



Avon Barrier Company Ltd

AVON EB450 PARKING BARRIER



Example Illustration Only



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INTRODUCTION

This manual provides information on the Avon EB450 Rising Arm Barrier and is designed to assist the Installers, Maintainers, Operators and System Integrators.

Should you require and further assistance or specific assistance please contact our security specialists at our UK Head Office.

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SCOPE OF DOCUMENT

The EB450 Avon Parking Barrier shall hereafter be referred to as the “Barrier” or “EB450”

This document is intended for those who will:

Install/Interface the Barrier

Operate the Barrier

Maintain the Barrier

NOTE FOR SYSTEM DESIGNERS/INSTALLERS

The safe operation of the EB450 depends on a careful balancing of the various factors that are inevitably associated with operating a piece of moving equipment in a public place. It is vital that these factors are taken into consideration before the system specifications are made final.

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HEALTH & SAFETY STATEMENT



This symbol indicates a potentially hazardous situation that might result in minor injury or machine damage. It also indicates strict attention must be given to the instructions following the displaying of this symbol.

Where associated equipment is supplied or fitted by others, the seller and purchaser of the equipment are responsible for ensuring that:

The equipment complies with all safety requirements, the associated equipment does not adversely affect the operation or safety of equipment supplied by Avon Barrier Company Ltd.

It is the sole responsibility of the owner/user of the equipment to establish which legislation is applicable to the country in which the equipment is installed, and to ensure subsequent compliance with all national and local regulations.

It is also important that the owner/user of the equipment has assessed all equipment and operational hazards, which might arise from the presence of electrical power, powered machinery and exposed moving parts, both pre and post-installation. It is recommended that this assessment be reviewed before the equipment is set to work.



PERSONNEL SAFETY

The vendor should train one or more authorised persons, nominated by the employer to be responsible for controlling the access system or advising vehicle users of the correct entry and exit procedures. Training should include instruction on the Safe Practices and known hazards including normal and emergency use. Operators and attendants should be directed **NOT** to operate the barrier unless the area is clear and all covers/guards are in place.

All maintenance and servicing must be carried out by suitably qualified and experienced personnel, who are familiar with the risks and dangers inherent to their particular discipline, and the precautions necessary to minimise them.

Safe Maintenance

Only carry out maintenance and servicing:

- **When suitable warning signs are posted and the area is cordoned off to traffic**
- **If no hazard exists (ie crushing hazard, slipping hazard etc)**
- **With the correct tools**
- **With the correct PPE**
- **When the control panel is at zero volts and is secured against restoration of the power supply (Isolator is off (Page 6 Fig 6.1)**

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PRODUCT DESCRIPTION



The Avon Parking Barrier Type EB450 is a robust (heavy use) traffic control barrier designed for general use in parking and access control environments.

Supplied with an aluminium arm (to a maximum length of 4 metres) available in both right and left handed versions. (Right hand is provided as standard unless specified otherwise).

With its safety extra low voltage (SELV) control interface, requiring clean switch or relay contacts, the barrier can be easily controlled from virtually any access control equipment.

The Avon EB450 Parking Electro Mechanical Barrier stands 1135mm above foundation level with the boom 840mm above foundation level. The boom is constructed from rectangular section alloy 76mm x 38mm supplied white polyester powder coated with red fascal striping.

The heavy duty motor plate supports the 100% duty cycle permanent capacitor 4 pole TEFC motor, which powers the sinusoidal drive mechanism via an industrial grade low ratio gearbox.

Two heavy duty bearings are secured to the motor plate; this having 2 adjustable cams to activate the limit switches to control the boom travel.

The barrier "parking logic" control panel is mounted within the barrier cabinet behind a removable/lockable door panel and provides the necessary power supply isolator, fuses and thermal overload trips. Control voltage is SELV.24V.

The hinged/removable and lockable steel top cover provides easy access to the Drive Mechanism. The all steel constructed cabinet and cover are shot blasted to give a clean grease free surface providing maximum keying effect for the two pack high zinc primer, followed by a yellow textured polyester powder coated top coat.

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MODE OF OPERATION

The EB450 comes complete with a standard logic control unit which provides all the necessary power and controls to perform the majority of parking and access control functions. Such as:

- Raise
- Lower
- Internal Raise or Lower Toggle Switch

Internal raise and lower control is provided with a spring loaded toggle switch (No.1 in *Fig 7.0 on the next page*) to assist in installation and service/maintenance work.

In the event of a power failure, a manual winding facility provides a means of raising or lowering the barrier arm. Details of which can be found on [page 13](#).



Please note that power should be isolated prior to using the hand wind facility.
(Fig 6.1)



