

Product & Solution Guide

Issue 2

AxPro
AxessProduktur

COMELIT PRC
WITH YOU ALWAYS

Contents

1	Introduction	3
2	Access Control Overview	4
3	PAC Access Control Overview.....	6
4	PAC Architecture	9
4.1	Overview.....	9
4.2	Networking.....	10
5	PAC Products	12
5.1	Access Controllers	12
5.1.1	PAC 212 Standalone Access Controllers.....	12
5.1.2	PAC 51x Networked Access Controllers.....	14
5.2	PAC I/O Controllers.....	23
5.2.1	PAC 520 Input Controller.....	24
5.2.2	PAC 530 Output Controller.....	25
5.3	Readers.....	27
5.3.1	PAC MT Readers.....	27
5.3.2	PAC HF Readers	31
5.3.3	PAC LF Readers.....	39
5.3.4	PAC Architect Readers.....	44
5.3.5	Biometric Readers	49
5.4	ID Devices	55
5.4.1	High Frequency RFID Devices	55
5.4.2	Low Frequency RFID Devices.....	58
5.4.3	Mobile ID	63
5.5	Door Hardware	65
5.5.1	Push Button Exit Devices	65
5.5.2	Hands-Free Request to Exit Device	65
5.6	Power Supplies	67
5.6.1	3.6 Amp Power Supplies	67
5.6.2	7.2 Amp Power Supply	68
5.7	Management	69
5.7.1	PAC Access Central™.....	70
5.7.2	PAC easinet™ residential.....	73
6	Glossary.....	77

1 Introduction

Comelit has, since 1956, grown from a base of intercom and video intercom solutions into being a world leader in integrated security solutions including anti-intrusion, video surveillance, home automation, fire detection and access control systems alongside video door entry systems. With values of constant evolution, user friendliness, reliability, and multi-functionality, Comelit is your trusted security partner for securing residential, educational, public sector and commercial customers.

Comelit has a global presence and support capability with 17 branch offices, 6 R&D centres, more than 800 employees and a commercial presence in over 90 countries.

Comelit-PAC is the specialised Access Control division within Comelit, with over 60 years' experience in designing and manufacturing secure access control products. Working closely in partnership with consultant engineers, architect partners, distributors, and installers, enables the PAC products to be continually developed to meet the requirements of the access control market and its associated legislation.

The PAC access control range has been designed to provide unbeatable reliability and functionality to meet the rigorous demands of both the residential and commercial market sectors. There are targeted customer options to enable PAC access control systems to be tailored to suit a variety of customer requirements. With a focus on reliability and an ease of installation & maintenance we offer access control solutions that deliver affordable security for the customer.

This document is for architects, designers, consultants and specifiers to provide information on the PAC Access Control solution including architecture, networking and product components.

The range of PAC equipment is supplied through authorised PAC distributors, dealers, and installers. This supports quality design, installation, and in-life maintenance to ensure a great customer experience. Please contact Comelit-PAC Customer Services for details of approved suppliers.

Email: pacgdxcustomerservice@comelit-pac.co.uk

Telephone: 0161 406 3400 opt. 1

Comelit-PAC offers a full range of design support services to our customers and approved installers. We have an experienced sales and support team based throughout the UK who are available to offer no obligation support, help & advice on all aspects of the following:

- Pre-Sales Systems Design
- Tender & Specification Support
- Technical & Site Survey Support

If you wish to discuss your requirements on any matter related to the PAC product range, please contact Customer Services to request contact details for your local support representative.

2 Access Control Overview

Access control is managed with security tokens that are configured to permit access to doors secured with access control. Figure 1 illustrates the access control process flow at a high level:

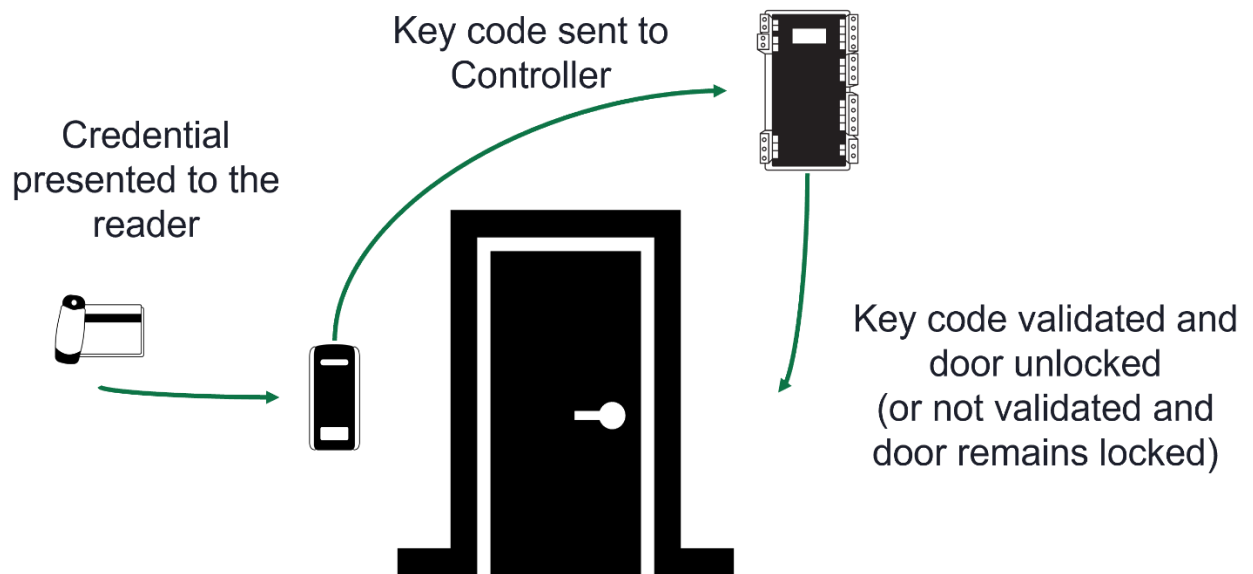


Figure 1 – Access control process flow

The following are some definitions of different access control solutions.

Access Control

The term access control refers to the practice of controlling an entrance or perimeter to a property, building, or room to allow authorised persons only. It can also be defined as the control of 'who' goes 'where' and 'when'.

Physical Access Control

Physical access control can be achieved by:

- Human means e.g., a guard, receptionist, etc
- Mechanical means i.e., locks and keys
- Electronic means such as a PAC access control system

Electronic Access Control

Electronic access control supports a more secure access control system compared to human or mechanical systems, by using access control lists held in a database that validates users based on the use of authentication methods. A wide range of ID Devices can be used to replace mechanical keys, with the electronic access control system granting or denying access based on the credential presented. When access is granted, the door is unlocked for a predetermined time and the event is recorded. When access is refused, the door remains locked, and the attempted access is recorded. The system can also monitor the door and generate an alarm if the door is forced open or held open too long after being unlocked.

Proximity Access Control

Proximity access control is a form of electronic access control that supports the use of RFID ID devices that can be read by the access control reader within a set 'read' distance i.e. within the proximity of the reader. The unique keycode on the ID device is identified against an access control list within the access controller to allow or decline access through the secured door or entrance.

Integrated Security and Building Control

Integrated security and building control is a system that incorporates additional features to an access control system that enhances security for people and property. An integrated system may provide:

- Alarm monitoring relating to CCTV and perimeter detection. This would allow the system to control cameras, making them pan or tilt to record movement or activity if an unauthorised person is trying to gain access.
- Alarm and event notification so that when an event is recorded, an automatic emergency message can be sent direct to a named person or a monitoring centre.
- Lift call, control, or management so that the calling of a lift and/or the floors that are accessible for a keyholder, can be secured like any other area of the access control system.
- Monitoring and control of heating, lighting and ventilation systems.
- Time and Attendance logging.
- Safety system integration so that doors are released on receiving an alarm from the Fire system.

PAC provide an industry leading portfolio of products and services that deliver high quality and high security **Electronic Access Control** using **Proximity Access Control** technology. PAC supports expansion into **Integrated Security and Building Control** either through its own hardware and software products or as part of a Physical Security Information Management (PSIM) solution.

3 PAC Access Control Overview

The PAC product range is a well-established suite of products to provide flexible access control solutions for the commercial, industrial, residential, education, health, and public sectors markets.

Figure 2 illustrates the basic components of a PAC access control solution. Please note that detailed descriptions, and further information on the components within the PAC system, will be detailed in later sections.

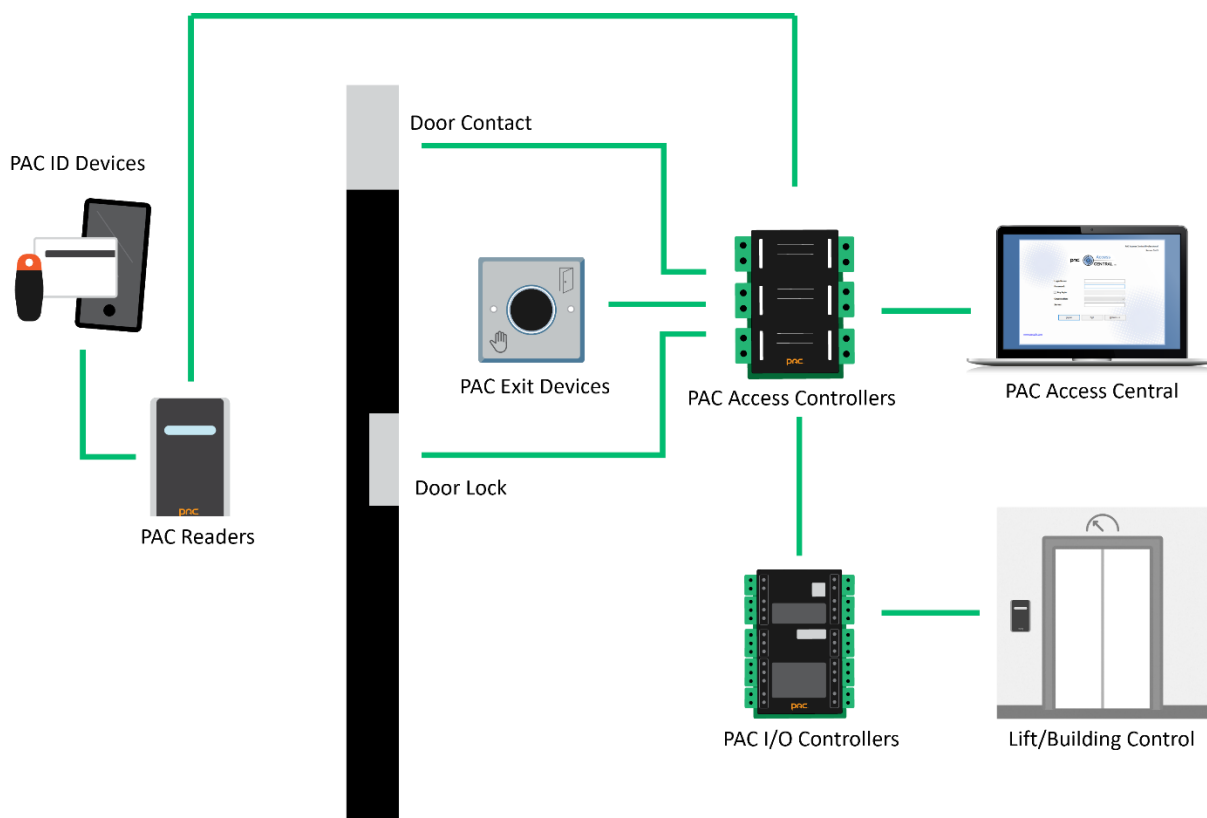


Figure 2 - PAC System overview

The above component functions are summarised below:

PAC Access Controller – this is the on-site intelligence within the system, as it is the device that communicates across all directly connected equipment and holds a local database of authorised ID Devices that grants or denies access. There are two variants of PAC Access Controller:

- Standalone – is a single integrated unit with an administration reader and on-board programming capability that enables it to be deployed and programmed locally.
- Networked – supporting expansion into larger systems through controllers being deployed into a system that supports global management of security policies, integrations and keyholder management through a software platform.

