



Installation Manual

Heras Crash Tested Barrier 94x Series

Please read this original installation manual before using this barrier for the first time. Act in accordance with the manual and keep it in a safe place for later use or for the following owner.



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FOREWORD

This manual provides information on the installation of the barrier unit. A separate manual is provide for operation and maintenance. Although every effort has been made to ensure that the information contained in this manual is correct at the time of issue, no responsibility is accepted for any loss or damage arising from incorrect information.

This manual forms no part whatsoever of any contract or agreement between Heras and others. In no circumstances will Heras be responsible or liable for any costs, damage or injury whatsoever arising from the use of this Manual.

Should the barrier be tampered with and/or any non-approved equipment is fitted to the barrier then any warranty will be considered void.

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1 SAFETY

1.1 EXPLANATION OF WARNINGS

Warnings are used to highlight information safety critical information and to ensure the safe installation of this equipment. Be sure to understand what each warning symbol indicates before attempting installation.



- A situation that poses a severe and imminent danger to personnel



- A situation that poses a severe and imminent danger to personnel from electrical equipment or a power supply



- A situation that poses a danger to personnel from a hazardous substance



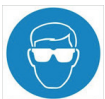
- A general situation that poses a risk to personnel and or damage to equipment



- A situation where additional information is required

1.2 PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) must be used where necessary. Heras recommend the following PPE as minimum safety requirements.



- Safety glasses



- Hard hat



- Safety gloves



- Safety boots



- Ear defenders



- High visibility vest

1.3 GENERAL SAFETY

Only persons trained in accordance with health and safety regulations should perform the installation. The safety precautions that follow are not specific to the equipment under test. Follow all local Health and Safety regulations and Safe Working Practices. When performing the installation be sure to:

- Report any equipment defects that pose a danger to the safety, health and welfare.
- Wear all applicable Personal Protective Equipment (PPE).
- Avoid causing injury to you or other persons.
- Assess that all cranes and lifting equipment are serviceable and calibrated, and have the correct Safe Working Load (SWL) for the task.
- Use only approved tools, recommended consumable materials.
- Isolate all applicable power sources (fuel/electrical/hydraulic/pneumatic), and ensure that applicable WARNING signs are visible where necessary.
- Clear all work areas of unneeded tools, equipment and materials.
- Dispose of all unwanted consumable materials in accordance with local health and safety and environmental regulations.

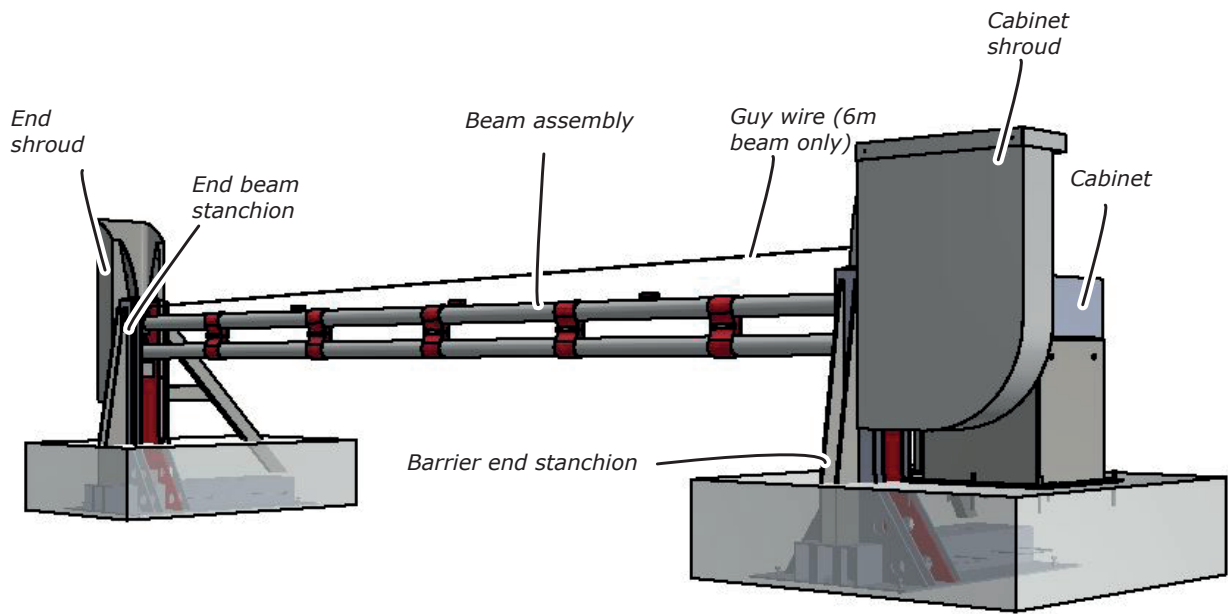
1.4 LIFTING EQUIPMENT

Before making use of any lifting equipment, be sure to:

- Examine the equipment for any signs of damage.
- Make sure the lifting equipment is suitable for the load.
- Make sure the slings are correctly placed and loading diameter is sufficient.
- Mark the weight of the item to be lifted.
- Make sure the SWL of lifting equipment is not exceeded.
- Make sure the shackles can be double locked, e.g. nut and split pin if necessary.

2 EQUIPMENT DETAILS

	Heras 94x Series Crash tested vehicle barriers to PAS68:
DESCRIPTION:	942 V/7500(N2)/48/90:2.4/7.9 (6m opening) 943 V/7500(N2)/64/90:6.9/0.0 (4m opening)* 943 V/7500(N2)/64/90:4.1/0.0 (6m opening) * Tested with 4m beam, all other tests carried out with 6m beam
CONTROLLER:	1 No integrated programmable controller with provision for connection of remote push button and card access control.
ADDITIONAL AVAILABLE EQUIPMENT:	Vehicle loop detectors, traffic lights, push buttons/key switches, high temperature kit
ELECTRICAL SUPPLY:	Single phase 200-240VAC 50/60 Hz Supply rated at 10 amps This is not the consumption of the unit.
UPS:	Back-up system to enable the barrier to operate after loss of power. (Optional)
CABINET DIMENSIONS:	H = 929 W = 600 D = 615mm
OVERALL EQUIPMENT HEIGHT:	1600mm
BEAM TYPE:	Dual 100 x 3 mm circular sections with Composite Cassette system internally installed within the beams.
CENTRAL HEIGHT OF BEAMS:	650 & 850 mm
BEAM LENGTHS:	4, 5, 6 metres clear passage
OPERATING TIME:	7 - 18 seconds (dependent on beam size)
STANDARD COLOUR:	RAL 7016 (Anthracite) - Other RAL/BS colours available on request.
SOUND EMISSION	A Weighted ≤70 dB
DUTY CYCLE	60%
CABINET IP RATING	54
TEMPERATURE RANGE	-10°C to 45°C (Can be extended with door fan assembly kit)



