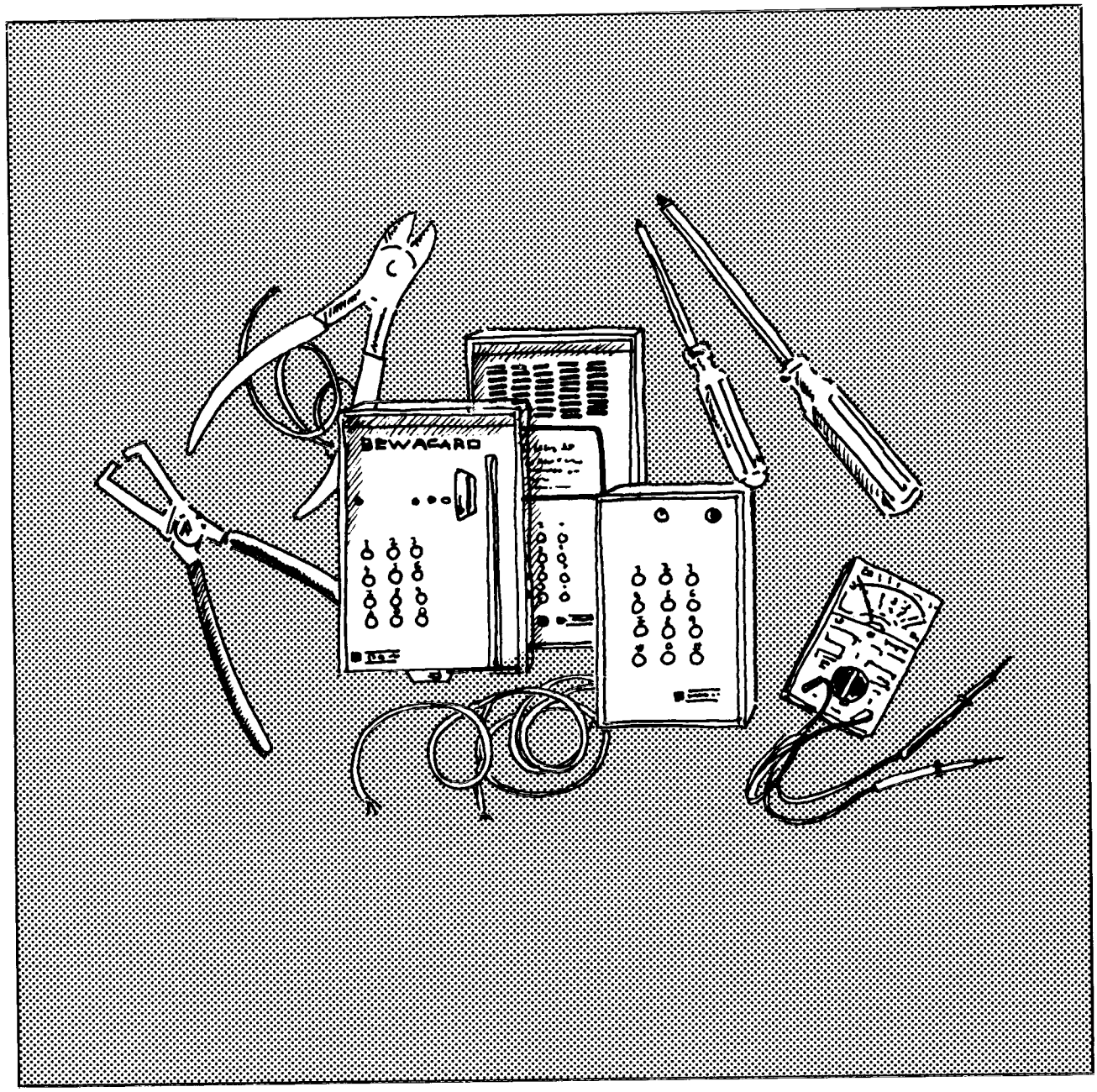
Installation guide Bewacard 300



BEWATOR

Access Control
Bewacard 300

Bewator develops and markets products and systems associated with security control: code locks, card readers and entryphones.

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Contents

1 Introduction

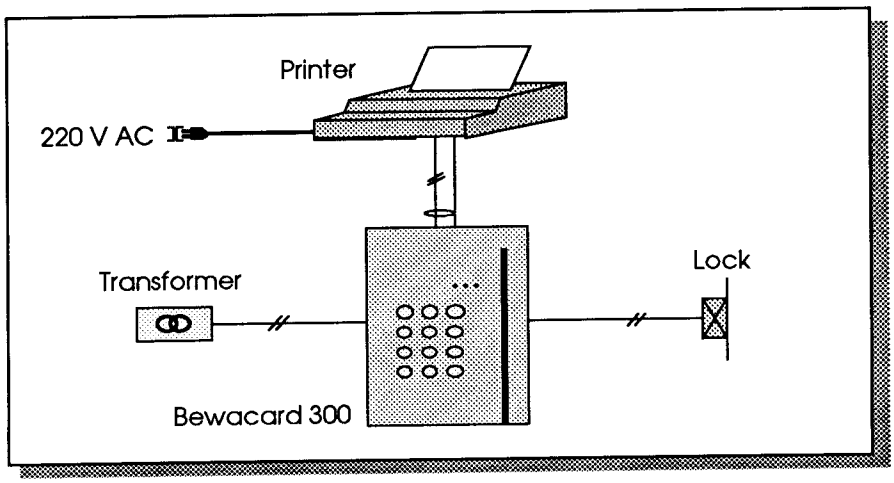
This manual is intended for those who will be installing the Bewacard 300 card reader system. The manual begins with a brief description of the system and continues with a detailed explanation of how to program the card reader. Chapter 5 covers cable dimensioning and Chapter 6 explains how to install a card reader.

2 How the System Works

Each card reader controls one lock. The lock can be opened with a code or with a card or with both, depending on the security level that has been set. If a printer is connected, all accesses can be checked on the printout, which lists the time and date of each access and shows which card and card reader were used.

The access cards are registered ("logged on") and programming is done directly at the card reader. Since the degree of security required varies depending on the time of day, day of the week and so on, the Bewacard 300 system is designed so that the security level can be matched precisely to the requirements of a particular company. Each card reader has a built-in clock which can be used to program different security levels for different times and days. Up to eight **time zones** are available; this means that the various security levels can be controlled within eight different time periods. When programming time zones, it is also possible to decide to have a lock fully open or fully closed at certain times.

The **calendar function** of the clock in the card reader may be used to program a suitable security level for all the odd public holidays and half-days, for one year at a time. (For central programming of several card readers, programming unit PU-10 may be added to the system.)



Card reader BC300 with printer connected.