PAC Input / Output Controllers – these extend the PAC access control system with a number of input and output relays for connecting and driving additional devices on site. The PAC I/O Controllers are feature rich and highly configurable that deliver enhanced security and building control including: Lift control; alarm monitoring; alarm management; automated driving of external equipment such as sounders, security shutters, CCTV camera pre-sets, etc. The I/O Controllers provide actions based on event driven rules easily configured and managed within Access Central™.

PAC Entry Reader – this is located on the public side of the door and is used to read ID Devices and send the data to the Access Controller for a decision on whether to grant access or not. RFID or Bluetooth technology are typically used to authenticate the user via an ID Device. LED lights are embedded to provide feedback to the ID Device holder on the status of their entry or exit request. Multi-factor authentication can be supported using Keypad readers that require an ID Device as well as PIN code authentication. Biometric readers support the ability to authenticate someone via fingerprint or iris scan.

PAC Exit Device – is the device located on the secure side of the door to grant access out of the secured area. The Exit device may be a:

- Reader that requires an ID Device to be presented to follow the same authorisation and door unlock process as the Entry Reader. This supports 'read-in' and 'read-out' safety or security policies.
- Request To Exit (RTE) device that, once activated, drives a door unlock via a request to the Access Controller.

PAC ID Devices – this is the token that enables the authorised user to gain access through a door. It utilises RFID or Bluetooth to connect to the PAC Reader. The ID Device has a unique code that allows it to be identified within the PAC system as an authorised or unrecognised ID Device. Please note an ID Device can take many forms from a smart card or fob to a mobile phone app or fingerprint. The main requirement is that it is unique and can be recognised by the Reader and the Access Controller.

Door Controls – these include the door locks that are connected to the Access Controller to support the door unlocking function. Door contacts can be used to provide alarm events if the door is forced or kept open for longer than a configurable time period. PAC systems support two modes for the door locks: Fail Safe (default); and Fail Secure.

Management Software – the management software supports the configuration and proactive monitoring and management of a PAC access control system including system health monitoring, security policies, keyholder administration, event and alarm logs, occupancy management, building controls, multi-site management, etc.

On top of the above access control functions, a whole variety of additional features can be added within PAC systems, to tailor the solution towards commercial or residential use cases.

The following are the main features supported:

- Setting of Access Control policies that are automatically and proactively applied and reported on.
- Secure a door, area, perimeter, or building, by only allowing authorised people access using valid access control ID Devices (RFID, Biometric, Mobile).
- Configure the access control system on a door or area basis to ensure personnel only access areas they are cleared for e.g., the IT Server room in an office will be limited to the IT department only.
- Utilise ID Devices (fobs, smart cards, mobile phone credentials, biometrics, etc) to provide a variety of electronic unique keys for authentication on the access control system. Our range of ID Device options are designed to suit residential and commercial applications.
- Supports multi-factor authentication if required e.g., an ID Device reader with a keypad for ID Devices authentication coupled with a PIN code entry.
- Support the ability to offer time-based access control which restricts access to personnel to set days or time of day e.g., reception staff are given general office access Monday to Friday 08:00 – 18:00.
- Remove a person's ability to access a door or area by deactivating their ID Device.
- Support a scalable range of doors, from a single door to thousands.
- Support a scalable range of ID Device holders from 1 to 75,000.
- Fail safe (door unlocks when power fails) or fail secure (door remains locked when power fails) options to meet customer requirements.
- Supports the configuration of other advanced access control functionality such as (but not limited to):
 - Anti-Passback
 - Occupancy management
 - Lift Call, Control and Management
 - Door and Reader Mode profiles
 - Alarm and event management including logs and alarm maps
 - First keyholder unlock
- Ability to integrate with other security solutions such as Intrusion Detection, CCTV, Fire systems, etc. to provide a single security system for management and monitoring of the security systems in a property.
- Software level integration for enhanced integrated security solutions including Time & Attendance, Visitor Management, Active Directory synchronisation, etc.

4 PAC Architecture

4.1 Overview

PAC access control solutions have a flexible and modular approach to physical security of property and people safety through:

- A high security access control solution that scales from small deployments of 1 door to large deployments of thousands of doors.
- Renown reliability with market leading warranties.
- Evolving security solutions that provide protection against changing security threats.
- A focus on User and Installer experience with ease of install and simple operation.
- A market ready, integrated security solution with:
 - Hardware level integration using Input/Output Relays for connecting with other building, alarm, and safety control systems.
 - Access Control level integration with other vendors using standardised open protocols such as Wiegand.
 - Software level integration using our fully featured SDK for API development with other software platforms.

Fully featured proactive monitoring and management software, forms a critical part of the PAC value proposition through supporting a full standalone PAC solution as well as an integrated security solution when connected into other software management solutions via its API. Out of the box, PAC management software supports:

- Configuration and management of PAC system components.
- Keyholder configuration and management for easy credential management.
- Expansion into full building control through fully featured Input/Output control functionality.
- Event to Action engine – a powerful tool that enables a fully configurable and automated response to an event/alarm monitored by PAC systems.
- Full operator Control Centre application that provides a fully customisable portal including security, occupancy management, CCTV feeds, alarm and event monitoring to deliver a real-time monitoring and management solution.
- Enriched Reporting capability for on-demand or scheduled reports for any event or alarm.

Figure 3, below, provides an architectural overview of a PAC access control solution, including components and connectivity options.

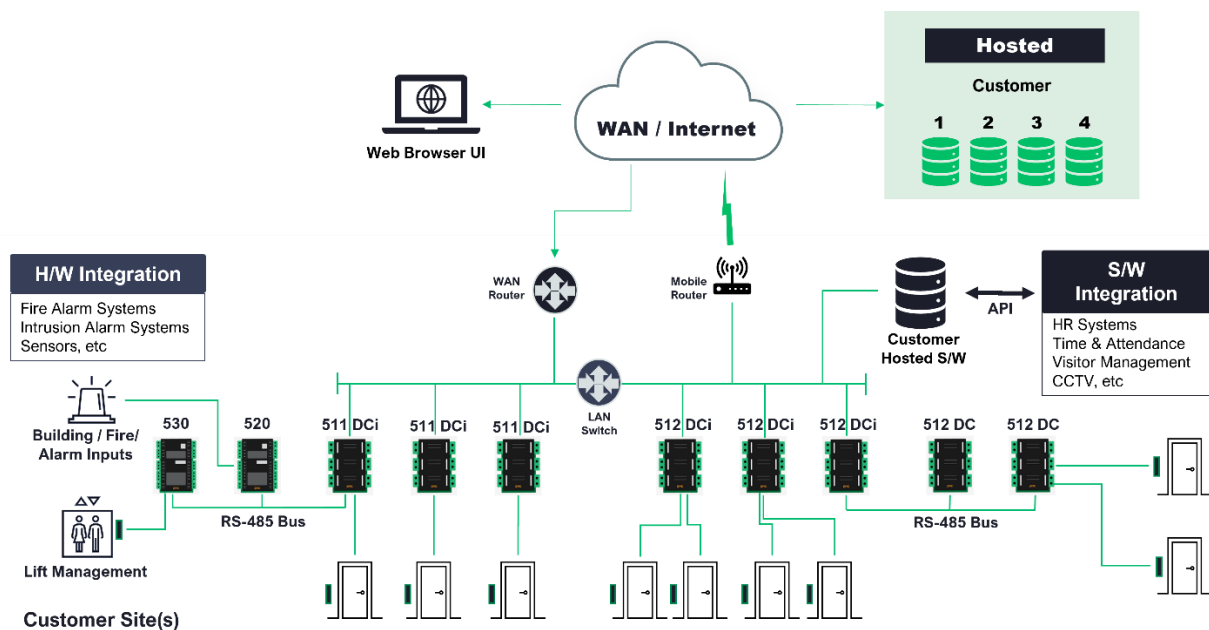


Figure 3 - PAC Architecture

4.2 Networking

For systems requiring multiple doors with the means to manage access control and security policies centrally, PAC provides their networked system solution based on centralised management of keys, security policies, and integrations. This relies on communication across the networked system to enable the access control and security policies to be downloaded to local networked controllers both at time of initial installation and when changes are required.

PAC networked controllers are available in two network technology versions:

- IP (Internet Protocol)
 - PAC 511 DCi – 1 door access controller.
 - PAC 512 DCi – 2 door access controller.
- Serial (RS-485)
 - PAC 512 DC – 2 door access controller.

PAC 51x series controllers operate in the following network architectures:

- Bus – Connectivity via IP to a gateway IP (DCi) controller which then supports a bus of up to 23¹ PAC Serial (DC) controllers via an RS-485 bus network.
- IP – Full IP system using IP (DCi) controllers and a switched LAN for connectivity. Note: it is recommended to use a dedicated VLAN for PAC systems to ensure optimum operation for the system

¹ This is reduced depending on the bandwidth and latency on the software management connectivity

- Input / Output Controllers – a dedicated IP (DCi) Controller can support up to four I/O controllers across an RS-485 bus. The IP (DCi) Controller can still be used to secure a local door(s) but it is defined as a dedicated I/O gateway controller on the RS-485 bus which means it cannot be also be a gateway controller for Serial (DC) Controllers.

For reliable, real-time operation, all the above architectures rely on a stable LAN or WAN connection to the Management Software server. This is critical when a PAC system is used for the following:

- real-time monitoring
- alarm/event management
- proactive Event to Action management

Figure 4, below, provides an architectural overview of PAC Network Architectures.

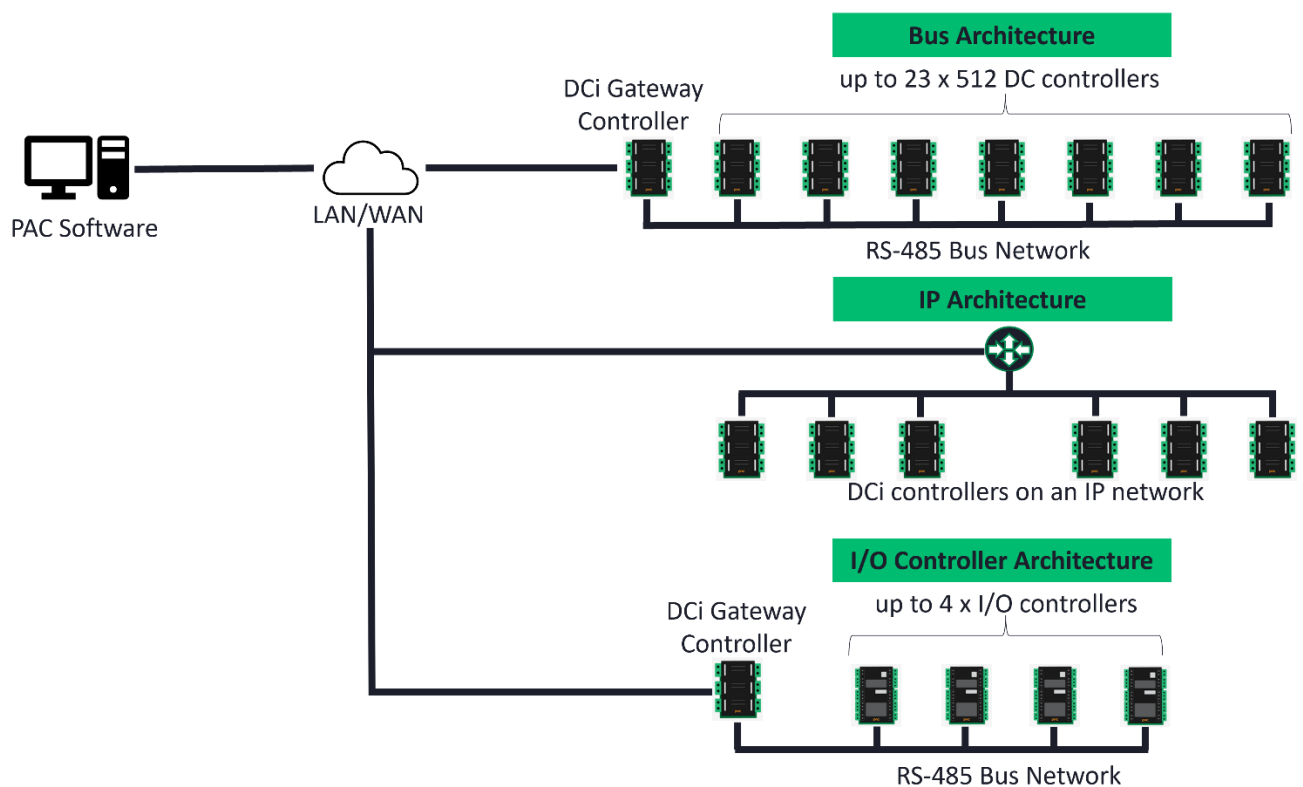


Figure 4 - Network Architectures

Further guidance on software connectivity to hardware is available through the PAC IT Managers Guide.