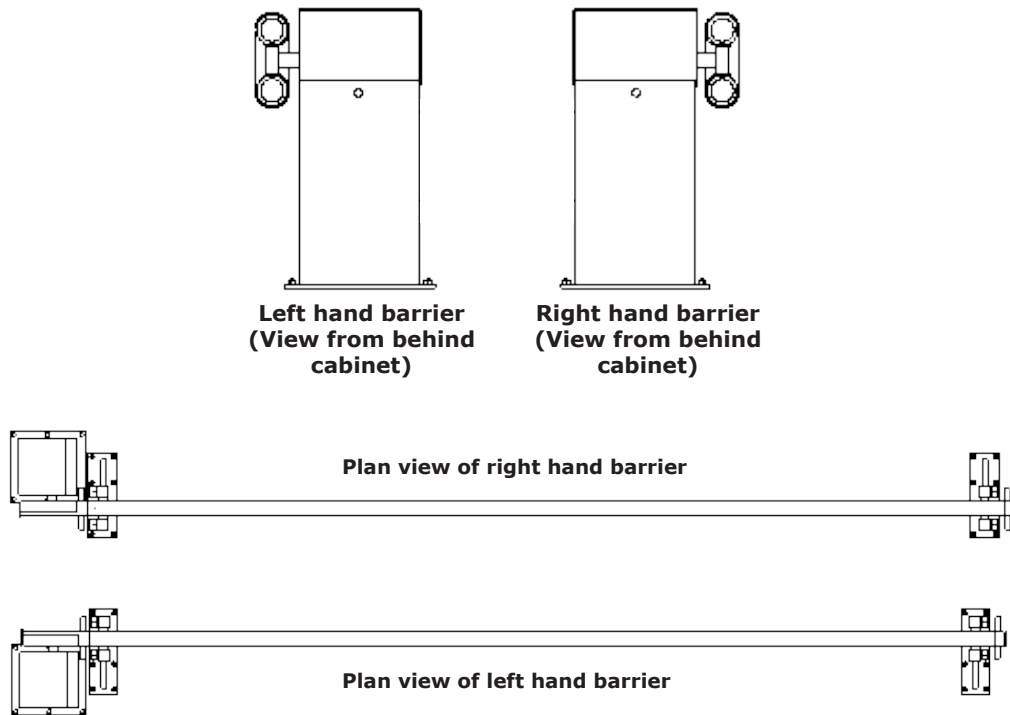
View of left-handed barrier



View of left-handed barrier

2.1 VARIANTS

The Broughton 94x barrier series is available in both left-hand and right-hand side acting yokes. The handing can be determined by looking at the barrier arm from the rear of the barrier cabinet. The side the barrier arm is in relation to the barrier cabinet determines the handing of the barrier. Part numbers are displayed in brackets.



3 INSTALLATION

3.1 SITE ASSESSMENT

Topography should be suitable to create a level road surface. For existing sites where the road surface is not level, correctional works should be carried out.

Ensure that the barrier, concrete bases and road surfaces are all level. Refer to site drawings for foundation sizes.

- i** The foundation depth (measured from the finished road level and distance between the two bases are two critical dimensions.

Ensure the bottom of each hole is level in relation to one another.

3.2 BARRIER IMPACT LOCKING



The barrier arm must be horizontally level. Using a levelling instrument / automatic level, ensure that cast-in stanchions are set to the correct height.



3.3 SPECIAL CONSIDERATIONS

3.3.1. Barrier Arm Height

The barrier must be installed at road level. Failure to do so may affect the impact rating of the system.

3.3.2. Kerbs

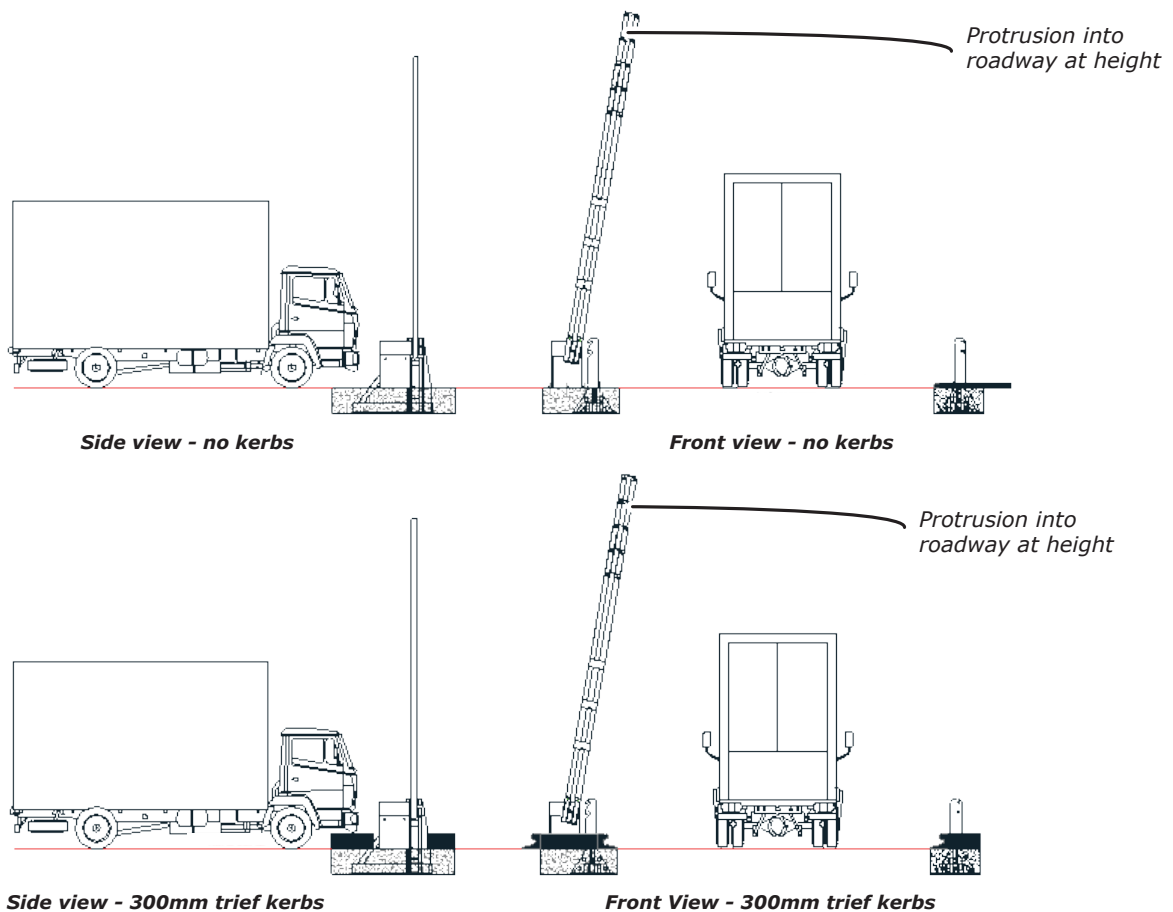
The concrete base below any kerbs must be level. Install the cast-in stanchions to the correct level as per installation drawing.



It may be necessary to create an opening in the kerb line to allow access to the barrier cabinet door.

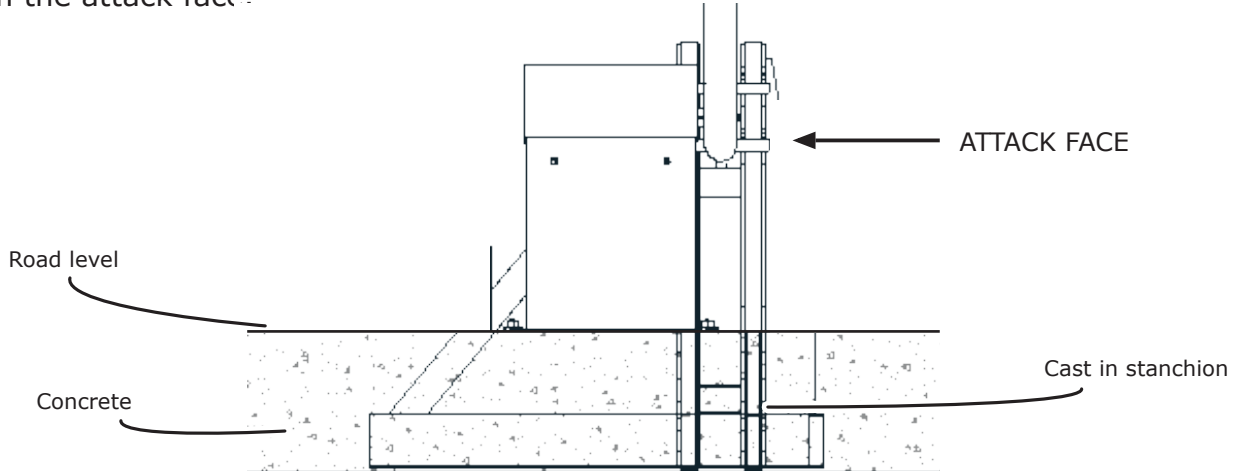
3.3.3. Barrier Arm Protrusion

Due to the weight of the barrier arm assembly, it is not possible to raise the barrier to 90° when fully open. The barrier arm assembly will travel open to a maximum of 85°, resulting in a protrusion at the highest raised point of the barrier. Refer to drawings for exact measurements.



