TURNSTAR

RELIABLE ★ DURABLE ★ GUARANTEED

INSTALLATION MANUAL

VEVB-IM

VELOCITY VEHICLE BARRIER

1. CONTENTS

2. COPYRIGHT & LIABILITY

2.1. Consent

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3. INTRODUCTION

3.1. Brief

This manual serves to assist the installer with the installing, connecting and commissioning of the product successfully. It also provides information for the operator of the barrier including troubleshooting and spare parts.

3.2. Symbols & Terms

These are the symbols used in this manual that the reader should understand. These will help to point out important notes, warnings and guidelines to the technician and assembler.

	**ELECTRICAL HAZARD** – Risk of electrical shock due to high voltage. Proceed with care.

	**RISK OF INJURY** – Risk of injury possible. Proceed with care.

	**TAKE NOTE** – An important note to consider.

	**SUPPLEMENTAL DOCUMENT** – More information is contained in a supplemental document, with document number included, if available.

3.3. Responsibility

The installer agrees to use this manual as the standard to which work on the product is carried out.

4. OVERVIEW

4.1. Product Application

The Velocity Vehicle barrier is a high speed, low power vehicle access control barrier with built-in battery back-up and a compact design for an aesthetic appearance.

The barrier is typically used for office parks, shopping malls, residential estates and parking lots.

The barrier is supplied with an octagonal aluminium barrier arm only.

4.2. Motor

The motor used is a 24-volt 100W brushless DC motor, with a planetary gearbox.

The brushless motor design ensures excellent longevity as there are no brushes that wear out and require replacement.

4.3. Springs

The barrier is fitted with counter-balance compression springs, which provide exceptional lifespan performance, far superior than conventionally used tension springs.

4.4. Variations

There are two main variations of the Velocity Barrier.

- The Standard Barrier
- The Articulated Arm Barrier (Jack Knife)

The barrier is designed for use with a 3 meter up to 6 meter barrier arm (standard) and 3 meter up to 4,5 meter for the articulated arm barrier.

4.5. Safety Devices

Collision detection is monitored by internal hall sensors inside the motor. The barrier auto-reverses in the event of a collision during a down operation and auto stops in the event of a collision during the up operation, following which, the barrier waits for a new raise or lower signal from either the trigger or loop / beam safety system.

The barrier is fitted with a built-in dual channel loop detector as standard. It can also be supplied with an infra-red beam transmitter and receiver kit with a 10-meter range, or a photoelectric diffuse sensor with a 10-meter range. These can be supplied as accessories.

4.6. Accessories

There are multiple optional extras that can be ordered with the Velocity Vehicle Barrier. These are not necessarily discussed in this manual.

- High security Mul-T-Lock for the barrier door
- Traffic light (LED type)
- Flashing/Solid courtesy light fitted on cabinet (activated when barrier is in use)
- Single or double pushbutton in plastic housing
- One button or three button remote control transmitter and receiver
- Card drop box (intelligent and unintelligent types)
- Reader and camera mounting boxes (special designs to customer specifications)
- Car and car/truck goosenecks with optional weather cowls

4.7. Finishes

The cabinet can be supplied in a variety of finishes:

- Mild steel with UV resistant exterior grade powder coat (Standard colour white, top cover of ABS plastic, standard colour blue).
- 3Cr12 stainless steel with UV resistant exterior grade powder coat (Standard colour white, top cover of ABS plastic, standard colour blue).
- 304 grade brushed stainless steel (Top cover of ABS plastic, standard colour blue).
- 316 grade brushed stainless steel (Top cover of ABS plastic, standard colour blue).

Chromiderm is a clear coat protective system which can be applied as an optional extra to a stainless cabinet to increase corrosion protection.

4.8. Maintenance of Stainless Steel

The cabinet should be kept clean. It is recommended that the cabinet be cleaned with a soft cotton cloth dipped in warm soapy water once every two weeks. This is to prevent build-up chlorides which can cause corrosion, dish washing liquid can be used for the soapy water solution.

Should your cabinet be coated with Chromiderm, never clean it with thinners or acetone.

