

## Swivel-Bolt 'Bolt-On' Electronic Safe Lock Options

### Product Overview (Swivel-Bolt) (Standard) Electronic Safe Lock Option

This lock option is supplied as **(standard)** with the purchase of an **(ECL)**, **(L02)**, **(L22)** and **(BIO)** electronic model. The high quality swivel-bolt operated stainless-steel safe lock provides a keyless and convenient entry solution based on the standard (3) wheel combination lock footprint.



**1000-LK1 Electronic Safe Lock option**

### Product Benefits

- Is constructed for strength, and is a quality all stainless-steel safe lock.
- Is retrofit to the standard (3) wheel combination lock footprint.
- Is certified as withstanding (10) times the bolt-head pressure requirement of the Australian standard AS4145.2.
- The lock-case comes complete with (2) drilled and tapped 'Re-Locker' holes.
- This same safe lock has been adapted to provide a restricted profile override 'Wave' key solution.

### Alternative Lock Option

- A 'Dead-Bolt' electronic safe lock version.
- A 'Swivel-Bolt' Bramah (Key-Override) electronic safe lock version.

### Product Overview (Swivel-Bolt) (Key-Override) Electronic Safe Lock Option

This lock option is supplied as **(standard)** with the purchase of a **(BLE)** Bluetooth model. For all other electronic models, a restricted profile override key safe lock can be provided on request.

### Product Benefits

- The cost benefit of not having to invest in a special redundant override plate system when an electronic opening is not possible.
- The knowledge that the lock is registered; a key(s) can be supplied at the time of purchase or supplied at a time when a key opening is necessary. This option may suit some end-users where the availability of a key creates concern.
- The (6) pick resistant levers, combined with a registered restricted profile key offers the ultimate in security in the one universal safe lock footprint.
- An alternative keying consideration is the 'RQK' option. Please refer to the 'RQK - Restricted Quick Key' brief for further information.
- With the knowledge these restricted profile keys are assembled. A joint agreement with a compliant service agency will allow these keys to be assembled on-site and dismantled once the key has served its purpose.



**1000-LK2 Electronic (Key-Override) Safe Lock option**

This unit is patented and Australian Made

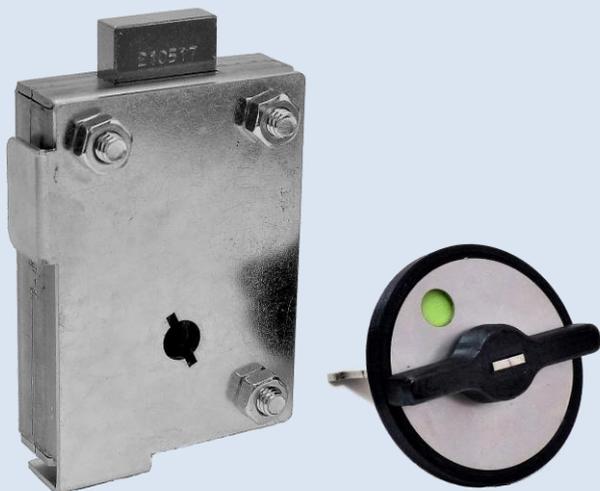
## Alternative: Electronic 'Dead-Bolt' and 'Swivel-Bolt' Bramah Safe Lock Options

**Product Overview (Dead-Bolt)****Alternative: Electronic Safe Lock Option**

The (Dead-Bolt) electronic safe lock can also be supplied with the purchase of an **(ECL)**, **(L02)**, **(L22)** and **(BIO)** electronic model. The high quality dead-bolt operated stainless-steel safe lock provides a keyless and convenient entry solution based on the standard (3) wheel combination lock footprint.

Please Note –

- The (Dead-Bolt) electronic safe Lock also comes complete with a 'Knob Assembly' as pictured.
- A key-override option is not available.



**1000-LK3 Electronic (Dead-Bolt) Safe Lock option with knob assembly**

**Product Benefits**

- Is constructed for strength, and is a quality all stainless-steel safe lock.
- Is retrofit to the standard (3) wheel combination lock footprint.
- The lock-case comes complete with (2) drilled and tapped 'Re-Locker' holes.