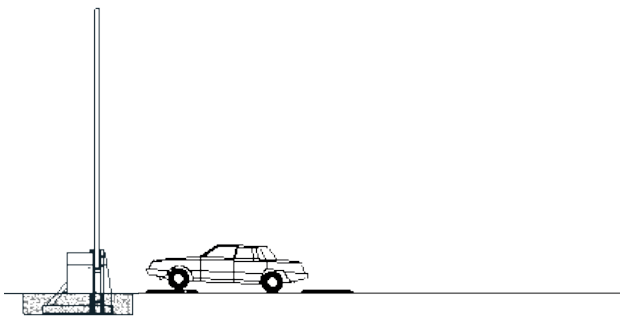
3.3.4. Direction Of Impact

Ensure the barrier orientation and handing are appropriate for direction of impact from the attack face.

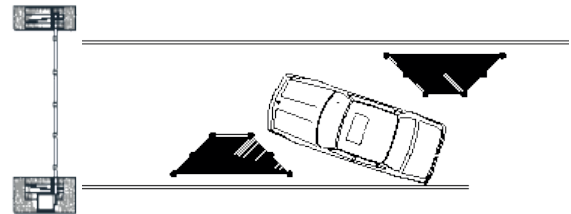


3.3.5. Maximum Impact Speed and Mass

The barrier system is available with different impact classifications. Ensure that the correct system is being installed. In certain circumstances chicanes may be necessary to limit the speed of approaching vehicles.



Example of speed bumps used as a traffic calming measure



Example of chicane used as a traffic calming measure

3.4 CAT SCANNING

It is recommended that a CAT scan is carried out to assess the site to locate potential obstacles. A CAT scan should be carried out prior to the excavation of the pits being carried out. Refer to any site specific drawings before determining final positioning.



Cat scanning

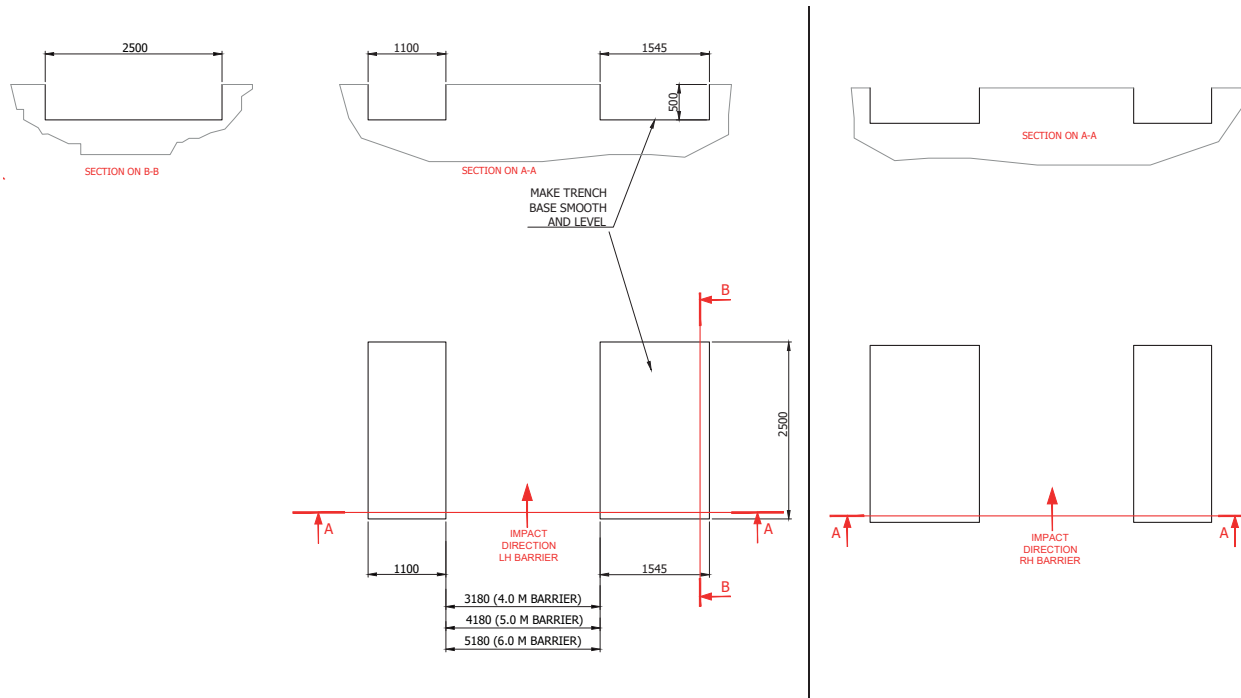


Excavation of pits

3.5 EXCAVATION AND LEVELLING

Determine dimensions required and excavate foundations. Smooth and level base.

The base of the pits should be level and capable of supporting 0.75 ton per metre square. Should this not be achievable because of ground installations, crushed stone aggregate may be laid and compacted at the bottom of the pit. Ensure that the bottom of the pit is at the correct depth.

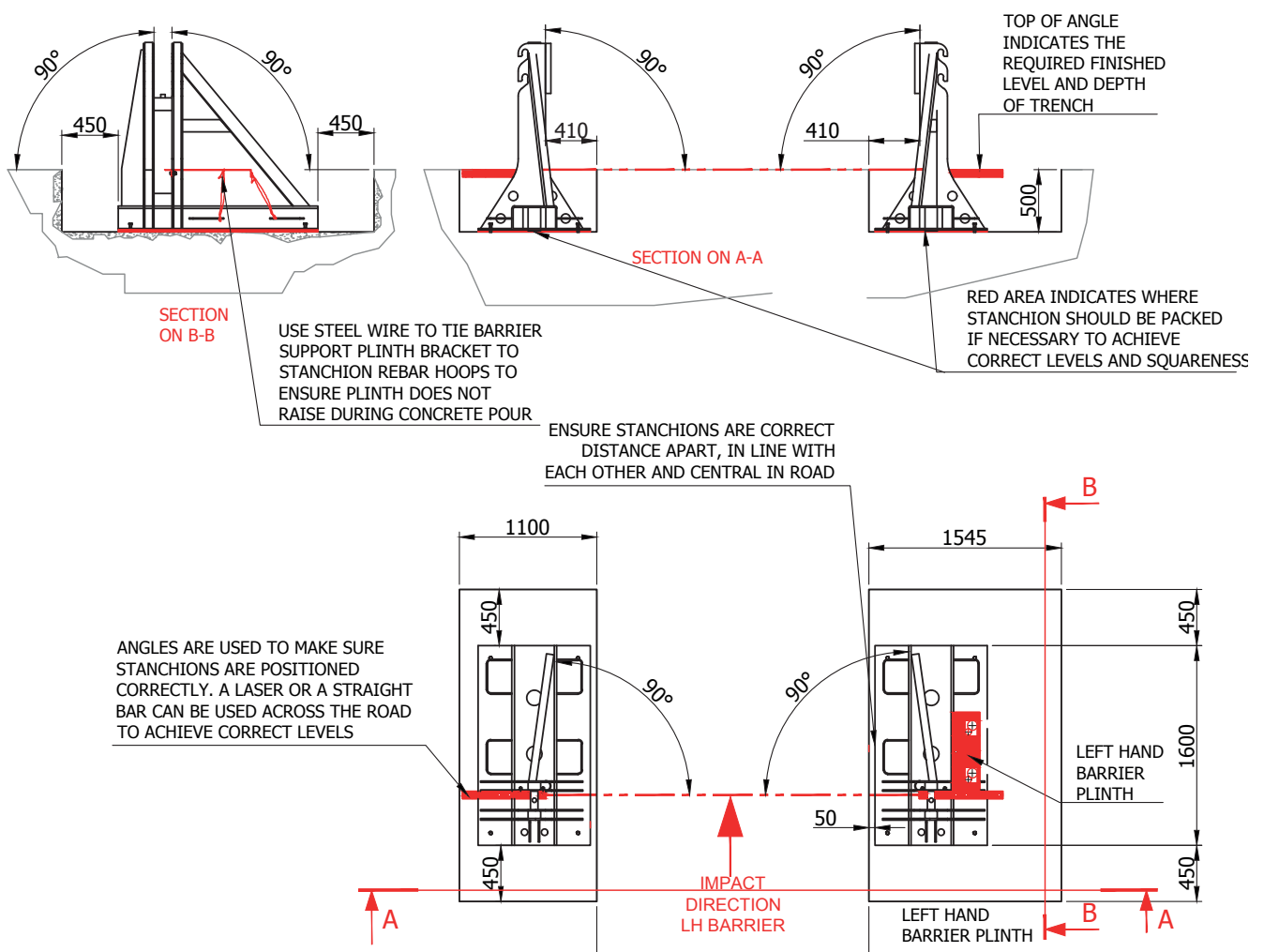


3.6 POSITIONING STANCHIONS

When foundations are complete, use appropriate lifting equipment to move the stanchions into place. Safe lifting procedures should be followed at all times. Lifting capacity should be circa 300 kg.

