the industry has not been extensive, and what is more, has not been generally positive.
To handle the various alarms, tamper and faults, the following zone configurations can be implemented on Comfort.

Grade 2 Zone Configurations

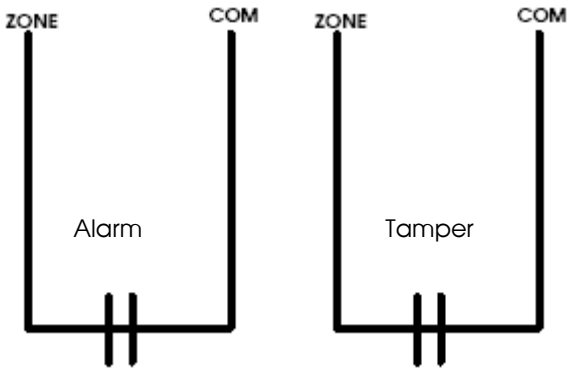


Figure 1: Alarm and Tamper Circuit (No EOL) Zone-to-Zone

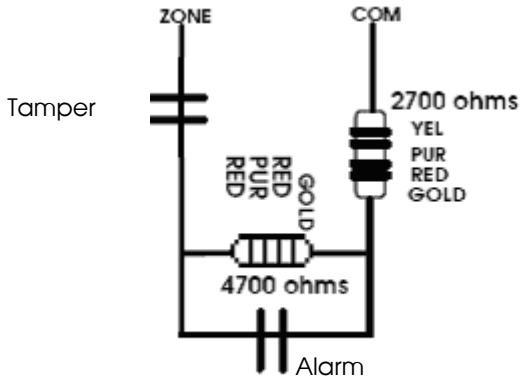


Figure 2: Fully Supervised Loop (Double EOL)

Grade 3 Zone Configurations

For Grade 3 Configurations, the zones configurations for the tamper and alarm contacts are the same as that for Grade 2. Grade 3, however, require an additional zone for the anti-mask contact:

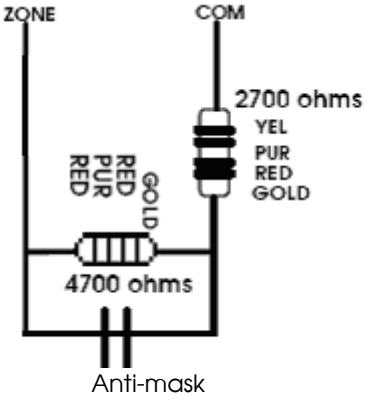


Figure 3: Anti-masking Zone Configuration

Alarm Transmission System (ATS)

ATS is used to describe the system of equipment and network connections from the intruder alarm system to the ARC. For an installer, the key area of interest would be the communicator, or dialer which is built-in in Comfort. The European Standards has requirements not only on the equipment but the entire communication system as well. Hence, both the manufacturers and service providers will need to provide the information so as to assess whether the communication method fulfils the standards Communicators are rated in six different categories. The categories are in the range from ATS 1 to ATS 6, ATS 6 being the most secure. The following explains some of the ATS Levels:

- ATS 2, used in Grade 2 systems and is roughly equivalent to current digital communications eg Contact ID
- ATS 3, used as backup path for devices on Grade 3 systems, similar to ATS 4, but more lenient reporting times
- ATS 4, used in Grade 3 systems and is roughly equivalent to Redcare or Ethernet signalling with SIA encryption

The security classification of an ATS (ATS1 to AS6) is defined by five parameters:

- D, transmission time – the speed of delivery
- M, maximum acceptable delivery time
- T, frequency of checks to identify or report faults
- S, substitution security
- I, information security

As in the case of other system components, the requirements differ in respect to different Security Grades. This is shown in the follow table:

Table 2: ATS Requirements for Grade 2 System (prEN50131-1 Annex B)