Remove 2 x screws to access Parking logic PCB



Fig 6.0

Manual wind Handle

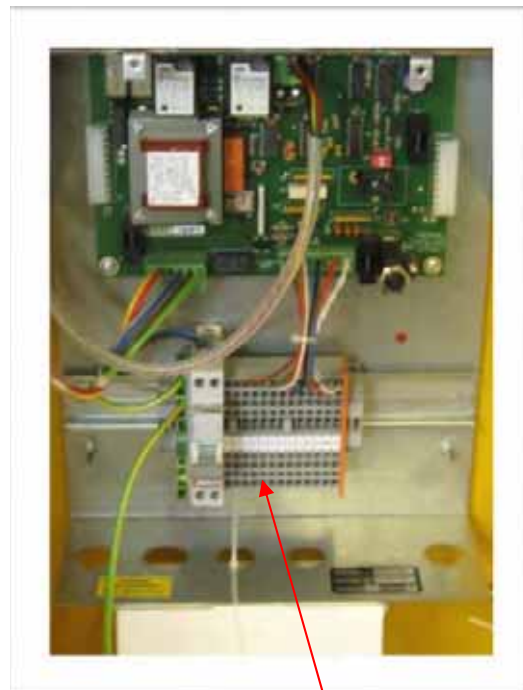


Fig 6.1

Power Isolator switch

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PARKING LOGIC

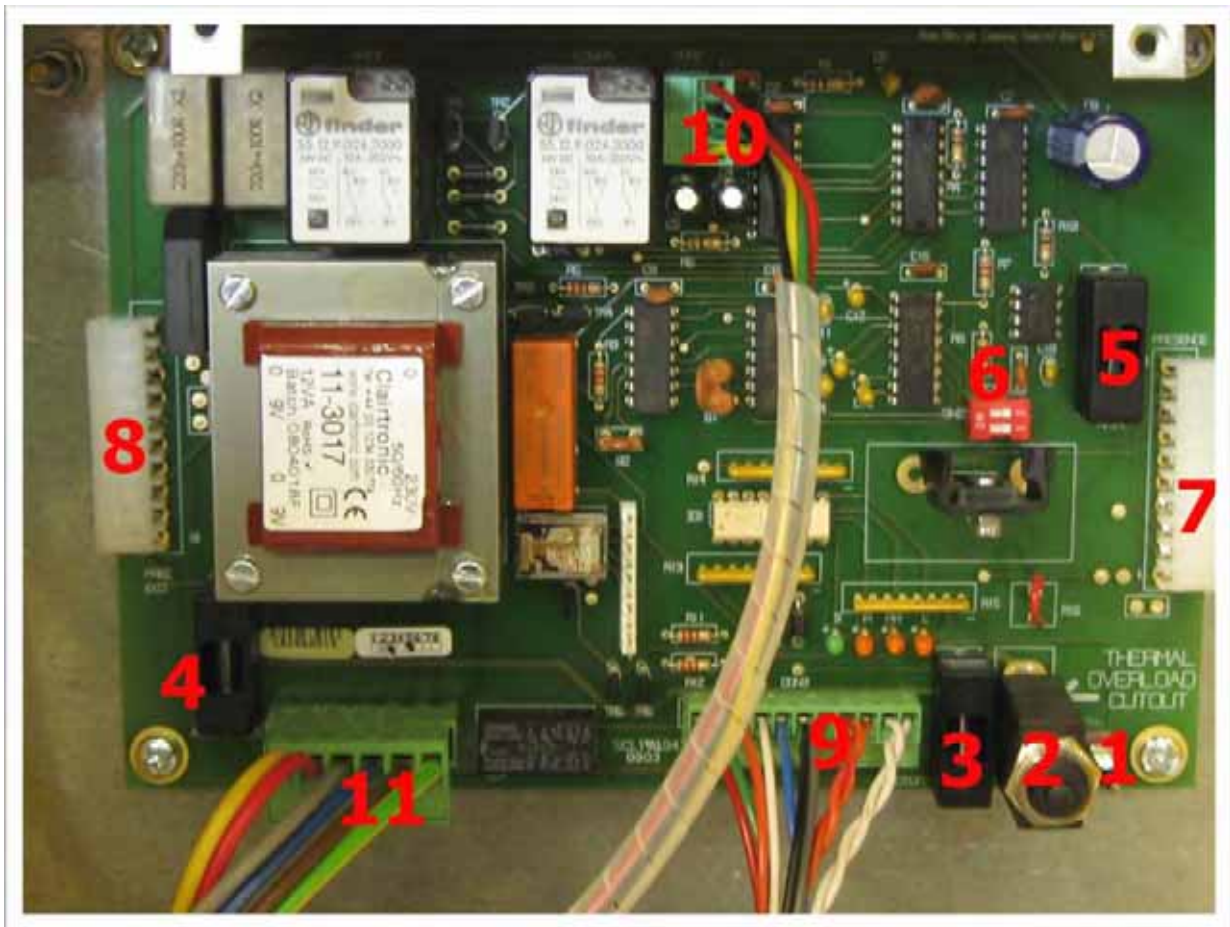


Fig 7.0

1. Raise/lower toggle
2. PCB thermal reset
3. Motor fuse 5A
4. Accessory fuse 1A
5. Main fuse 2A
6. SW2 dipswitches (when switched to the “on” position, covers the safety loop to safety close – enabling the barrier to lower automatically once a vehicle has exited)
7. Presence loop detector plug
8. Free exit loop detector plug
9. Plug to Terminal connection
10. Limits plug
11. Main power & motor connector

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TECHNICAL DETAILS

Electrical requirements: Single phase, 230V AC, 50 Hz, 6 Amp is required at the barrier position. This is supplied via conduit through the base of the barrier and is wired to an isolating switch ([Fig 6.1](#)) inside the barrier cabinet. The drive unit is protected by a thermal cut-out (No. 2 in [Fig 7.0](#)) mounted on the electrical panel. Limit switches are triggered by cams on the main shaft to control the raising and lowering of the barrier. Earthing is via an M6 earthing stud secured to the cabinet base.

Electrical Supply	Value	Tolerance	Comments
Supply Voltage (V ac)	230	+10%, -15%	Other voltages can be accommodated
Supply Voltage Frequency (Hz)	50		Other frequencies can be accommodated
Current Rating (A)	6A		
Maximum power cable size (mm ²)	4		
Maximum signal cable size (mm ²)	1.5		

Cabinet: The all steel constructed cabinet, door and lid are manufactured from 3mm CR4, and stands 1160mm above the foundation level. This is then shot blasted and primed with a two pack high zinc primer, 40 microns, followed by a textured polyester powder coating in yellow (RAL 1007), 40 microns thick. The lid is retained by a thumbwheel located internally, at the front left of the cabinet, which is accessed via the key lockable door.



Location of thumbscrew inside the cabinet

Fig 8.0

The main unit (without boom attached) weighs between 100 - 104KG, depending on type of side arm fitted.