Ensure that the distance between the stanchions is as shown in site drawings.

The barrier will not operate as intended should the stanchions be installed incorrectly.



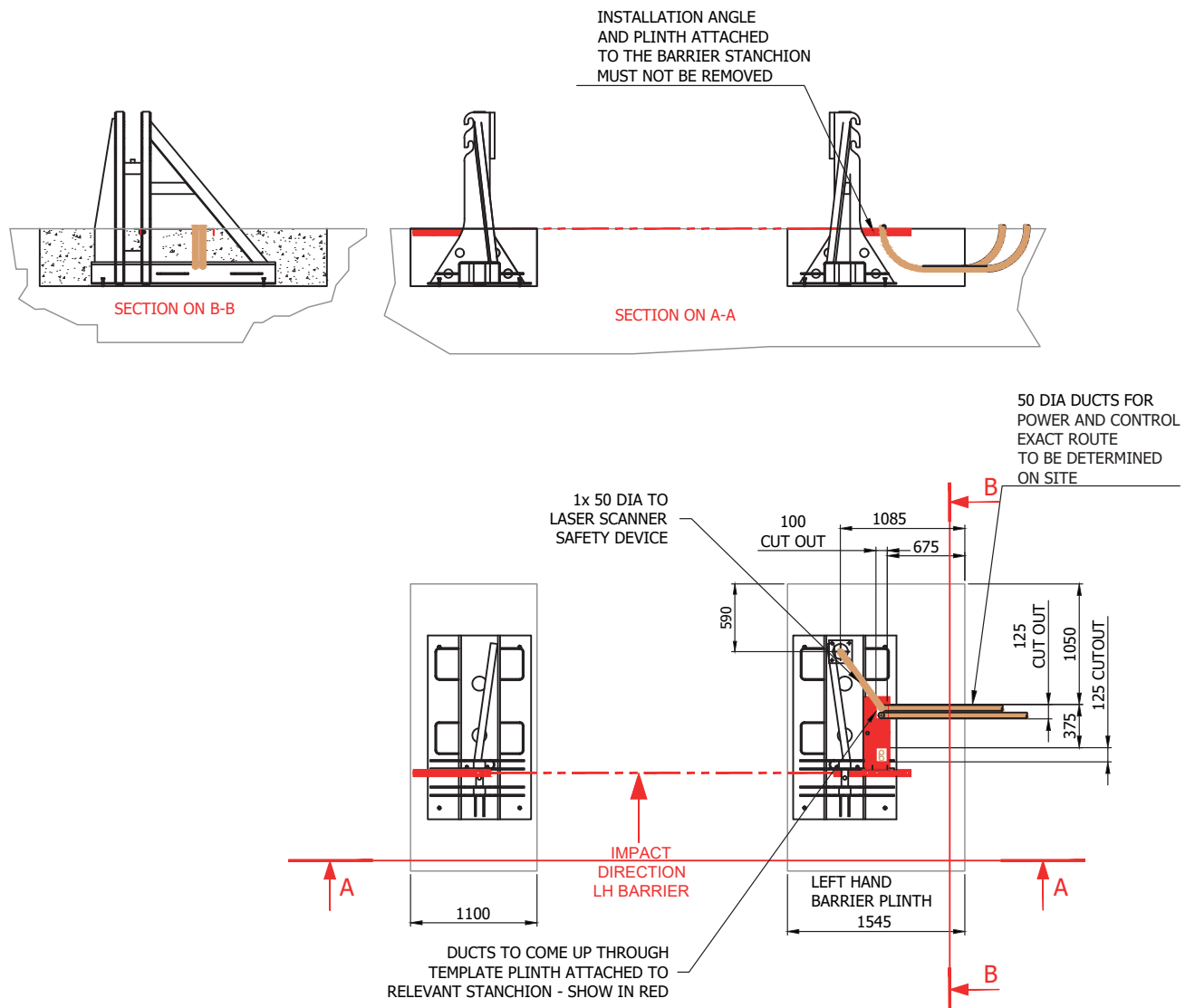
Part	Part number
Installation plinth	941/1708
Positioning angles	941/1709

3.7 DUCTS

Lay ducts in accordance with issued site drawings. Position the ducts so that they rise under the barrier installation plinth as shown. Seal the ends of the ducts to prevent any concrete entering them during the pour over the cast-in frames.

Install draw wires through all relevant ducts before the barrier cabinet is installed. On long duct runs, install secure manholes to ensure cables can be appropriately installed as well as to streamline future maintenance efforts.

The power duct and control duct are both 50 mm with 600 mm min. bend radius.

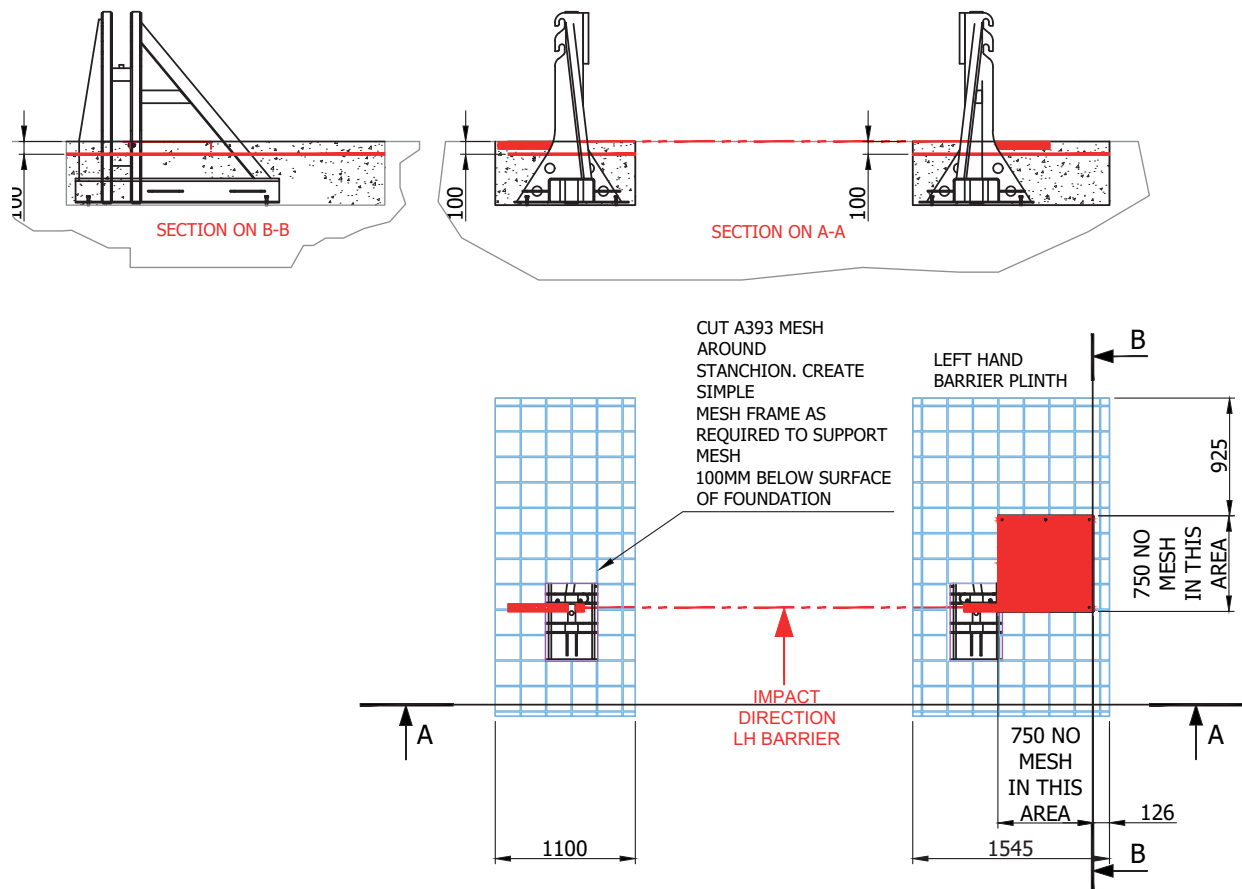


3.8 MESH

Following duct installation, A393 mesh should be installed 100mm from the top of the foundation. Mesh should be tied and secured using suitable wire to prevent dislodging during the concrete pour. A suitable support frame or packing should be used to support the mesh frame at the foundation level.