5 PAC Products

The following sections provide details on all the components used in PAC systems.

5.1 Access Controllers

PAC access controllers come in 2 main varieties:

- Standalone – able to be programmed and managed directly at the access controller utilising the integrated administration reader and keypad.
- Networked – access controllers that are supported within a scalable networked system including access control readers, management, etc

5.1.1 PAC 212 Standalone Access Controllers

The PAC 212 Access Controller range provides cost effective deployment of fully featured access control without the need for any additional software.

Built on the PAC 512 controller, The PAC 212 is a standalone access controller that supports onsite programming via an onboard keypad.

Figure 5, below, shows the PAC 212 Din Mount Controller.



Figure 5 - PAC 212 DIN Mount Controller

The PAC 212 range has the following features:

- Standalone access controller with keypad for local programming
- 2 door controller that supports up to 4 access control readers (2 readers per door).

- 4 varieties exist of the PAC 212 to meet different installation requirements:
 - HF DIN mount version for installation in optional PAC 4 or 6-way cabinets.
 - HF boxed without cut-out, pre-wired with 3Amp PSU in a metal cabinet with lock for ease of install.
 - LF DIN mount version for installation in optional PAC 4 or 6-way DIN cabinets.
 - LF boxed without cut-out, pre-wired with 3Amp PSU in a metal cabinet with lock for ease of install.
- PAC HF Versions support all [PAC HF ID Devices](#).
- PAC 212 LF versions support all [PAC Low Frequency ID Devices](#).
- Supports standalone installations without requiring any additional software or servers.
- Events and ID Device information are stored locally with a database that holds 4000 events.
- Supports up to 2,000 Keyholder records within its onboard database.
- Supports both residential and commercial applications:
 - Commercial supports up to 2000 ID Devices
 - Residential supports up to 256 residences with up to 8 ID Devices per residence. Coloured ID Devices can be utilised to identify individual ID Device use.
- Supports extensive features including:
 - Time profiles that can be applied to access groups
 - Access levels
 - Case and reader tamper alarm
 - Programmable door unlock time
 - Local anti-passback
 - Residential mode where the PAC 212's database enables the ability to configure multiple ID Devices (colour coded) that can be associated to a single residence.
- Programmable relays for additional security features such as 'door forced' or 'left open' alarms.
- Can be used in conjunction with any PAC reader
- Reports and event history can be imported into Windows PC's via USB memory stick transfer from the PAC 212.
- New eco-friendly PSU that meets the stringent California Energy Commission (CEC) Level 6 standard.

For Datasheets and detailed installation guides please refer to [PAC Product Literature](#)

5.1.2 PAC 51x Networked Access Controllers

Networked access controllers create a scalable access control solution through the ability to interconnect multiple PAC controllers into a fully managed integrated security solution. The following sections detail the 3 versions of PAC networked access controllers available.

5.1.2.1 PAC 511 DCi

The PAC 511 DCi is an intelligent IP access controller for securing and managing a single door. It can be deployed within a PAC access control system to support on-site access control, lift control and door functions either singularly or part of a larger PAC networked system. It relies on management software for many additional features but has in-built databases and processing ability to execute local access control and features associated with door management and lift control.

Figure 6, below, shows the PAC 511 DCi access controller.



Figure 6 - PAC 511 DCi Controller

The PAC 511 DCi access controller has the following key features:

- Manages access through 1 door with a maximum of 2 readers (PAC or Wiegand) for full read-in and read-out capability.
- Controls door lock with 2 modes supported:
 - Fail Safe – where the doors unlock in the event of a power failure. This requires the doors to lock when powered and unlock when power is removed or fails
 - Fail Secure – where the doors remain locked until powered. This means if there is a power failure the doors will remain locked and will need a manual over-ride to open until power is restored. Typically used in high security locations.
- Available in 2 variants:
 - DIN mount PAC 511 DCi for installation in optional PAC 4- or 6-way DIN cabinets.
 - Boxed with pre-wired 3.6 Amp PSU in a metal cabinet with lock and tamper switch for ease of install.
- Up to 20,000 keyholder records in its onboard database. Note that this figure is reduced if multiple access groups are utilised.
- The PAC 511 DCi Database provides distributed intelligence which supports the ongoing access control and lift control functions if communication to the management platform is lost.
- One-Touch™ test mode built into the access controller to support commissioning and in-life fault diagnosis. This supports a health check of directly connected reader and door connections with feedback through onboard LEDs.
- Easy to install with clear labelling on the controller, terminal blocks for easy wiring, installation guides and the One-Touch™ testing feature.
- Multiple access groups to define different access and time profile privileges.
- Local anti-passback that drives the user to read-in and read-out for accurate tracking of personnel within the access control system.
- Energy efficient PSU (in the boxed variants) that meets the stringent California Energy Commission (CEC) Level 6 standard.
- Able to support the following access control reader protocols:
 - PAC64 – for all PAC systems supporting PAC HF Ops™ ID Devices
 - PAC – for all PAC systems supporting PAC LF and PAC HF Ops™ Lite ID Devices
 - Wiegand (multiple standard formats) – for Wiegand configured systems supporting Wiegand ID Devices
 - Clock and data reader protocol (magstripe)
- Built-in IP and RS-485 for communication to management software and directly connected Serial (DC) controllers or Input/Output controllers.

- A PAC 511 DCi is designed to be locally situated to the door it controls. It can still reach long distances to the reader when required as per the following:
 - 70m if the reader is powered by the PAC 511 DCi power supply
 - 500m if the reader is powered locally via its own power supply
- A PAC 511 DCi connects to PAC management software via the following means:
 - via an IP based Local Area Network (LAN)
 - via an IP based Wide Area Network (WAN)
 - direct to the management software server using a CAT5e cable with RJ-45 connector
- PAC 511 DCi's support larger installations through:
 - IP Network – a Total of 255 PAC DCi's can be connected into the PAC Management Software
 - RS-485 network - Further system expansion is supported through the PAC 511 DCi controller acting as a gateway controller for an RS-485 bus. Up to 23 PAC 512 DC controllers can be connected on a single RS-485 bus and will act as secondary controllers to each PAC 511 DCi gateway controller.
- The number of controllers that can be connected in series is dependent on the network supporting the connection between a gateway controller and the PAC management software:
 - 24 controllers (including the gateway controller) when connected to a server running PAC management software via direct, LAN, or WAN connections.
- The maximum length of the RS-485 bus, supporting a series of PAC access controllers, is 1000m.
- 1 x 5Amp ancillary relays, supporting programmable outputs.
- 3 x inputs for proactive monitoring:
 - Tamper
 - Over-ride
 - Customer programmable input

For Datasheets and detailed installation guides please refer to [PAC Product Literature](#)

5.1.2.2 PAC 512 DCi

The PAC 512 DCi is an intelligent IP access controller for securing and managing 2 doors. It can be deployed within a PAC access control system to support on-site access control, lift control and door functions either singularly or part of a larger PAC networked system. It relies on management software for many additional features but has in-built databases and processing ability to execute local access control and features associated with door management and lift control.

Figure 7, below, shows the PAC 512 DCi access controller.



Figure 7 - PAC 512 DCi Controller

The PAC 512 DCi access controller has the following key features:

- Manages access through 2 doors with a maximum of 4 readers (PAC) for full read-in and read-out capability.
- Controls door lock with 2 modes supported:
 - Fail Safe – where the doors unlock in the event of a power failure. This requires the doors to lock when powered and unlock when power is removed or fails
 - Fail Secure – where the doors remain locked until powered. This means if there is a power failure the doors will remain locked and will need a manual over-ride to open until power is restored. Typically used in high security locations.
- Available in 2 variants:

- DIN mount PAC 512 DCi for installation in optional PAC 4- or 6-way DIN cabinets.
- Boxed with pre-wired 3.6 Amp PSU in a metal cabinet with lock and tamper switch for ease of install.
- Up to 20,000 keyholder records in its onboard database. Note that this figure is reduced if multiple access groups are utilised.
- The PAC 512 DCi Database provides distributed intelligence which supports the ongoing access control and lift control functions if communication to the management platform is lost.
- One-Touch™ test mode built into the access controller to support commissioning and in-life fault diagnosis. This supports a health check of directly connected reader and door connections with feedback through onboard LEDs.
- Easy to install with clear labelling on the controller, terminal blocks for easy wiring, clear installation guides and the One-Touch™ testing feature.
- Multiple access groups to define different access and time profile privileges.
- Local anti-passback that drives the user to read-in and read-out for accurate tracking of personnel within the access control system.
- Energy efficient PSU (in the boxed variants) that meets the stringent California Energy Commission (CEC) Level 6 standard.
- Able to support the following access control reader protocols:
 - PAC64 – for all PAC systems supporting PAC HF Ops™ ID Devices
 - PAC – for all PAC systems supporting PAC LF and PAC HF Ops™ Lite ID Devices
 - Wiegand (multiple standard formats) – for Wiegand configured systems supporting Wiegand ID Devices
 - Clock and data reader protocol (magstripe)
- Built-in IP and RS-485 for communication to management software and directly connected Serial (DC) controllers or Input/Output controllers.
- A PAC 512 DCi can be placed in a central location for controlling 2 doors as it supports the following distances from the controller to PAC Access Control Readers:
 - 70m if the reader is powered by the PAC 512 DCi output
 - 500m if the reader is powered by its own PSU
- A PAC 512 DCi can connect to PAC management software via the following means:
 - via an IP based Local Area Network (LAN)
 - via an IP based Wide Area Network (WAN)
 - direct to the management software server using a CAT5e cable with RJ-45 connector
- PAC 512 DCi's support larger installations through:

- IP Network – a total of 255 PAC DCi's can be connected into the PAC Management Software
- RS-485 network - further system expansion is supported through the PAC 512 DCi controller acting as a gateway controller for an RS-485 bus. Up to 23 PAC 512 DC controllers can be connected on a single RS-485 bus and will act as secondary controllers to each PAC 512 DCi gateway controller.
- The number of controllers that can be connected in series is dependent on the network supporting the connection between a gateway controller and the PAC management software:
 - 24 controllers (including the gateway controller) when connected to a server running PAC management software via direct, LAN, or WAN connections.
- The maximum length of the RS-485 bus, supporting a series of PAC access controllers, is 1000m.
- 2 x 5Amp ancillary relays, supporting programmable outputs.
- 4 x inputs for proactive monitoring:
 - Tamper
 - Over-ride
 - 2 x Customer programmable inputs

For Datasheets and detailed installation guides please refer to [PAC Product Literature](#)

5.1.2.3 PAC 512 DC

The PAC 512 DC is an intelligent serial access controller for securing and managing 2 doors. It can be deployed within a PAC access control system to support on-site access control, lift control and door functions either singularly or part of a larger PAC networked system. It relies on management software for many additional features but has in-built databases and processing ability to execute local access control and features associated with door management and lift control.