Cabinet with Side Arm – 100 KG

Cabinet with Side Arm with "Lump" - 104KG

Barrier (boom) The barrier arm is constructed from aluminium, powder coated white, supplied with alternating traffic grade, reflective red bands. The length of the barrier arm can be a maximum of 4m.

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INSTALLATION



When preparing a site for installation please be aware of the following problems:



- Car parking Spaces – adjacent to barrier or opening loop.
- Overhead obstructions – which may foul the barrier arm.
- Obstructions to the rear of Barrier cabinet and to the main side access door- may prevent access to barrier mechanism/difficulty with on –going maintenance.
- Obstruction to the side arm route parameters on raising and lowering.
- Identify all underground services before excavation – could cause problem when installing ducting and barrier base.
- **Drainage covers close to loop installation – may cause interference with inductive loop.**
- Ensure site is organised – make sure that pedestrians and vehicles can both move around safely without risk.

The barrier foundation should consist of Grade CP25 and have minimum dimensions of 500mm x 500mm x 500mm. The cabinet should be secured via 4 x M12 x 160mm chemical anchors. Installation process should take the following trend:

1. Foundation completion and set firm
2. Cabinet securing
3. Loops installation (if applicable)
4. Accessory installation (if applicable)
5. Wiring termination
6. Boom assembly
7. Test, adjust and commission
8. Handover to customer

Installation of Boom Arm

The boom arm is simply held in place by the use of 2 off M8 hex steel bolts, which secures the galvanised steel clamping plate which is placed over the outer face of the boom. The two steel bolts are then inserted through the clamp plate boom and steel side arm and then secured into place with the nuts provided.



Fig: 9.0



Fig 9.1



Fig 9.2

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Inductive Loop Systems

Inductive loops work by detecting the small change in frequency that occurs when the inductive field, surrounding the loop, is altered by a metal object passing through it.

This change is presented as a relay output from the Loop Detector Module.

The Inductive loop can be used for several purposes:-

- Safety/Closing/Opening device for Barrier systems
- Safety only device for Barrier systems
- Validation Loop for Access control systems
- VMS Counting system

Typical measurements for a loop can be found on [Page 19](#).



Fig 10.0

Cutting and Laying Inductive Loops

Two types of loop installation may be used. For existing roadways, saw cut loops are most cost effective. Preformed loops encased in PVC conduit or trunking must be used in installations under block paving.

The size and shape of the loop determines the detection zone characteristics.

Loop size may vary and will depend upon lane width, traffic patterns and types of vehicles to be detected.



The loop installation area must be free from reinforcing steel, electrical cables, steel conduit or water pipes.



Loop wires should be installed at a minimum of 50mm above any of these items.



Drilling – before commencing any drilling work, ensure that the following are observed



- The drill bit has no obvious defects
- The drill bit is secure in the chuck
- The drill is appropriate for the job in hand
- The correct Protective clothing is being worn for the job
- That at least 2 personnel, including the operative are present

Disc cutting – before commencing any disc cutting work, ensure that the following are observed:

- The disc being used has no obvious defects
- The disc is securely attached to cutting tool
- The disc cutter is appropriate for the job in hand
- The correct Protective clothing is being worn for the job
- That at least 2 personnel, including the operative are present
- Ensure site is organised – make sure that pedestrians and vehicles can
- Both move around safely without risk

Manual handling – before attempting to lift a vehicle barrier please make sure that 2 personnel carry out the lift following manual handling procedures

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SAW CUT INSTALLATIONS



Protective Clothing before commencing any type of work onsite make sure that you and your colleagues are wearing the correct PPE (Personal protective clothing). All personal should be supplied with the minimum level of protective equipment i.e. Hard Hat, Safety Boot/shoes and reflective jacket/waistcoat. Protective glasses are to be worn if any power tools are being used and the appropriate gloves in accordance with COSHH regulations when handling any hazardous liquids. Please note that PPE should only be used as a last resort if there is no other way of removing the risk of injury.



Caution should be taken when using hot fill sealant, as the high temperatures could damage the insulation.

- The wire used for the loops should have an insulation rated for direct burial as moisture can cause significant loop frequency drift, 1.5mm class 854 type 4A rubber sheathed cable is recommended.
- When the cable is laid, the installer should ensure that no insulation is protruding above road level.
- The loop should, wherever possible, be installed in one continuous run, any connections made must be soldered and protected with a moisture proof seal.
- The slots must be 40-50mm deep and clean, with no sharp corners which could damage the cable insulation.
- The tails of the loop should be twisted together from the point of leaving the loop to the termination's in the barrier.
- The tail should have no fewer than 20 turns per metre.
- The connections to the barrier terminal rail should be securely tightened.
- It is advisable to perform an earth leakage and loop resistance test prior to commissioning the loop using a calibrated Megger.



Fig 11.0 Typical Exit Loop



Fig 11.1
Typical Safety or Safety Closing Loop

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Recommended Loop requirements