2.1 Access Logging by Printer

By connecting a printer, it is possible to arrange for information to be printed out on the basis of two options:

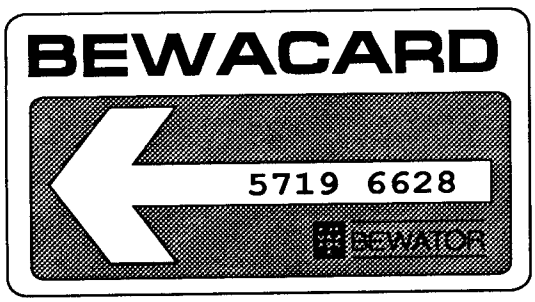
- continuous printout of all entries
- printout on request of data stored in memory

If the first option is chosen, every access is logged on the printer immediately. If there are several card readers connected to the printer, the printout also shows which card reader was used. The built-in clock can be used to determine when activity is to be logged, for example only outside working hours.

With the second option, a printout can be requested when something special has happened, over a weekend or during a public holiday, for example. The built-in memory of the card reader is sufficient to allow details of the most recent entries (up to 750 per door) to be printed out. The number of entries stored depends on how the memory distribution of the card reader has been set (see Chapter 3, *Explanation of Terms*).

2.2 Access Cards

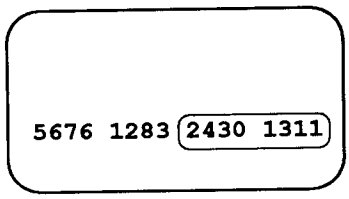
The cards used in the card reader must be of a standard type (CR-80 format). Up to 2000 cards can be logged on to the card reader. As well as Bewator's own access cards, a large number of other magnetic strip cards can be used, such as bank cards and credit cards. If in doubt, consult Bewator. However, we recommend Bewator cards since their quality is higher and they can stand up to being used several times a day.



A Bewator access card.

Card Code

The code of the card is printed on Bewator access cards. This is not the code that is keyed in on the card reader keypad; it is the code that appears on the printout when an entry is registered. The code can be checked against a list to identify the holder of the card. The last four digits of the card code are used to calculate the supplementary personal code. On bank cards, a code is embossed on the card as shown below:



Bank card.

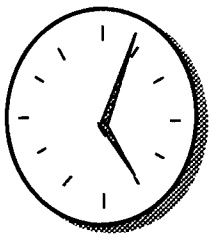
The card reader registers the eight digits encircled in the illustration above. The last four digits are then used with a conversion factor to give the personal code (PIN code). To check which digits are the bank card code, log the card on to the card reader and then request a printout (for instructions, see Section 4.10, *Printouts*). The card code appears on the printout.

Note: Bank cards and some credit cards normally have a four-digit PIN code. This code cannot be used in the card reader system, and should not be confused with the PIN code referred to in this manual.

3 Explanation of Terms

This chapter provides explanations of some of the terms relating to programming the system. Before starting to program the system you must

- decide a password
- fill in the time list, the name list and the calendar list together with the customer (these lists are at the back of the user's guide)



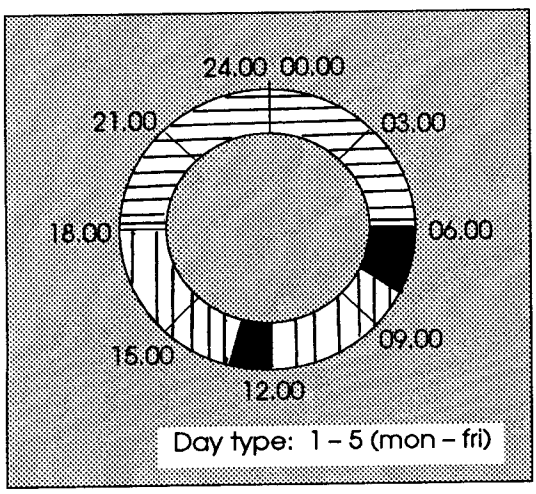
Time Zones

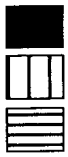
Using the eight time zones, the security levels (see below) can be matched precisely to the requirements of a particular building. Six time zones are used in the example.

Example of time control for a main entrance:

Monday-Friday	06.00-08.00	card only
Monday-Friday	08.00-12.00	door open
Monday-Friday	12.00-13.00	card only
Monday-Friday	13.00-18.00	door open
Monday-Friday	18.00-06.00	card + PIN code
Saturday-Sunday	00.00-24.00	card + PIN code

Make sure that there is a security level for all times and all days. Public holidays and half-days can also be pre-programmed, so that even if Christmas Day is on a weekday, for example, it can be given the same security level as a Sunday. See Section 4.8, *Additional Functions*.



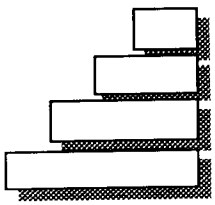


Card only

Door open

Card + PIN code

At the back of the user's guide there is a diagram to fill in. This will be useful when it becomes necessary to check that there is a security level programmed for all times of the day. The diagram on the left shows the security levels set for the example above (Mon-Fri).



Security Levels

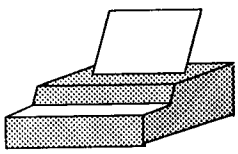
Depending on the safety requirements, the following security levels can be programmed:

door unlocked - no need to use card reader

common code - a four-digit code common to all users (cards can also be used on this level) - "code lock"

card only - lock opens when card is passed through card reader.

card + PIN code - green LED lights up when card is passed through card reader. The four-digit PIN code must then be entered. This security level is appropriate outside normal working hours and to protect departments where extra security is needed.



Continuous Printout

Any time zone can be programmed for continuous printout of all accesses. This is done when programming the time zones.

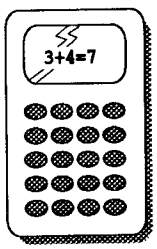
Day Types

When programming the time zones it is also essential to specify which days they apply to. The days of the week are therefore divided into day types. Day type 1 is Monday, day type 2 is Tuesday and so on. Odd public holidays such as Christmas Day, Easter Monday etc are the same day type as a Sunday (7), since the security level required on public holidays is presumably the same as for a Sunday. Time zones can also be programmed for half-days.

Memory Distribution

The user can decide how the card reader memory is to be shared between the number of cards that can be logged on and the number of entries that can be printed out afterwards. A pre-programmed public holiday occupies the same amount of memory as a logged-on card. The table below shows how the memory is shared. The factory setting is 980-512. If more memory is needed to log on cards, and the memory is already full, it is still possible to change from setting ❷ to setting ❸. All that happens is that any access data stored is lost. On the other hand, it is not possible do the opposite, ie to increase the amount of memory for access data storage when logged-on cards are already occupying the increased memory area (see also page 17).

