

Technical Support

877-585-6223



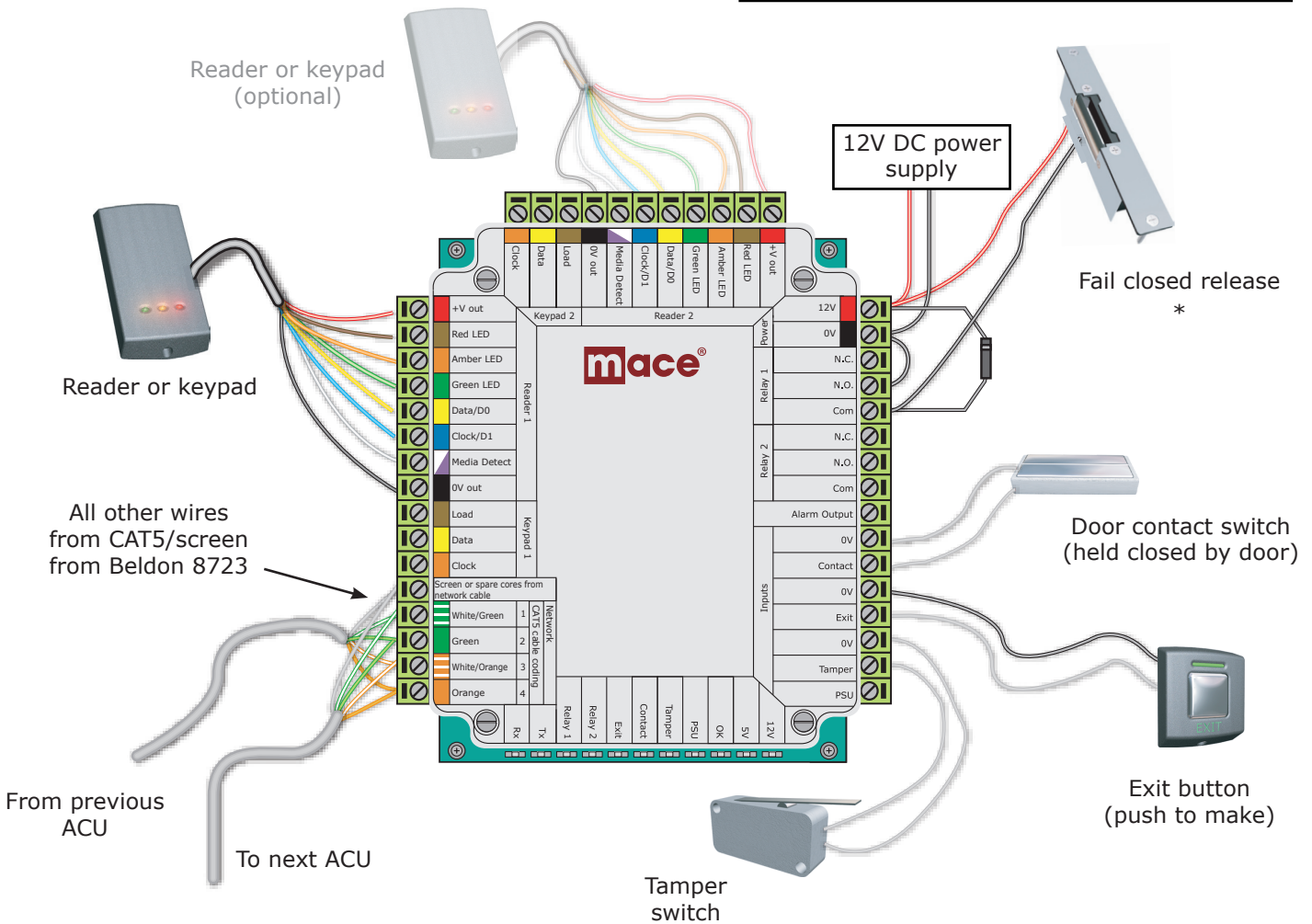
support@mace.com

Technical help is available: Monday - Friday 9am to 7pm (EST)

Documentation on all Mace Security Products can be found on our web site - <http://www.macepro.com/>

If power is provided via a separate supply, a UL Listed Access Control (or Burglar Alarm), Class 2 , Power-Limited, power source capable of 4 hours standby must be employed.

Wiring



* For a fail open lock (Maglock) , the 0v link wire must be connected to the "N.C." terminal.