Figure 8, below, shows the PAC 512 DC access controller.



Figure 8 - PAC 512 DC DIN Mount Controller

The PAC 512 DC access controller has the following key features:

- Manages access through 2 doors with a maximum of 4 readers (PAC) for full read-in and read-out capability.
- Controls door lock with 2 modes supported:
 - Fail Safe – where the doors unlock in the event of a power failure. This requires the doors to lock when powered and unlock when power is removed or fails
 - Fail Secure – where the doors remain locked until powered. This means if there is a power failure the doors will remain locked and will need a manual over-ride to open until power is restored. Typically used in high security locations.

- Available in 3 variants:
 - Boxed with pre-wired 3.6 Amp PSU in a metal cabinet with lock and tamper switch for ease of install.
 - DIN mount PAC 512 DC for installation in optional PAC 4 or 6-way DIN cabinets
 - Boxed in vandal resistant Sarel Case with pre-wired PSU, two locks, and tamper switch
- Up to 20,000 keyholder records in its onboard database. Note that this figure is reduced if multiple access groups are utilised.
- The PAC 512 DC Database provides distributed intelligence which supports the ongoing access control and lift control functions if communication to the management platform is lost.
- One-Touch™ test mode built into the access controller to support commissioning and in-life fault diagnosis. This supports a health check of directly connected reader and door connections with feedback through onboard LEDs.
- Easy to install with clear labelling on the controller, terminal blocks for easy wiring, clear installation guides and the One-Touch™ testing feature.
- Multiple access groups to define different access and time profile privileges.
- Local anti-passback that drives the user to read-in and read-out for accurate tracking of personnel within the access control system
- Energy efficient PSU (in the boxed variants) that meets the stringent California Energy Commission (CEC) Level 6 standard.
- Supports the following access control reader protocols:
 - PAC64 – for all PAC systems supporting PAC HF Ops™ ID Devices
 - PAC – for all PAC systems supporting PAC LF and PAC HF Ops™ Lite ID Devices
 - Wiegand (multiple standard formats) – for Wiegand configured systems supporting Wiegand ID Devices
 - Clock and data reader protocol (magstripe)
- RS-232 communication port.
- RS-485 for connecting to other PAC 512 access controllers
- The PAC 512 DC can be placed in a central location for controlling 2 doors as it supports the following distances from the controller to the PAC Access Control Readers:
 - 70m if the reader is powered by the PAC 512 DC output
 - 500m if the reader is powered by its own PSU
- PAC 512 DCs support larger installations through being networkable on an RS-485 bus. This requires a PAC IP (DCi) as a gateway controller that supports connecting to 512 DC controllers over an RS-485 bus.

- The number of controllers that can be connected in series is dependent on the network supporting the connection between a gateway controller and PAC management software:
 - 24 controllers (including the gateway controller) when connected to a local server running PAC management software
 - 4 controllers (including the gateway controller) when connected via GPRS mobile connection
- The maximum length of the RS-485 bus, supporting a series of PAC 512 access controllers, is 1000m.
- 2 x 5Amp ancillary relays, supporting programmable outputs.
- 4 x inputs for proactive monitoring:
 - Tamper
 - Over-ride
 - 2 x Customer programmable inputs

For Datasheets and detailed installation guides please refer to [PAC Product Literature](#)

5.2 PAC I/O Controllers

Input / Output (I/O) Controllers work in conjunction with PAC Networked DCi Access Controllers (PAC 511/512 DCi) to provide advanced security and building management functions including:

- Lift Control including multiple options such as:
 - Secure the calling of a lift with a PAC access reader.
 - Provide enhanced security through extending full access control to floors within a building by controlling the lift buttons that a keyholder can activate based on their privileges.
- Alarm points for monitoring and proactive notification of alarms with the following capabilities:
 - Time profiles for enabling alarm point at specific times.
 - Arm and Disarming of alarm points.
 - Proactive notifications of alarms in Control Centre (within PAC Management Software)
 - Configurable Event to Action rules to trigger a large variety of automated notifications.
 - Output control driven by alarm/event inputs (see output examples below).
- Input monitoring of a large variety of equipment, such as:
 - Freezer temperature control monitors.
 - PIR motion sensors.
 - Door/window sensors.
 - Smoke detectors.
 - And many other building control equipment.
- Outputs that can be used to control items including:
 - Lifts.
 - Audible sounders.
 - Flashing beacons.
 - Security shutters, that can be automatically deployed in the event of an alarm.
 - Building control equipment such as PIR lighting, air-conditioning units, etc.
 - And many other building control equipment.

PAC provides two feature rich controllers for maximum flexibility and cost-effective deployment of I/O control functions:

- PAC 520 Input Controller
- PAC 530 Output Controller

User friendly configuration and ongoing management of the I/O Controllers is via the PAC management software.

For Datasheets and detailed installation guides please refer to [PAC Product Literature](#)

The PAC Input and Output controllers are covered in detail in the following sections.

5.2.1 PAC 520 Input Controller

The PAC 520 Input Controller is a powerful, feature rich Input Controller with:

- 20 user-configurable inputs in the following modes:
 - Normally Open
 - Normally Closed
 - Normally Open 3-state
 - Normally Closed 3-state
 - Normally Open 4-state
 - Normally Closed 4-state
 - Pulse including configurable options for:
 - Pulse count
 - Pulse count time
 - Debounce time
 - Configurable time profiles to determine active input monitored times
- 2 x 5Amp output relays configurable in the following modes:
 - Latched with configurable maximum activation time
 - Momentary with configurable momentary time
 - Toggled which toggles the output state
 - Pulsed with the following configurable options:
 - Cycle time
 - Active %
 - Number of pulses
 - Configurable to operate on a time profile
 - Commonly used templates are available within Access Central
- Connected into a PAC 511/512 DCi access controller via an RS-485 connection.
- Additional connections include:
 - 1 x anti-tamper connection
 - 1 x over-ride connection
 - 2 x Polyfused 100mAmp auxiliary voltage output
- One-Touch™ test mode built into the access controller to support commissioning and in-life fault diagnosis. This is achieved by identifying cabling, channel, and configuration issues when the One-Touch™ mode is deployed.
- Status LEDs for all Inputs and Outputs when in One-Touch™ mode.
- Available in 2 versions:
 - DIN Mount
 - Boxed in metal enclosure
- Configured and managed via PAC management software.
- Easy to install with clear labelling on the controller, terminal blocks for easy wiring, clear installation guides and the One-Touch™ testing feature.

Figure 9, below, shows the PAC 520 Input Controller.



Figure 9 - PAC 520 Input Controller

5.2.2 PAC 530 Output Controller

The PAC 530 Output Controller is a powerful, feature rich Output Controller with:

- 12 user-configurable outputs in the following modes:
 - Latched with configurable maximum activation time
 - Momentary with configurable momentary time
 - Toggled which toggles the output state
 - Pulsed with the following configurable options:
 - Cycle time
 - Active %
 - Number of pulses
 - Configurable time profiles to determine active output times
- The outputs are rated as per the following:
 - 10 x outputs are 2Amp rated
 - 2 x outputs are 8Amp rated
- 2 user configurable inputs in the following modes:
 - Normally Open
 - Normally Closed
 - Normally Open 3-state
 - Normally Closed 3-state
 - Normally Open 4-state
 - Normally Closed 4-state
 - Pulse including configurable options for:

- Pulse count
- Pulse count time
- Debounce time
- 24 hour monitored alarm point
- Commonly used templates are available within Access Central
- Connected into a PAC 511/512 DCi access controller via an RS-485 connection.
- Additional connections include:
 - 1 x anti-tamper connection
 - 1 x over-ride connection
 - 1 x Polyfused 100mAmp auxiliary voltage output
- One-Touch™ test mode built into the access controller to support commissioning and in-life fault diagnosis. This is achieved by identifying cabling, channel, and configuration issues when the One-Touch™ mode is deployed.
- Status LEDs for all Outputs and Inputs when in One-Touch™ mode.
- Available in 2 versions:
 - DIN Mount
 - Boxed in a metal enclosure
- Configured and managed via PAC management software.
- Easy to install with clear labelling on the controller, terminal blocks for easy wiring, clear installation guides and the One-Touch™ testing feature.

Figure 10, below, shows the PAC 530 Output Controller.

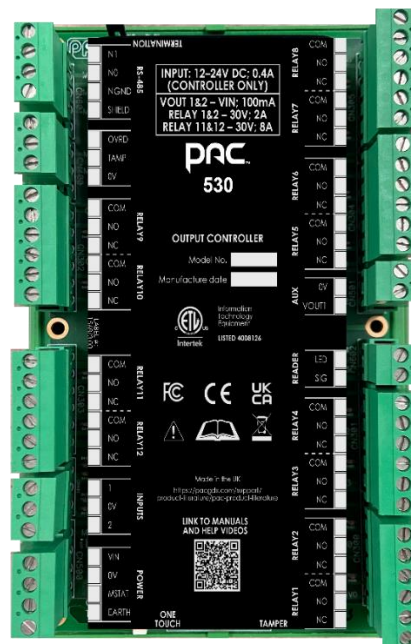


Figure 10 - PAC 530 Output Controller

5.3 Readers

A wide range of PAC readers are available to meet customer's requirements, based on a variety of factors including authentication method, installation options or aesthetics. They are all designed and manufactured to high standards with a deserved reputation for their longevity in all environments.

The following sections provide details on all the PAC readers available.

5.3.1 PAC MT Readers

PAC's MT Readers provide the one single reader solution that supports all PAC RFID credentials as well as support for all standard LF and HF credentials supported via Wiegand protocols. It is therefore ideal for sites where support of multiple ID Device types is required.

The PAC MT Reader range supports all PAC HF and LF ID Devices as well as many Wiegand format ID Devices. This enables the MT Readers to be used in sites which are transitioning between existing LF ID Devices to higher security HF ID Devices.

Using PACs unique One prox smart (Ops™) technology coupled with the industry leading MIFARE™ and DESFIRE™ EV1 ID Device encryption protocols, the highest available standard of access control security is achieved. The most secure PAC access control system is via the use of a High Frequency capable reader (PAC HF, MT or Architect Reader) with a PAC Ops™ ID Device. This combination provides unrivalled security as the ID Devices are not cloneable like many LF ID Devices.

Designed to work in the most demanding of operating environments, the MT Readers support installations which require reliability and security.

There are 3 models of MT Readers available. They support deployments in all commercial and residential scenarios. All PAC MT Readers have the following in common:

- Robust design with Lifetime Warranty against electrical failure.
- Provides commercial grade security to underpin insurance requirements.
- Certified to the EN50131-1 and EN50131-3 standards.
- Easy to install and configure using the in-built switches for setting card and output format.
- Multiple ID Device formats supported including PAC, PAC64, Wiegand 26, Wiegand 34, Wiegand 74 and Wiegand emulation mode.
- Supports high security deployments with 128bit AES (Advanced Encryption Standard) certification when used in conjunction with PAC Ops™ ID Devices and PAC 512 controllers.
- User friendly with 2 LEDs and audible sounder for clear feedback on access request.

The following sections detail the PAC MT Reader range.

5.3.1.1 PAC GS3 MT Mullion Reader

The Mullion Reader is a compact reader that is ideal for fitting on the frame of a door, internally or externally. In addition to the features in Section 5.3.1, the GS3 MT Mullion Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed onto most door frames.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- ID Device reading range of:
 - Up to 45mm for HF ID Devices
 - Up to 85mm for LF ID Devices
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC512

Figure 11, below, shows the GS3 MT Mullion Reader:



Figure 11 - GS3 MT Mullion Reader

5.3.1.2 PAC GS3 MT Standard Reader

The Standard Reader provides the same functionality as a Mullion Reader but in a larger form. The Standard Reader is ideal for fitting into most standard electrical back boxes, internally or externally. In addition to the features in Section 5.3.1, the GS3 MT Standard Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed into most flush mounted electrical back boxes.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC
 - Stanley
 - KeyPAC
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- ID Device reading range of:
 - Up to 45mm for HF ID Devices
 - Up to 85mm for LF ID Devices
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with the PAC512

Figure 12, below, shows the GS3 MT Standard Reader:



Figure 12 - GS3 MT Standard Reader

5.3.1.3 PAC GS3 MT PIN Reader

The GS3 MT PIN Reader comes in the same footprint as a PAC Standard Reader and supports dual mode authentication through:

- Proximity access control using an authenticated ID Device
- Unique Personal Identification Number (PIN) entry by the user

This increases the security of the access control system as it reduces the risk of unauthorised access into high security areas.