This unit is patented and Australian Made

**Product Overview (Swivel-Bolt)****Alternative: Electronic Bramah Safe Lock Option**

ROSS has partnered with BRAMAH to provide this (Swivel-Bolt) electronic safe lock **(ECL)** option. This option is a further key-override variant to the ROSS restricted profile key solution.



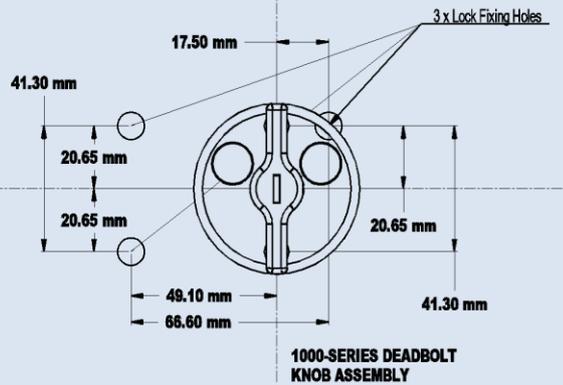
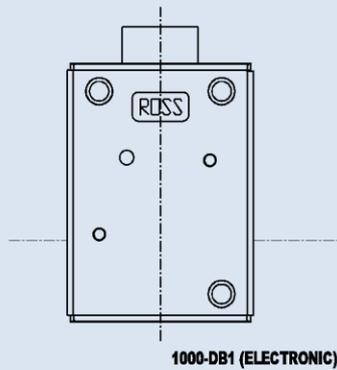
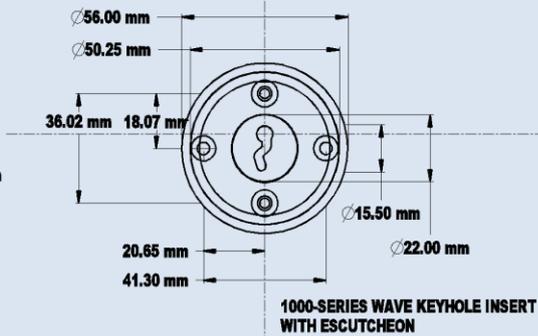
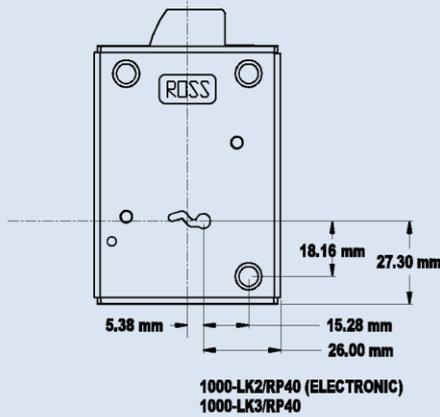
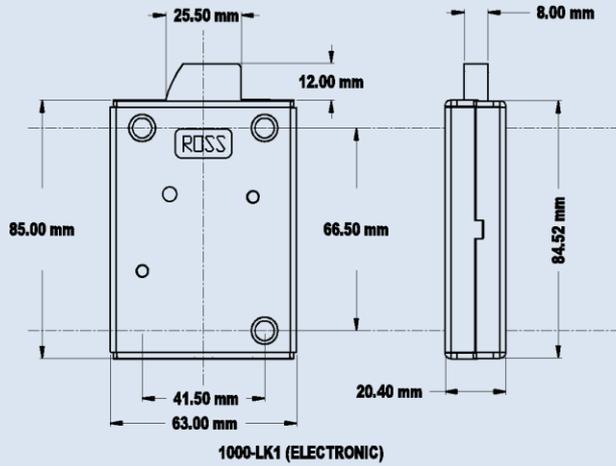
**1000-LK4 Electronic BRAMAH (key-override) Safe Lock option**

**Product Benefits**

- The Bramah override element can be supplied KD, KA or MK lock sets.
- The stainless-steel keys are available in lengths from 37mm to 230mm long.
- The unique key dimensions allow retrofit without drilling to enlarge or modify existing spindle holes.
- The (7) slide highly attack-resistant mechanism is supplied by Bramah of London, the world's oldest patent lock manufacturer and offers in excess of half a million key variations.
- The lock-case comes complete with (2) drilled and tapped 'Re-Locker' holes.