	Number of cards logged on	Number of accesses recorded
❶	468	768
❷	980	512
❸	1492	256
❹	2004	0



Conversion Factor for PIN Code

The conversion factor is used to calculate PIN code. The PIN code is the sum of the conversion factor chosen by the person responsible for the system and the last four digits of the card code (see also page 12).

Example:

If the card code is **4901 8014** and the conversion factor is **4567**, the personal code is worked out as followed:

$$\begin{array}{r} 8014 \\ +\,4567 \\ \hline 12581 \end{array}$$

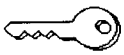
The first digit is disregarded. The PIN code is **2581.**

4 Programming

4.1 Setting the Password

Before the card reader can be programmed its password must be set. Whenever programming is necessary or a printout is required, this code must be entered first.

This is how to set the password:



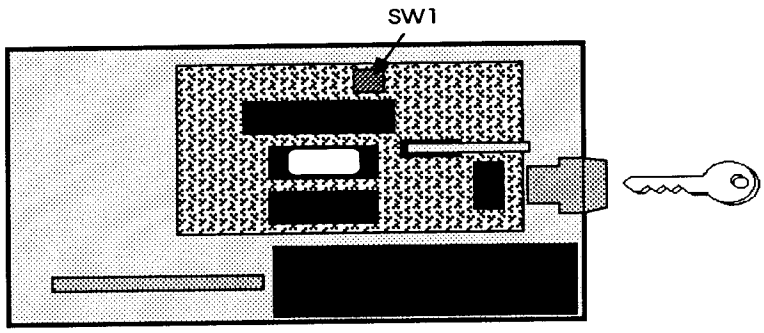
1 Open the card reader with the key supplied. The lock is on the underside of the case.

2 Remove the front panel with the keypad. On the circuit board in the case there is a red knob for setting the opening time. Turn it fully anticlockwise.

3 Turn the front panel with the keypad to show the other circuit board.

SW 1

4 Press the button marked SW1. This button is located halfway along the right-hand edge of the board (see illustration below). Two LEDs, one red, one green, will now light up on the front panel.



●●●●●● 5 Enter the six-digit password on the card reader keypad. The LEDs go out.

Important: Make a note of the password so that it is not forgotten. Keep the key of the card reader in a safe place.

4.2 Programming Mode

Whenever a function is required, such as programming or printing out, the card reader must be set to programming mode. This is done as follows:

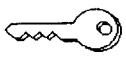
			LEDs show:
Ⓑ	1	Press **B**. The green LED lights up.	◍○○
●●●●●●	2	Enter the six-digit password. All LEDs light up; the card reader is now in programming mode.	◍◍◍
	3	Follow the instructions for the relevant function (see section 4.5).	

If the wrong password is entered, the green LED goes out. Repeat the procedure from step 1.

If there is a long pause (over 60 seconds) before a key is pressed, all the LEDs will go out. Repeat the procedure from step 1.

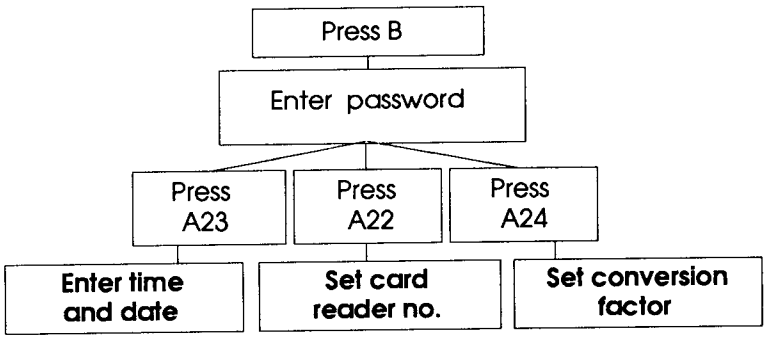
4.3 Opening Time

The opening time of the card reader can be adjusted (ie the time allowed for a card holder to open the door from the lighting of the yellow LED). The normal opening time is 6-7 seconds. To adjust the opening time, proceed as follows:

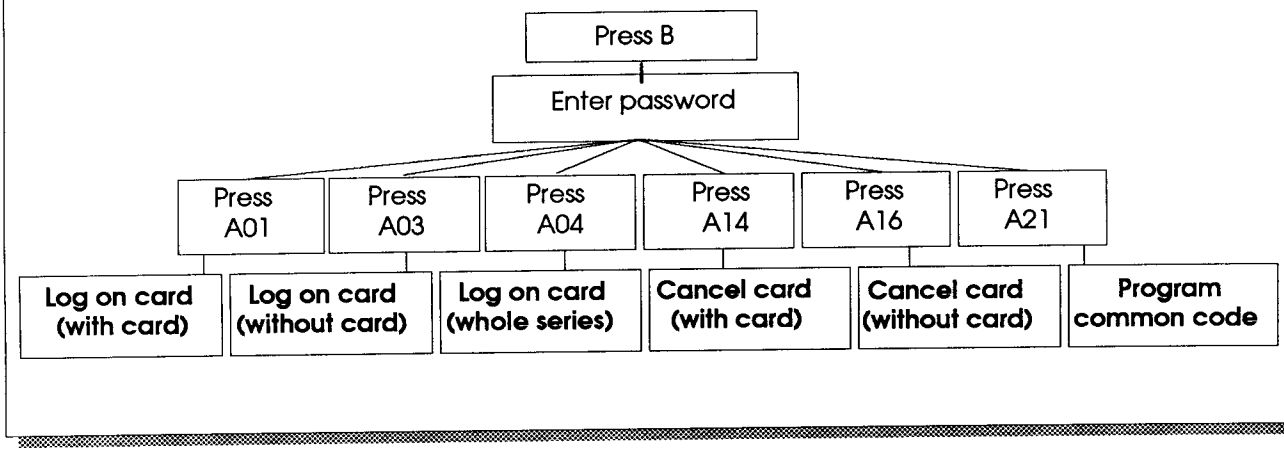
	1	Open the front panel of the card reader with the key.
	2	Turn the red knob on the circuit board inside the card reader clockwise about one centimetre (see top picture on page 25) . There is no direct way of knowing how long the set opening time is. If it turns out to be too long or too short, adjust it again.

4.4 Programming Flowcharts

Basic Functions (see also page 12)



Card and Common Code (see also pages 13 – 15)



4.5 Basic Functions

Enter Time and Date

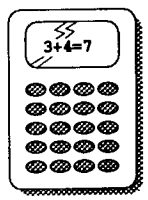
			LEDs show:
	1	Set the card reader to programming mode (see page 9).	●●●
A23	2	Press **A23**.	○●●
●●●●●●	3	Enter required date. Key in the digits in the order year, month, day, eg **900129**.	○●●
●●●●	4	Enter the required time, eg **1823**.	○●●
●	5	Enter the required type of day, eg **4** (Thursday).	●●●

ID

Set Card Reader Identity Number

When there are several card readers connected to one printer, the printout should show which card reader was used for each access.