In addition to the features in Section 5.3.1, the GS3 MT PIN Reader comes with:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed into most flush mounted electrical back boxes.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- ID Device reading range of:
 - Up to 45mm for HF ID Devices
 - Up to 65mm for LF ID Devices
- Integral Tamper circuit and Mounting Plate
- Reader line tamper when used in conjunction with PAC 512 controllers
- The PIN reader supports the following PIN Modes
 - PAC PIN Blocking (PIN derived from Keycode)
 - PAC PIN
 - PAC64 PIN
 - Wiegand PIN (4-bit)
 - Wiegand PIN (8-bit)

Figure 13, below, shows the GS3 MT PIN Reader:



Figure 13 - GS3 MT PIN Reader

5.3.2 PAC HF Readers

The PAC HF reader range supports all PAC HF ID Devices as well as many Wiegand format Tokens.

Using PACs unique One prox smart (Ops™) technology coupled with the industry leading MIFARE™ and DESFIRE™ EV1 ID Device encryption protocols, the highest available standard of RFID access control security is achieved. The most secure PAC access control system is via the use of a High Frequency reader (PAC HF, MT or Architect Reader) with a PAC Ops™ ID Device. This combination provides unrivalled security as the ID Devices are not cloneable like many LF ID Devices.

Designed to work in the most demanding of operating environments, HF Readers support installations which require reliability and security.

There are 5 models of HF Readers available. They support deployments in all commercial and residential scenarios. All PAC HF Readers have the following in common:

- Provide commercial grade security to underpin insurance requirements.
- Certified to the EN50131-1 and EN50131-3 standards.
- Easy to install and configure using the in-built switches for setting card and output format.
- Multiple ID Device formats supported including PAC, PAC64, Wiegand 26, Wiegand 34, Wiegand 74 and Wiegand emulation mode.
- Supports high security deployments with 128bit AES (Advanced Encryption Standard) certification when used in conjunction with PAC Ops™ ID Devices and PAC 512 controllers.
- User friendly with 2 LEDs and audible sounder for clear feedback on a user-initiated access request.

The following sections detail the PAC HF Reader range.

5.3.2.1 PAC GS3 HF Mullion Reader

The Mullion Reader is a compact reader that is ideal for fitting on the frame of a door, internally or externally. In addition to the features in Section 5.3.1, the GS3 HF Mullion Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed onto most door frames.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 45mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC 512 controllers
- Robust design with Lifetime Warranty against electrical failure.

Figure 14, below, shows the GS3 HF Mullion Reader:



Figure 14 - GS3 HF Mullion Reader

5.3.2.2 PAC GS3 HF Standard Reader

The Standard Reader provides the same functionality as a Mullion Reader but in a larger form. The Standard Reader is ideal for fitting into most standard electrical back boxes, internally or externally. In addition to the features in Section 5.3.1, the GS3 HF Standard Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed into most flush mounted electrical back boxes.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 65mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC 512 controllers
- Robust design with Lifetime Warranty against electrical failure.

Figure 15, below, shows the GS3 HF Standard Reader:



Figure 15 - GS3 HF Standard Reader

5.3.2.3 PAC GS3 HF PIN Reader

The GS3 HF PIN Reader comes in the same footprint as a PAC Standard Reader and supports dual mode authentication through:

- Proximity access control using an authenticated ID Device
- Unique Personal Identification Number (PIN) entry by the user

This increases the security of the access control system as it reduces the risk of unauthorised access into high security areas.

In addition to the features in Section 5.3.1, the GS3 HF PIN Reader comes with:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed into most flush mounted electrical back boxes.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 65mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper when used in conjunction with PAC 512 controllers
- Robust design with Lifetime Warranty against electrical failure.
- The PIN reader supports the following PIN Modes
 - PAC PIN Blocking (PIN derived from Keycode)
 - PAC PIN
 - PAC64 PIN
 - Wiegand PIN (4-bit)
 - Wiegand PIN (8-bit)

Figure 16, below, shows the GS3 HF PIN Reader:



Figure 16 - GS3 HF PIN Reader

5.3.2.4 PAC GS3 HF Vandal Resistant Reader

The Vandal Resistant Reader is designed to work in the most demanding of operating environments as it provides a robust, intruder-graded access reader. The Vandal Resistant Reader is ideal for internal or external installations. In addition to the features in Section 5.3.1, the GS3 HF Vandal Resistant Reader comes with the following features:

- Certified to Security Grade 3 classification and to IP67 weather resistance to make this an indoor/outdoor reader.
- Raised key symbol on the front with audible and visual user feedback for Equality Act compliance
- Comes with pre-connected 2m cable for ease of installation
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 40mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC 512 controllers
- Robust design with Lifetime Warranty against electrical failure.

Figure 17, below, shows the GS3 HF Vandal Resistant Reader:



Figure 17 - GS3 HF Vandal Resistant Reader

5.3.2.5 PAC DS1 Reader

The PAC DS1 Reader provides high security functionality in a small form factor and is designed to fit onto an internal door frame. In addition to the features in Section 5.3.1, the DS1 Reader comes with the following features:

- Certified to IP55 for indoor use only.
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 45mm reading range of ID Device
- Robust design with 1 year Warranty against electrical failure.

Figure 19, below, shows the DS1 Reader:



Figure 18 – DS1 Reader

5.3.2.6 PAC HF Panel Mount Reader

The Panel Mount Reader is designed to fit OEM door entry panels which makes it an easy retrofit reader option. In addition to the features in Section 5.3.1, the GS3 HF Panel Mount Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Raised key symbol on the front with audible and visual user feedback for Equality Act compliance
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
 - Wiegand (many variants)
- Up to 20mm reading range of ID Device
- Reader line tamper configurable when used in conjunction with PAC 512 controllers
- Robust design with Lifetime Warranty against electrical failure.

Figure 19, below, shows the GS3 HF Panel Mount Reader:



Figure 19 - GS3 HF Panel Mount Reader

5.3.2.7 PAC HF Backbox Reader

The Backbox Reader is compatible with most electrical backboxes for ease of installation. In addition to the features in Section 5.3.1, the GS3 HF Backbox Reader comes with the following features:

- For use indoor only.
- Ease to install as it is designed to fit onto most electrical backboxes, surface or flush
- Supports the following ID Devices:
 - PAC Ops™ Lite
 - PAC Ops™
- Up to 100mm reading range of ID Device
- Selectable reader outputs (PAC64 or PAC) via a switch on the rear of the reader
- Reader line tamper configurable when used in conjunction with PAC 512 controllers
- Robust design with 1 year warranty against electrical failure.

Figure 20, below, shows the GS3 HF Backbox Reader:



Figure 20 - GS3 HF Backbox Reader

5.3.3 PAC LF Readers

The PAC LF reader range supports all PAC LF ID Devices as well as many Wiegand format Tokens.

Designed to work in the most demanding of operating environments, LF Readers support installations which require reliability and security.

There are 4 models available, which supports deployment for all commercial and residential scenarios. All PAC LF Readers have the following in common:

- Robust design with Lifetime Warranty against electrical failure.
- Provides commercial grade security to underpin insurance requirements.
- Certified to the EN50131-1 and EN50131-3 standards.
- Easy to install and configure using the in-built switches for setting card and output format.
- Multiple ID Device formats supported including PAC, PAC64, Wiegand 26, Wiegand 34, Wiegand 74 and Wiegand emulation mode.
- User friendly with 2 LEDs and audible sounder for clear feedback on access request.

The following sections detail the PAC LF Reader range.

5.3.3.1 PAC GS3 LF Mullion Reader

The Mullion Reader is a compact reader that is ideal for fitting on the frame of a door, internally or externally. In addition to the features in Section 5.3.3, the GS3 LF Mullion Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed onto most door frames.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - Wiegand (many variants)
- Up to 85mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with the PAC 512 controllers

Figure 21, below, shows the GS3 LF Mullion Reader:



Figure 21 - GS3 LF Mullion Reader

5.3.3.2 PAC GS3 LF Standard Reader

The Standard Reader provides the same functionality as a Mullion Reader but in a larger form. The Standard Reader is ideal for fitting into most standard electrical back boxes, internally or externally. In addition to the features in Section 5.3.3, the GS3 LF Standard Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Able to be installed into most flush mounted electrical back boxes.
- Certified to Security Grade 3 classification.
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - Wiegand (many variants)
- Up to 85mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC 512 controllers

Figure 22, below, shows the GS3 LF Standard Reader:



Figure 22 - GS3 LF Standard Reader

5.3.3.3 PAC GS3 LF Vandal Resistant Reader

The Vandal Resistant Reader is designed to work in the most demanding of operating environments as it provides a robust, intruder-graded access reader. The Vandal Resistant Reader is ideal for internal or external installations. In addition to the features in Section 5.3.3, the GS3 LF Vandal Resistant Reader comes with the following features:

- Certified to Security Grade 3 classification and to IP67 weather resistance to make this an indoor/outdoor reader.
- Raised key symbol on the front with audible and visual user feedback for Equality Act compliance
- Comes with pre-connected 2m cable for ease of installation
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - Wiegand (many variants)
- Up to 40mm reading range of ID Device
- Integral Tamper circuit and Mounting Plate
- Reader line tamper configurable when used in conjunction with PAC 512 controllers

Figure 23, below, shows the GS3 LF Vandal Resistant Reader:



Figure 23 - GS3 LF Vandal Resistant Reader

5.3.3.4 PAC GS3 LF Panel Mount Reader

The Panel Mount Reader is designed to fit OEM door entry panels which makes it an easy retrofit reader option. In addition to the features in Section 5.3.3, the GS3 LF Panel Mount Reader comes with the following features:

- Certified to IP65 weather resistance to make this an indoor/outdoor reader.
- Raised key symbol on the front with audible and visual user feedback for Equality Act compliance
- Supports the following ID Devices:
 - PAC
 - KeyPAC
 - Wiegand (many variants)
- Up to 45mm reading range of ID Device
- Reader line tamper configurable when used in conjunction with the PAC 512 controllers

Figure 24, below, shows the GS3 LF Panel Mount Reader:



Figure 24 - GS3 LF Panel Mount Reader

5.3.4 PAC Architect Readers

PAC Architect Readers are high security readers that offer both HF RFID and/or Smartphone Mobile ID support.

PAC Architect Readers support PAC Ops™ ID Devices. They also support high security Mobile ID's that allow a user's smartphone to become the ID Device. The Mobile IDs are high security by utilising the latest encryption, secure storage, and authentication technologies meeting First Level Security Certification (CSPN) by ANSSI (French Network and Information Security Agency).

Using PACs unique One prox smart (Ops™) technology coupled with the industry leading MIFARE™ and DESFIRE™ EV1 ID Device encryption protocols, the highest available standard of access control security is achieved. The most secure PAC access control system is via the use of a High Frequency capable reader (PAC HF, MT or Architect Reader) with the PAC Ops™ ID Device or Mobile ID on a user's smartphone. This combination provides unrivalled security as the ID Devices are not cloneable like many LF ID Devices.

Designed to work in the most demanding of operating environments, the Architect Readers support installations which require reliability and security. They are environmentally friendly through a modular design that allows the reader to be recycled as well as the support for Mobile ID's that reduce the need for physical plastic ID Devices.