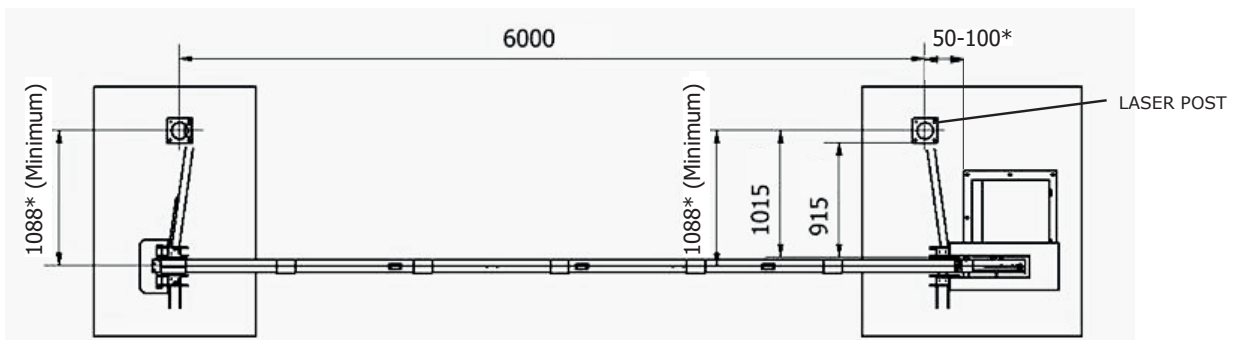


Ensure that the cut of the mesh accounts for the ducts and fixing positions. Consult site drawings for reference.



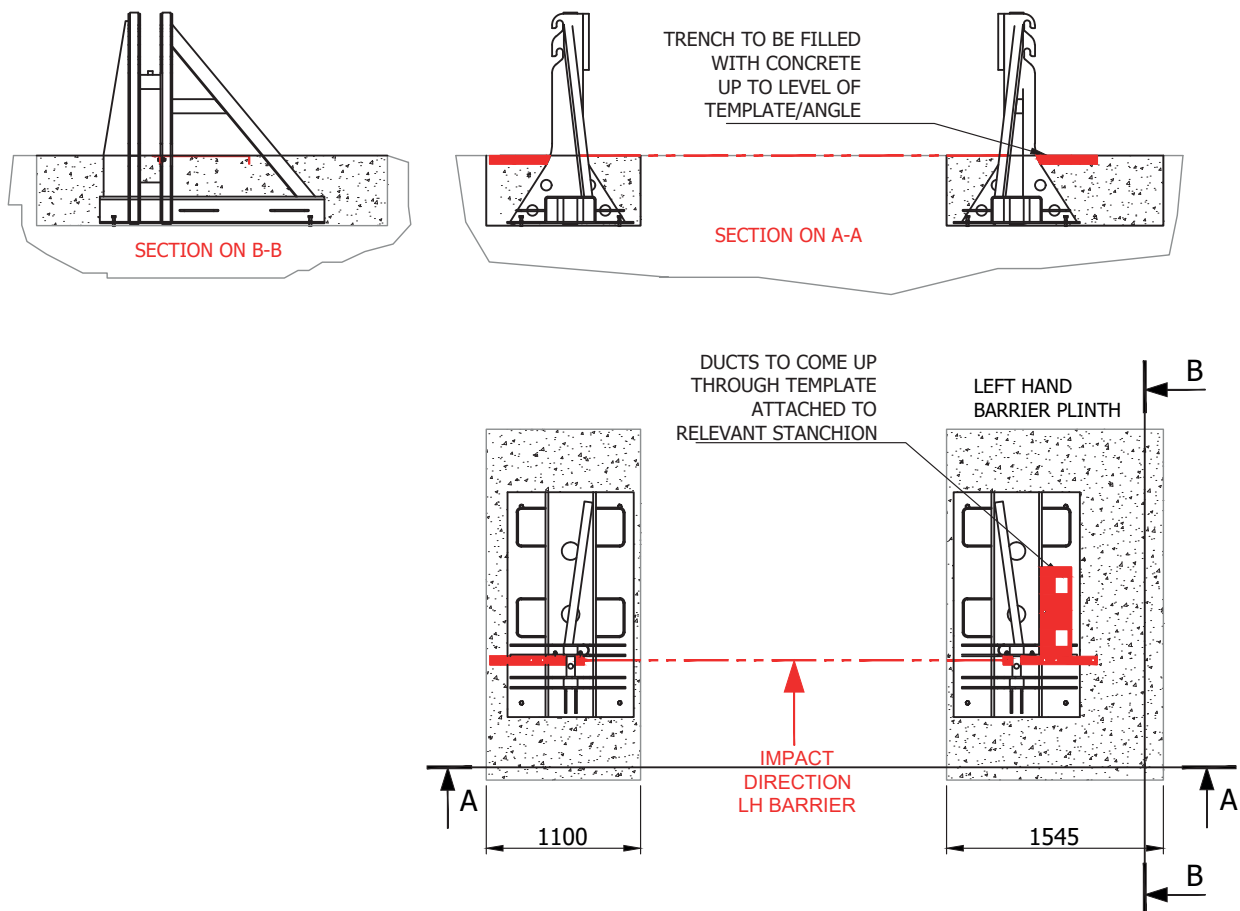
3.9 LASER SCANNER POSITIONING

Dimensions marked * are mandatory. Minimum dimensions are also safety critical. Deviating from these will cause safety issues and invalidate the CE mark.



3.10 CONCRETE POUR

The concrete should be C50 specification with a 70 slump, single pour. This should provide a minimum C35 strength. Exposed ducts should be protected during concrete pouring with plastic sleeves or tape. Fill concrete to the top of the angles located on the stanchions, as site drawings. Ensure to expel air pockets.



3.11 CABINET LIFTING

Safe lifting procedures should be followed at all times. Lifting capacity should be circa 300 kg. Using a Hi-AB or forklift truck is recommended.