**Electronic 'Bolt-On' Handing Option**

**Bolt-On Options**



**1000-SERIES (LK)** identifies this lock version comes with a swivel-bolt.

**1000-SERIES (DB)** identifies this lock version comes with a dead-bolt.

**PRODUCT CODING STRUCTURE**

## Swivel-Bolt 'Bolt-On' ECL Safe Lock Option

## Product Overview

The **(ECL)** model is the entry level unit in our Electronic Combination Safe Lock range.

**1000-ECL Electronic Safe Lock**

The (ECL) model is a (2) user based system.

- **User (1)** is identified as the *Manager*.
- **User (2)** is identified as the *other* user granted access to the safe.

**A Super-Code is also assigned to this unit.**

- This code is an emergency override code that also enables you to reset the Manager Code. **A factory reset procedure is also provided.**
- With the door open, this procedure allows this unit to be reset to its original factory settings.

**Lock Options****A Key-Override option is also available.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the '*Safe Lock*' brief for further information on this option.

**A Dead-Bolt lock option is also available.**

- The model can also be supplied with a Dead-Bolt locking action. The key-override option is not available with this lock.
- Please refer to the '*Dead-Bolt Lock*' brief for further information on this option.

**Operating Features**

- Access is by the entry of a 6-digit code.
- This model is distributed with a factory set **User (1) Manager Code**.

**Functions include**

- A Manager Code reset function.
- A User Code set and reset function.
- A Disable/Enable user code function.
- A Delete user function.

**Features include**

- A (4) minute lock-out is activated when (4) consecutive invalid entry codes detected.
- An automatic re-lock occurs in (4) seconds.
- A low-battery warning feature is included.
- Instructions must be completed in (15) seconds.

**Technical Specifications**

- Retrofit to international footprint.
- Powered by (1) standard 9v alkaline battery.
- Power supply range is DC 4.5v – 12.0v.
- Low battery voltage is 5.2v.
- Battery life range is about (1) year.
- Working temperature range is -25°C to +60°C.
- Working humidity is <90°C.
- Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Swivel-Bolt 'Bolt-On' L02 Safe Lock Option

## Product Overview

The (L02) model extends on the features provided in the entry level (ECL) unit. The LCD screen display on this entry pad allows 'Menu' options to be viewed and altered with ease.



**1000-L02 Electronic Safe Lock**

The (L02) model is a (30) user based system.

- **User (1) & (2)** are identified as the *Managers*.
- **(28)** other access user codes can be registered.

**A Super-Code is also assigned to this unit.**

- This code is an emergency override code that also enables you to reset the Manager Code. **A factory reset procedure is also provided.**
- This procedure allows this unit to be reset to its original factory settings.

### Lock Options

**A Key-Override option is also available.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the '*Safe Lock*' brief for further information on this option.

**A Dead-Bolt lock option is also available.**

- The model can also be supplied with a Dead-Bolt locking action. The key-override option is not available with this lock.
- Please refer to the '*Dead-Bolt Lock*' brief for further information on this option.

## Operating Features

- Access is by the entry of a 6-digit code.
- This model is distributed with a factory set **User (1) Manager Code**.

### Functions include

- A Manager Code set and reset function.
- A User Code set and reset function.
- A Disable/Enable user code function.
- A Delete 'All' and single user function.

### Operating Facilities include

- Activating the Time-Delay facility.
- Activating the Dual-Mode facility
- Activating the Multi-Door option.

### Features include.

- A (4) minute lock-out is activated when (4) consecutive invalid entry codes detected.
- An automatic re-lock occurs in (4) seconds.
- A low-battery warning feature is included.
- Instructions must be completed in (15) seconds.

### Technical Specifications

- Retrofit to international footprint.
- Powered by (1) standard 9v alkaline battery.
- Static current is 50µA.
- Power supply range is DC 4.5v – 12.0v.
- Low battery voltage is 5.2v
- Battery life range is about (1) year.
- Working temperature range is -25°C to +60°C.
- Working humidity is <90%.
- Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Swivel-Bolt 'Bolt-On' L22 Safe Lock Option

## Product Overview

The (L22) model extends on the features provided in the (L02) unit. The LCD screen display on this entry pad allows 'Menu' options to be viewed and altered with ease.