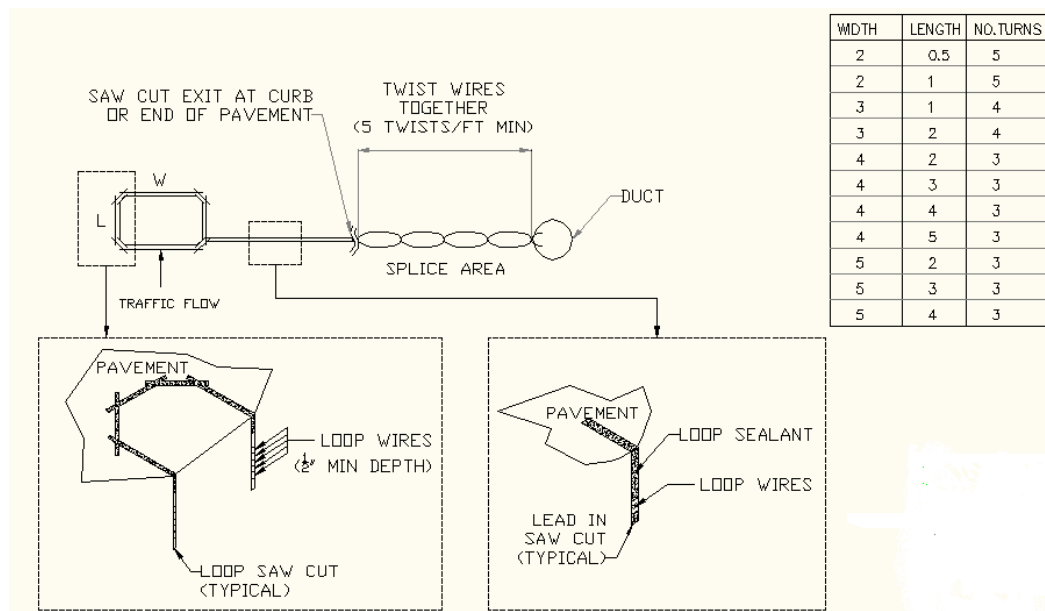
Based on recommendations from the manufactures of the inductive loop detectors an insulation test with a value of less than 100M ohms at 500V and a resistance test higher than 5 ohms will be classed as a failure and a recommendation should be made to the customer to replace the inductive loop immediately.

The inductive loop testing procedure should be carried out as follows:
Insulation test should be carried out using a suitable insulation tester:

1. Carry out self tests on Insulation Tester
2. Remove Inductive loop tails from Termination rail
3. Connect red crocodile clip to both loop tails
4. Connect black crocodile clip to a suitable earthing point
5. Select 500V setting on insulation tester and press appropriate button to conduct test
6. Note result and re-install loop tails (>100 Mega Ohms)

Resistance test should be carried out using a suitable resistance tester:

1. Remove inductive loop tails from termination rail
2. Connect one tail to the red lead on the tester
3. Connect the other tail to the black lead on the tester
4. Select ohms on resistance meter
5. Note result and re-install loop tails (<5 Ohms)



Preformed Loop Installations

Where an Inductive Loop is to be put under Block Paviers, Cobbles or even prior to laying a concrete roadway, Pre-Formed loops are recommended.

These loops are prefabricated in the factory and shipped to site ready to be laid in the substrate of the roadway.

The same cable type is used as for the saw-cut installation, but this time it is housed in PVC Trunking, which provides mechanical protection.

The loops are placed in position and covered with either sand (Block Paviers & Cobbles) or Concrete. Care should be taken not to crush or damage the trunking when installing the roadway.



**ENSURE MANUAL TOOL IS REMOVED
THEN REPLACE PLASTIC CAP,
BEFORE POWER IS RESTORED**



MANUAL OPERATION

In the event of a power failure or other fault which stops electrical operation of the barrier, manual raising or lowering may be carried out as follows:

- 1 Isolate the mains at the isolator mounted in the control unit. ([Page 6](#), [Fig 6.1](#)).
- 2 To gain access to the drive mechanism, release the M8 hand wheel from under the top motor plate (front) and hinge the lid back. ([Page 8](#), [Fig 8.0](#)).
- 3 Take the manual winding handle ([Page 6](#), [Fig 6.0](#)) from its mounting clip and insert onto the shaft extension on the top face of the gearbox.
- 4 By turning in either direction, this will raise or lower the barrier. ([Fig: 13.2](#)).



Fig: 13.0



Fig: 13.1



Fig: 13.2

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EB450 OPTIONAL EXTRAS

The barrier can be customised to interface with a wide range of access control equipment to suit customer needs and personal choice. The list is not definitive and includes:

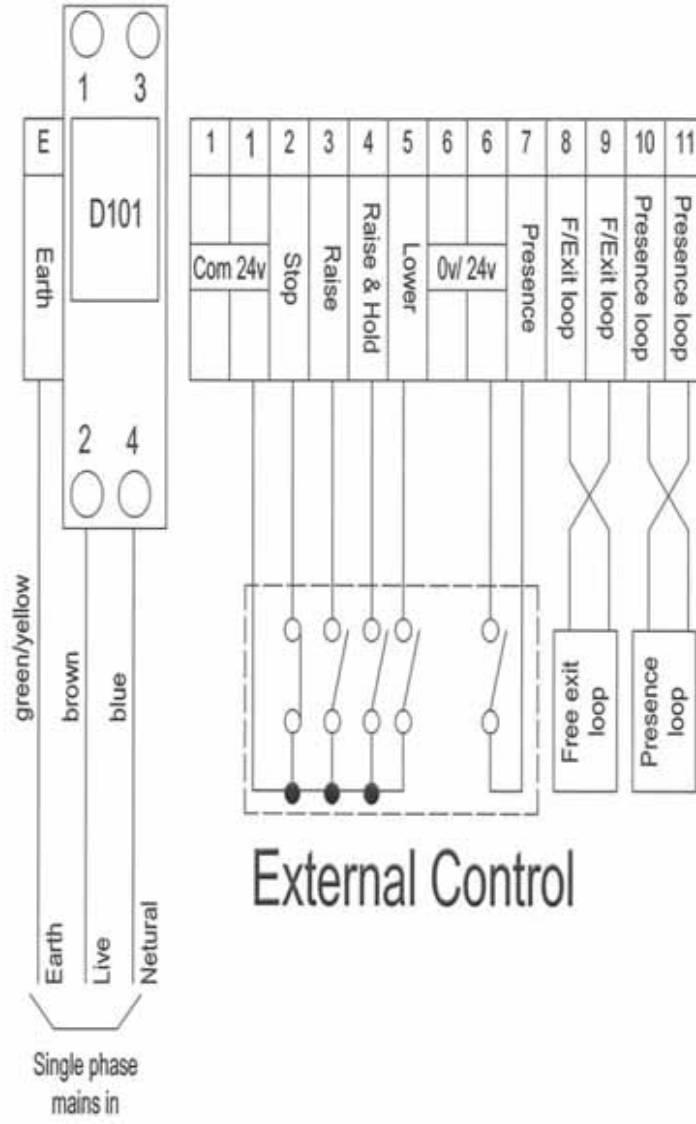
- ❖ Inductive loop systems (Free exit and Auto closing)
- ❖ Card readers
- ❖ Key pads
- ❖ Communication equipment (intercoms),
- ❖ Traffic light management can also be provided with signalling via the back indication output
- ❖ Stop signs/No entry (single and double sided)
- ❖ Under slung skirts (up to 2m)
- ❖ Radio transmitter/receiver
- ❖ Pogo stick
- ❖ Additional push button controls
- ❖ High visibility dual aspect red warning lights
- ❖ Sounders
- ❖ Boom lights
- ❖ Key switches (Raise & Hold/Auto)
- ❖ Ticket Issue Machine
- ❖ Coin Vend Machine
- ❖ Token Acceptor
- ❖ Digital Code Lock
- ❖ Inductive Vehicle Loop
- ❖ Infra-red Beams