There are 4 models of Architect Readers available. They support deployments in all commercial and residential scenarios. All the PAC Architect Readers have the following features in common:

- Robust design with Lifetime Warranty against electrical failure.
- Provides commercial grade security to underpin insurance requirements.
- Certified to IP65 weather proofing standards to support deployments both internally and externally.
- IK10 certified vandal-proof structure has been optimized to resist knocks and malicious acts.
- Self-extinguishing in the event of a fire.
- Easy to install internally and externally as it is mountable on walls and door frames without any need for a spacer. Comes with plug-in 3m cable and connector for ease of wiring.
- Multiple HF ID Device formats supported including PAC and PAC64.
- Supports high security deployments with 128bit AES (Advanced Encryption Standard) certification when used in conjunction with PAC Ops™ ID Devices/Mobile IDs and PAC 512 controllers.
- User friendly with 2 LEDs and audible sounder for clear feedback on a user initiated access request.

5.3.4.1 Architect One

The Architect One is a mullion RFID reader specially designed for installation in small spaces, for example on door frames or narrow flush box mounting. Its small size and intelligent design make it easy to incorporate into any installation environment with a 3m plug-in/plug-out connector cable for ease of wiring.

In addition to the features in Section 5.3.3, the Architect One Reader comes with the following features:

- Supports the following ID Devices:
 - PAC Ops™
- Supports the following User Access mode:
 - Card Mode
- PAC HF ID Device reading range up to 60mm
- Accelerometer-based tamper detection system with key deletion option (patented solution)

Figure 25, below, shows the Architect One Reader:



Figure 25 – Architect One Reader

5.3.4.2 Architect One Blue

The Architect One Blue is a mullion RFID/Bluetooth/NFC reader specially designed for installation in small spaces, for example on door frames or narrow flush box mounting. It is specially designed for all your high security access control applications coupled with industry leading Mobile ID support for user friendly deployments. Its small size and intelligent design make it easy to incorporate into any installation environment.

In addition to the features in Section 5.3.3, the Architect One Blue Reader comes with the following features:

- Supports the following ID Devices:
 - PAC Ops™
 - Mobile IDs
- When using Mobile IDs the Card User Mode is set as default. Other modes are available for configuration as part of the install:
 - Card mode – present the smartphone to the reader like a physical ID Device
 - Slide mode – swipe your hand in front of the reader
 - Tap tap mode – tap your smartphone twice to activate the access request
 - Voice activation mode - SIRI voice command on your iPhone or Apple Watch.
 - Remote mode – remotely open the door through the Mobile ID app
 - Hands free mode – simply walk past the reader which will detect and authenticate you as you come into the configurable read distance of the reader
- Configurable ID Device reading range:
 - up to 60mm for PAC HF ID Devices
 - up to 20m for Mobile IDs
- Accelerometer-based tamper detection system with key deletion option (patented solution)

Figure 26, below, shows the Architect One Blue Reader:



Figure 26 – Architect One Blue Reader

5.3.4.3 Architect A

The Architect A is a standard RFID reader designed to be Vandal-proof and extremely secure, the Architect A Reader is specially designed for all your high security access control applications. Easy to incorporate into any installation environment with a 3m plug-in/plug-out connector cable for ease of wiring.

In addition to the features in Section 5.3.3, the Architect A Reader comes with the following features:

- Supports the following ID Devices:
 - PAC Ops™
- Supports the following User Access mode:
 - Card Mode
- PAC HF ID Device reading range up to 80mm
- Accelerometer-based tamper detection system with key deletion option (patented solution)

Figure 27, below, shows the Architect A Reader:



Figure 27 – Architect A Reader

5.3.4.4 Architect A Blue

The Architect A Blue is a standard RFID/Bluetooth/NFC reader designed to be Vandal-proof and extremely secure, the Architect A Blue Reader is specially designed for all of your high security access control applications coupled with industry leading Mobile ID support for user friendly deployments.

In addition to the features in Section 5.3.3, the Architect A Blue Reader comes with the following features:

- Supports the following ID Devices:
 - PAC Ops™
 - Mobile IDs
- When using Mobile IDs the Card User Mode is set as default. Other modes are available for configuration as part of the install:
 - Card mode – present the smartphone to the reader like a physical ID Device
 - Slide mode – swipe your hand in front of the reader
 - Tap tap mode – tap your smartphone twice to activate the access request
 - Voice activation mode - SIRI voice command on your iPhone or Apple Watch.
 - Remote mode – remotely open the door through the Mobile ID app
 - Hands free mode – simply walk past the reader which will detect and authenticate you as you come into the configurable read distance of the reader
- Configurable ID Device reading range:
 - up to 80mm for PAC HF ID Devices
 - up to 20m for Mobile IDs
- Accelerometer-based tamper detection system with key deletion option (patented solution)

Figure 28, below, shows the Architect A Blue Reader:



Figure 28 – Architect A Blue Reader

5.3.5 Biometric Readers

Biometric readers support the use of user's fingerprints as the ID Device to authenticate entry to the secured location. PAC partner with ievo® for the biometric readers detailed in this section.

The main components of an ievo® biometric system are:

- Reader – used at point of entry to verify authenticated users via their fingerprint.
- Control Board – is the biometric access controller that contains the fingerprint database (access control list).
- Desktop Reader – the administration unit used to capture and then upload a user's fingerprint to the control board.
- Peripherals – including mounting kits and LED relays.

All the above are fully integrated with PAC Access Central management software enabling biometric readers to be easily incorporated within a new or existing PAC access control system.

Please note, whilst the above components are available to purchase individually, we have also created kit bundle including Fingerprint reader and Controller board.

The following sections detail the above components.

5.3.5.1 Readers

There are 2 varieties of ievo® biometric readers as detailed in the following sections:

5.3.5.1.1. ievo® Ultimate Reader

The ievo® Ultimate Reader uses multispectral imaging combined with a secure, award-winning algorithm to offer stable verification of users via their fingerprints. The following features are supported:

- Multispectral imaging sensor for reliable fingerprint identification.
- Activated by capacitive proximity detection.
- Vandal resistant and anti-tamper protocols.
- LED indications for accepted/denied feedback.
- Audio beep indication.
- IP65 rated for internal and external use.
- In-built environmental controls for external use including:
 - Thermostat heated sensor.
 - Humidity sensor.
- Supports PAC output.
- 1:N matching up to 50,000 users (with the appropriate Control Board).
- Integrates into PAC systems.

Figure 29, below, shows the Ultimate Reader:



Figure 29 – ievo® Ultimate Reader

5.3.5.1.2. ievo® Micro Reader

The ievo® Micro Reader is designed for reliable fingerprint identification. It is an indoor reader with the following features supported:

- Powerful optical imaging sensor for reliable fingerprint identification.
- Activated by capacitive proximity detection.
- Anti-tamper protocols.
- LED indications for accepted/denied feedback.
- Audio beep indication.
- Internal use only.
- Supports PAC output.
- 1:N matching up to 50,000 users (with the appropriate Control Board).
- Integrates into PAC systems.

Figure 30, below, shows the Micro Reader:



Figure 30 – iuvo® Micro Reader

5.3.5.2 iuvo® Control Boards

The iuvo® Control Board is a powerful, dedicated fingerprint matching system, supporting any connected iuvo® biometric reader. The Control Board acts as the main communication platform for a biometrics access control system, providing secure and highly reliable authentication data for processing.

There are 2 varieties of Control Board:

- Rev 4 Control Board
- Rev 4S Control Board

These are detailed in the following sections:

5.3.5.2.1. iuvo® Rev 4 Control Board

The iuvo® Rev 4 Control Board supports the latest revision of iuvo® biometric systems and has the following features:

- Fingerprint matching database that comes in 2 varieties:
 - Support for 10,000 fingerprint templates
 - Support for 50,000 fingerprint templates
- Supports up to two iuvo® Rev 4 readers.
- Available in 2 power options:
 - 12V DC – standalone and bundled with a Reader
 - Power over Ethernet (PoE) – standalone only
- LED indicators
- Integrates into PAC systems

Figure 31, below, shows the iuvo® Rev 4 Control Board.



Figure 31 – ievo® Rev 4 Control Board

5.3.5.2.2. ievo® Rev 4S Control Board

The ievo® Rev 4S Control Board supports existing Rev3 versions of ievo® biometric systems and has the following features:

- Fingerprint matching database that supports up to 8,000 fingerprint templates.
- Supports one ievo® Rev 3 reader.
- Available in 2 power options:
 - 12V DC – standalone and bundled with a Reader
 - Power over Ethernet (PoE) – standalone only
- LED indicators
- Integrates into PAC systems

Figure 32, below, shows the ievo® Rev 4S Control Board



Figure 32 – ievo® Rev 4S Control Board

5.3.5.3 ievo® Desktop Readers

ievo® Desktop Readers are a fast and accurate way of registering fingerprints into the ievo® biometric system.

They are designed for desktop use and connect via USB to a PC running the associated software.

There are 2 varieties of Desktop Readers:

- ievo® Ultimate Desktop Reader
- ievo® Micro Desktop Reader

These are detailed in the following sections:

5.3.5.3.1. ievo® Ultimate Desktop Reader

The ievo® Ultimate Desktop Reader has the following features:

- Used for systems that contain:
 - Ultimate Readers only
 - A mix of Ultimate and Micro Readers
- 500 dpi image resolution
- Multispectral imaging sensor
- USB powered

Figure 33, below, shows the ievo® Ultimate Desktop Reader



Figure 33 – ievo® Ultimate Desktop Reader

5.3.5.3.2. ievo® Micro Desktop Reader

The ievo® Micro Desktop Reader has the following features:

- Used for systems that contain Micro Readers only
- 500 dpi image resolution
- Optical imaging sensor
- USB powered

Figure 34, below, shows the ievo® Micro Desktop Reader



Figure 34 – ievo® Micro Desktop Reader

5.3.5.4 ievo® Peripherals

These are items that support the installation and operation of the ievo® biometric systems and comprise of:

- ievo® Ultimate Surface Mount Kit – enables surface mounting of the ievo® Ultimate Reader
- ievo® Ultimate Flush Mount Kit – enables flush mounting of the ievo® Ultimate Reader
- Relay Module – used to enable the LED indicator on the ievo® Readers when integrated into a PAC access control system

5.4 ID Devices

PAC ID Devices come in a range of forms (fob, card or mobile) and technology types that enable a variety of user options. This enables PAC ID Devices to suit many different access control deployments throughout the commercial, industrial, residential, education, health, and public sectors.

The following sections detail the ID Devices orderable with PAC access control systems.

5.4.1 High Frequency RFID Devices

The following range of HF RFID Devices can be used with the following range of Readers:

- PAC HF Readers
- PAC MT Readers
- PAC Architect Readers

5.4.1.1 *PAC Ops™ Lite ID Devices*

PAC Ops™ Lite ID Devices are available in 2 forms:

- Fob – designed to fit onto a keyring or lanyard, these fobs are often used in residential installations.
- Card – a credit card sized ID device with the ability to print other user details for additional identification. Often used in educational and commercial installations.

Ops™ Lite ID Devices utilise 13.56MHz RFID passive proximity technology to be self-powered and built to last.

The following sections provides full details on the PAC Ops™ Lite ID Devices available:

5.4.1.2 *PAC Ops™ ID Devices*

PAC Ops™ ID Devices are available in 2 forms:



- Fob – designed to fit onto a keyring or lanyard, these fobs are often used in residential installations.
- Card – is credit card sized with the ability to print other user details for additional identification. Often used in educational and commercial installations.

With the increasing risk of ID Device cloning, the PAC Ops™ ID Devices provide customers with industry leading MIFARE™® smart technology. This provides the highest security of the access control system by removing the risk of ID Device cloning associated with LF ID Devices.

