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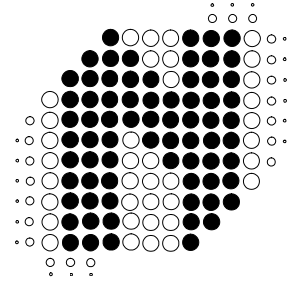
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BC110 USER MANUAL

NORTECH INTERNATIONAL (PTY) LTD

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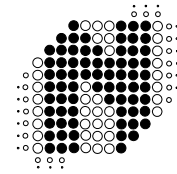
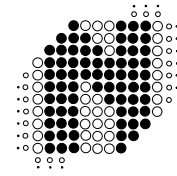


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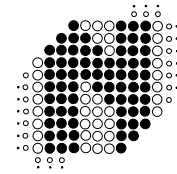


WARNING: 1. THIS UNIT MUST BE EARTHED !

WARNING: 2. DISCONNECT POWER BEFORE WORKING ON THIS UNIT !

WARNING: 3. INSTALLATION AND OPERATION BY SERVICE PERSONNEL ONLY !

WARNING: 4. NO USER SERVICEABLE PARTS INSIDE. WARRANTY VOID IF COVER REMOVED!



1. INTRODUCTION

The BC110 is a microprocessor-based barrier logic controller designed specifically for parking and vehicle access control applications. The BC110 has been designed using the most up-to-date technology in order to meet the requirements of a vast number of parking applications in terms of operating conditions and functional options available to the user.

The primary function of the barrier logic controller is to control the operation of a barrier, gate, or door. This is accomplished by applying the various controlling inputs to the device in order to achieve the required actions on the outputs. The Barrier Controller has a selectable rollback time-out for the protection of the vehicle should it move back on to the closing loop whilst the barrier is lowering. A selectable time-out for restoring the barrier to the closed position if a vehicle does not cross the closing detector exists on the BC110 as well as the facility to ignore this feature, if so required.

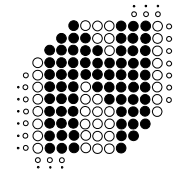


The controller has been designed for ease of installation and operation and is compact in design.

The unit has a raise and lower switch on the front as well as a remote raise and lower jock socket for the manual operation of the barrier.

Two visual indications (LED's) are provided for the raise input conditions, the inputs being Memory and Non Memory.

All remaining connections are made via a 11-pin submagnal connector at the rear of the enclosure. All inputs (Memory, Non Memory, Barrier Closing) to the unit are optically isolated for protection. The Ticket Issue Interlock output is also optically isolated. The Raise and Lower output relay contacts as well as power to the unit are routed via the 11-pin connector.



2. TECHNICAL DATA

2.1 Functional Data

Inputs:

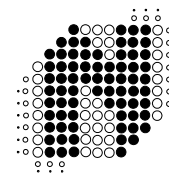
Memory	Optically Isolated Active high requiring connection to 0V (i.e. Relay contact) 10 mA sink current Input signal duration 80 ms MIN Minimum of 2 Seconds between inputs
Non-Memory	Optically isolated Active high requiring connection to 0V (i.e. Relay contact) 10 mA sink current Input signal duration 80 ms MIN
Closing Loop	Optically isolated Active high requiring connection to 0V (i.e. Relay contact) 10 mA sink current Input signal duration 200 ms MIN
Remote Raise & Lower	3.5 mm Stereo jock socket Optically isolated Active high requiring connection to 0V (i.e. Switch) 10 mA sink current Input signal duration 200 ms MIN
Raise and Lower	3 position slide switch Function: Raise, Auto, Lower

Outputs:

Ticket Issue Interlock	Optically isolated Normally "on" transistor output Diode protection for reverse bias Max current permissible 100 mA Max voltage permissible 50 VDC
Raise and Lower Relay	Change over contact Contact supply 230 VAC Live Max current permissible 6 A Note: External Contactor required for motor connection
Visual Indications	Red LED: Memory Input Red LED: Non Memory Input Surge Protection: Mains Supply clamped with Metal Oxide Varistor