If staining or initial signs of rust have formed on the product, a phosphoric acid cleaning solution (Tiara - Supplied separately by Turnstar) can be used. Chromiderm, if originally supplied, can then be applied.

In cases of severe corrosion, Turnstar can supply a stainless-steel rescue kit which contains hydrofluoric acid and protective safety gear for the applicator.

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5. DATASHEET

Internal Structure	• Frame – Mild Steel - 7-stage zinc phosphate pre-treatment, PC (powder-coated) • Cabinet – Mild Steel / 3CR12 - 7-stage zinc phosphate pre-treatment, PC (powder-coated) / Brushed Stainless 304 / Brushed Stainless 316 • Top Cover – ABS plastic, standard colour blue.
Power Requirement	• 100-120VAC 2.2A / 200-240VAC 1.1A 50/60Hz (Switchable)
Power Consumption	• Idle – 8W • Operating – 20W (Average per full cycle) • Peak – 120W • Duty Cycle – 100%
Solar	• 24v 10A Solar Charge controller (Optional)
Barrier Arm	• Aluminium Octagonal Extrusion (90 x 45mm – 2mm wall thickness)
Barrier Arm Weight	• 1,45Kg per meter
Motor	• 24V 100W Brushless DC Motor, Planetary Gearbox
Opening Operating Speed (Without Articulated Arm)	• 1,2 Second Up = 3 meter to 4 meter arm • 2 Second Up = 4,5 meter arm • 2,5 Second Up= 5 meter to 5,5 meter arm • 3 Second Up = 6 meter arm
Power Fail System	• 24v 7Ah Battery Backup on power failure (Sealed Lead Acid). +- 1600 operations in the event of power failure over a 24-hour period.
Cabinet Weight	• 60Kg
Operating Temperature	• -15°C to 60°C
Trigger Inputs	• Single Trigger, Dry Contact (Automatic / Toggle)
Outputs	• Open and Closed Relay Outputs
Manual Override	• Internal easy pull lever