The following sections provides full details on the PAC Ops™ ID Devices available:

5.4.1.2.1. PAC Ops™ Fobs

The PAC Ops™ Fobs come in 2 variants and are detailed in the following table:

Fob	Description	Accessories
<p>PAC Ops™ Fob with clip</p> 	<ul style="list-style-type: none"> • MIFARE DESFire EV1 unique 7 byte CSN per card • Unique identity code per card/token • Fully Encapsulated in blue ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to keyring or lanyard • Self-powered, no need for batteries • ISO 14443 compliant • Lifetime Guarantee against electronic failure • Supplied in packs of 10 	None
<p>PAC Ops™ Fob without clip</p> 	<ul style="list-style-type: none"> • MIFARE DESFire EV1 unique 7 byte CSN per card • Unique identity code per card/token • Interchangeable colour clip for ease of identification • Fully Encapsulated in blue ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to keyring or lanyard • Self-powered, no need for batteries • ISO 14443 compliant • Lifetime Guarantee against electronic failure • Supplied in packs of 10 	<p>Colour Clips in the following colours:</p> <ul style="list-style-type: none"> • Red • Green • Blue • Yellow • White • Black • Orange • Grey

5.4.1.2.2. PAC Ops™ Card

The PAC Ops™ Card comes with the following features:

- MIFARE DESFire EV1 unique 7 byte CSN per card
- Unique identity code per card/token
- ISO Card supporting direct thermal or image transfer printing
- Hole punching guide included
- Self-powered, no need for batteries
- Lifetime Guarantee against electronic failure
- Supplied in packs of 10

Figure 35, below, shows the PAC Ops™ Card:

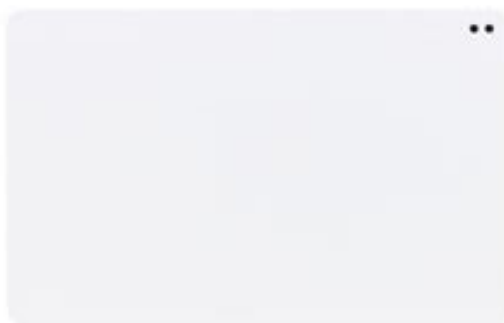




Figure 35 – PAC Ops™ Card

5.4.1.2.3. PAC Ops™ Lite Fobs

The PAC Ops™ Lite Fobs come in 2 variants and are detailed in the following table:

Fob	Description	Accessories
 <p>PAC Ops™ Lite Fob with clip</p>	<ul style="list-style-type: none"> • Pre-configured identity code using a 1K MIFARE™ 4 Byte serial number • Fully Encapsulated in blue ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to keyring or lanyard • Self-powered, no need for batteries • ISO 14443 compliant • Lifetime Guarantee against electronic failure 	None
 <p>PAC Ops™ Lite Fob without clip</p>	<ul style="list-style-type: none"> • Pre-configured identity code using a 1K MIFARE™ 4 Byte serial number • Interchangeable colour clip for ease of identification • Fully Encapsulated in blue ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to keyring or lanyard • Self-powered, no need for batteries • ISO 14443 compliant • Lifetime Guarantee against electronic failure 	Colour Clips in the following colours: <ul style="list-style-type: none"> • Red • Green • Blue • Yellow • White • Black • Orange • Grey

5.4.1.2.4. PAC Ops™ Lite Card

The PAC Ops™ Lite Card comes with the following features:

- Pre-configured identity code using a 1K MIFARE™ 4 Byte serial number
- ISO Card supporting direct thermal or image transfer printing
- Hole punching guide included
- Self-powered, no need for batteries
- Lifetime Guarantee against electronic failure
- Supplied in packs of 10

Figure 36, below, shows the PAC Ops™ Lite Card:



Figure 36 – PAC Ops™ Lite Card

5.4.2 Low Frequency RFID Devices

The following range of Low Frequency (LF) ID Devices can be used with all PAC LF or MT Readers.

5.4.2.1 PAC ID Devices



PAC ID Devices are available in 2 forms:

- Fob – designed to fit onto a keyring or lanyard, these fobs are often used in residential installations.
- Card – is credit card sized with the ability to print other user details for additional identification. Often used in educational and commercial installations.

PAC ID Devices utilise the proprietary PAC protocol which was developed by PAC before RFID standards were established for access control. They utilise 153.6kHz RFID passive proximity technology to be self-powered and built to last. The following sections provides full details on the PAC LF ID Devices available:



5.4.2.1.1. PAC LF Fobs

PAC LF Fobs come in 2 variants as detailed in the following table:

Fob	Description	Accessories
<p>PAC Fob with clip</p> 	<ul style="list-style-type: none"> • Unique pre-configured identity code • Fully Encapsulated in black ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to keyring or lanyard • Self-powered, no need for batteries • Lifetime Guarantee against electronic failure • Supplied in packs of 10 	<p>None</p>
<p>PAC Fob without clip</p> 	<ul style="list-style-type: none"> • Unique pre-configured identity code • Interchangeable colour clip for ease of identification • Fully Encapsulated in black ABS plastic • Double sealed and ultrasonically welded • Metal eyelet for attachment to a keyring or lanyard • Self-powered, no need for batteries • Lifetime Guarantee against electronic failure • Supplied in packs of 10 	<p>Colour Logo Clips options:</p> <ul style="list-style-type: none"> • Red • Green • Blue • Yellow • White • Black • Orange • Turquoise • Brown • Pink • Purple

5.4.2.1.2. PAC LF Cards

PAC LF Cards come in 2 varieties as detailed in the following table:

Card	Description
<p>PAC ISO Card</p> 	<ul style="list-style-type: none"> • Unique pre-configured identity code • ISO Card supporting direct thermal or image transfer printing • Hole punching guide included • Self-powered, no need for batteries • Lifetime Guarantee against electronic failure • Supplied in packs of 10
<p>PAC ISO Card – with magnetic stripe</p> 	<ul style="list-style-type: none"> • Same as ISO Card above • With magnetic stripe for customer encoding • Supplied in packs of 10

5.4.2.2 KeyPAC ID Devices

KeyPAC ID Devices are available in 2 forms:

- Fob – designed to fit onto a keyring or lanyard, these fobs are often used in residential installations.
- Card – is credit card sized with the ability to print other user details for additional identification. Often used in educational and commercial installations.

KeyPAC ID Devices utilise 125kHz RFID passive proximity technology to be self-powered and built to last.

The following sections provides full details on the KeyPAC LF ID Devices available:

5.4.2.2.1. KeyPAC LF Fobs

The KeyPAC LF Fob comes with the following features:

- Unique pre-configured identity code
- Fully Encapsulated in black ABS plastic
- Double sealed and ultrasonically welded
- Metal eyelet for attachment to keyring or lanyard
- Self-powered, no need for batteries
- Lifetime Guarantee against electronic failure
- Supplied in packs of 10


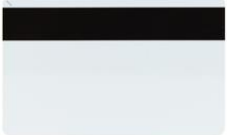
Figure 37, below, shows the KeyPAC Fob:



Figure 37 – KeyPAC Fob

5.4.2.2.2. KeyPAC LF Cards

KeyPAC LF Cards come in 2 varieties as detailed in the following table:

Card	Description
<p>KeyPAC ISO Card</p> 	<ul style="list-style-type: none"> • Unique pre-configured identity code • ISO Card supporting direct thermal or image transfer printing • Hole punching guide included • Self-powered, no need for batteries • Lifetime Guarantee against electronic failure • Supplied in packs of 10
<p>KeyPAC ISO Card – with magnetic stripe</p> 	<ul style="list-style-type: none"> • Same as ISO Card above • With magnetic stripe for customer encoding • Supplied in packs of 10

5.4.3 Mobile ID

Mobile ID's are usable with the Architect Blue range of Readers. Mobile ID's are access control credentials stored on a smartphone (Android™ and iOS®). Mobile ID's work alongside or replace traditional physical ID Devices.

Supported through a dedicated app called STid Mobile ID. The Mobile ID is securely stored on the user's smartphone using 128bit AES standards to encrypt and authenticate the unique Mobile ID.

There are 2 forms of Mobile ID as described in the following table:

Mobile ID	Description
Green Mobile ID	<ul style="list-style-type: none"> • Standard security, equivalent to PAC Ops™ Lite security • Unique card number issued on successful download of the Mobile ID app • Allows mobile phone to be used as the ID device via a Bluetooth/NFC connection to a supported Architect Reader • Only the card user access mode supported (see Section 5.3.3) • Recommended for visitor access
Blue Secure Mobile ID	<ul style="list-style-type: none"> • High security, equivalent to PAC Ops™ security • Unique private card number issued via a customer dedicated web portal • Allows mobile phone to be used as the ID device via a Bluetooth/NFC connection to a supported Architect Reader • The following user modes supported (see Section 5.3.3): <ul style="list-style-type: none"> ○ Card mode ○ Slide mode ○ Tap tap mode ○ Voice Activation mode ○ Remote mode ○ Hands free mode • Multi-mode identification and authentication can be implemented (providing the smartphone supports them) including: <ul style="list-style-type: none"> ○ PIN Code ○ Biometrics ○ Voice recognition • Recommended for staff/resident access

Figure 38, below, shows the virtual wallet, which contains all Mobile IDs applicable to a single user:





Figure 38 – Mobile ID's

5.5 Door Hardware

5.5.1 Push Button Exit Devices

There are 2 variants of Push To Exit devices available. As described in the following table:

Push To Exit	Description
	<p>Push Button 25mm S/steel (23002)</p> <ul style="list-style-type: none"> • Stainless Steel plate • 25mm push button • Engraved with Push To Exit <p>Fits into a single gang electrical backbox</p>
	<p>Push Button 25mm S/steel, yellow bezel (23003)</p> <ul style="list-style-type: none"> • Stainless Steel plate • 25mm push button • Yellow bezel around the push button • Engraved with Push To Exit • Fits into a single gang electrical backbox

5.5.2 Hands-Free Request to Exit Device

The device uses Infrared to detect a request to exit without the user needing to push a button. This limits the threat of transference of disease, infections and dirt between users.

The Hands-Free Request to Exit (RTE) device comes with the following features:

- Stainless Steel plate
- IR button rated to IP65
- 12V-20V DC powered
- LED indication with visual indication of successful request
- Adjustable latch time from 0.5 to 30 seconds
- Adjustable trigger distance from 4 to 15cm
- Designed to prevent any interference with other infra-red devices
- Fits into a single gang electrical backbox

Figure 39, below, shows the Hands-Free RTE Device:



Figure 39 – Hands-Free RTE Device

5.6 Power Supplies

5.6.1 3.6 Amp Power Supplies

The PAC 3.6A (50W) power supply units are designed with efficient eco-friendly credentials coupled with high performance.

The features for the PSU are as follows:

- PAC PSUs have been designed and tested to meet the stringent California Energy Commission (CEC) Level 6 standard. They come in the following variants:
 - 12V DC – used for 12V DC door locks
 - 24V DC – used for 24V DC door locks
- Drawing less mains power, because of the high efficiency (80% efficiency rate at most load scenarios), to provide a stable 12V or 24V output.
- The PSUs come in a DIN rail mountable form.
- Battery charger leads are supplied as standard to easily connect a battery back-up capability. For battery back-up the following batteries are needed in addition:
 - A 7 Ah 12V DC battery is required for a 12V DC PSU
 - 2 x 7 Ah 12V DC batteries, connected in series, for a 24V DC PSU

Figure 40, below, shows the 12V 3.6 Amp PSU:



Figure 40 – PAC 12V 3.6 Amp PSU

Figure 41, below, shows the 24V 3.6 Amp PSU:



Figure 41 – PAC 24V 3.6 Amp PSU

5.6.27.2 Amp Power Supply

The features for the PAC 7.2Amp (99W) PSU are as follows:

- High Quality power supply that can switch between 12V and 24V DC outputs
- The PSU come in a DIN rail mountable form.
- Battery charger leads are supplied as standard to easily connect a battery back-up capability. For battery back-up the following batteries are needed in addition:
 - A 7 Ah 12V DC battery is required for a 12V DC output
 - 2 x 7 Ah 12V DC batteries, connected in series, for a 24V DC output

Figure 42, below, shows the 12/24V 7.2A PSU:



Figure 42 – PAC 12/24V 7.2 Amp PSU

5.7 Management

There are 2 PAC management solutions designed to configure and maintain PAC access control systems as well as the ability to extend into integrated security and building management control:

- PAC Access Central™ – feature rich access control, keyholder management, building control software for commercial/educational environments.
- PAC easinet™ residential – feature rich access control, keyholder management, building control software for residential environments.