NOTE: Keypad 1 and Keypad 2 inputs are for 5V keypads and should not be used. All Mace Security keypads are wired to Reader port 1 or port 2.

Cable type

Cable specification		
Use	Max length	Type
RS485 Data Line	1000 yds	2 x twisted pairs - Belden 8723 or Cat5 equivalent
Reader / Keypad	100 yds	10 core, shielded - Belden 9540, Alpha 1298C (22AWG) or equivalent
Input / Output	100 yds	2 conductor - Alpha 1172C (22AWG) or equivalent

Where selected, any equivalent cabling / wire must be `UL Listed`

Wiring methods shall be in accordance with the National Electrical Code (ANSI/NFPA70), local codes, and the authorities having jurisdiction.

RS485 data line

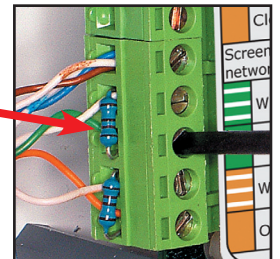
90% of installation faults are caused by wiring errors on the RS485 data line. Special attention to getting this right first time saves a lot of time and effort.

END OF LINE TERMININATION.

- These must be wired across each data pair at the beginning AND end of the data line. Resistor rating must be 120 ohm.

READER & DATA CABLE SCREENS.

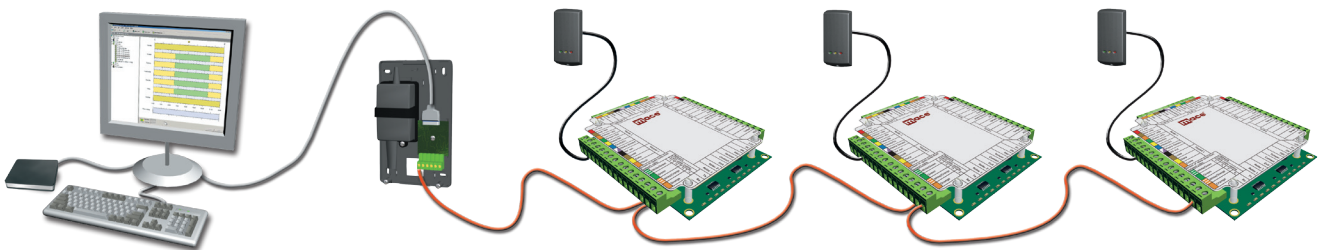
- Data cable screens and spare cores MUST be connected throughout.
- Reader and keypad screens where provided, should be connected to Black 0V.



The ACUs will continue to operate in a `standalone` mode if the PC is shut down or the dataline is disconnected. Any Events that occur during this period are stored in the ACU (up to 2454) and the PC is updated when it comes back on line.

NOTE: The PC must be running for any `active` functions to operate. (Fire Door release, Antipassback, etc)

The data line must be wired in a single daisy chain. The data converter may be located anywhere along the data line. 120 ohm terminating resistors must be linked across each data pair at the beginning AND end of the line. This can be done on many units with a switch or jumpers. If not, free resistors are provided with the converter. The example below requires terminating at the RS232 converter and also the 3rd ACU at the end.



RS485 data line checks

Power down all TCP/IP, USB and RS232 converters.

- ✓ Check the resistance of the data line is 60-80 ohms.
- ✓ Check that there are no data line to screen shorts.
- ✓ Check the screen of the data cable is continuous - this provides the 0V DC system reference.

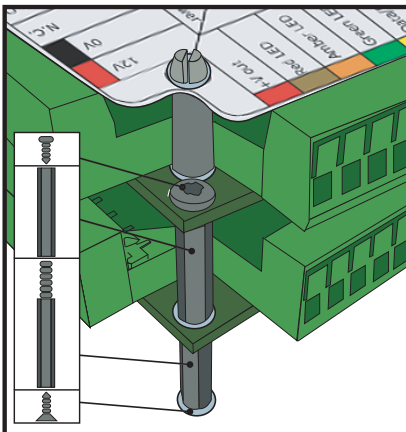
Fitting

Fitting kit		
Part number	Qty	Description
Fitting Kit fk1-037	4	Wall plugs
	4	Pozi round woodscrew - zinc
	2	Pozi panhead screw - small
	10	Cable tie
	3	Diode 1N4001
Fitting Kit fk1-077		Only supplied with 874-334 (PCB only)
	4	M3 x 20 hexagonal spacer - m/f (male/female)
	4	M3 x 20 hexagonal spacer - f/f (female/female)
	8	M3 x 6 pozi pan machine screw

The ACU shall be installed within the protected premises as both the power and lock wiring is present at the PCB. A Tamper alarm input is provided on the PCB - See Input/Output Wiring

The ACU is supported on mounting posts located at the corners.