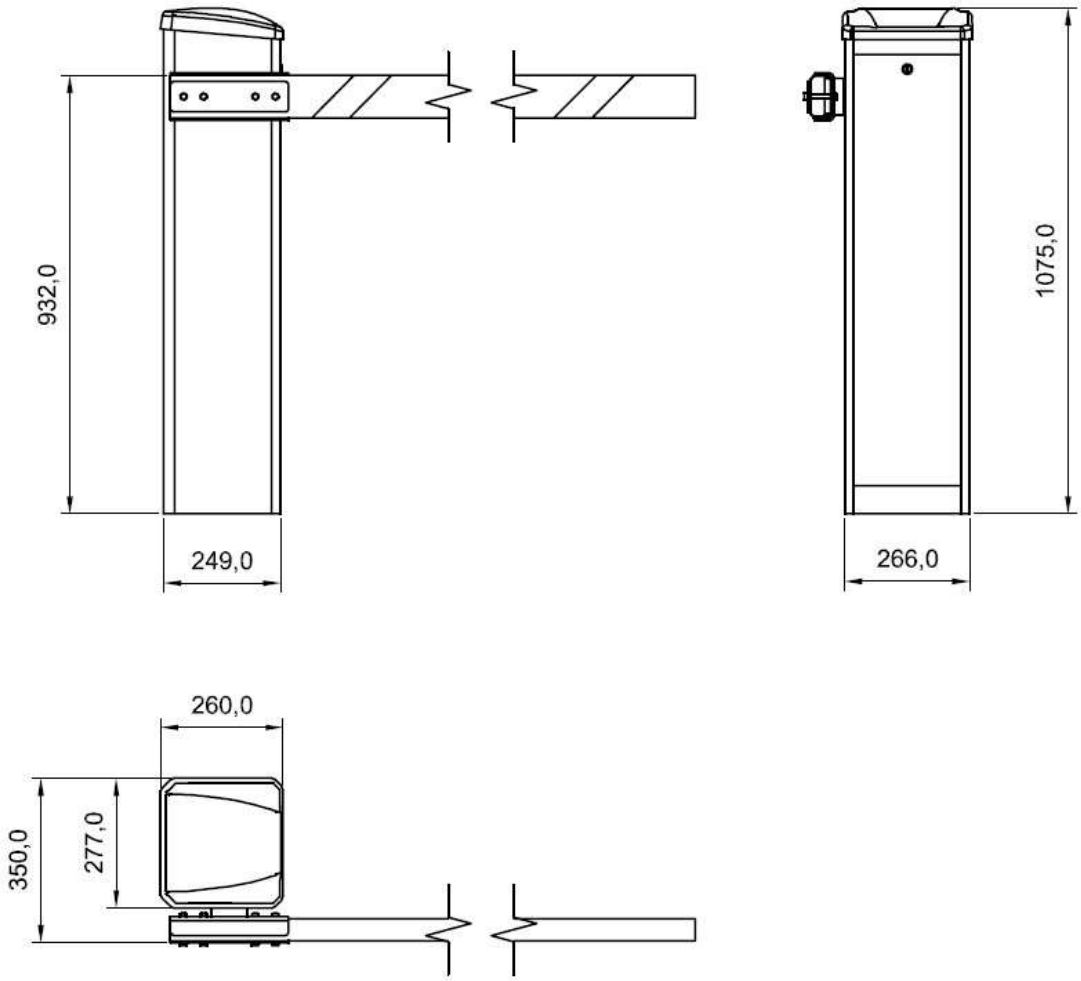


Figure 1: General Dimensions

6. CONNECTION AND SETTINGS

6.1. Location of Electronic Components

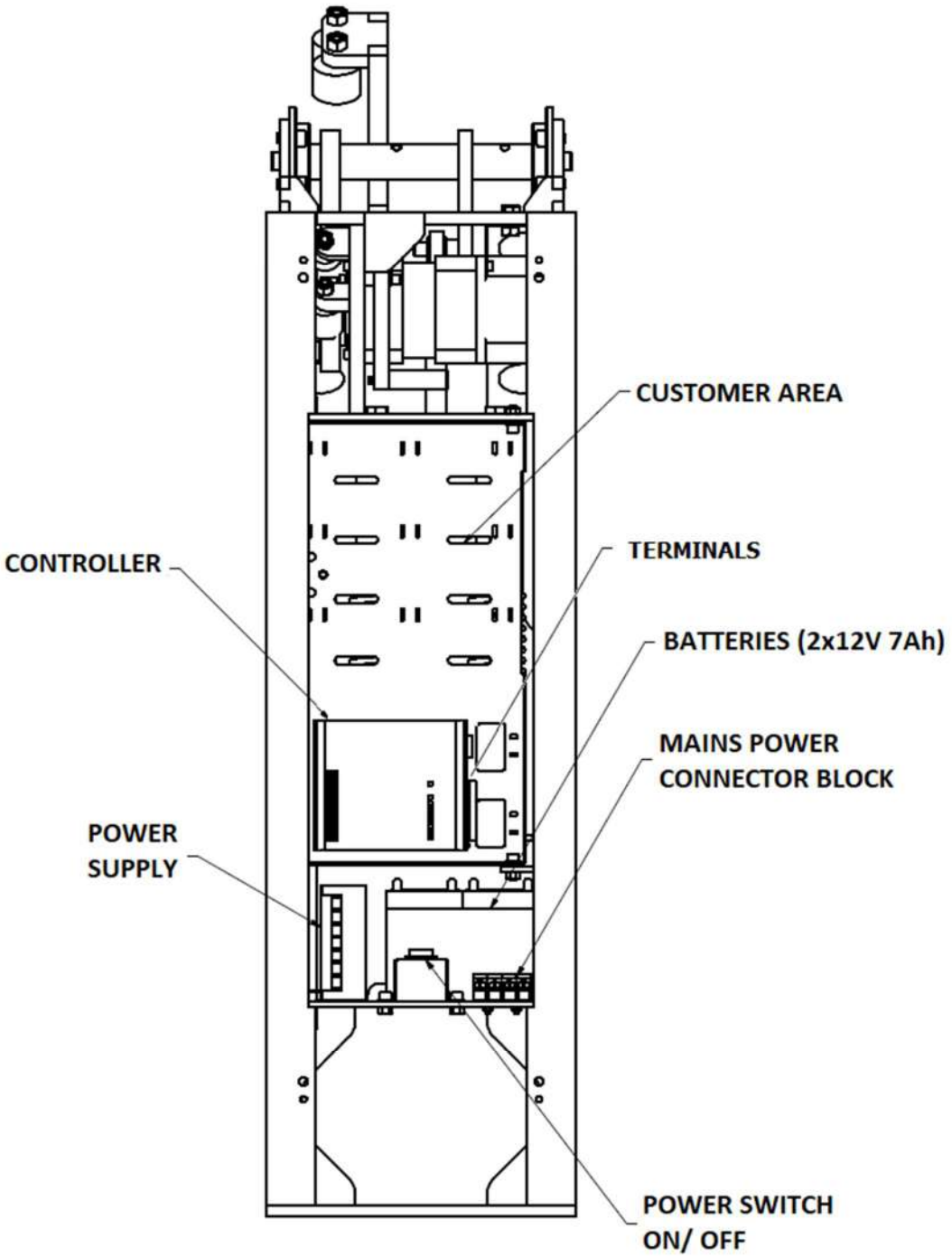


Figure 2: Electronic Components

6.2. Connecting Mains Power

The mains power is connected to the Mains Connector Block as shown.

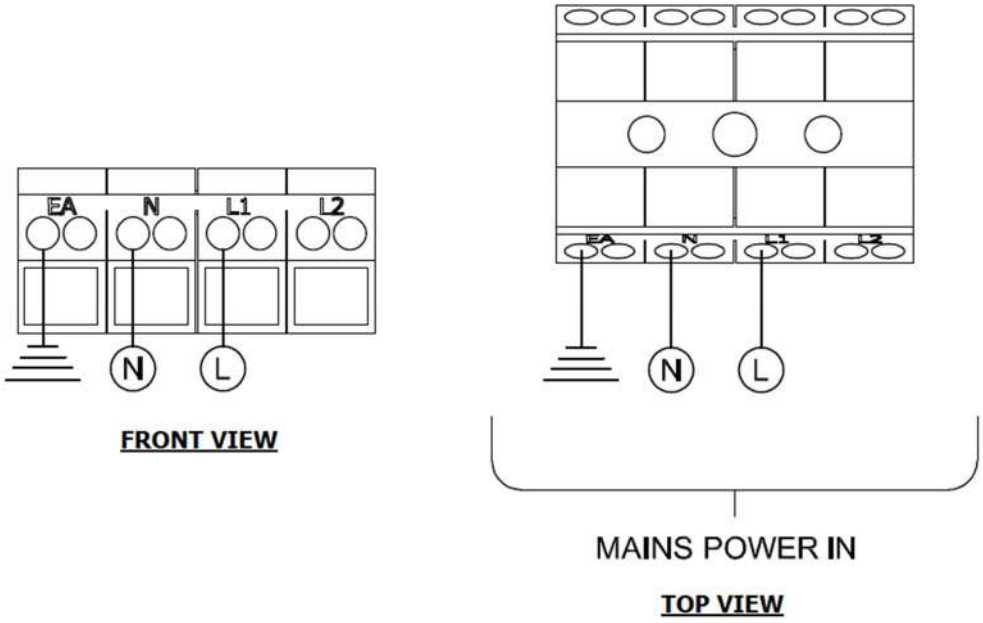


Figure 3: Mains connector block

6.3. Power Distribution and Battery Connections

Power is connected at the mains connector block. 220v 50Hz live power is distributed to the power supply which in turn supplies 24v power to the board. Batteries are also connected to the power supply. A switch separates the batteries from the power supply.