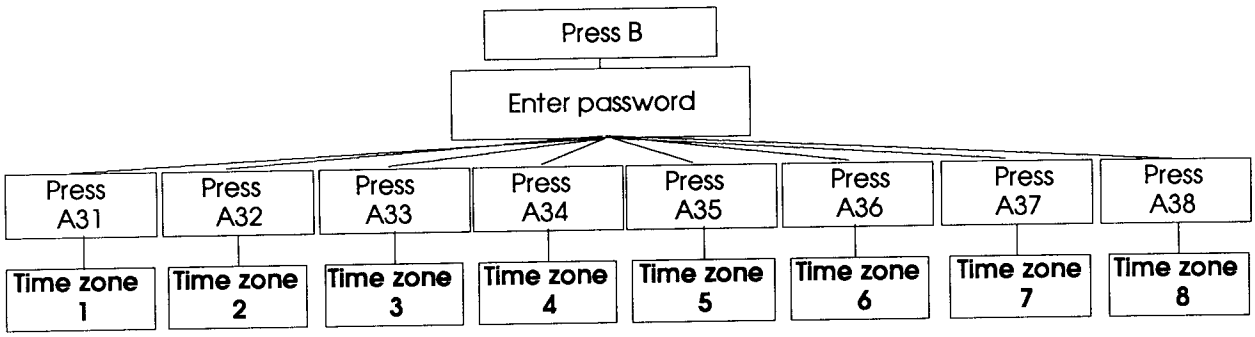
	1	Set the card reader to programming mode (see page 9).	●●●
A22	2	Press **A22**.	○●○
●●	3	Enter the required two-digit identity number (eg 01). This number is then shown on the printout at each access.	●●●



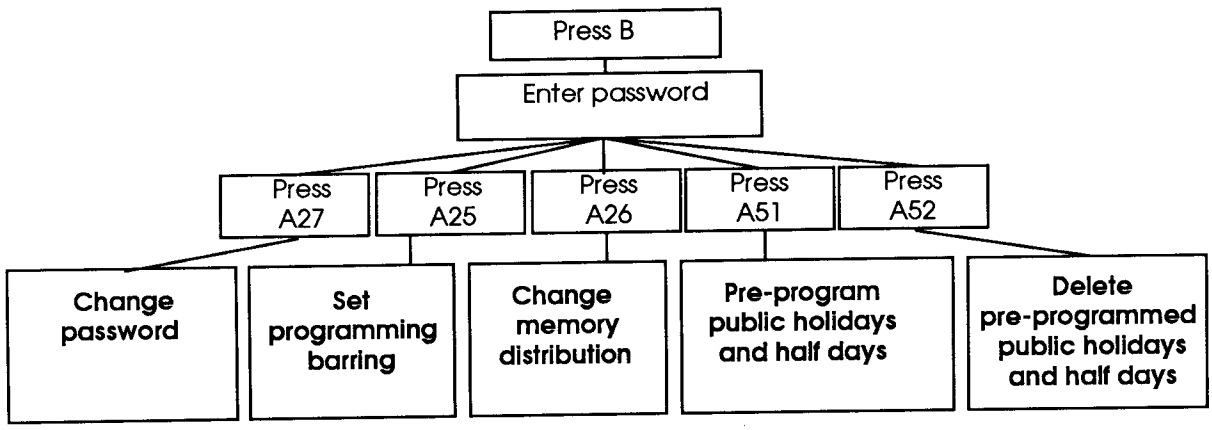
Set Conversion Factor

	1	Set the card reader to programming mode (see page 9).	●●●
A24	2	Press **A24**.	●○○
●●●●	3	Enter the required conversion factor (four digits).	●●●

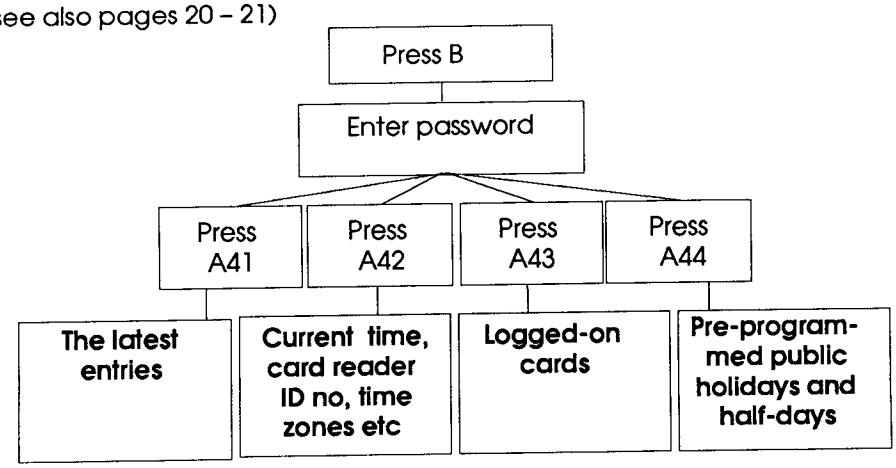
Time Zones (see also page 16)



Additional Functions (see also pages 17 – 19)



Printouts (see also pages 20 – 21)



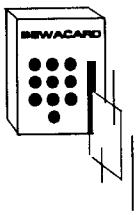
4.6 Card and Common Code

Log on Access Card (with card)

LEDs show:

1 Set the card reader to programming mode (see page 9). ⊛⊛⊛

A01 2 Press A01. ○○⊛



3 Pull the card through the card reader slot.
If the card is accepted, the red LED will flash once.
If the LED does not flash, either the memory is full or the card is defective.

4 Log on any other cards in the same way.

B 5 Press B. ⊛⊛⊛

Log on Access Card (without card)

1 Set the card reader to programming mode (see page 9). ⊛⊛⊛

A03 2 Press A03. ○⊛⊛

●●●●●●●● 3 Enter the card code (eight digits).
The yellow LED flashes (off/on) at each keypress. When the card has been logged on, the red and yellow LEDs flash once (on/off) to confirm. If the LEDs do not flash, the memory is full.

4 Log on any other cards in the same way.

B 5 Press B. ⊛⊛⊛

Log on Access Cards (whole series)

LEDs show:

1 Set the card reader to programming mode (see page 9). ●●●

A04 2 Press **A04**. ●○○

●●●●●●●● 3 Enter the card code (eight digits) of the first card in the number series.

●●●●●●●● 4 Enter the card code (eight digits) of the last card in the number series. The red LED starts flashing rapidly. (It takes about 5 seconds to log on 500 cards.)

If the red LED does not flash, the number of the first card is higher than the number of the last card. If all LEDs flash, there are too many card for the memory of the card reader. Press B to cancel the error signal and then check the number of cards. Then repeat the procedure from the start.