If the unit is supplied in a plastic housing, this housing should be fixed to the surface with suitable fasteners; four screws and wall plugs are provided for this in the fitting kit. Also provided are cable ties to secure the cabling and two smaller screws for the lid.



Altronix - AL300ULX (2.5A / 12V DC)

If the unit is supplied as a PCB, it may be mounted inside this UL listed power supply. A mounting plate (AC-874-571) may be purchased separately to provide a suitable fixing for the AL300ULX mounting studs.

Mount the four corner f/f mounting posts to the plate with four of the machine screws and then secure the circuit board to their tops using the remaining four screws. If more than one circuit is to be built as a stack, use the m/f posts (as per diagram) to support the first ACU and then the f/f posts to space the units apart, securing the top unit with the four machine screws.

Unit installation / test

This unit is for Indoor use only.

Wire the components to the Access Control Unit (ACU) as shown on the first page. This will include:

- Reader/Keypad
- Electric Lock
- Power supply
- Any other optional components

Press the exit button or in the absence of an exit button short the 0V and exit terminals to test the relay function. The lock Relay LED will come on and the lock should release.

Ensure the all the LEDs are lit on the reader/keypad.

Test each reader by presenting a token and the unit should bleep and display a single flashing red or green LED.

Maintenance

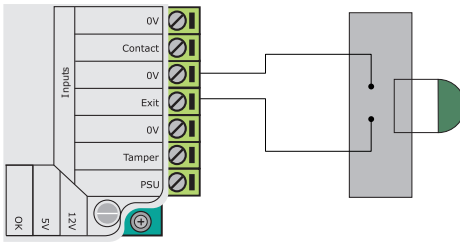
The ACU is designed to take input from Clock and Data readers through its two (In/Out) reader ports. It can also be configured for Wiegand (26 to 50 bits) - Not evaluated by UL.

It has an RS485 communications port that is used for uploading firmware and user information as well as providing Event information to the PC on demand.

Following the completed installation of this equipment, no further maintenance or testing is required.

It is advisable to ensure that any third party backup power supplies or recovery procedures are checked regularly to ensure that the operation of the Mace Security access control system is not compromised.

INPUT / OUTPUT WIRING

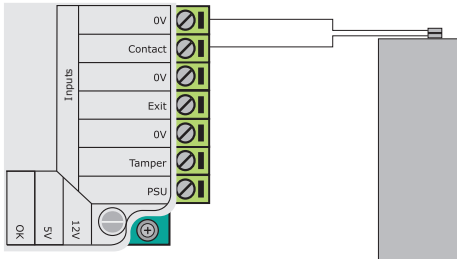


Exit button

The 'push to make' button is wired as per the diagram and must be UL Listed. (0V and Exit)

The Exit LED will be ON when the switch is closed (Button pushed).

When the Exit terminal is shorted to 0V, the Exit LED will illuminate and the ACU will operate Relay 1. The reader/exit button Green LED will flash during this period. More than one exit button can be wired in parallel. Relay 1 will remain transferred while the short to 0V remains.

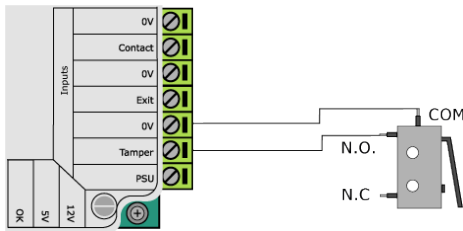


Door contact

The NO switch is wired as per the diagram and must be UL Listed. (0V and Contact)

The Contact LED will be ON when the switch is closed (Door Closed).

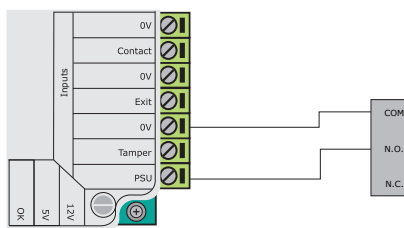
When connected, the software will then monitor the door position against access activity and will raise an Alarm in the event of a 'Door Forced' or 'Door left open' condition.