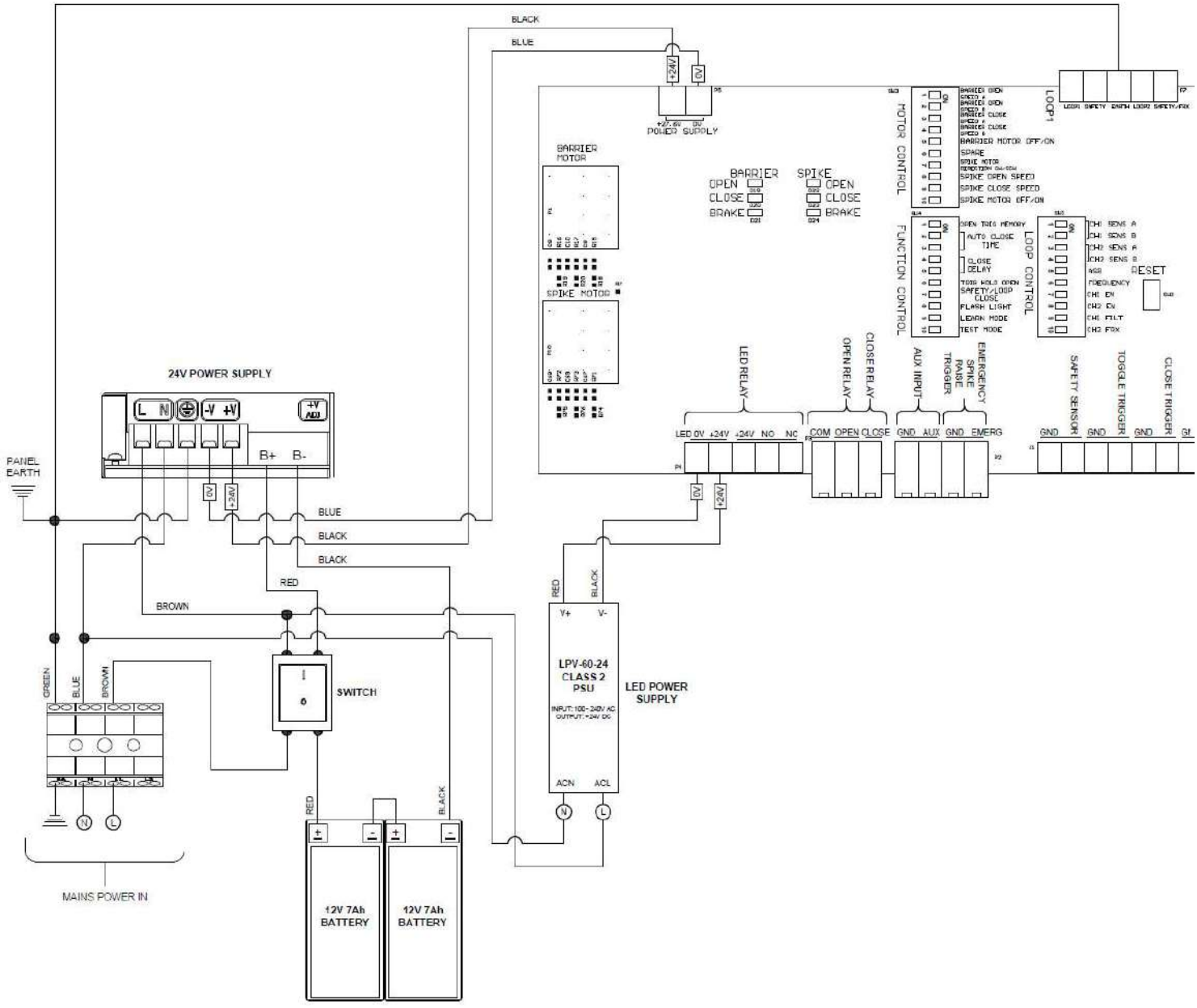


Figure 4: Power Distribution and Battery Connections

The two 12-volt batteries should be connected to the power supply as shown. The B+ (Red Wire) and B- (Black Wire) leads are soldered to the power supply. The LED's on the barrier arm require its own power supply. This is connected to the mains terminal block. The loop terminal earth must be earthed.

6.4. Configuring the power supply for 110V

The power supply has a switch that should be set for either 220V or 110V (for USA installations). Remove the front screw, slide the perforated top back and up to remove, to access the switch.