**1000-L22 Electronic Safe Lock**

The (L22) model is a (30) user based system.

- **User (1) & (2)** are identified as the *Managers*.
- **(28)** other access user codes can be registered.

**A Super-Code is also assigned to this unit.**

- This code is an emergency override code that also enables you to reset the Manager Code. **A factory reset procedure is also provided.**
- This procedure allows this unit to be reset to its original factory settings.

### Lock Options

**A Key-Override option is also available.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the '*Safe Lock*' brief for further information on this option.

**A Dead-Bolt lock option is also available.**

- The model can also be supplied with a Dead-Bolt locking action. The key-override option is not available with this lock.
- Please refer to the '*Dead-Bolt Lock*' brief for further information on this option.

## Operating Features

- Access is by the entry of a 6-digit code.
- This model is distributed with a factory set **User (1) Manager Code**.

### Functions include

- A Manager Code set and reset function.
- A User Code set and reset function.
- A Disable/Enable user code function.
- A Delete 'All' and single user function.
- An open under 'Duress' interface facility.

### Operating Facilities include

- Activating the Time-Delay facility.
- Activating the 'Duress' Time-Delay facility.
- Activating the Dual-Mode facility
- Activating the Multi-Door option.
- A LCD Audit Trail display facility.

### Features include

- A (4) minute lock-out is activated when (4) consecutive invalid entry codes detected.
- An automatic re-lock occurs in (4) seconds.
- A low-battery warning feature is included.
- Instructions must be completed in (15) seconds.

### Technical Specifications

- Retrofit to international footprint.
- Powered by (1) standard 9v alkaline battery.
- Static current is 50µA.
- Power supply range is DC 4.5v – 12.0v.
- Low battery voltage is 5.2v
- Battery life range is about (1) year.
- Working temperature range is -25°C to +60°C.
- Working humidity is <90°C.
- Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Swivel-Bolt 'Bolt-On' L66 Safe Lock Option

**Product Overview**

The (L66) model extends on the features provided in the (L22) unit. The LCD screen display on this entry pad allows 'Menu' options to be viewed and altered with ease.



**1000-L66 Electronic Safe Lock**

The (L66) model is a (30) user based system.

- **User (1) & (2)** are identified as the *Managers*.
- **(28)** other access user codes can be registered.

**A Super-Code is also assigned to this unit.**

- This code is an emergency override code that also enables you to reset the Manager Code. **A factory reset procedure is also provided.**
- This procedure allows this unit to be reset to its original factory settings.

**Lock Options**

**A Key-Override option is also available.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the '*Safe Lock*' brief for further information on this option.

**A Dead-Bolt lock option is also available.**

- The model can also be supplied with a Dead-Bolt locking action. The key-override option is not available with this lock.
- Please refer to the '*Dead-Bolt Lock*' brief for further information on this option.

**Operating Features**

- Access is by the entry of a 6-digit code.
- This model is distributed with a factory set **User (1) Manager Code**.

**Functions include**

- A Manager Code set and reset function.
- A User Code set and reset function.
- A Disable/Enable user code function.
- A Delete 'All' and single user function.
- An open under 'Duress' interface facility.

**Operating Facilities include**

- Setting Time-Lock facility (Timer/Timetable).
- Activating the Time-Delay facility.
- Activating the 'Duress' Time-Delay facility.
- Activating the Dual-Mode facility
- Activating the Multi-Door option.
- A LCD Audit Trail display/upload facility.

**Features include**

- A (4) minute lock-out is activated when (4) consecutive invalid entry codes detected.
- An automatic re-lock occurs in (4) seconds.
- A low-battery warning feature is included.
- Instructions must be completed in (15) seconds.

**Technical Specifications**

- Retrofit to international footprint.
- Powered by (1) standard 9v alkaline battery.
- Static current is 50µA.
- Power supply range is DC 4.5v – 12.0v.
- Low battery voltage is 5.2v
- Battery life range is about (1) year.
- Working temperature range is -25°c to +60°c.
- Working humidity is <90°c.
- Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Swivel-Bolt 'Bolt-On' BIO Safe Lock Option

**Product Overview**

The (BIO) model is the 'Biometric Fingerprint' access unit in our Electronic Combination Lock range. The screen display provides the support dialogue with respect to the registration of users and the execution of the administration processes.