2.2 Electrical Data

Power requirements	230V AC $\pm 15\%$ (48 to 60Hz) 2.6 VA Maximum @ 230V
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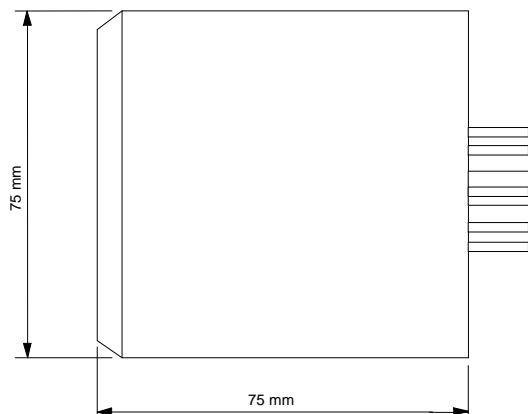
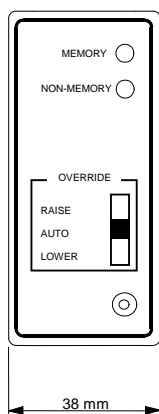


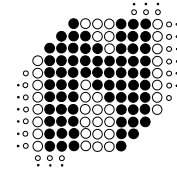
2.3 Environmental Data

Storage Temperature	-40°C to +85°C
Operating Temperature	-20°C to +70°C
Humidity	Up to 95% relative humidity without condensation
Circuit protection	Conformal coating over the PCB and all components

2.4 Mechanical Data

Housing Material	ABS blend
Mounting Position	Shelf Mounting
Connector	11-pin submagnal type (86CP11)
Size of Housing	75mm (High) X 38mm (Wide) X 75mm (Deep)





3. OPERATING INSTRUCTIONS

3.1 Hardware Set-up

The BC110 Barrier logic Controller is designed to be shelf of DIN rail mounted with the controls and visual indicators at the front and wiring at the rear of the enclosure.

The power, inputs and relay outputs are all connected to the single 11-pin plug which is mounted at the rear of the enclosure.

3.2 Switch Setting Selections

3.2.1 Jumper settings

The jumpers are inside the unit and are located by removing the unit from the enclosure and then referring to Figure 3.1:

3.2.1 JP1 is to select the rollback protection time-out.

2 seconds if connected

10 seconds if omitted



3.2.2 JP2 is to select automatic lower time-out should no vehicle pass over the closing loop after the signal has been obtained.

2 minutes if connected

Infinite if omitted

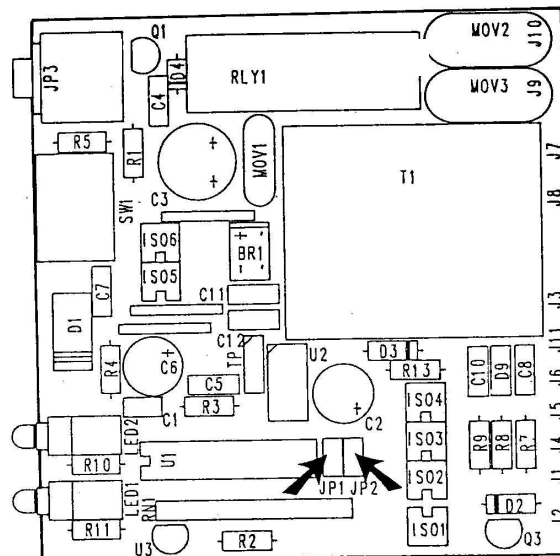
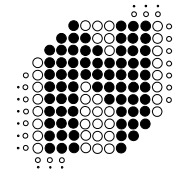


Figure 3.1: PCB indicating jumper switches

3.2.2 Front panel indicators

- Memory Input (MI) - Illuminated when input active
- Non-Memory Input (NMI) - Illuminated when input active



4. PRINCIPLE OF OPERATION

The BC110 Barrier Logic Controller is used to control the operation of automatic parking barriers and motorised gates and doors. The module receives control signals from external devices (i.e. Card readers, ticket vending machines, closing loop detectors, etc.) and provides the necessary outputs in response to these commands.

4.1 Inputs

4.1.1 *Memory input (MI)*

A momentary contact closure (80 ms) between this pin and pin 6 (Common) will generate a RAISE command. A subsequent input will be accepted after a 2 second pause requiring that two vehicles cross the barrier closing loop to effect closure. This input is specifically intended for card reader or other similar "Permanent" ticket control applications, and is designed to speed up vehicle throughput in a busy parking environment.