These management platforms are fundamentally the same software and differ in their dedicated user interfaces focussed on their specific user audience.

They both provide an integrated security software solution that is reliable, scalable and can be adapted to suit every access control installation be it a single site business or a global organisation. Easily configured to operate on a standalone server or across a LAN/WAN network, they provide real-time management of the access control system with event and alarm monitoring and alerting. Feature enhancements also offer integration with a host of customer facilities, security and IT components including:

- High security access control with a huge range of user configurable security policies.
- Keyholder management.
- Occupancy Management.
- Monitoring alarm points.
- Lift control.
- Managing fire doors.
- CCTV integration and control.
- Active Directory integration.
- Input control for monitoring other devices.
- Output control for driving other devices.
- Configurable Event to Action for flexible building and security management functions through proactive and automated management of events and alarms on site with pre-defined actions.
- Control Centre which provides operators with a 'single pane of glass' for remote monitoring of all aspects of the access control and building management system managed by the PAC software.
- Assign different operator roles with default and configurable read/write access options tailored to different system administration tasks.
- Embedded help file.
- Language support in Dutch, English, French, German, Italian, Spanish.

The following sections detail the 2 management software options.

5.7.1 PAC Access Central™

PAC Access Central™ software is designed for commercial, education, healthcare, industrial, and non-residential public sector customers to support the easy configuration and in-life management of PAC access control. It also supports easy extension into integrated security solutions including CCTV, building controls, lift controls, time & attendance, etc. PAC Access Central™ is an IT friendly software package that supports initial configuration and in-life proactive monitoring for operational/security teams, with the following capabilities:

- Supported on a Windows server operating system
- Downloadable from www.pacgdx.com
- PAC Access Central™ has the following licence tiers:
 - SE Edition
 - Professional Edition
- Supports multiple user browser options including:
 - Via Local Standalone PC
 - Via web browser interface across a customer's intranet

For detailed installation and configuration guides please refer to the [PAC website](#).

5.7.1.1 Software Features

The following table provides details on the features within PAC Access Central™ v5.4:

Features	SE Edition	Professional Edition
Feature License Limits		
No. of Doors	250	2000
No. of Time Profiles	20	2000
No. of Holiday Profiles	5	200
No. of Access Groups	1000	5000
Event To Action Manager	✓	✓
Areas	✓	✓
Area Management	✗	✓
Lift Call	✓	✓
Lift Control	✓	✓
Lift Management	✗	✓
No. of Lifts	20	100
CCTV Integration	✓	✓
Occupancy Tracking	✗	✓
Managed Entrance	✗	✓
Global Anti-Passback	✗	✓
Guard Tour	✗	✓
Time Zones	✓	✓
ID Card Designer	✓	✓
Access Options	✓	✗
Alarm Integration and Management	✓	✓
Alarm Time Profiles	✓	✓
Alarm Arm/Disarm	✓	✓
Alarm and Event Archiving	✓	✓

Feature License Limits		
PC Pop-Up Alerts	✓	✓
Personal Access	✓	✓
Area Mode Profiles	✗	✓
Door Mode Profiles	✓	✓
Reader Mode Profiles	✓	✓
No. of Muster Points	10	100
Site Map Designer	✓	✓
Token Formats for use with 3 rd party readers	Feature Pack	✓
Visual Verification	✓	✓
Local Anti-Passback	✓	✓
Event Relay	✓	✓
Hardware License Limits		
IP channels support	✓	✓
No. of Dialup channels	50	750
Over-Air-IP	✓	✓
VPN for Over-Air-IP	✓	✓
No. of 511/512 controllers on an IP channel	24	24
No. of 511/512 controllers on a dialup channel	4	4
PAC 520/530 support (I/O Controllers)	✓	✓
No. of 520/530 I/O controllers supported on a system	4	4000
No. of 520/530 I/O controllers on a PAC 511/512 DCi Channel	4	4
Biometric Reader Support	✓	✓
Compatibility Features		
No. of PAC 500 channels	✗	500
No. of PAC 500 (and associated) controllers on a PAC 500 Channel	✗	24
PAC 2xxx support	Feature Pack	Feature Pack
User License Limits		
Keys	20000	75000
Keyholders	✓	✓
Operators	25	100
Unused Key Expiry	✓	✓
Guest Access End Dates	✓	✓
System License Limits		
Org Units	5	100
Client PCs	5	15
Alarm Workstations	2	8
Web Browser Interface	Feature Pack	✓
Active Directory	Feature Pack	Feature Pack

5.7.1.2 Software Ordering

The software is available to order and download as follows:

Licence	Part Numbers	Description	Chargeable
SE Edition	13490/1.00	SE Edition - software downloadable from the https://pacgdx.com/products/pac-access-central/ website.	No
Professional Edition	13491/1.00	Professional Edition is supplied as a licence key that is orderable through PAC customer services. This key is used on the SE Edition software to unlock the professional features	Yes
Feature Packs	13492/1.00 - PAC 212 support 13493/1.00 - Web Browser Interface 13494/1.00 - Active Directory 13495/1.00 - Token Format	Feature packs are supplied as licence keys that are orderable through PAC customer services. This key is used on the SE Edition software to unlock the Feature Packs.	Yes

5.7.1.3 Deployment Options

PAC Access Central™ software can be deployed as per the following:

- Local standalone Server – software loaded and running on a customer owned Windows PC or server that is directly connected to the PAC system directly or via a customer’s Local Area Network (LAN). For details on the minimum Server specifications required please refer to the [PAC Software Install Guide](#).
- Local/remote web browser interface – with the software running on a customer owned server, it is then possible to remotely log in to the Access Central™ software via a web browser over the customer’s own intranet.

5.7.2 PAC easinet™ residential

PAC easinet™ residential software is specifically designed for residential customers, with the User Interface (UI) developed to allow easy management of access control for residents/staff in a residential environment. PAC easinet™ residential also allows easy expansion into a building control solution including lift control, building control and monitoring to support higher security and easier property management.

- PAC easinet™ residential is supported on a Windows operating system
- Downloadable from www.pacgdx.com
- PAC easinet™ residential has the following licence tiers:
 - easinet™ SE Edition
 - easinet™ Professional Edition
- PAC easinet™ residential also supports the following upgrade packs:
 - Extra 10 door pack
 - Extra 50 door pack
 - Extra 10 dial-up channels
 - Extra 50 dial-up channels
 - 500 Access Group upgrade
 - 5000 keyholder upgrade
 - 10 operators upgrade
 - Additional Client PC upgrade
- Supports multiple deployment options including:
 - Local Standalone server
 - PAC supplied server with pre-loaded easinet™ residential software
 - Local/remote web browser interface (accessing a server running easinet™ residential software) for distributed user access across a customer's intranet
 - Remotely hosted cloud management via PAC Residential Cloud for easy installation of a secure and backed up system dedicated for property managers.

For detailed installation and configuration guides please refer to the [PAC website](#).

5.7.2.1 Software Features

The following table provides details on the features within PAC easinet™ residential v5.4:

Features	SE Edition	Professional Edition
Feature License Limits		
No. of Doors	200	750
User Defined Access Groups	X	✓
Event To Action Manager	✓	✓
Areas	✓	✓
Area Management	X	✓
Lift Call	✓	✓
Lift Control	✓	✓
Lift Management	X	✓
No. of Lifts	20	100
CCTV	✓	✓
Time Zones	✓	✓
No. of Time Profiles	50	100
No. of Holiday Profiles	2	5
No. of Access Groups	500	2000
Department Access	X	✓
Timed Access	X	✓
ID Card Designer	✓	✓
Control Centre	✓	✓
Alarm and Event Archiving	✓	✓
Personal Access	✓	✓
Token Formats for use with 3 rd party readers	FP	✓
Hardware License Limits		
PAC 512 controller support	✓	✓
IP channels support	✓	✓
No. of Dialup channels	50	500
VPN for Over-Air-IP	✓	✓
No. of 511/512 controllers on an IP channel	24	24
No. of 511/512 controllers on a dialup channel	4	4
PAC 520/530 support (I/O Controllers)	✓	✓
No. of 520/530 controllers supported on a system	4	4000
No. of 520/530 controllers on a PAC 511/512 DCi Channel	4	4
Biometric Reader support	✓	✓
User License Limits		
Keyholders	20000	30000
Operators	10	15
Unused Key Expiry	✓	✓
System License Limits		
Org Units	1	25
Client PCs	2	15
Web Browser Interface	✓	✓

5.7.2.2 Software Ordering

The software is available to order and download as follows:

Licence	Part Numbers	Description	Chargeable
easinet™ residential SE Edition	52909	SE Edition - software downloadable from the https://pacgdx.com/products/pac-easinet-residential/ website.	No
easinet™ residential Professional Edition	52915	Professional Edition is supplied as a licence key that is orderable through PAC customer services. This key is used on the SE Edition software to unlock the professional features	Yes
Feature Packs	<ul style="list-style-type: none"> • 13086 – 5,000 Keyholder upgrade Feature Pack • 13114 – 10 Operators upgrade Feature Pack • 13402 – 500 Access Group upgrade Feature Pack • 13967 – Extra 10 dialup channel Feature Pack • 13968 – Extra 50 dialup channel Feature Pack • 13969 – Extra 10 door Feature Pack • 13970 – Extra 50 door Feature Pack • 52910 – Additional Client PC upgrade Feature Pack 	Feature packs are supplied as licence keys that are orderable through PAC customer services. This key is used on the SE Edition software to unlock the Feature Packs.	Yes

There is also the option of a PAC provided server with easinet™ residential software preloaded as detailed in the following table:

Server	Part Number	Description
Pre-configured server	40403	Windows server running PAC easinet™ residential software. Wired Mouse and Keyboard. PAC GS3 MT Desktop Reader kit for token administration.

5.7.2.3 Deployment Options

The PAC easinet™ residential software can be deployed as per the following:

- Local standalone server – software loaded and running on a customer owned Window's server that is connected to the PAC system directly or via a customer's IT network. For details on the minimum Server specifications required please refer to the [PAC Software Install Guide](#).
- PAC supplied server with pre-loaded easinet™ residential software – with a PAC administration kit. Connected directly or via the customer's network, this offers an out of the box management solution for easinet™ residential.
- Local/remote web browser interface – with the software running on the appropriate server, it is then possible to remotely log in to the easinet™ residential software via a web browser over the customer's own intranet.
- Remotely hosted cloud management called PAC Residential Cloud – offers all the features and capabilities of easinet™ residential in a secure and scalable Cloud hosted environment called The Bunker. The ultimate management option for security, reduced installation complexity, high availability, keyholder database management and user friendliness. For further information on PAC Residential Cloud please visit: <https://pacgdx.com/products/pac-residential-cloud/>

6 Glossary

Abbreviation	Description
AES	Advanced Encryption Standard
CEC	California Energy Commission
DC	Door Controller (serial)
DCi	Door Controller IP
EA	Equality Act
EN	European Standards
HF	High Frequency
IP	Internet Protocol
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Low Frequency
MT	Multi-Technology
Ops™	Oneprox smart
PAC	Proximity Access Control
PSIM	Physical Security Information Management
PSU	Power Supply Unit
RFid	Radio Frequency Identification
RJ45	Ethernet Cable Connector Standard
RTE	Request To Exit
SIP	Session Initiation Protocol
SMB	Small / Medium Business
TFT	Thin Film Transistor
UI	User Interface
UPS	Uninterrupted Power Supply
WAN	Wide Area Network

Table 1 - Glossary of Terms