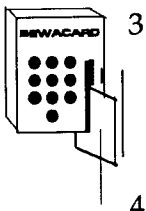
5 Log on any additional card series in the same way.

B 6 Press **B**. ●●●

Cancel Access Cards (with card)

1 Set the card reader to programming mode (see page 9). ●●●

A14 2 Press **A14**. ●○○



3 Pull the card to be cancelled through the card reader slot.
All LEDs will flash to confirm that the card is now cancelled.

4 Repeat step 2 for any other cards to be cancelled.

B 5 Press **B**. ●●●

If the LEDs do not flash, the card was not logged on.

Cancel Access Cards (without card)

LEDs show:

1 Set the card reader to programming mode (see page 9). ●●●

A16 2 Press **A16.** ●●○

●●●●●●●● 3 Enter the code of the card to be cancelled. All LEDs will flash to confirm that the card is now cancelled.

4 Repeat step 2 for any other cards to be cancelled.

B 5 Press **B.**

If the LEDs do not flash, the card was not logged on or the wrong code was entered. ●●●

Program Common Code

1 Set the card reader to programming mode (see page 9). ●●●

A21 2 Press **A21.** ○○●

●●●● 3 Enter the required common code (four digits). To erase the common code, press **0000.** ●●●

4.7 Time Zones

Before programming the time zones, print out a listing of the time zones already in use (see Section 4.10, *Printouts*). At the factory, the first three time zones are programmed as follows:

A31 2 00.00-24.00 1 2 3 4 5 6 7 8 Time zone 1 - common code applies all day every day
A32 3 00.00-24.00 1 2 3 4 5 6 7 8 Time zone 2 - card only applies all day every day
A33 9 00.00-24.00 1 2 3 4 5 6 7 8 Time zone 3 - continuous printout applies all day every day

This is done so that you can easily check that the system is working, without first having to program time zones. The other time zones are not programmed. This is how to program time zones:

			LEDs show:
	1	Set the card reader to programming mode (see page 9).	◎◎◎
❹❸❶	2	Press **A31**. (The 1 signifies the first time zone; the code for the next time zone is A32, and so on up to A38).	○○◎
●	3	Enter the required security level or ❾ for continuous printout of all accesses. ❶ = door unlocked, ❷ = group code, ❸ = card only and ❹ = card + PIN code.	○○◎
●●●●	4	Enter the time of day when the security level is to become operative, eg **0800.**	○○◎
●●●●	5	Enter the time of day when the security level is to cease to be operative, eg **1700.**	○○◎
	6	Enter the day types that are to apply to the security level and times entered. ❶ = Monday, ❷ = Tuesday ❸ = Wednesday, ❹ = Thursday, ❺ = Friday, ❻ = Saturday, ❼ = Sunday, ❼ = public holiday and ❽ = half day. (Example: for Monday-Friday, enter 12345).	○○◎
❹	7	Press **B**.	◎◎◎

4.8 Additional Functions

Change Password

LEDs show:

	1	Set the card reader to programming mode (see page 9).	◍◍◍
A❷❼	2	Press **A27**.	○○◍
●●●●●●	3	Enter a new six-digit password.	◍◍◍

Remember to make a note of the new password.

Define Program Barring

With setting one ❶ the system can be programmed both directly at the card reader and from a connected programming unit. This is the factory setting. To restrict the ability to program the card readers to the programming unit only, press ❷. Pressing ❸ makes it impossible for an unauthorised person to set a new password by pressing SW1 (see page 8).

	1	Set the card reader to programming mode (see page 9).	◍◍◍
A❷❺	2	Press **A25**.	◍○◍
●	3	Select the required type of barring.	◍◍◍

Change Memory Distribution

	1	Set the card reader to programming mode (see page 9)	◍◍◍
A❷❻	2	Press **A26**.	◍◍○
●	3	Enter the required memory distribution (see Chapter 3, *Explanations of Terms*). Press ❶ for distribution 468 – 768, ❷ for 980 – 512, ❸ for 1492 – 256 and ❹ for 2004 – 0.	◍◍◍

Pre-programming Odd Holidays

A whole year can be pre-programmed, but the same settings will remain in force for the next year if they are not changed. Remember that the date of Easter and certain other public holidays changes from year to year.

Pre-programming and Changing Public Holidays and Half-days

LEDs show:

	1	Set the card reader to programming mode (see page 9).	●●●
A51	2	Press **A51**.	○○●
●●●●	3	Enter date of a public holiday or half-day, eg 25 December. In this case, enter the number in day-month format, ie **2512**.	
●	4	Enter the desired day type, eg 7, (8 = half-day).	○○●
	5	Enter the next date and continue pre-programming day types in the same way for all public holidays and half-days throughout the year. Press **B** to end.	

Note. When pre-programming half-days (8), a time interval must be entered for this day type when programming time zones.

Deleting Pre-programmed Days

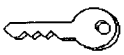
	1	Set the card reader to programming mode (see page 9).	●●●
A52	2	Press **A52**.	●○●
●●●●	3	Enter the date to be deleted, eg **2512** for 25 December.	
	4	Enter any additional dates to be deleted.	
B	5	Press **B**.	●●●

This is how to delete all pre-programmed days at once: **LEDs show:**

	1	Set the card reader to programming mode (see page 9).	●●●
A52	2	Press **A52**.	●○●
2186	3	Enter the code **2186**.	
B	4	Press **B**.	●●●

4.9 Erasing the Memory

This function is used to remove all information in the memory of the card reader. It does not affect the clock and the password. This is what to do:

	1	Open the card reader with the key.
SW1	2	Press **SW1** for two seconds (see illustration on page 8).
112186	3	Enter the code **112186**. The LEDs flash three times to confirm that the memory has been erased.

4.10 Printouts

Set the card reader to programming mode before printing.

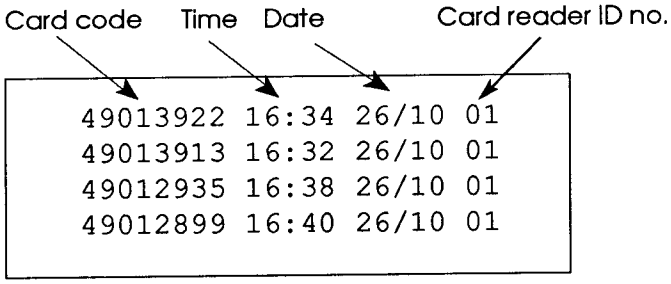
Printout of the Latest Entries

LEDs show: ○○●

A41 1 Press **A41**

B 2 To terminate printing, press **B** for five seconds.