4.1.2 *Non Memory Input (NMI)*

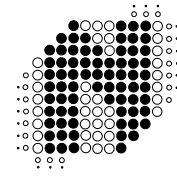
A momentary contact close (80 ms) between this pin and pin 6 (Common) will similarly generate a RAISE command. This input specifically intended for ticket issuing, coin operated machines, push buttons or other similar applications requiring tight audit control. In this case the barrier arm will return to the LOWER position between each transaction.

4.1.3 *Barrier Closing Loop Input*

The command to lower the barrier is derived from the Barrier Closing Loop Input (i.e. Presence contact of the inductive loop vehicle detector). The signal must be present for a minimum period of 200 ms to provide a valid output. The LOWER command is executed upon retraction of the signal i.e. the vehicle has departed the closing loop. If the vehicle rolls back into the barrier within a selectable time period the BC110 Logic will sense the resultant detector presence signal and re0open the barrier, thus preventing roll-back damage. The closing loop cannot activate a barrier-raise command after the selected time period has expired.

4.1.4 *Remote Raise/Lower*

The Raise/Lower function can be manually overridden using a front panel mounted slide switch, or alternatively remotely using the 3.5 mm jack plug, facilitating the connection of a remote switch up to 100 metres from the control module. The front panel OVERRIDE switch will take priority over all the other inputs.



4.2 Outputs

4.2.1 *Barrier Raise*

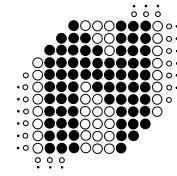
This output provides an internal relay contact closure to the AC line to effect a BARRIER RAISE function. Maximum contact rating is 6 amps at 240V AC. This output is maintained for the entire duration that the barrier is in the raise condition.

4.2.2 *Barrier Lower*

This output provides an internal relay contact closure to the AC line to effect a BARRIER LOWER function. Maximum contact rating is 6 amps at 240V AC. This output is maintained for the entire duration that the barrier is in the lowered condition.

4.2.3 *Ticket Vend Interlock*

This is an optically isolated output provided to inhibit ticket issue from a ticket issuing machine while the barrier is opening or opened. This allows for tight audit control of “casual” users in a parking application.



5. INSTALLATION GUIDE

5.1 Mounting Position

The modules can be shelf or DIN-rail mounted, however, the following simple precautions must be observed:

1. Mount away from “hot spots”, i.e. keep away from motors, heaters and other hot devices.
2. Ensure that rain water cannot splash or reach the unit.
3. Mount away from oily spots, mechanical mechanisms, as a light oily deposit secures considerable dirt.
4. Ensure that the front panel controls are readily accessible at all times by the operator.

5.2 Power Connections to the AC Mains

Provide a circuit breaker adjacent to the BC110 module. The current rating of the circuit breaker will be determined by the motor run load current. The over-current condition of a stalled motor must trip the circuit breaker.

Note: Specifically designed motors are available for barrier control applications which can withstand a permanent stall power-on condition. These motors do not use limit switches but rather are stalled at barrier limits. Certain of these types of motor can be directly driven by the BC110 outputs without the need of additional contactors. Contact the dealer for further details.

5.3 Inter-connections to the Motor

1. Pins 5 and 10 are the RAISE and LOWER outputs respectively.

The respective RAISE and LOWER output is maintained until the opposite command is received. Consequently, wire the coils of the power switching relays or contactors controlled by these outputs in series with the travel limit switch to cut the motor drive.

2. A maximum of 5 amps @ 240V AC can be sourced from these outputs. Metal oxide varistors clamp any peak induced voltage across the internal relays to 270 volts.

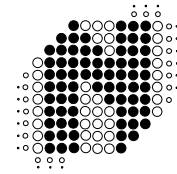
Direct driving of reversible induction motors is therefore not generally possible as the voltage between the AC line supply and the non-driven input will exceed 270 volts, i.e. voltage appears across the open contacts of the de-energised output.

Certain motors are, however, suitable for direct drive. Please contact the factory for particulars.

5.4 Barrier Closing Loop Input

The barrier closing loop input terminates the pins 11 and 6 (Common) of the 11-pin connector.

A minimum contact closure of 200 ms is required to cause the barrier to return to the lowered position.



5.5 MI and NMI Input Connections

1. Pins 8 and 7 of the 11-pin connector access the memory (MI) and non-memory (NMI) inputs of the BC110 respectively.
2. To activate the respective input, connect an external contact closure between the respective pin 8 and 7 and pin 6 which is the common terminal (0V).
3. Opto-isolator protection is provided on both these inputs, together with noise filtering to reject unwanted electrical spikes etc.