Example Illustrations Only

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GENERIC PARKING LOGIC DRAWING



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RECOMMENDED SPARES LIST

Avon Barrier Company Ltd recommend the following list of spares for the EB450. Although the list is not exhaustive, these parts listed are a minimum recommendation.

1. Spring Eye Bolt
2. Rubber buffer
3. Thumbscrew
4. Oilite bushes x 4
5. Limit switch assembly
6. Conrod connection bolts x 2
7. Conrod
8. Spring buffer
9. Bearing unit x 2
10. Cabinet key switch

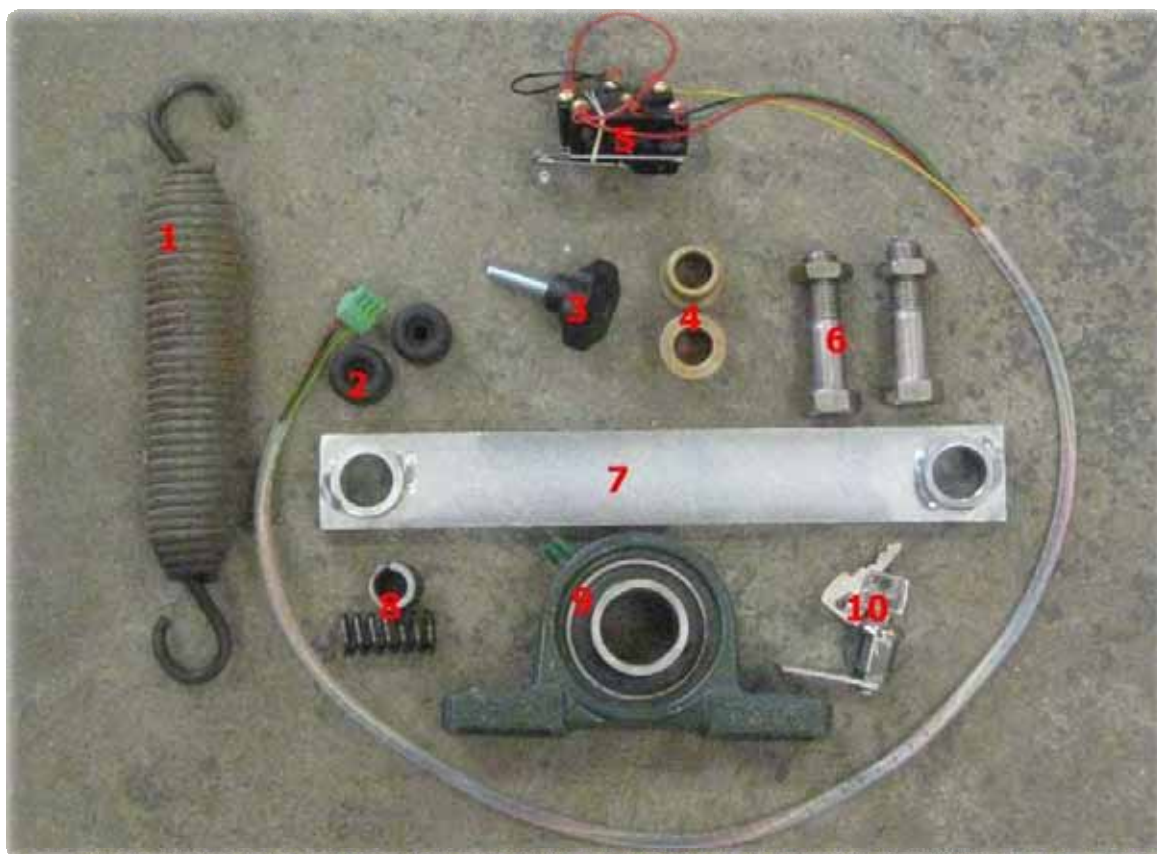


Fig 16.0

EB450 - PARTS LOCATION

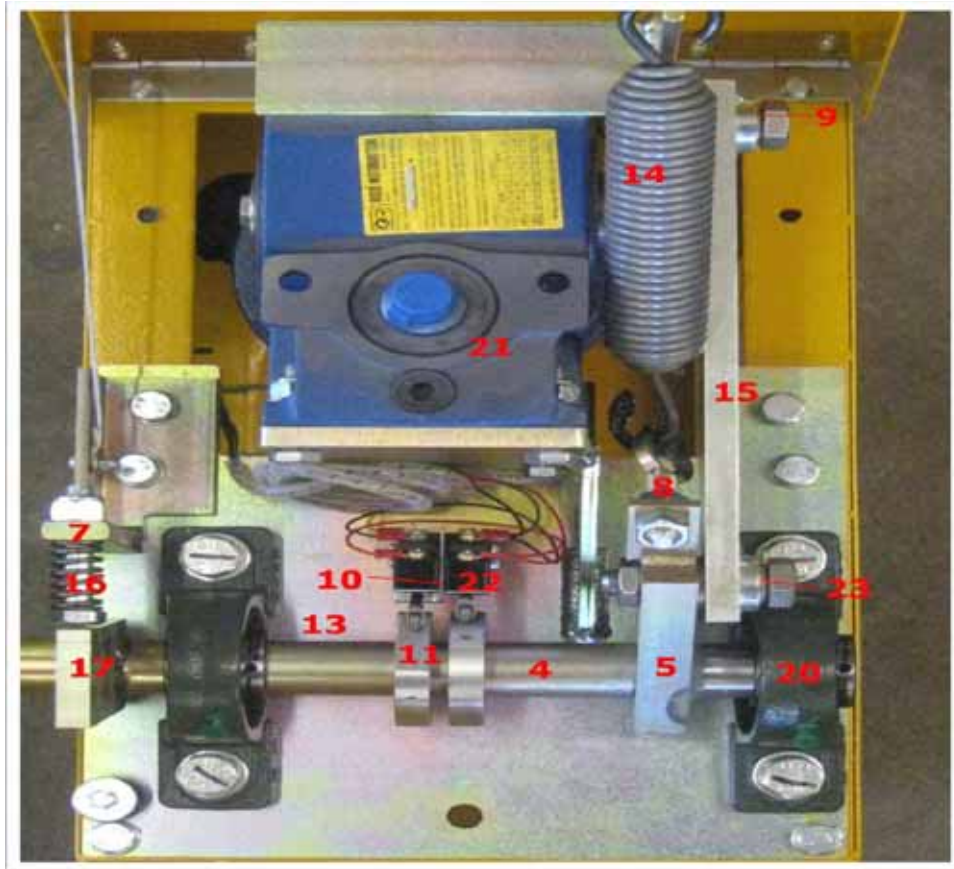


Fig 17.0

EB450 ASSEMBLY

ITEM	DESCRIPTION	DRAWING
4	MAIN SHAFT	EB47S-0-01
5	MAIN SHAFT LINK ARM	EB47S-0-02
6	GEARBOX LINK ARM	EB47S-0-03
7	MAIN SHAFT STOP ARM	EB47S-0-04
8	SPRING ANCHOR BOLT	EB47S-0-05
9	GEARBOX SHAFT	EB47S-0-06
10	LIMIT SWITCH PLATE	EB47S-0-07
11	LIMIT SWITCH CAM	EB47S-0-23
12	GEARBOX SHAFT SPACER	EB47S-1-27
13	MOTOR BASE PLATE	EB450-1-01
14	SPRING ANCHOR	EB450-1-02
15	BELT DRIVE LINK ARM	EB450-1-03
16	SPRING BUFFER BRKT.	EB47S-1-12
17	SIDE ARM	01-1-012
18	STAY WIRE BRACKET	EB47S-1-08
19	MAIN SHAFT SUB ASSY.	EB47S-8-08