Parameter	Requirement
D	D2 (60 seconds) or better for the primary path, and D1 (2 minutes) or better for the secondary path
M	M2 (2 minutes) or better for the primary path, and M1 (8 minutes) or better for the secondary path
T	T2 (25 hours) or better for both transmission paths
S	S0 (no measures) or better on either transmission paths
I	I0 (no measures) or better on either transmission paths

Table 3: ATS Requirements for Grade 3 System (prEN50131-1 Annex B)

Parameter	Requirement
D	D2 (60 seconds) or better for the primary path, and D2 (60 seconds) or better for the secondary path
M	M2 (2 minutes) or better for the primary path, and M2 (2 minutes) or better for the secondary path
T	T3 (5 hours) or better for the primary transmission path, and T2 (25 hours) or better for the secondary path
S	S1 (measures to detect substitution of the transceiver by addition of an identity or address in all messages transmitted) or better on either transmission paths
I	I2 (moderate measures including measures to prevent modification of information transmitted – by encryption or authentication) on the primary transmission path, and I1 (basic measures to prevent unauthorised reading of information transmitted) on the secondary transmission path

For Grade 2 systems, signalling by Contact ID would be adequate while for Grade 3, Redcare or equivalent would be called for.

Apart from ATS Classifications, , there are several notification options A,B,C,D (and X for PD6662 only). One of the options can be selected.

Table 4: Grades 2 and 3 Notification Requirements (Table 10 prEN50131-1)

Notification Equipment	Grade 2					Grade 3			
	A	B	C	D	X	A	B	C	D
No of Remote Powered WD	2					2			
No of SAB/SCB		1			1		1		
Main ATS	ATS 2	ATS 2	ATS 2	ATS 3		ATS 4	ATS 4	ATS 4	ATS 5
Additional ATS			ATS 1					ATS 3	

For Grade 2 systems, set the CMS Dial Test every 24 hours using Time Program. For Grade 3, the primary ATS will be Redcare or equivalent Secondary ATS can be via communicator/dialer.

Processing of Holdup, Intruder Signals or Messages

The European Standards have certain requirements in the processing of Holdup, Intruder tamper or fault signals to be notified on sounders or to be sent to ARCs.

This would mainly be in the details of the alarms to be sent. In the lower grades, some signals may be combined or are optional, but not for the higher grades. For Grades 2 and 3, the requirements are shown as follow:

Table 5: Processing of Alarm Signals or messages for Grade 2 (Table 7, prEN50131-1)

		Grade 2			
I&HAS status		Hold-Up Signal/ Message	Intruder Signal/ Message	Tamper Signal/ Message	Fault Signal/ Message
Set	Indication	M	M	M	M
	External WD	Op	M	M	NP
	Internal WD	Op	M	M	Op
	ATS Message	Hold Up (Zone)	Intruder	Intruder or Tamper	Intruder or Fault
Unset	Indication	NP	M	M	M
	External WD	NP	NP	NP	NP
	Internal WD	NP	NP	Op	NP
	ATS Message	NP	NP	Op as Tamper	Op as Fault

Key: M = Mandatory Op = Optional NP = Not permitted

Table 6: Processing of Alarm Signals of messages for Grade 3 (Table 7 - pr-EN50131-1)

		Grade 3			
I&HAS status		Hold-Up Signal/ Message	Intruder Signal/ Message	Tamper Signal/ Message	Fault Signal/ Message
Set	Indication	M	M	M	M
	External WD	Op	M	M	NP
	Internal WD	Op	M	M	Op
	ATS Message	Hold Up (Zone)	Intruder	Tamper	Fault
Unset	Indication	NP	M	M	M
	External WD	NP	NP	NP	NP
	Internal WD	NP	NP	Op	NP
	ATS Message	NP	NP	Tamper	Fault

Key: M = Mandatory Op = Optional NP = Not permitted

Note: According to BSIA Form 171 Issue 2, the Indications in the table are available to Level 2 Users only after they have entered their code.