Consequently low cost twin-core cable or twisted pair conductors may be connected to these inputs from the peripheral devices e.g. Card Reader, Ticket Issuing Machines etc.

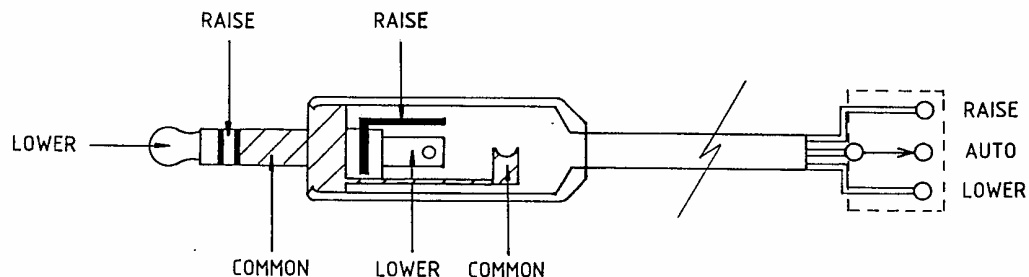
The minimum contact closure period must exceed 80 ms to overcome the effects of the input noise filter.

5.6 Ticket Vend Interlock

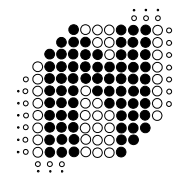
1. Pins 3 and 4 on the 11-pin connector are the ticket vend interlock (TVI) output.
2. This is an opto-isolated normally on transistor output rated at a maximum of 50 volts @ 100 mA.
3. The purpose of TVI is to inhibit the ticket issuing machine until such time as the leading vehicle has cleared the barrier closing loop and the arm commences to descend. This enables a tight audit control to be maintained in a parking system.
4. It is intended for TVI to activate a small 12 volt or 24 volt relay coil within the ticket issue machine. An integral diode provides for reverse bias protection.

5.7 Remote Raise and Lower

The remote raise and lower facility is via a 3.5 mm jack socket mounted on the front faceplate. A 3.5 mm stereo jack plug is plugged into the socket and connected as shown below. The raise and lower options are selected by shorting the input terminals of the plug to the chassis of the plug. The top of the plug when shorted to the chassis will select the lower option while the middle connection will select the raise option.



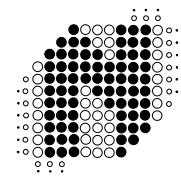
The remote input cable should be no longer than 100 metres and special screened cable must be used if in close proximity to noisy electrical equipment. 1.0 mm cable is recommended for correct operation between plug and switch.