**1000-BIO Electronic Safe Lock**

The (BIO) model is a (30) user based system.

- **User (1) & (2)** are identified as the *Managers*.
- **(28)** other access user codes can be registered.

**A Super-Code is also assigned to this unit.**

- This code is an emergency override code that also enables you to reset the Manager Code. **A factory reset procedure is also provided.**
- This procedure allows this unit to be reset to its original factory settings.

**Lock Options**

**A Key-Override option is also available.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the '*Safe Lock*' brief for further information on this option.

**A Dead-Bolt lock option is also available.**

- The model can also be supplied with a Dead-Bolt locking action. The key-override option is not available with this lock.
- Please refer to the '*Dead-Bolt Lock*' brief for further information on this option.

**Operating Features**

Security setting options include

- **Level (1)** is access is by fingerprint or password. This is the factory setting.
- **Level (2)** is access by fingerprint and its bound password.
- Access is by the presentation of a valid fingerprint or password or both.
- A Password is 10 – 14 digits in length.

**Functions include**

- A Manager Code set and reset function.
- A User Code set and reset function.
- A Delete 'All' and single user function.

**Operating Facilities include**

- Activating the Time-Delay facility.

**Features include**

- A (4) minute lock-out is activated when (4) consecutive invalid entry codes detected.
- An automatic re-lock occurs in (4) seconds.
- A low-battery warning feature is included.
- Instructions must be completed in (15) seconds.

**Technical Specifications**

- Retrofit to international footprint.
- Powered by (1) standard 9v alkaline battery.
- Static current is 50µA.
- Power supply range is DC 4.5v – 12.0v.
- Low battery voltage is 5.2v.
- Battery life range is about (1) year.
- Working temperature range is -10°C to +60°C.
- Working humidity is <80%.
- Fingerprint Sensor: 500 DPI optical sensor.
- FRR (False Rejection Rate) : < 0.1 %.
- FAR (False Acceptance Rate) : < 0.0001 %.
- Verification Time: < 1 second.
- Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Swivel-Bolt 'Bolt-On' BLE Safe Lock Option

## Product Overview

The ROSS (BLE) Bluetooth model introduces a (BLE) smartphone entry solution. No entry pad is required on the door. Access control is setup and an entry is validated via your smartphone

**1000-BLE Electronic Safe Lock**

The (BLE) model is a Bluetooth Smart Device.

- It is compatible with all modern Apple smartphones. Android support to follow.
- It is totally off the grid and does not use the 'internet or cloud' to store any data.
- All authorised users and 'eKey' data is securely stored in the PCB Controller itself.

**Comes complete with Key-Override.**

- This lock option utilises (6) pick-resistant levers with a restricted profile 'WAVE' key.
- Please refer to the 'Safe Lock' brief for further information on this option.
- This model also comes complete with an Escutcheon and plastic 'Wave' key profile Keyhole Insert that is inserted into the spindle hole of the safe door.

## Operating Features

- This model provides a proprietary multi-layer security encryption with rolling code to eliminate unauthorised access.
- Comprises an advanced self-defence protocol.
- Contains intelligent anti-hacking controls and counter-measures.

**The Administrator App**

- Profiles the way the lock is to be opened by its endorsed users.

Operating modes include –

- (Manual) that requires an 'Unlock' button to be pressed on the smartphone, or
- (Pin-Secured) that requires a PIN to be entered on the smartphone.

The 'eKey' profiling feature includes -

- Distribution of 'eKey' profiles to all users granted access to the lock.
- Profiles an 'eKey' prior to its distribution by granting a date and/or time profile that defines the time-frame in which the lock can be opened.
- An 'eKey' is distributed as a steganographically encrypted SMS attachment that is unique to that user's smartphone.
- An Audit Trail display facility is provided.
- Instigates the purchase of additional 'eKeys'.
- Has the provision to store (96) 'eKeys'.

**The User App**

- Engages with the 'eKey' access profile when it comes to opening the lock.