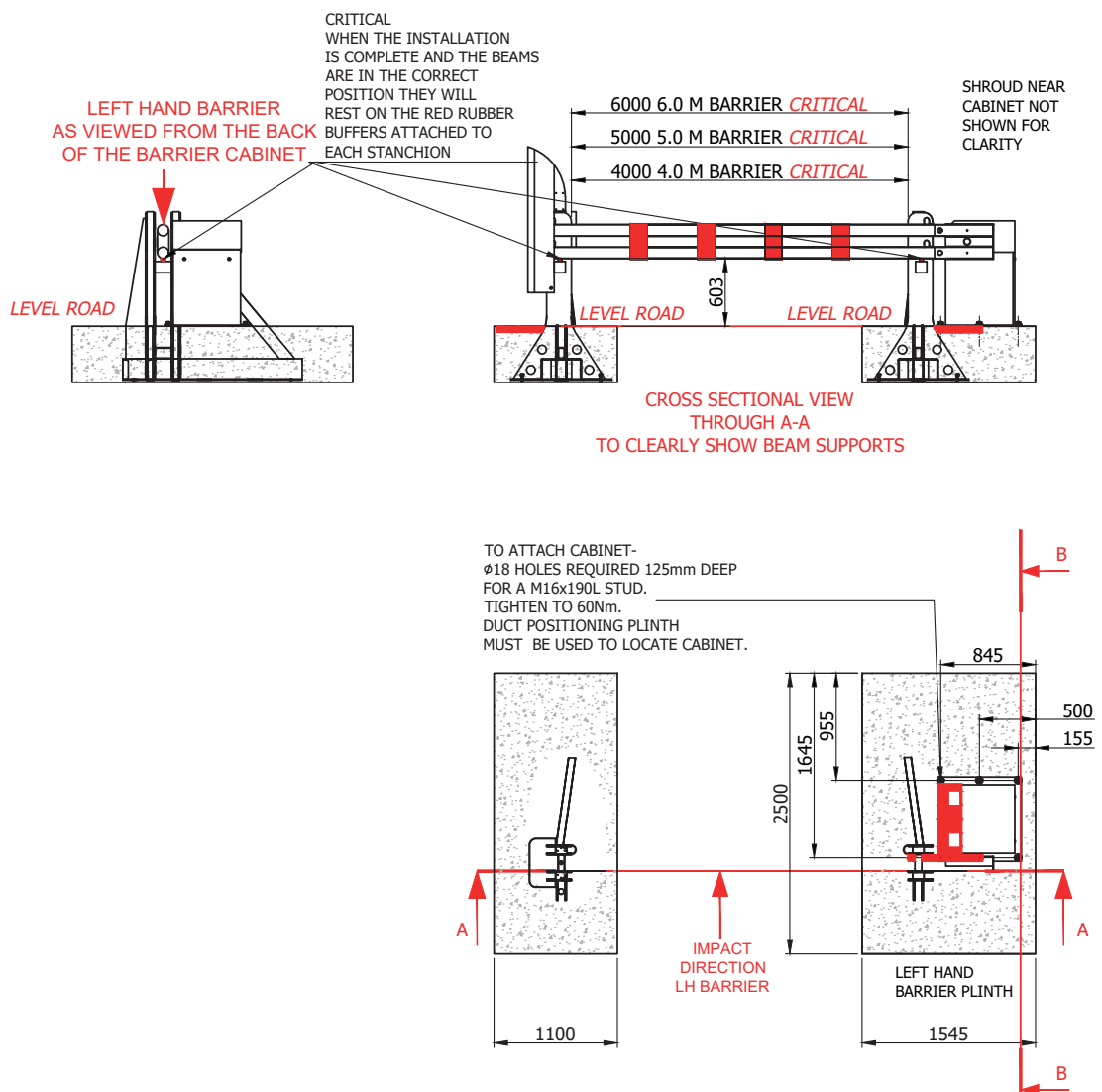
Drill 18 mm diameter holes to a 125 mm depth using the barrier plinth as a template.

Clean out the holes then insert the resin and supplied M16 threaded stud. When the resin has set, tighten the bolt 60 Nm.

Resin curing time approximately 30 mins but varied dependent on ambient temperate.

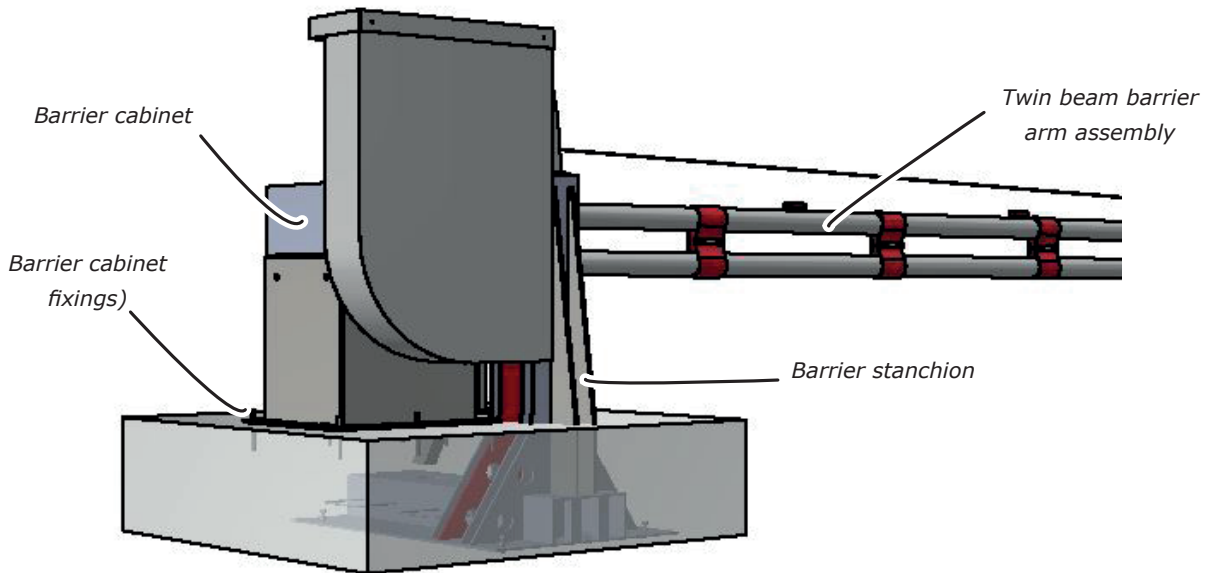
Conventional expansion anchors/studs must not be used to fix the barrier down, as they are not strong enough to secure the barrier to the concrete base.

A vinyl based resin such as Spit Epomax, which is also hydrophobic, should be used.



3.12 CABINET POSITIONING

The barrier cabinet is installed on top of the concrete foundation but is not cast into the concrete. Refer to site drawings for cabinet positioning.



The beam assembly must be facing attack side of the site. Ensure that the barrier is installed with stanchions using the installation plinth as a guide. If these are not set parallel, the barrier arm will not locate correctly within the stanchion when lowered and the barrier will not work as intended.

3.13 AFFIXING THE BARRIER

Do not use conventional expansion anchor studs to fix the barrier down, these are not strong enough to secure the barrier appropriately. The barrier must be affixed using resin M16 studs.



Polyester-based resins must not be used, only vinyl-ester based resins are appropriate. Spit Epomax or a similar hydrophobic resin is recommended.

Refer to the following table for drilling specifications.

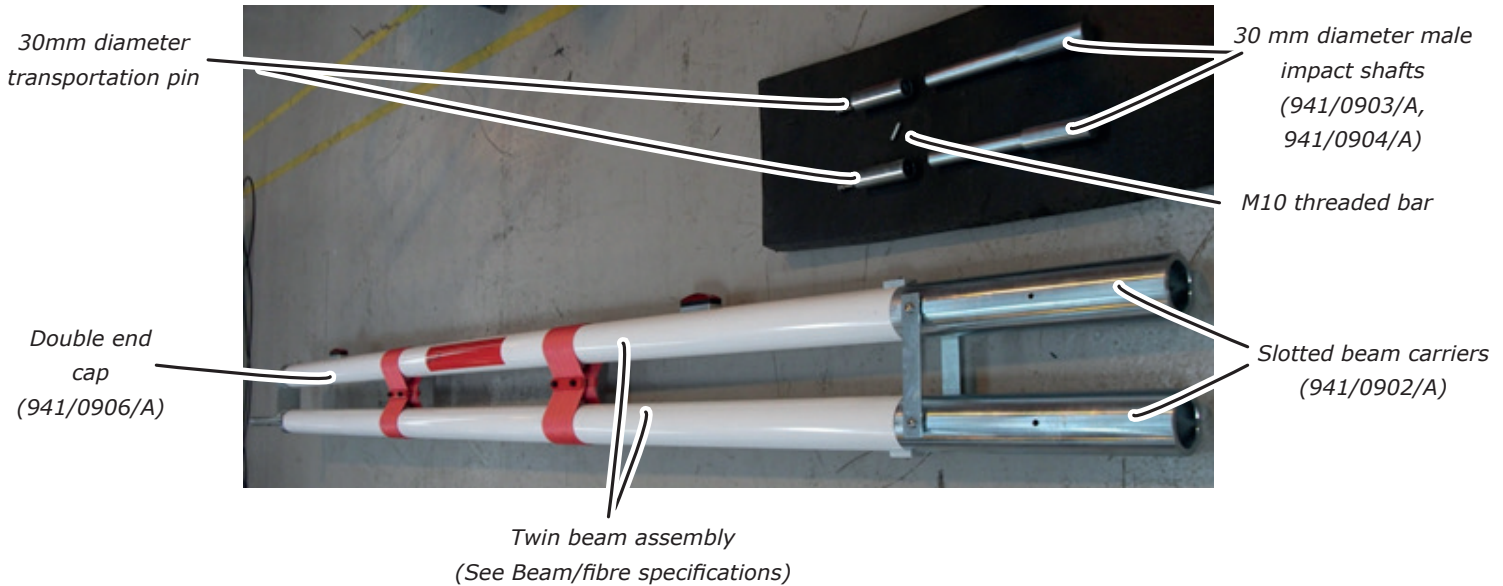
Drilling Specifications				
Stud size	Stud length	Drill diameter	Drill Depth	Maximum torque
M16	190 mm	18 mm	125 mm	60 Nm