6. CONFIGURATION

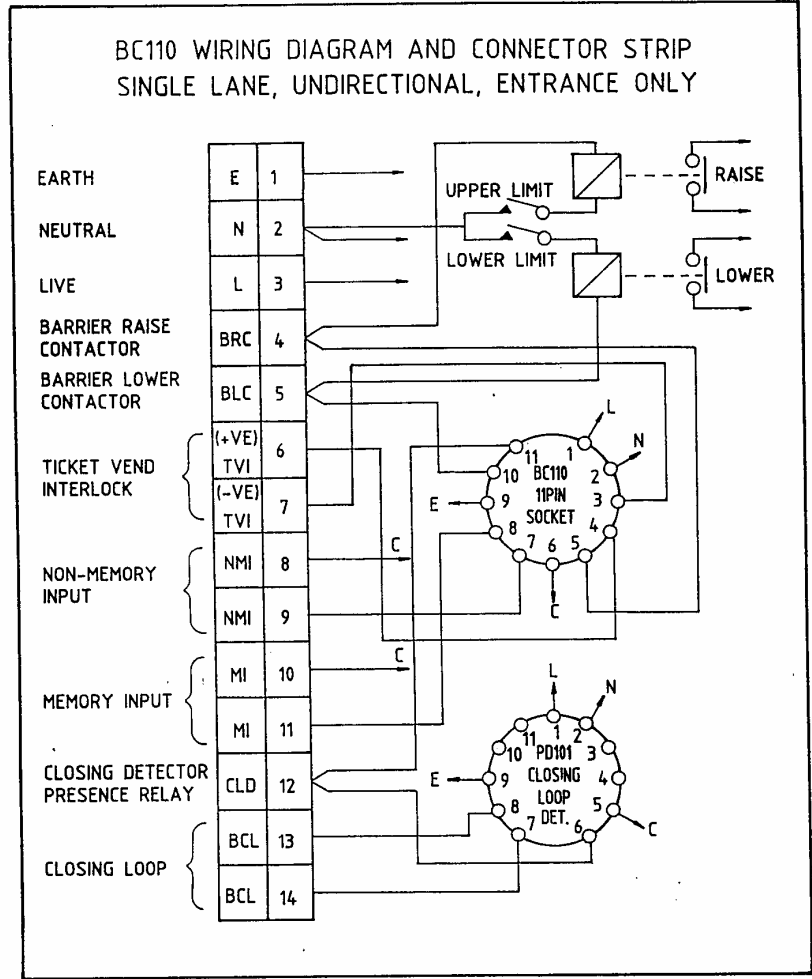
11 – PIN CONNECTOR WIRING: 310FT0302

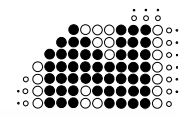
WIRING HARNESS WIRE COLOUR	11 PIN Connector Pin No.	Function	
		Red	1
Black	2	Neutral	
Blue/White	3	Ticket Vend Interlock (-ve)	
Blue	4	Ticket Vend Interlock (+ve)	
Yellow	5	Barrier Raise O/P (230V AC live)	
Brown	6	Common- pins 7, 8 and 11	
Mauve	7	Non Memory Input (+ve)	
White	8	Memory Input (+ve)	
Green	9	Mains Earth	
Grey	10	Barrier Lower O/P (230 V AC live)	
Pink	11	Closing Loop Input (+ve)	