Tamper switch

The ACU supplied in a plastic housing has a 'Normally Open' Tamper switch fitted and pre-wired into the PCB.

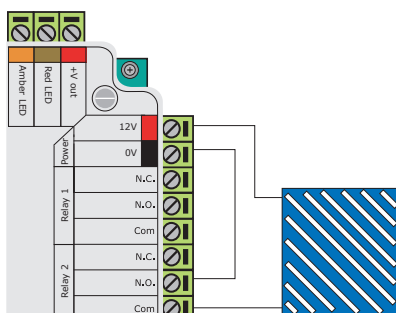
The Tamper LED will be ON when the switch is closed. The software will monitor the switch position and will raise an Alarm in the event of a 'Tamper' condition.



PSU monitoring

The PSU LED will be ON when the NO Relay contacts are closed (Power OK).

The software will monitor the relay contacts and will raise an Alarm in the event of a 'Power Fail' condition.



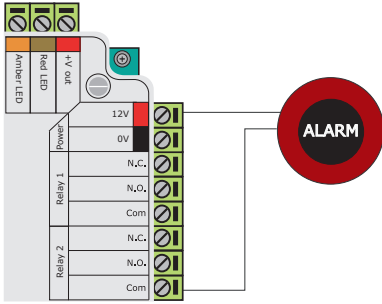
Door bell - Relay 2

Pressing the bell button on the keypad will result in Relay 2 being energised for 1 second. A bell sounder can be controlled by wiring one of the bell feeds across COM / NO on the relay.

See Specification table for Relay Ratings.

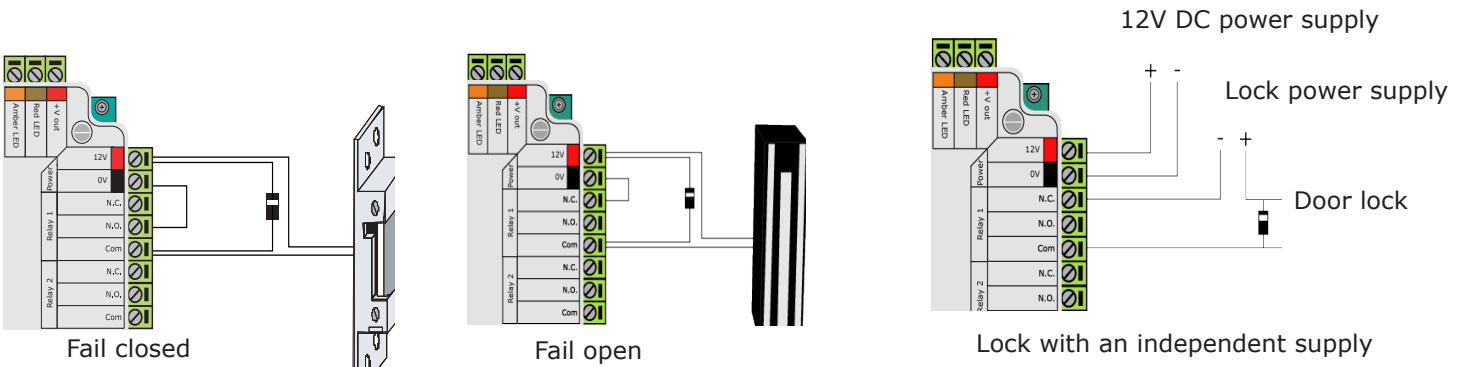
All interconnecting devices must be UL Listed.

Alarm sounder



The ACU has a local alarm output. This is a transistor 'open drain' output, (not a volt free contact) that is capable of switching 1A at 12V DC, and can be connected to a bell, sounder, light etc. This local output can be turned on or off for each type of alarm and can be configured to sound continuously or intermittently to distinguish between different alarm types.

Lock wiring - Relay (Maximum load 24V DC - 4A)



This is a ONE door controller using a volt free relay.

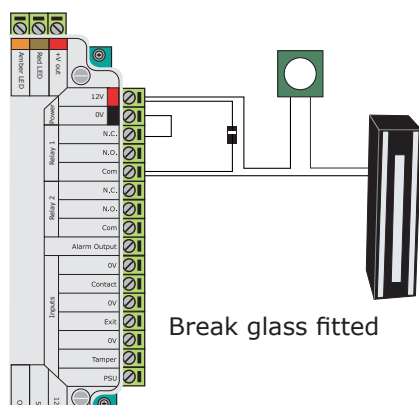
The lock is wired across 12V and COM. A 0V link to COM is then required to complete the circuit. This will be wired to NO or NC depending on lock type (Fail Open / Fail Closed)

A diode is supplied which should be fitted across 12V and COM (Silver end to 12V) to protect the relay contacts.