Features include –

- The 'Open' activation period can be set from (1) second to a (4) minute time-frame.
- An automatic re-lock occurs at the end of this activation period.
- A low-battery warning feature is included.

**Technical Specifications**

- Powered by (2) standard 1.5v alkaline batteries. Warranty is (18) months on the electronics.

This unit is patented and Australian Made

## Supplementary Electronic Safe Lock Options

**Additional Lock Options include –**

- A 1000-Series Anti-Drill Plate, is hardened to 58Rc to a depth of 2.5mm, and
- A 1000-Series Anti-Drill Plate, is hardened to 58Rc to a depth of 6.0mm..
- A 1000-Series Cable Plate.
- 350mm and 450mm extended cables.

**Key-Override considerations –**

- (2) restricted profile keys are always included in the price of any keyed-to-differ key-override 1000-Series safe lock purchase.
- RP40 restricted profile keys (40mm between-bitt-bow) of the key, is the default keylength supplied with the 1000-Series safe locks.
- RP75, RP85, RP100, RP130, RP150 and RP180 are also available at no extra charge.
- The RQK key option safe lock is priced on the basis that no keys have been provided at the time of purchase.

**Key-Override Keyed-Alike Options –**

- (2) only restricted profile keys are provided in the price for any keyed-alike lock set requested.
- Additional keys to a keyed-alike lock set will need to be purchased separately.
- The add-on lock options apply to all or any locks within the keyed-alike lock set request.

**Keyed-Alike lock set request examples–**

- (1) x 1000-ECL/**KA2** is (2) locks keyed to the same key-code (PAIR).
- (1) x 1000-L02/**KA3** is (3) locks keyed to the same key-code (TRIPLE).
- (1) x 1000-L22/**KAn** is (n) locks keyed to the same key-code.

**(RQK) – Restricted Quick Key Solution**

Whilst both the ROSS restricted profile 'WAVE' key management systems have been successful for the emergency safe opening scenario, the (RQK) option provides a further management choice without compromising security.

With the knowledge these restricted profile keys are assembled, a joint agreement with a compliant service agency will allow these keys to be assembled on-site and dismantled once the key has served its purpose.

**Solution Benefits**

- Considering the usual scenarios where a digital solution is unable to open the safe, history more than often has found the override key has been lost or is locked in the safe.
- In many cases, time is most important. (RQK) allows a qualified technical locksmith to gain entry by assembling the 'Key-Cuts' onto the 'Key-Stem' under the security management protocol/platform put in place by the safe maker.
- Kits can be purchased by compliant partners under the management controls of the safe maker requirements. These key kits are not made available to the general wholesale/trade marketplace.



**1000-RQK/RP40 Restricted Quick Key Kit**

**Electronic Lock Set Accessories**

**Multi-Lock Junction Module**

The Multi-Lock Junction Module enables you to use (1) entry-pad to operate up to (4) safe locks. The entry-pad and all locks are connected by separate cables into this junction box.

Please note –

- Safe lock cable lengths cannot exceed (3) metres.
- This junction module also has an AC input port that allows your lock(s) to be powered by AC mains power. The 9v battery is then used as backup power in the event of a power failure.



**1000-MJM Multi-Lock Junction Module**

**Accessories include -**

- An AC/DC Power Adaptor. This unit can be used on both the 'Junction and Duress' modules.
- An Alarm Buzzer. For those locks fitted with lock bolt status and door open status sensors, an alarm buzzer can be deployed where an alarm system interface is not possible.
- A Magnetic Door Sensor. Can be deployed to monitor the status of the safe door.