This is what the printout looks like:



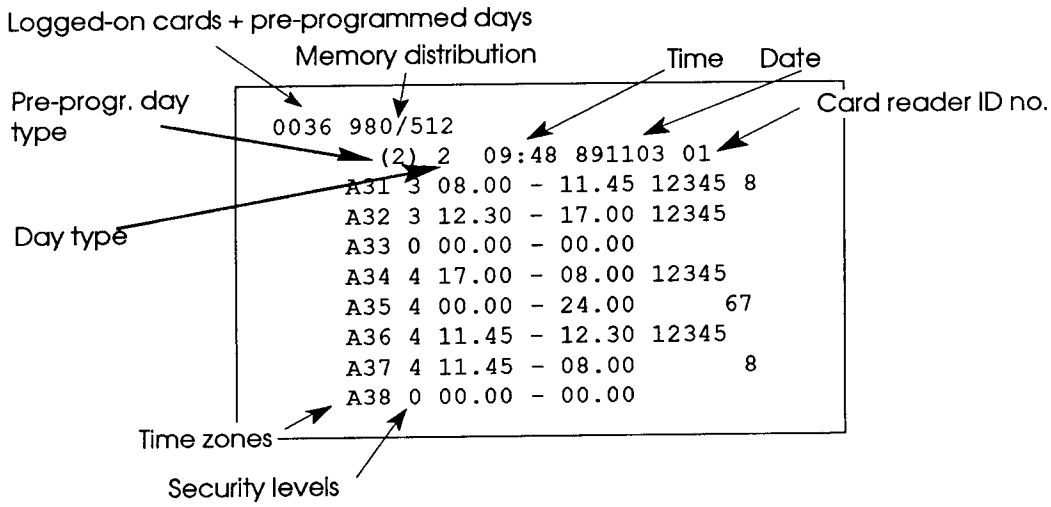
Printout of Card Reader ID number, Actual Time, Time Zones etc.

○●○

A42 1 Press **A42.**

B 2 To terminate printing, press **B** for five seconds.

This is what the printout looks like:



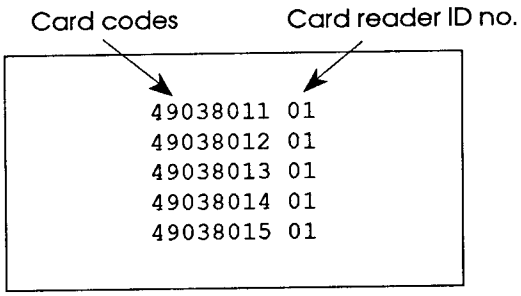
Printout of Logged-on Cards

LEDs show:

A43 1 Press **A43**. A list of all logged-on cards is now printed out. ●○○

B 2 To terminate printing, press **B** for five seconds.

This is what the printout looks like:

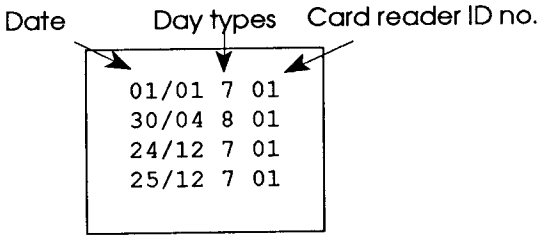


Printout of Pre-programmed Odd Public Holidays and Half-days

A44 1 Press **A44**. A list of all pre-programmed odd public holidays and half-days is now printed out. ○●●

B 2 To terminate printing, press **B** for five seconds.

This is what the printout looks like:



5 How to Dimension the Cables

It is important to use cables with the correct conductor gauge, to keep the voltage drop in the cables as low as possible. A 24 V electric locking device needs at least 21 V to work properly, so the voltage at the card reader should never be less than 21 V.

The recommended gauge (cross-sectional area) of the conductor depends on the distance between the power supply and the card reader and on the load at the card reader.

The table below is for a Bewacard 300 with an electric release. The total load is 300 mA at 24 V. At 12 V the area should be multiplied by 3.

Cable length	Minimum conductor area (mm^2)	Minimum conductor diametet (mm)
0 – 50	0.17	0.46
51 – 100	0.34	0.65
101 – 151	0.51	0.80
151 – 200	0.68	0.93
201 – 250	0.85	1.04
251 – 300	1.02	1.14
301 – 350	1.19	1.23
351 – 400	1.36	1.31
401 – 450	1.53	1.39
451 – 500	1.70	1.47

If the load is doubled, for instance if another locking device is used, the conductor area must also be doubled. If power is to be supplied to several card readers through the same cable, the correct conductor area can be calculated as shown below.

Example:
Three card readers with electric releases are to be installed at 50, 80 and 210 metres from a battery backup unit (24 V). The cables are to follow the same route. A common cable would be easier to run. What conductor area would be appropriate?

Add together the recommended conductor areas for each distance

50 m		0.17 mm^2
80 m		0.34 mm^2
210 m	+	0.85 mm^2
		1.36 mm^2

Round up the area to give: 1.5 mm^2

In other cases the conductor area can be worked out using the following formula:

$$\frac{1{,}5\ V}{\ldots\ldots\ A} = \frac{\ldots\ldots\ Ohm}{\ldots\ldots\ m} = \frac{0{,}017}{\ldots\ldots\ Ohm/m} = \ldots\ldots\ mm$$

Explanations of the values in the formula:

1.5 V	The maximum voltage drop in one direction from the power supply to the card reader (24 V - 1.5 V - 1.5 V = 21 V). At 12 V the voltage drop is 0.75 V.
... A	Total current drawn by card reader and electric locking device
... ohm	Result of first calculation: maximum resistance in the cable between power supply and card reader.
... m	Length of cable between power supply and card reader.
... ohm/m	Result of second calculation: resistance of cable per metre.
0.017	Constant for copper cable.
... mm2	Cross-sectional area of cable. Answer rounded up to give suitable conductor area.

Formula for converting conductor area to conductor diameter:

$$2 \times \sqrt{\frac{\ldots\ldots\ mm}{3{,}14}} = \ldots\ldots\ mm\ \varnothing$$

Note: The power supply must always run in a separate cable, never in the cable used to carry the data.

6 Installation Instructions

This chapter describes in words and pictures how to install a card reader.

Locating the Card Reader

Install the card reader at a height of 120-140 cm (from the ground to the bottom edge of the reader). Where the reader is intended to be used by the disabled, 95 cm is a suitable height.

The card reader for indoor installation is intended for an office environment and a temperature range of 0 °C to +55 °C; the reader for outdoor installation can operate in temperatures from -35 °C to +55 °C.