With no 0V link, the relay becomes just a switch and so any device (e.g. 24V lock) that needs to be controlled via the ACU just needs to have the 0V line from its own power supply wired to NC or NO and the lock wired to COM; the +ve voltage is wired directly to the lock. - NOTE: No 0V link wire is fitted as this will conflict with the 0V used by the ACU itself.

Panic hardware

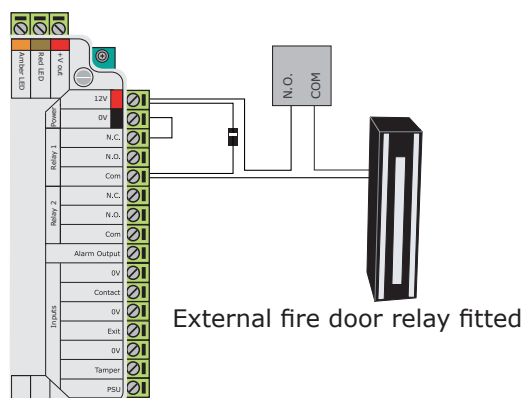
A break glass should be fitted, in conjunction with a fail open release to ensure a reliable egress method in the event of an emergency situation. This is fitted on the 12V supply wire to the lock and drops the power ensuring that the lock always opens.



Break glass fitted

Fire door interface

External fire door relays should be fitted in conjunction with a fail open release. These relay contacts are held closed by the fire alarm interface and will be dropped during an alarm condition. Opening the relay contacts will remove the 12V supply from the lock releasing the door. The system is fail safe as the door will also release if the cable becomes disconnected or burns through.



External fire door relay fitted

PC installation

The current specification for compatible PC hardware, network and operating systems is available on our website.

Software installation

Once all the ACUs have been tested and the data line connected, the Mace software must be installed:

- Install the Mace software.
 - Mace software configures the system to use an RS485 data line converter by default. TCP/IP converters must first be detected using the Server configuration utility.
- Run the Mace software and detect ACUs in the Doors screen.
- Check that all ACUs have been found. The firmware in the ACUs will be automatically updated.
- Each ACU must be configured.

Software configuration

Door name: Name the ACU.
Door open time: Set the door open time.
Unlock the Door during: Permanently unlocks the door while this time zone is active. - Should be set to 'At No Time' for normal user operation.

Reader 1: Settings for Reader 1 and Keypad 1 on the ACU.
Reader 2: Settings for Reader 2 and Keypad 2 on the ACU.
Alarm: Contains settings for the different types of alarm.
Codes: Valid codes can be viewed, added and removed. (Can only be viewed when a keypad is active).
Events: Shows the events for the control unit selected.

Name: Each reader can be named individually if required.
Reader type: Set the reader type, if applicable.
Keypad type: Set the keypad type, if applicable.
Token data format: Select the type of cards being used on the system. (New formats can be created).

Reader operating mode: Set the operating mode.
Timed operating modes: A different operating mode can be configured within a time window.

Reader action: Set the action required when access is granted.

Software features and functions have not been evaluated by UL.

System checks

Present a token at each reader. An event for each read should appear in the Events screen.
Change the default password for the System Engineer.
Set up other operators if required.
Set up time zones.
Set up access levels.
Users can be added & assigned to the required access level.
Departments can be created if required.

Here is the list of topics about this product that receive the most technical support inquiries. We list them here to help you speed up the installation and trouble shooting process.

1 - Upgrading Mace software.

Mace software upgrades are available free of charge supplied on CD. Mace can be upgraded within the same revision or to the next full version.

Upgrades can be run directly over the current installation; there is no need to uninstall the previous version. It is recommended that an end user advise their installer before carrying out an upgrade. Ensure the PC specification meets any new requirements

2 - Readers/keypads not working.

- Software settings - Confirm that the settings of the reader or keypad are correct.
- Connections - Check the wiring of the connectors. Where possible, test this reader on the other port.
- Extended Cable - Belden 9540 should be used. (100yds maximum) Twisted pair alarm cable should not be used. To confirm that an extended cable is not at fault, wire the reader direct into the reader port.
- Supply voltage - Confirm that the voltage is within specification. (see table)
- User token - Confirm that the user token used for testing is OK by presenting it to a known working reader.
- Interference - Confirm whether the reader works when tested 'in hand' and not mounted on the wall. Ensure that readers are not mounted back to back or there is no interference from other local RF devices.