ITEM	DESCRIPTION	DRAWING
1	CABINET	EB47S-1-16
2	LID	EB47S-1-14
3	DOOR	EB47S-1-15

ITEM	DESCRIPTION
20	PILLOW BLOCK
21	GEARBOX
22	LIMIT SWITCH
23	OILITE BUSH
	SPRING BUFFER

NOTES:
WELD PRACTICES TO BE IN ACCORDANCE WITH QMS 7.1.2/7.1.3

EB450 ASSEMBLY

ITEM DESCRIPTION: EB450_100

NTS 1 1 A

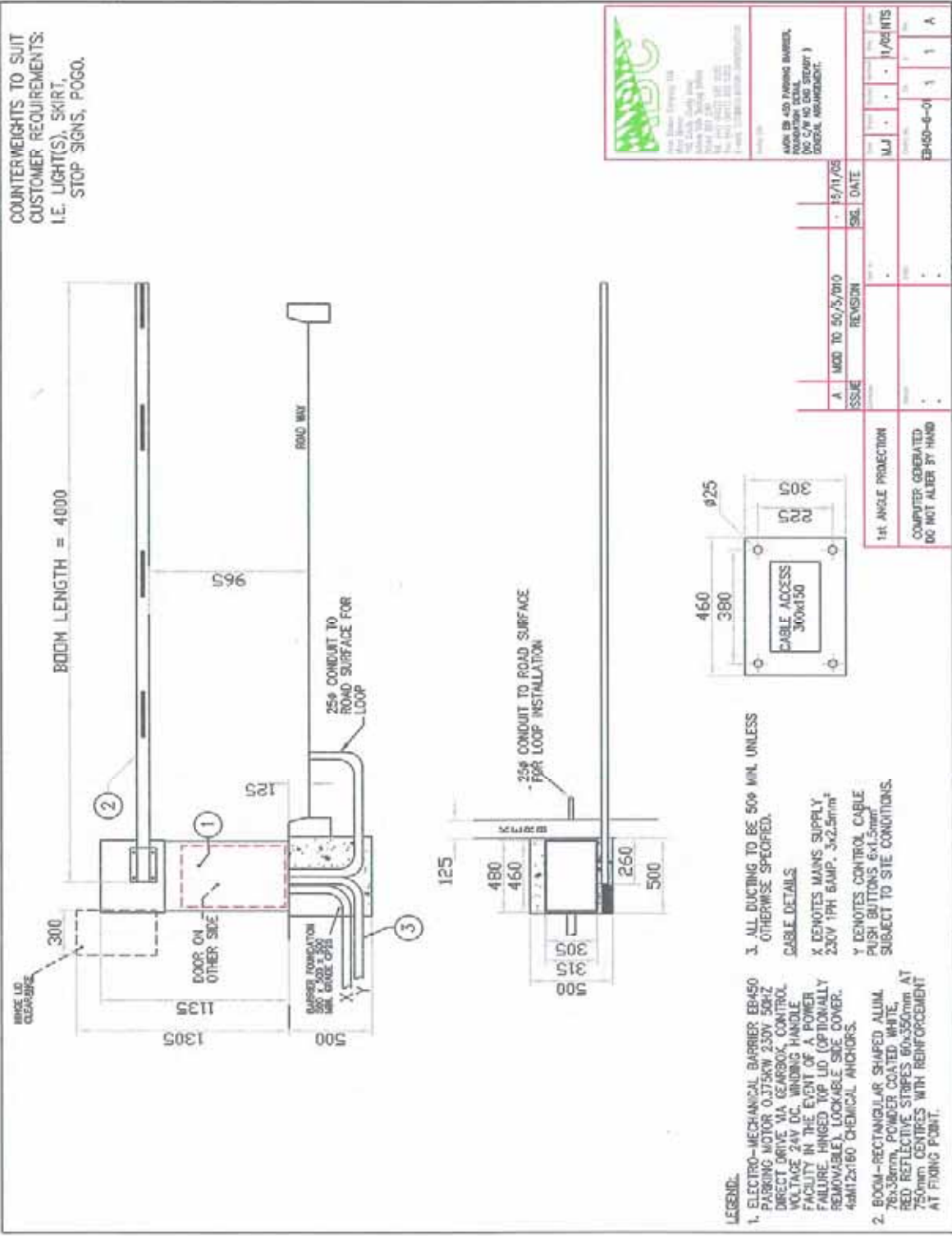
SHAFT SUB ASSY RIGHT HAND