According to EN50131-1, a Tamper alarm cannot be indicated on the External WD but PD6662-2004 allows the exception of a self powered WD which has its supply cut. In Comfort, the Tamper alarm Siren Type is changed to Trouble. The Tamper Alarm Response turns on the BELL if the Security system is SET. Require Engineer Reset action is assigned to Tamper Alarm Response

Table 7: Indications at Access Level 2 (from Table 8, prEN50131-1)

Conditions to be indicated	Indications	
	Grade 2	Grade 3
Set / Part Set / Unset State	M	M
Intruder Alarm/ Holdup Alarm/ Tamper Alarm	M	M
Zone of Intruder or Hold-up Alarm	M	M
Alarm Point Isolated/ Inhibited	M	M
Alarm Point Inhibited	M	M
Faults (see prEN50131-1 Table 1)	M	M
Alert/ Pending Indication	M	M

Table 8: Indications at Access Level 1 (from Table 9, prEN50131-1)

Indications	Grade 1		Grade 2		Grade 3	
	Set	Unset	Set	Unset	Set	Unset
Set/Part Set/Unset	Op	Op	Op	Op	NP	NP
Setting/Unsetting Complete (Transitory)	M	M	M	M	M	M
Exit/Entry	M	M	M	M	M	M
Alert	NP	M	NP	M	NP	M

Key: M = Mandatory Op = Optional

These indications relate to Control Panel only. Range reduction and masking indications are for detectors themselves

Transitory Set and Unset Indications are allowed for a maximum of 30 seconds.

Note that new KP04 firmware 1.08e and KP03 firmware 22e are required for compliance to these requirements

These requirements mean that at Level 1 ie without signing in with a user code, very few indications are allowed.When the system is unset, only Alert indication is allowed. In Comfort that is provided by the red (armed) and green (Off) leds. In Unset state, any Trouble condition is indicated by flashing of the Green LED. Any Alert or Alarm condition is indicated by the flashing of the RED LED. The actual event or alarm or zone cannot be displayed or announced.

When the system is set, NO alarm or alert conditions can be shown at all including alerts or flashing of the LEDs.

It is not permitted to even show the system is set or unset in either the display or the OFF/Armed LEDs after the transitory period of 30 seconds.

This means that the user will not know whether the system is armed or disarmed without signing in, which will then disarm the system (if they do not enter the * key before the code)

Detectors which comply to the standards have to have the walk test LEDs disabled. This leads to difficulty in knowing whether the PIR is working.

The behaviour of Comfort to comply with this is programmed in Modules and Settings > “Show Alarms” checkbox. Check the box to Show alarms ie not comply with PD6662/EN50131, and uncheck the box to Hide Alarms or comply as described here.

This requirement has important implications for a Comfort system. Comfort will disable all information broadcasts to the keypads when it is not permitted to show alarms

When user signs in without disarming (ie press * before user code) , the Armed/Off led will show the security mode and the security mode must display on the LCD KP04.

The KP Armed/Home LED will change when the system is armed or disarmed, but after 30 seconds will turn off. When system is in UNSET state, the Home led will

blink for Trouble and the Arm LED will blink for Alert/Alarm state. When system is in SETstate, no indications are allowed

If Show Alarms are disabled, the KP LCD will not display any alarms or zone information without signing in. When the user signs in, the alarms and zones display is enabled as long as the keypad is in a menu mode. The user can see event log and alarm history. When the keypad exits from the menu by pressing F or the # key, or times out, all the alarm and zone and security mode information will be removed after 30 seconds. Comfort does not display Set and Unset after the transitory period, ie in this aspect only the Grade 3 requirements are implemented.

Announcements of alarms and zones will not be heard if the user does not sign in. The Alarm LED will NOT blink when there is any alert or alarm condition. The Home/Trouble LED will NOT blink if there is any trouble condition when the systen is armed.. However non alarm information will be displayed eg the temperature and time

When “Show alarms” is disabled, the keypads will not respond to broadcast messages.The Zone announcement feature where any zone activation is announced, will not work. The Door station will not chime on the keypads. However the phones will ring. The keypad can still be used to answer the door station. Reminder messages will not chime on keypads. Intercom mode (F8) broadcasting to all keypads will not work. However Intercom to a specific keypad F8 and keypad number will function as this addresses an individual keypad. Complying to the regulations will necessarily lead to reduction of functionality of Comfort.