3 - Cannot detect ACU via TCP/IP.

- 1 - Ensure the TCP/IP interface has been detected in the Mace Configuration Utility, and responds to a PING from the utility. A static IP address must be used for the interface.
- 2 - Restart the Mace server.
- 3 - Make sure that the PC firewall allows the Mace TCP/IP ports through. (See TCP/IP documentation)
- 4 - If the interface is responding, try a loopback test (See TCP/IP documentation)
- 5 - The Mace data line should be checked for resistance readings, screen continuity, and screen shorts.

4 - Cannot detect ACU via a Serial Port comms converter.

- 1 - Confirm the comms converter is connected to the correct serial port and powered. A USB to Serial converter or PCMCIA card should not be used.
- 2 - Restart Mace Server.
- 3 - Check the Mace data line for resistance readings, screen continuity, and screen shorts.
- 4 - In the Configuration Utility, manually select the serial port and then restart the server.
- 5 - Test serial port.

5 - Mace Workstations.

Mace Workstation software allows more than one Mace operator to connect into the same access control system at any one time. Connections can be established over most TCP/IP networks, including VPN through the Internet. Mace Workstation software is included on the CD and is an option during installation. No addition license is required. Mace Workstation software must be the same version as that running on the Mace server. Workstation software can also be installed on the server machine allowing it to view other Mace servers on the network. Once Mace software has been loaded, run the installation again choosing Workstation. It is recommended that the number of concurrent connections be limited to five.

6 - Moving a user database to a new PC.

Ensure the new PC meets the minimum specification. All of the files containing the site-specific information in a Mace system are stored in a single folder. The default location for this is C:\Mace Security Access Control.

- **On the old PC.** Using the Mace Server Configuration Utility, go to the Database tab and click the Create Copy button. This creates a copy of this existing database into a Zip file.
- **On the new PC.** Load the Mace software onto the new PC. The version must be the same on both machines. Copy across the Database.zip file into C:\Mace Security Access Control. Using the Configuration Utility, go to the Database tab and click Import Copy, browse to the Database.zip in the C:\Mace Security Access Control folder and click OK. Once completed, run the Mace software to confirm all details have been transferred. Disconnect the Mace dataline from the old PC and connect it to the new PC.
- **Custom Settings.** The settings held in the Configuration Utility are not transferred with the database. Details of any TCP/IP nodes, custom Wiegand configuration, etc. will need to be input manually on the new PC.

7 - ACU not responding or fails to be detected (Data line resistance check).

First power down the converter (RS232 or TCP/IP) and disconnect any ACU's that do not have a flashing OK LED. Using a Multimeter, measure the resistance across the White/Green and Green pair at one end of the network. A resistance of between 60 and 80 ohms is required. Repeat the test for the White/Orange and Orange pair. This is vital for a stable and trouble free installation.

Enclosure options

Part number	Description
AC-874-334	Mace Security RS485 single door ACU
AC-874-527	Mace Security RS485 ACU in plastic housing

Specifications

Features	Min	Max	
Number of Cards	1	10,000	
Number of PINS	1	10,000	
Access Levels	1	250	
Time Zones	1	64	
Maximum door open time	1 sec	99,999 sec	
Number of Codes	1	50	
Doors per ACU	1	1	
Reader ports per ACU	1	2	
Readers per port	1	2	
Keypads per port	1	2	
ACU per dataline	1	200	
Datalines per PC	1	50	
Data retention after total power loss		9 hours	
Events stored in ACU with no server connection		2,454	
Electrical	Min	Max	
Input Voltage			12V DC
Input Current	110 mA	3 A	
Relay switchable voltage		24V DC	
Relay switchable current		4 A	
Alarm output current		1 A	
Combined reader port output current		500 mA	
Reader port voltage		11.5V DC	
Environment	Min	Max	
Operating temperature - Battery limits	0°C (32°F)	55°C (131°F)	
Waterproof			No
Dimensions	Width	Height	Depth
PCB only	4 1/2 inch	4 1/2 inch	1 inch
Plastic Housing (option)	7 inch	7 inch	2 inch

FCC Compliance

Class B digital devices.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Class A digital devices.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.