- Assemble all fixings.
- Drill the first hole. Insert a stud to align fixing depth if required. Thread a nut around the stud to ensure the stud does not drop into a hole drilled too deep.
- Drilling the remaining holes in the same way. Once all holes are drilled, remove any loose materials and dust.
- Prepare fixing solution and injection tool.
- Inject the resin into the holes to approximately three quarters capacity. Take care not to overfill.
- When inserting the stud into the hole, twist it several times. This will remove any air bubbles and also push the resin into any excess space in the hole. If the stud keeps pushing out, twist it a few more times. All the threads should be evenly covered, so add more resin if necessary.
- Fit all the studs this way. Clean off excess resin from the studs.
- Allow the resin to set. Refer to the following table for curing times.
- Do not tighten the nuts until the torque time has been reached.
- Do not load the studs until the full cure time has been reached
- After the resin cures, cut off any excess studs as necessary.

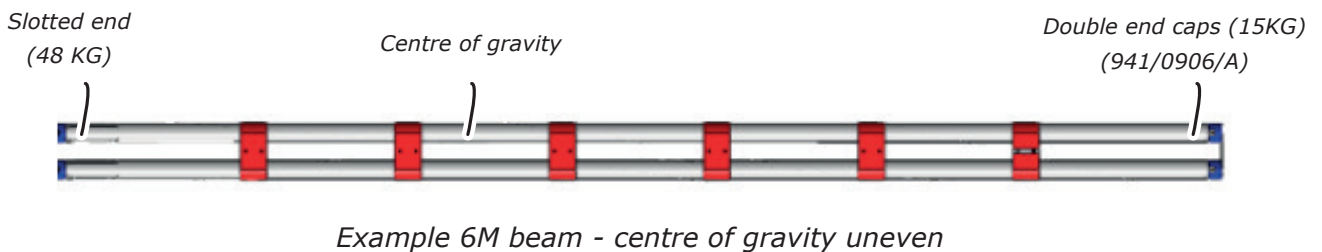
Setting Specifications			
Ambient temperature (°C)	Torque time (mins)	Cure time - dry concrete (mins)	Cure time - wet concrete (mins)
40	40	40	80
30	60	60	120
20	60	110	160
10	150	180	360
0	240	270	540

4 BARRIER ARM ASSEMBLY

The twin beam system is delivered fully assembled. The transportation pins and straps are removed after installation and replaced with the impact male and female diameter pins.



4.1 MASS AND CENTRE OF GRAVITY



Utilise appropriate lifting equipment to move the beam, accounting for the uneven centre of gravity of the beam.

4.2 LIFTING

Refer to the following tables to see weight specifications.

Assembly part	Weight (kg)	Gross weight boxed (Kg)	Dimensions (mm)
Beam assembly (4m)	110	240	H = 350 L = 5100 W = 350
Beam assembly (5m)	120	395	H = 350 L = 6100 W = 350
Beam assembly (6m)	130	450	H = 350 L = 7100 W = 350
Barrier cabinet	250	350	H = 950 L = 750 W = 750

Total assembly (meters)	Weight (Kg)	Gross weight boxed (Kg)	Approximate external crate dimensions (mm)
4.0	1160	1190	H = 600 L = 5200 W = 640
5.0	1170	2045	H = 600 L = 6200 w = 620
6.0	1180	2100	H = 600 L = 7200 W = 640

Two certified lifting straps with a suitable load bearing capacity should be used. Ensure that each lifting strap can carry the total load of the beam assembly.

Place the straps under the assembly.

Feed one strap through the eye of the other until it is taut around the beam.

Do this for both straps.



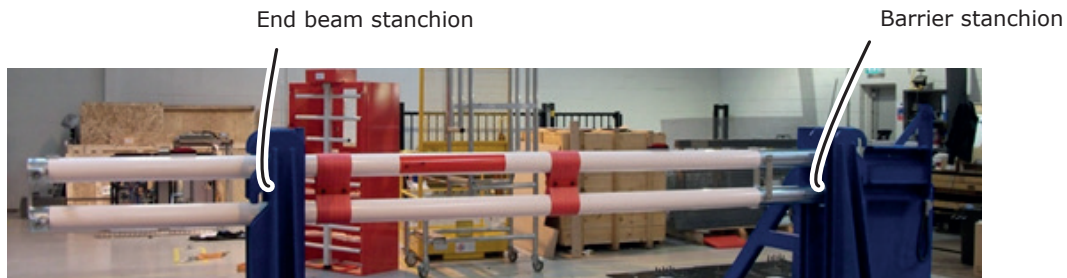
Place the eyes of the lifting straps onto the bars of the forklift.

Lift the straps carefully, ensuring the correct offset for centre of gravity.



4.3 BEAM FASTENING

When the barrier arm is in place, complete the following procedure. The barrier shown is left handing. Part codes are shown in brackets.



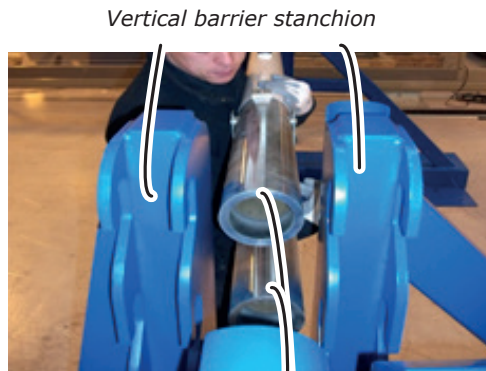
Carefully insert the beam through the vertical sections of the stanchions using appropriate lifting equipment, ensuring the slotted beam carriers are towards the barrier cabinet.

Push the slotted beam carriers into the barrier yoke. Apply lubricant to the carriers to ease this process.

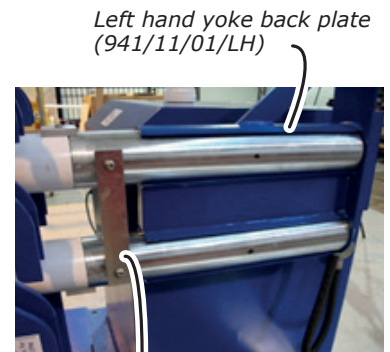


Slotted beam carrier (941/0902/A)

Barrier yoke - left hand (941/1101) right hand (941/1102)



Slotted beam carrier shaft (941/0902/A)



Left hand yoke back plate (941/11/01/LH)

Outside transportation bar (941/0908)

Slotted beam carriers are fully inserted when they touch against the yoke back plate.

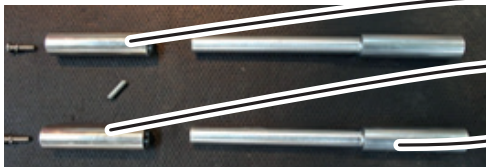
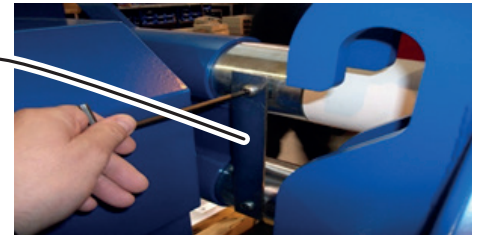
Remove the M10 button head bolts from the top of the transportation bars.

One bolt is to be removed from the top outside and the other from the top inside. Care should be taken not to disturb the transportation shafts.