These requirements seem to make it diifficult for a user to know what is going on in the home, even not knowing at a glance whether the system is set or unset.

Interconnections

Monitoring of Interconnections

For wired interconnections, double EOL resistors need to be used for all zones. Comfort monitors communications with its own RS485 peripherals.

Event Log

prEN50131-1 Table 21

Requirement	Grade 1	Grade 2	Grade 3
No of Events	Op	250	500
Retention	Op	30 days	30 days

The Event Log shortcut menu on the keypad has to be protected by a user code (Level 2)
Comfort is able to comply with Grade 3, which requires 500 events. Comfort Ultra will have 600 events. Memory retention is in years rater than days as nonvolatile memory (U4) is used. Comfigurator 2.1.0 and above is needed to upload the event log. An older version of Comfigurator will not read the new larger event log correctly

Power Supply

There are three types of power supply defined, each having different requirements to adhere to EN50131. The type of power supply is classified based on its characteristics and its requirements are defined in terms of their standby duration.

The three classes are:

- **Type A**, which contains mains and rechargeable backup batteries
- **Type B**, which contains mains and non-rechargeable backup batteries
- **Type C**, which contains batteries alone.

Comfort is of Type A, as Comfort contains both mains, as well as batteries backup. As mentioned previously, Comfort can be compliant to Grades 1 to 3, but this document will concentrate on the requirements for the grades 2 and 3. Hence, the following table only illustrates the requirements needed for Grades 2 and 3:

Table 9: Power Supply Standby Requirements (from prEN50131-1 table 23)

Type of Power Supply	Grade 2 (hours)	Grade 3 (hours)
Type A	12	60

Table 10: Power Supply Standby Requirements (from PD6662 table E.1)

Type of Power Supply	Grade 2 (hours)	Grade 3 (hours)
Type A	12	12 / 24[1]

PD6662 reduces the standby requirement for Grade 3 from 60 hours to 24 hours, and if failure of the PPS is notified to the Alarm Receiving Centre (for Grades 3 and 4), the time can be reduced to 12 hours (prEN50131-1 Clause 9.2)

Table 11: Alternate Power Supply Recharge Requirements (from prEN50131-1 Table 24)

Type of Power Supply	Grade 2 (hours)	Grade 3 (hours)
Type A	72	24

[1] For PD6662:2004 - 12 hours if system is able to provide “Mains Failure” to ARC. Comfort can comply to this requirement

The current consumption by Comfort is dependent on the number of modules and the modules connected. A guide to Comfort's consumption is as follow:

Table 12: Current consumption by Comfort

Module	Quiescent Current	
	Typical	Maximum
Comfort Control Panel	80	96
Door Station	10	12
LEM	10	12
UCM	70	84
SEM02	45	54
RIO	15	18
Keypad (Silent)	15	18
Keypad (Talking - Min Volume)	75	90
Keypad (Talking - Max Volume)	170	204

When calculating the current, the IDLE current should be considered, ie the keypads are not in the voice menu mode, the system is not dialing out, and the alarm is not activated, as these events occur during a very small percentage of the time. A percentage of 5% of the total current can be added for safety