SHAFT SUB ASSY LEFT HAND

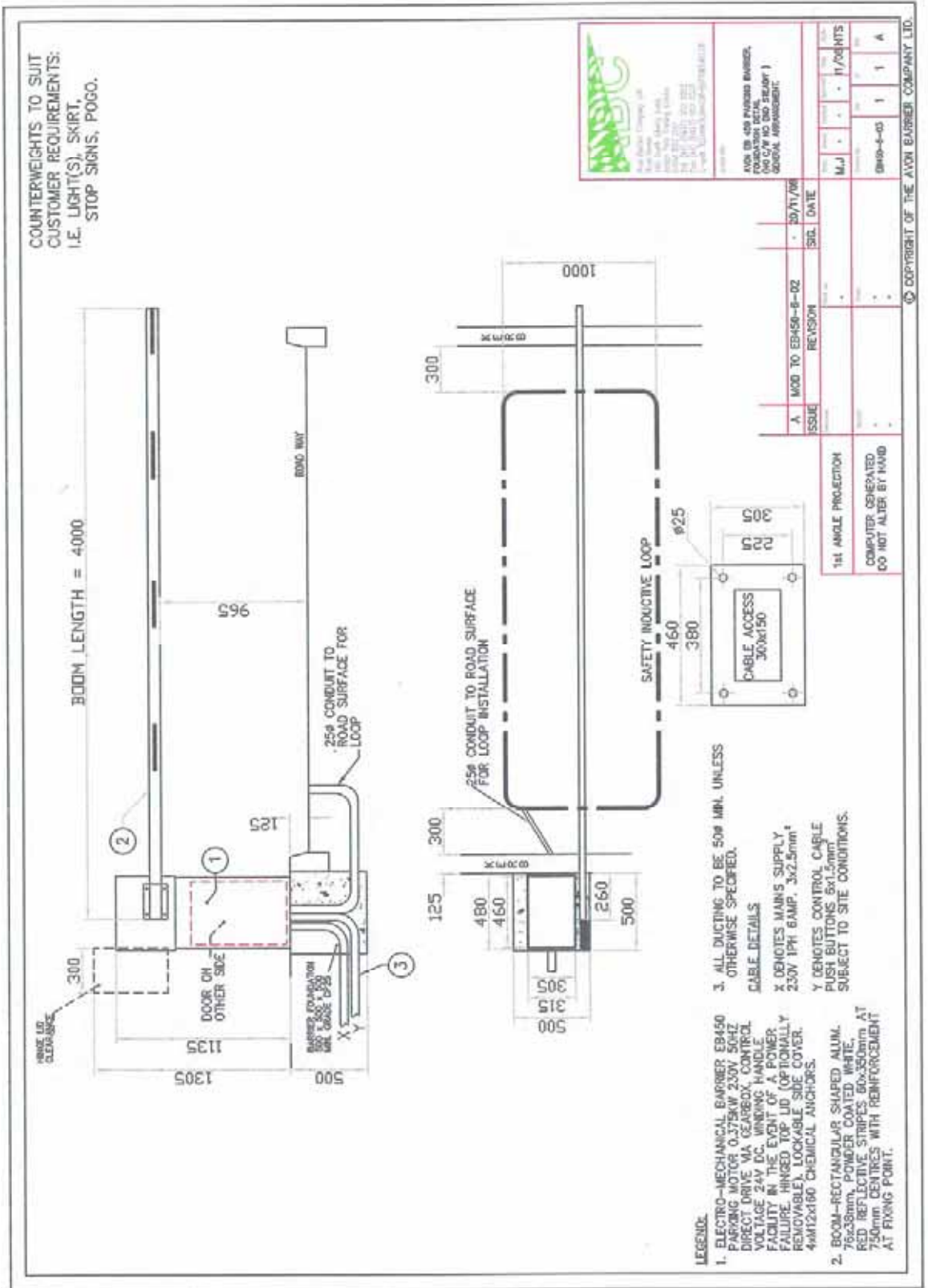
ITEM DESCRIPTION: EB450_100

NTS 1 1 A

EB450 FOUNDATION DRAWING



EB450 FOUNDATION DRAWING WITH LOOP



SERVICE AND MAINTENANCE



The service schedule for the Avon EB450 Barrier should be carried out at 60,000 cycles or half-yearly intervals, dependent upon usage.