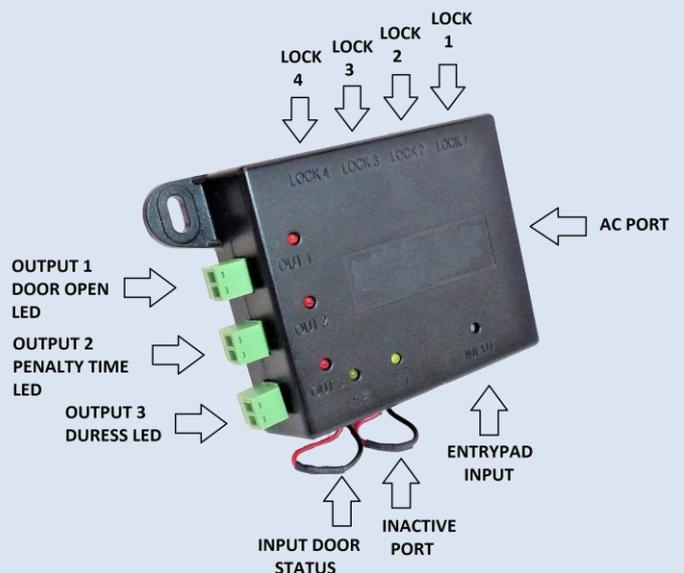
**Multi-Lock Duress Module**

The Multi-Lock Duress Module can be deployed where a Duress Interrupt, Door Open Time and/or Penalty Time needs to be monitored. This module again enables you to use (1) entry-pad to operate up to (4) safe locks and interfaces with your alarm system using a normal 'open/closed' circuit.

Please note –

- Safe lock cable lengths cannot exceed (3) metres.
- (3) output ports either connect directly into your alarm panel interface or can be connected to a standalone audible alarm buzzer.
- Output (1) reports 'Door-open-over-max-time'.
- Output (2) reports 'Penalty-time'.
- Output (3) reports 'Duress-code-entry'.
- (1) input port allows you to monitor the door status using a magnetic door switch which reports on an 'open/closed' state.
- This junction module also has an AC input port that allows your lock(s) to be powered by AC mains power. The 9v battery is then used as backup power in the event of a power failure.

**1000-MDM WIRING DIAGRAM**



ALARM REPORTS DOOR OPEN / PENALTY TIME / DURESS

**1000-MDM Multi-Lock Duress Module**

## Swivel-Bolt 'Bolt-On' Mechanical Safe Lock Options

**Product Overview (1000-LK5)****(Key-Only) Safe Lock Option**

This 'Swivel-Bolt' Safe Lock option is of the same design as the 1000-Series electronic key-override product; but minus the electronics. Mechanically, this high quality swivel-bolt operated stainless-steel safe lock provides a convenient entry solution based on the standard (3) wheel combination lock footprint.

**Product Benefits**

- The primary design aspect of the 'WAVE' key profile is the key-bitt is offset from the key-pin centre line.
- This key profile is a 'High Security' option where key duplication is considered a problem.
- Being a restricted key profile, ROSS does not distribute this keyblank and all keys can only be cut under authorization.
- This safe lock is distributed with a key-tag that consists of a Registration ID and the key-Code.
- The (6) pick resistant lever lock is registered, and the restricted key offers the ultimate in security within the one universal safe lock footprint.
- This model comes complete with an Escutcheon and plastic 'Wave' key profile Keyhole Insert that is inserted into the spindle hole of the safe door.



**1000-LK5 Mechanical (Swivel-Bolt) Safe Lock option  
with Escutcheon and 'Wave' keyhole Insert**

This unit is patented and Australian Made

**Product Overview (1570-Series)****(Restricted Key) Safe Lock Option**

This 'Dead-Bolt' Safe Lock option uses the same footprint design as the 1000-Series Safe Lock, but adopts a convenient and secure keying option that can be keyed-alike to the home, office or entrance doors.

**Product Benefits**

- The model comes with a high strength 'Dead-Bolt' that enables locking into both bolt-work and side locking bar applications.
- This model also uses a 570 cylinder to restrict key duplication with all 'in-line' key systems.
- Standard C4 profile cylinders can also be supplied with this model.



**1570-RK1 Safe Lock option**

**(Mechanical) Swivel-Bolt (Bramah Cylinder) Safe Lock Option****Product Overview (1000-LK6)****(Key-Only) Bramah Safe Lock Option**

This 'Swivel-Bolt' Bramah Safe Lock option is of the same design as the 1000-Series electronic Bramah key-override product; but minus the electronics. Mechanically, this high quality swivel-bolt operated stainless-steel safe lock provides a convenient entry solution based on the standard (3) wheel combination lock footprint.