To calculate the maximum current consumption, add up the individual currents for each installed module. For example for a Comfort system with 1 Slave SEM02 (No Power supply) and 2 LEMs, 4 keypads and 2 DPs, the total current would be 96+54 + 24 +72+ 24 = 270 mA. Add to this the current of the PIRs and other active devices, eg 8 PIRs @30 mA = 240 mA. Hence the total current = 510 mA. The battery capacity required for 12 hours standby is 12 x 0.51 = 6.12 AH. Hence a 7 AH battery would just be sufficient. For 24 hour standby 24 x 0.510 = 12.3 AH and a 14 AH battery would be required.
However note that Slaves (SEM01/SEP01) have their own power supply and batttery. Hence the devices which require power can be connected in such a way as to evenly distribute the current between the Comfort controller and all the Slaves
In the above example, using a SEM01 as slave with each (Controlller and slave) powering 1 LEM, 2 KP, 1 DP and 4 PIRs, the current required from Comfort is 96+ 12 +24 + 12 + 120 = 264 mA and for the Slave, 54 + 12 + 24 + 12 +120 = 222 mA. A 7 AH battery for Controller and Slave would suffice for 24 hour standby. Bulky 17 AH batteries are not necessary.
Another useful method is to calculate the maximum current allowed from the battery to achieve a 24 hour standby time with a 7 AH battery. Max Current = 7 AH/ 24 H = 290 mA. Subtract the current requied by Comfort (96 mA) or slave (54 mA) to give the maximum available current of 194 mA (Comfort) and 236 mA (Slave)
We suggest that the system should be configured to use 7 AH batteries only. It must be remembered that the larger the battery capacity, the longer it takes to charge the battery after the mains power is restored. Comfort II has current limiting to 200 mA for battery charge to allow the system to function while a flat battery is being charged, and it also has a low battery cut-off to prevent a battery from being completely discharged

Power Supply Requirements of EN50131-6

This section applies to power supplies used for Intruder Alarm systems. Comfort has a built in power supply which recharges the standby battery (APS) which is classified as Type A

Monitoring of Power Supply (Clause 4.2.1)

An APS fault signal shall be generated within 10 seconds if a Low battery condition is detected or a storage device failure is detected. (Clause 4.2.1)
Comfort detects no battery connected within 10 seconds and gives a Battery alarm which has the same behaviour as a Low battery alarm. This will prevent setting of the alarm system, unless the setting for Allow Low Battery arm is enabled. See Application Note for Battery Disconnect Detection

Overvoltage Protection (Clause 5.1)

Not required for Grade 3 according to Table 7 and BSIA Guideline 180 pg 7

Short Circuit/Overload Protection (Clause 5.2)

The 12V output is protected against Short Circuits by resettable fuses

Deep Discharge Protection (Clause 5.3)

Comfort II provides Deep discharge protection which cuts off the APS when the voltage drops below a preset threshold when the PPS is off.

Ripple

< 10 mV

Environmental (Clause 5.5)

Complies

Tamper (Clause 5.6)

Provided by main Coomfort enclosure

Power Supply Specifications

Input Voltage: 230 V + /- 20% 50 hz
Output Voltage: 13.3 to 14.0 Volts DC
Ripple: < 10 mV
Maximum Continuous current from all 12V outputs = 1.0 Amps
Security Grade : Grade 3
Storage Device to be Used: 12V Sealed Lead-acid battery 7 AH
Maximum recharge time = 24 hours
Terminal Identification: Terminal Blocks removable with markings
Monitoring Functions provided:

- Low Battery at 11.5 V +/- .3 V
- Disconnection of battert

Flat Battery at 10 Volts minimum
Monitoring signals: Internal, to Comfort CPU
Operating Temperature range: 0 deg to 50 deg C
Operator serviceable parts : Fuse 5A/125V Slow blow on secondary leads.
Certification: EN60950 by Productivity and Standards Board Singapore
Type of Power Supply Linear Regulated Power Supply
Overvoltage Protection: N/A

Note that only Comfort systems supplied complete from the factory without any third party enclosures or transformers can be claimed to comply with EN50131-6

.

Appendix – Compliance Statement

Table 13: Security Grades and Environmental Class of Comfort's CIE

Product	Security Grade	Environmental Class
CP9000 Comfort II Control Panel	3	II
DP03 Comfort Door Station	NA	III
KP03 Comfort Keypad	3	II
KP04 Comfort LCD Keypad with IR Receiver	3	II

Document History
28 December 2006: Draft Release
26 August 2007: Revised