On Page 21, there is an example of a typical servicing schedule.

Always remember Safety First when servicing or working in or around the barrier and be aware of moving vehicles and pedestrians even though the area may be cordoned off.



Ensure control panel is at zero volts and is secured against restoration of the power supply (Isolator is off).

Ensure suitable warning signs are posted and the area is cordoned off to traffic and pedestrians.

SERVICING SCHEDULE

Service schedule	Checked		Comments
	√	x	
	√	x	
During servicing visits, check to ensure all fixings are secured.			
The 2 x flanged bearings carrying the main shaft are pre-greased prior to assembly and should not require re-greasing.			
Grease should be applied to the drag link assembly, if fitted and the straining wire post on top of the side arm.			
A visual inspection should be made of the straining wire rope and boom light cable, to check that no fraying or damage is occurring.			
Boom light LEDs/Bulbs (if applicable) May need replacing from time to time.			
Disconnect induction loops (if applicable) and carry out insulation/continuity tests and record results.			
Check all terminals for loose connections on din rail and main PCB.			
Check condition of torsion spring			
Check cables to accessories (if applicable).			
Check counter weight bolts are secure (If applicable)			
Check floor-securing bolts.			
Test all access control/ manual switches and push buttons.			
Check all safety equipment (circuits, loops).			
Lubricate door lock with a quality switch cleaner.			
Check balance of boom			
Check drive belt condition			
Check fly wheel is secure on gearbox motor			
Check gearbox condition i.e. for oil leaks			
Check limit switches ie correctly set up			
Check all motor plate fixings including gearbox bolts and bearing bolts			
Replace brass bushes on conrod arm			
Check gearbox shaft for any signs of play			
Ensure limit switch cams are secured on the main shaft			

EB450 Serial number:	
Number of cycles:	
Date:	

FAULT FINDING



Ensure control panel is at zero volts and is secured against restoration of the power supply

(Isolator is off).

Ensure suitable warning signs are erected and the area is cordoned off.

In some cases, you may have to keep Mains power on to locate fault.

SYMPTOM & POSSIBLE CAUSES	ACTION
<p>Barrier not operating raised or lower</p> <p>Main power tripped Thermal protection on PCB activated Fuse blown on Barrier logic (PCB)</p>	<p>Reinstate power supply Reset thermal protection switch Replace fuse</p>
<p>Barrier permanently raised</p> <p>Faulty inductive loop/photo cell</p> <p>Permanent raised input from access control equipment Lower limit switch activated</p>	<p>Replace faulty loop or check loop detector or re-align photocell, check power to power cell Clear raised input from push button or card reader etc Adjust limit switch</p>
<p>Barrier judders when lowering</p> <p>Counter balancing incorrect</p>	<p>Remove or replace counter weights. A correctly balanced boom will sit unassisted at 45 degrees with the spring connected but:</p> <p style="text-align: center;"> CONROD MUST BE DISCONNECTED </p>
<p>Barrier permanently lowered</p> <p>Permanent lowered input from access control equipment Drive belt failure Raise limit switch activated</p>	<p>Check push button control (if applicable)</p> <p>Replace drive belt Adjust limit switch</p>
<p>Barrier cycling</p> <p>Faulty limit switch settings Possible impact damage off set bearings</p>	<p>Adjust limit switch settings Realign bearings</p>

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WARRANTY AND LIMITATION OF LIABILITY

Avon Barrier Company Ltd. warrants that during the first 12 months following delivery, the products will be free from defect in material and workmanship.

Avon Barrier Company Ltd's sole obligation under the terms of this warranty shall be to repair (or at Avon Barrier Company Ltd's option, to replace) any defective product/part, without extra charge to the Buyer, provided that,

- (a) Buyer gives Avon Barrier Co. written notice of any such claimed defect within such period of 12 months,
- (b) The product(s), if installed, were installed by an Avon Barrier Company Ltd authorised installer,
- (c) The products have not been altered, subjected to misuse, improper maintenance, negligence or accident, or used with parts not authorised by Avon Barrier Company Ltd.

NO OTHER WARRANTY IS EXPRESSED AND NONE SHALL BE IMPLIED, INCLUDING WITHOUT THE WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR USE.

THE FOREGOING STATES THE ENTIRE LIABILITY OF AVON BARRIER CO. LTD. WITH RESPECT TO THE PRODUCTS.

IN NO EVENT SHALL AVON BARRIER CO. LTD. BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH RESULT FROM USE BY BUYER OR ANY OTHER PARTY, OF THE PRODUCTS, AND IN NO EVENT SHALL AVON BARRIER BLOCKER CO. LTD'S LIABILITY EXCEED THE AMOUNTS PAID BY THE BUYER FOR THE PRODUCTS THEREUNDER.

DISCLAIMER

Careful consideration must be given to the selection, placement and design of a Barrier installation, and care must be taken to ensure that approaching vehicles as well as pedestrians are fully aware of the Barrier system and its operation. Proper illumination, clearly worded signage and auxiliary safety devices, should be considered.

Avon Barrier Company Ltd. has information available on many such pieces of safety equipment not specifically listed here.

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Avon Barrier Company Ltd

DECLARATION OF CONFORMITY

E C MACHINERY DIRECTIVE 2006/42/EC

E C LOW VOLTAGE DIRECTIVE EN60204-1:1998

E C ELECTROMAGNETIC COMPATIBILITY

DIRECTIVE EN 50081-1 & EN 50082-2

We hereby certify that the EB 450 Parking Barrier complies with the relevant provisions of the E C Directives detailed above.

Manufactured by:

**Avon Barrier Company Ltd
Nova House
195 South Liberty Lane
Ashton Vale Trading Estate
Bristol
BS21 2TN**

Date: 1st December 2009

Name: P A Jeffrey

Position: Managing Director, Avon Barrier Company Ltd

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