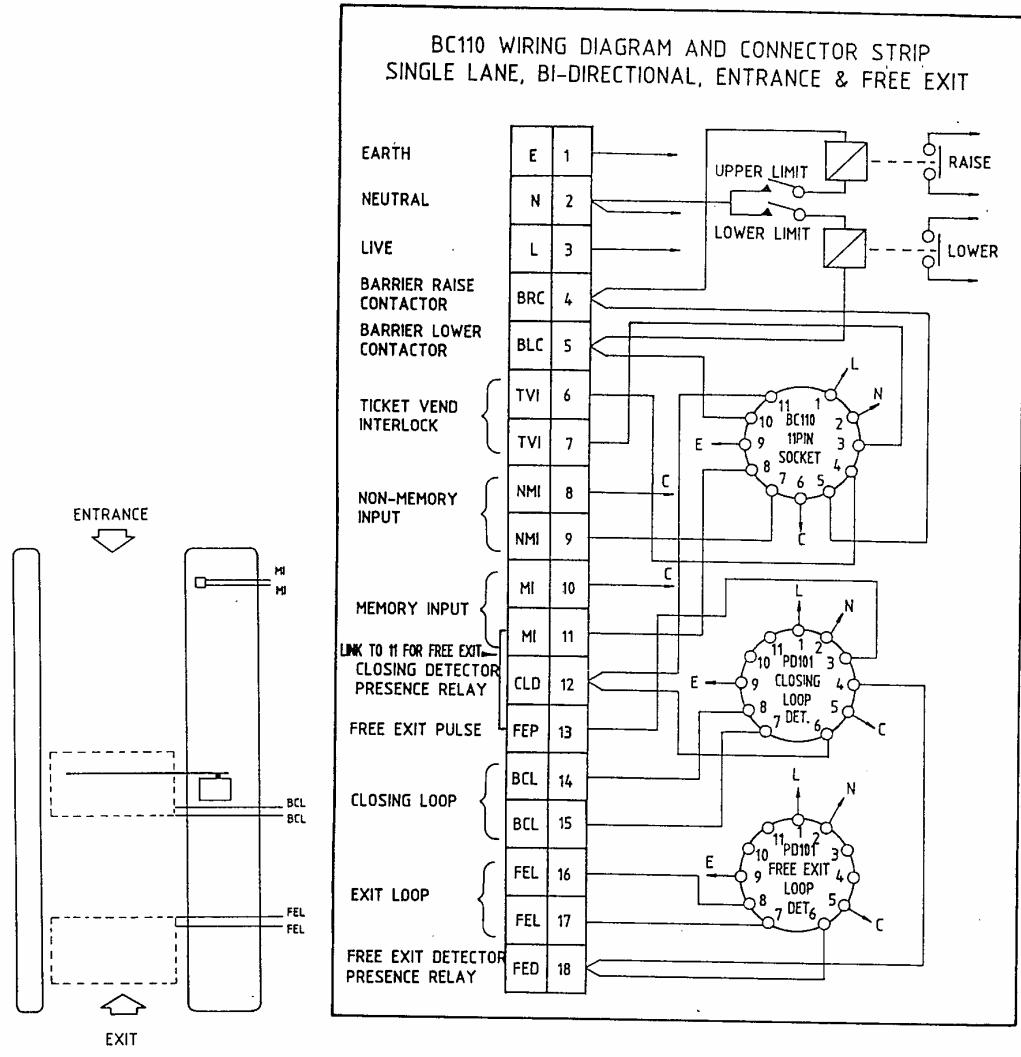
7. APPLICATIONS

APPLICATION 1

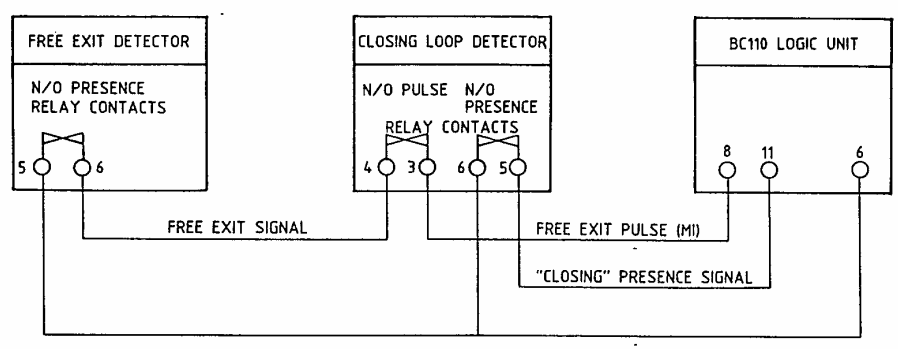




APPLICATION 2

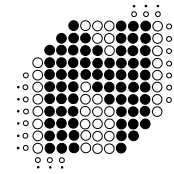


EXIT LOGIC WIRING OF THE TWO DETECTORS



FOR FREE EXIT, VEHICLE COVERS EXIT LOOP AND CLOSING LOOP
THE "EXIT LOOP" GROUNDS THE CLOSING LOOP OUTPUT PULSE TO THE BC110 LOGIC UNIT

N.B. TO EXIT, VEHICLE MUST COVER BOTH LOOPS



8. CUSTOMER FAULT ANALYSIS

8.1 Fault Finding

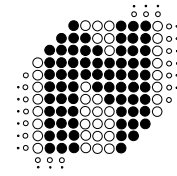
FAULT	CAUSED BY	REMEDY
MI LED not operating	Faulty wiring	Check wiring to external device i.e. card reader
No lower after BCI (Barrier Closing Input)	Faulty wiring	Check wiring loop to inductive loop vehicle detector
No raise after MI	No power to unit Faulty relay wiring Incorrect switch setting	Check power Check raise wiring Check manual and remote override switch selection
No lower after BCI	Faulty relay wiring Incorrect switch setting	Check lower wiring Check Manual and remote override switch selection
No raise on override switch	No power to unit	Check power to unit
No lower on remote override	BCI input active	Check BCI input

8.2 Functional Test

1. Connect power to the unit.
2. Connect pin 7 or pin 8 to pin 6 then remove.
3. Observe relay operation.
4. Now connect pin 11 to pin 6 and then remove.
5. Observe relay action.

During the application and retraction of the connections the relay should change states. This can be observed by listening to the relay action or by connecting suitable measuring equipment to the relay outputs

NB: Remember that the relay outputs switch AC live and extreme care should be taken when employing the latter option.



8.3 Converting Installations using the old silver BC100 Barrier Controller

These are the changes that are required in order for the BC110 (Black box) to operate in a site that previously operated using a BC100 (Silver box).

On the BC100 plug-in base in the cabinet, the following wires need to be re-configured in order for the new BC110 to operate:

1. On Pin 6 of the base, this wire will currently be connected to the LIVE connection or Pin 1 of the base. **Always treat installation as LIVE and use extreme caution when re-configuring this wiring.** Remove this wire from Pin 6 and completely from the cabinet wiring harness.
2. Now take a new wire and connect this from Pin 9 of the relay base to Pin 6 of the relay base. This is the simplest change and the BC110 (Black box) will now work in this site.