Mounting the Card Reader

1 Remove the front panel of the card reader by unlocking the lock on the underside of the case using, the key supplied.

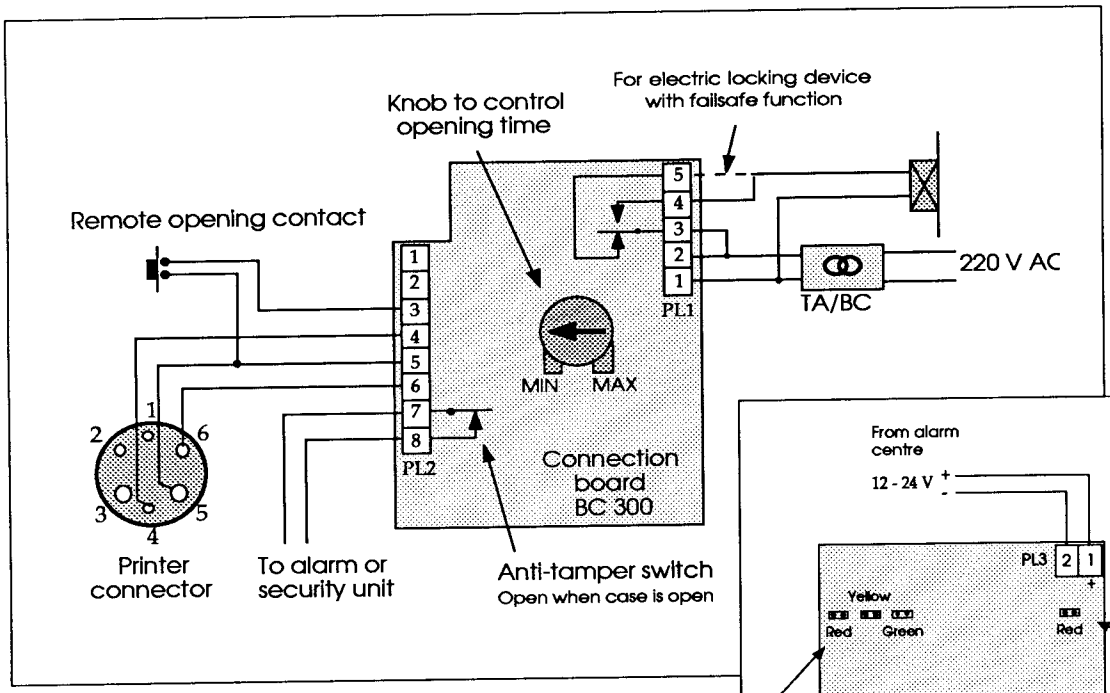
2 Fix the case to the wall with screws. Check that the insulating washers in the fixing holes are secure.

3 Refit the front panel and check that the card reader is securely fixed.

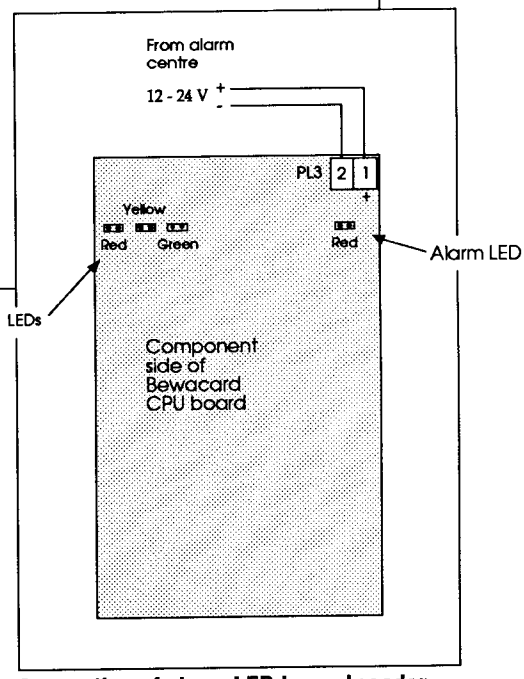
4 Before connecting the cables, check that the card reader is fully isolated from earth/ground (metal parts etc). Using a meter, check that there is no contact between terminal 5 of terminal block PL2 and earth/ground or any part of the door. Remember that anodising gives an insulating finish.

5 If the card reader is to be installed outdoors it should be fitted with a special protective hood. If there is a risk of water running into the screw/cable holes, seal them with a sealing compound such as silicone.

How to Connect the Card Reader:

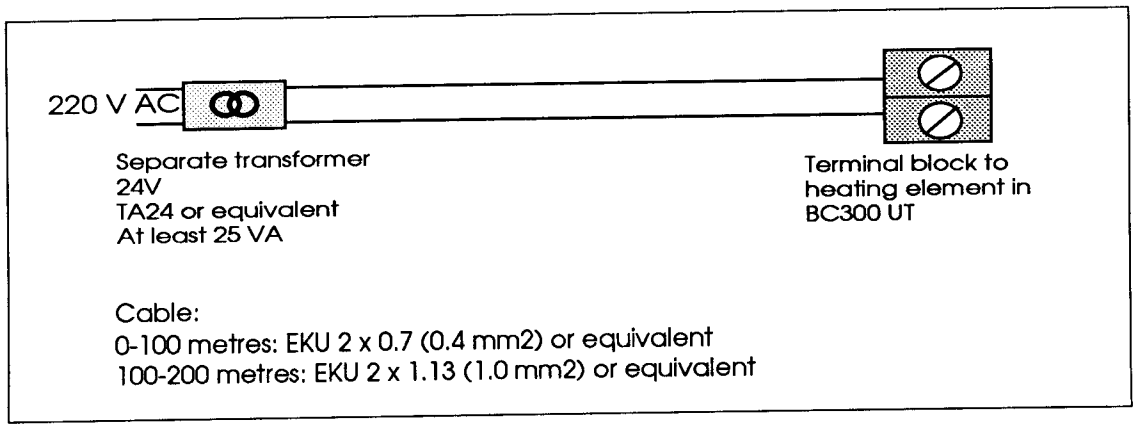


Install a printer connector inside the door.
If a long cable to the printer is needed, use screened cable.