**Product Benefits**

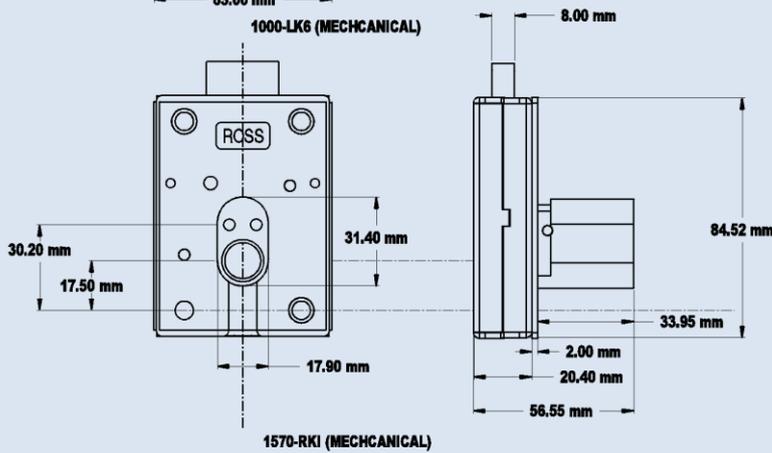
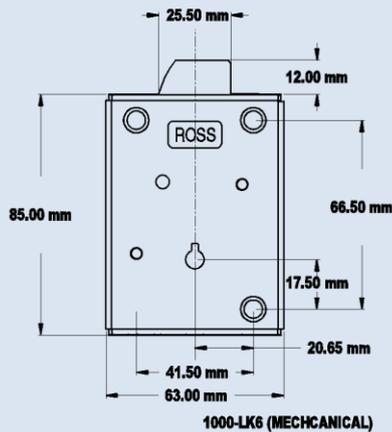
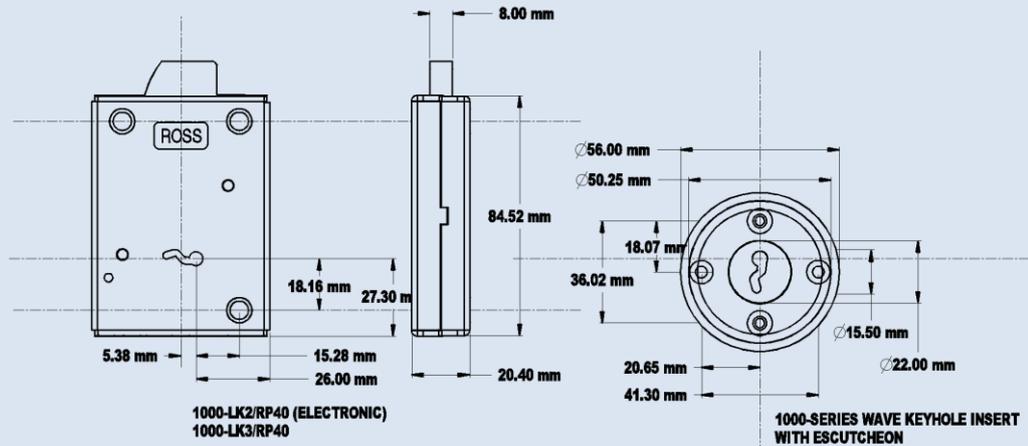
- The (7) slide highly attack-resistant mechanism is supplied by Bramah of London, the world's oldest patent lock manufacturer and offers in excess of half a million key variations.
- This safe lock is distributed with a Key Registration Form that identifies the key-number and key-type associated with this lock.
- Being a restricted key profile, ROSS does not distribute this keyblank and all duplication requests of registered keys will be sourced from Bramah of London's Australian Distributor.
- The Bramah override element can be supplied KD, KA or MK lock sets.
- The stainless-steel keys are available in lengths from 37mm to 230mm long.
- This model can be supplied with an Escutcheon to cover the spindle hole of the safe door.



**1000-LK6 Mechanical (Swivel-Bolt)  
Bramah Safe Lock option**

**(Mechanical) 'Bolt-On' Handing Option**

**Bolt-On Options**



1000-SERIES (LK) identifies this lock version comes with a swivel-bolt.

1570-RK1 (DB) identifies this lock version comes with a dead-bolt.

**PRODUCT CODING STRUCTURE**