Outside transportation bar (941/0908)

Inside transportation bar (941/0908)

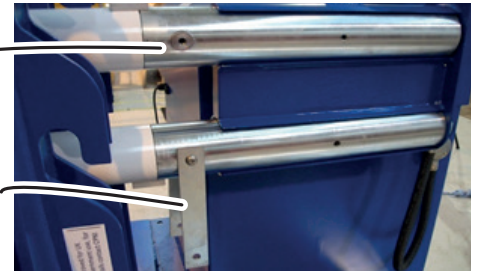


M10 threaded bar (941/0903/A)

Female transportation shaft (941/0907)

Top bolts removed

Outside transportation bar (loose) (941/0908)



Once the top bolts have been removed, rotate both the internal and external transportation bars through 180 degrees so that they hang downwards from the bottom bolts.

The beam assembly is supplied with an M10 threaded bar. Screw bar into the threaded end of the 30 diameter male impact shaft from outside of the site, as shown below.

M10 threaded bar

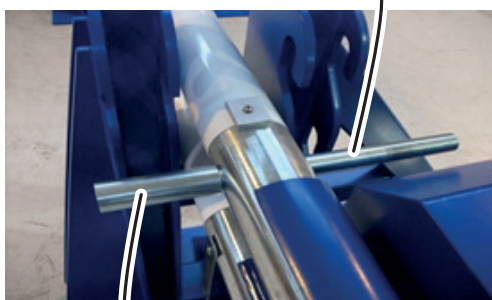
Top transportation shaft (941/0907)



Male impact shaft (941/0903/A)

When the M10 bar is hand tightened into the end of the male impact shaft, it can be connected into the internal thread of the top transportation shaft.

Top transportation shaft (941/0907)



Male impact shoulder shaft

M10 threaded bar



Top transportation shaft removed

Use a rubber mallet to insert the top transportation shaft through the slotted beam carrier until the shoulder of the impact shaft is against the outside diameter of the slotted beam carrier.



Female impact shaft



M10 pinex bolt and allen key

Unscrew the transportation shaft from the M10 bar in the male impact shaft.

Insert the female impact shaft, over the end of the male impact shaft. This will result in the female impact shaft creating a sleeve over the male impact shaft. Secure using the M10 pinex bolt supplied together with the allen key.

Use a torque wrench to tighten to a minimum of 35 Nm.



Remove the fixings in the lower transportation bar and repeat the above procedure.

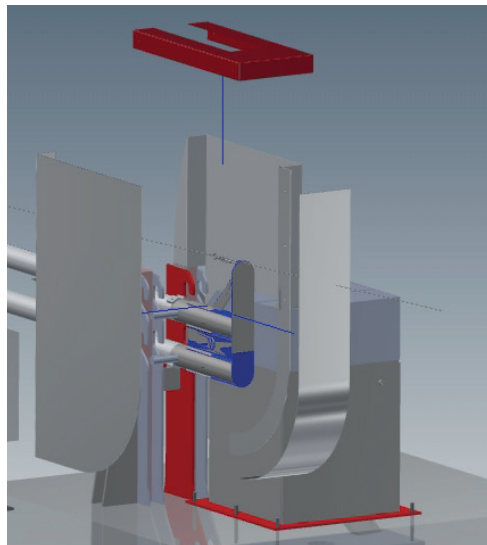
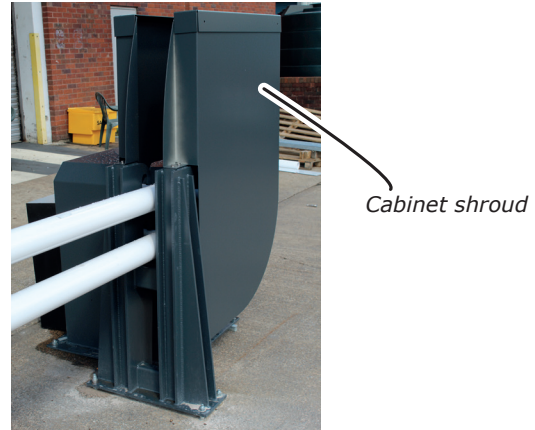
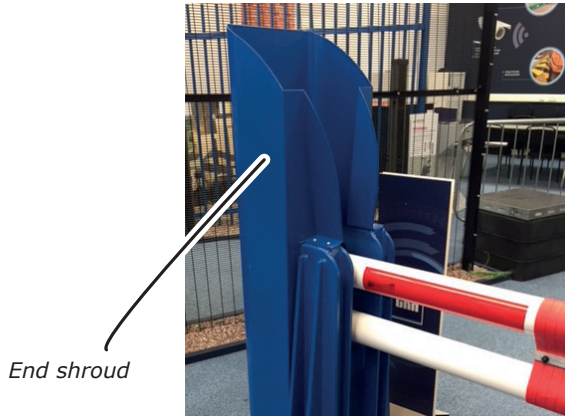
Insert the supplied M8 bolts through the slotted beam carriers and into the yoke. Screw the M8 nut on to the bolt from the barrier cabinet side and tighten to a minimum of 25 Nm using a torque wrench.



4.3.1. Shroud Installation

When the beams are in place, the shrouds must be attached. Observing safe lifting techniques, arrange the shrouds one at a time on each applicable stanchion.

Fasten with fixings provided.



Cabinet shroud construction

4.3.2. Guy Wire

For barriers with 6m beams only, the guy wire will be provided and must be fixed to the upper section of the beam assembly to support the beam cassettes. Affix the wire to the fastening atop the yoke and feed through the tensioners and D shackle and affix in place. With barrier in fully lowered position, hand tighten the D shackle until beam cassettes are horizontally. Adjust D shackle when barrier in fully lowered position until beam cassettes are level. Fasten with fixings provided.

4.4 LZR-H100



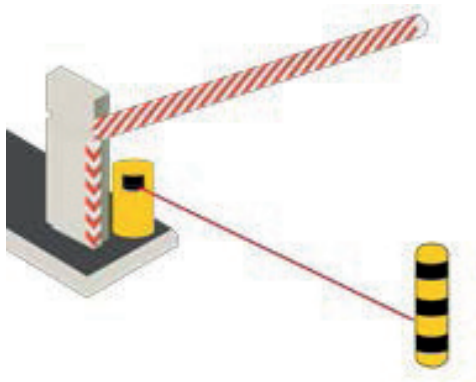
The BEA LZR-H100 must be installed and configured by trained and qualified personnel. Following installation, an access code should be entered by remote control.

Refer to section 3.9 to determine where the laser post should be located. The sensor body can be screwed into the top of the post.

A full manual published by manufacturer will be supplied alongside the LZR-H100. Consult this manual for full details of how to configure the project.

4.4.1. Reference Principles

The sensor has to learn a reference when the safety field is the only protection against contact between the vehicle and the boom.



The reference can be adjusted on any type of object already present on site (wall, tree, barrier boom support) or on a post.

The object used for the reference must be adjusted must be:

- Positioned in the continuity of the 0° laser beam
- Positioned min. at the end of the boom or father away than the end of the boom
- To operate in accordance with EN12453 a reference point of surface area no less than 100mm² is required
- Fixed to the floor and not subject variations

Use a reflective sticker when the distance between sensor and reference is higher than 5000 mm.

4.4.2. Safety Precautions



The device contains IR and visible laser diodes.
IR laser: wavelength 905nm; max. output pulse power 75W
(Class 1 according to IEC 60825-1)
Visible laser: wavelength 650nm; max. output CW power 3mW
(Class 3R according to IEC 60825-1)

The visible laser beams are inactive during normal functioning.
The installer can activate the visible lasers if needed.

Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

4.4.3. Installation Considerations



Precautions must be taken to ensure correct function of the safety device:

- Avoid extreme vibrations
- Do not cover the front screens
- Avoid moving objects and light sources in the detection field
- Avoid the presence of smoke and fog in the detection field
- Avoid condensation
- Avoid exposure to sudden significant temperature changes
- Avoid direct exposure to high pressure cleaning
- Aggressive/abrasive cleaning products



Local supplier stamp:

Heras
33 Stakehill Industrial Estate
Middleton
Manchester
M24 2RW
United Kingdom