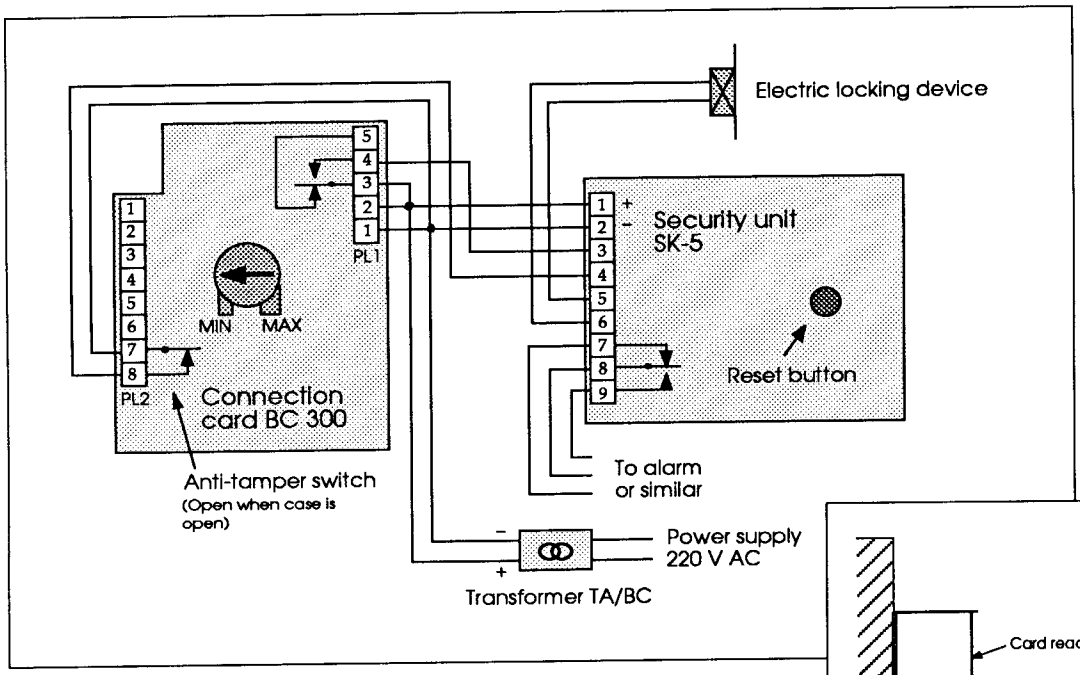


Connection of alarm LED in card reader.

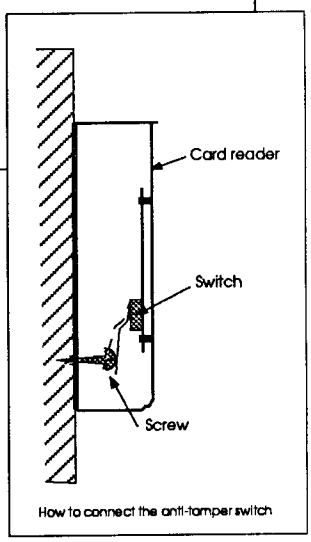
If the card reader is to be installed outside, a separate transformer is needed, connected to a heating element as shown below:



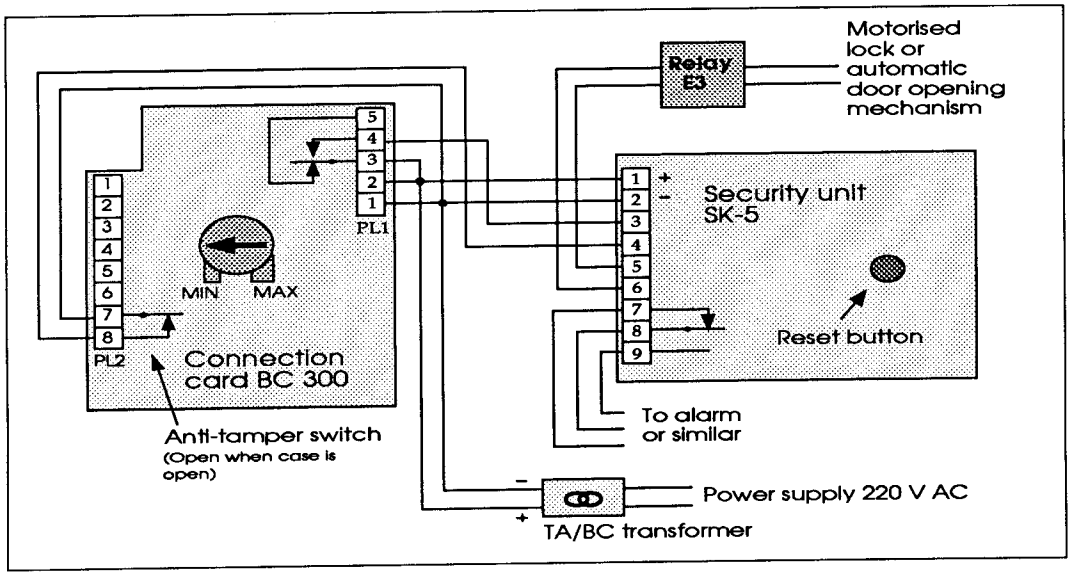
This is how to connect security unit SK-5 when the card reader is controlling an electric locking device or a lock release (Bewalock):



Security unit SK-5 is used at doors where extra strict security is required.



This is how to connect security unit SK-5 when the card reader is controlling a motorised lock or automatic door opening mechanism:



7 Points to Consider during Commissioning

One important point when comissioning a security system on the premises of a company or official organisation is to make sure that the functions and possibilities of the system are explained to those who will actually be using it. When preparing a tender for an access control system, time should therefore be allocated for commissioning and training. Bewator will be pleased to offer help and advice. System documentation, diagrams etc should be handed over to the customer.

8 Checklist after Installation

Before starting the system, check the following points:

☐ that the card reader has a power supply unit recommended by Bewator.

☐ that the card reader is not in contact with earth/ground (metal parts etc) Measure (with a buzzer) between terminal block 2 (PL 2), terminal 5 and earth or part of the door.

☐ that the card reader has a heating element and protective hood (not essential) if installed outdoors.

Before the installation can be regarded as complete, check also that:

☐ the password and identity number of the card reader have been programmed, and that the correct opening time has been set.

☐ cards can be logged on at the card reader.

☐ the door (lock) opens when a logged-on card is used.

☐ the printer works. To check this, use the command A42.

☐ the customer has been informed of the programmed information, eg the password.

☐ the customer has been trained in the use of the system.

☐ documentation for the system has been handed over to the customer

☐ card reader keys have been handed over to the customer.

☐ guarantee forms have been filled in and returned to Bewator.

9 Technical Data

Card Reader Bewacard 300 (part no. 21-300)

- for indoor use
- power supply: 12 V DC or 24 V DC (always use interference-suppressed power supply recommended by Bewator)
- current drawn: 150 mA when idle (at 24 V)
- cast housing with front panel of stainless steel and security lock
- floating changeover relay contact for lock
- maximum load across relay contacts: 1 A 28 V DC
- dimensions: 195 x 125 x 52 mm (h x w x d)
- up to 2000 cards can be logged on
- remote opening function with delay
- opening time: 1-40 seconds
- temperature range: -5 °C to +55 °C
- recommended mounting height: 1200-1400 mm from ground to bottom edge

Card Reader Bewacard 300 UT (part no. 21-303)

- for outdoor use
- built-in 25 W heating element with thermostat
- a separate transformer is needed for the heating element, TA 24 (part no. 73-105)
- temperature range: -35 °C to +55 °C
- other features same as Bewacard 300 for indoor use

Wiring diagram (extra copy)