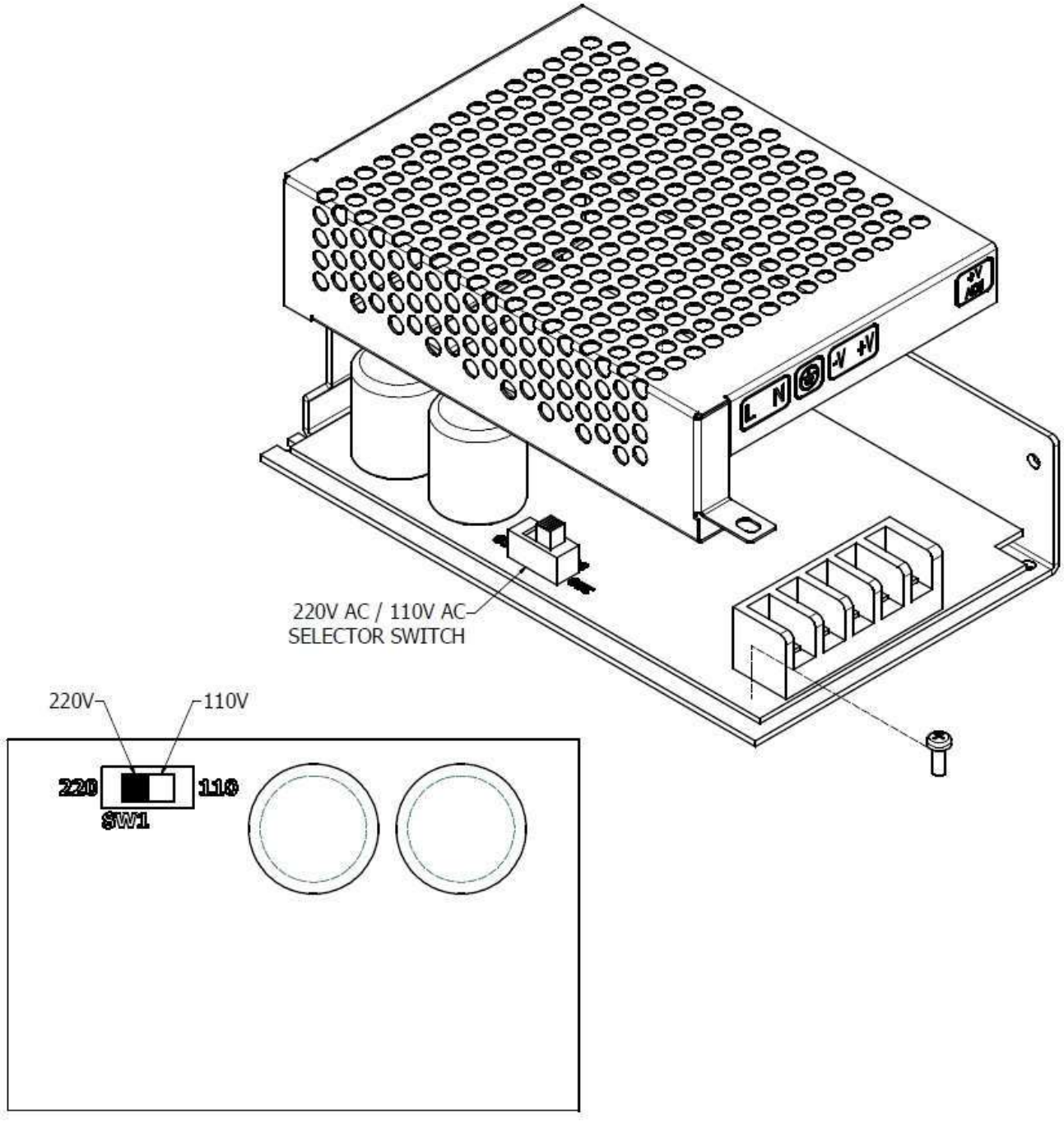


Figure 5: Power Supply 220-110V Setting

6.5. SBL106TUR Controller Interface

The controller is fitted with terminals at the bottom for the triggers and LED controls on the base and each of these have a plug for connecting the various cabling. There is also one input for an additional safety sensor. On the side, there are connections for the barrier motor and spike motor. Each have a specific cabling plug for the BLDC motors. On the top, there are connections for the 24V power and the inductive loops.

On the controller, there are three dipswitch terminals for motor control, function control and loop control settings.

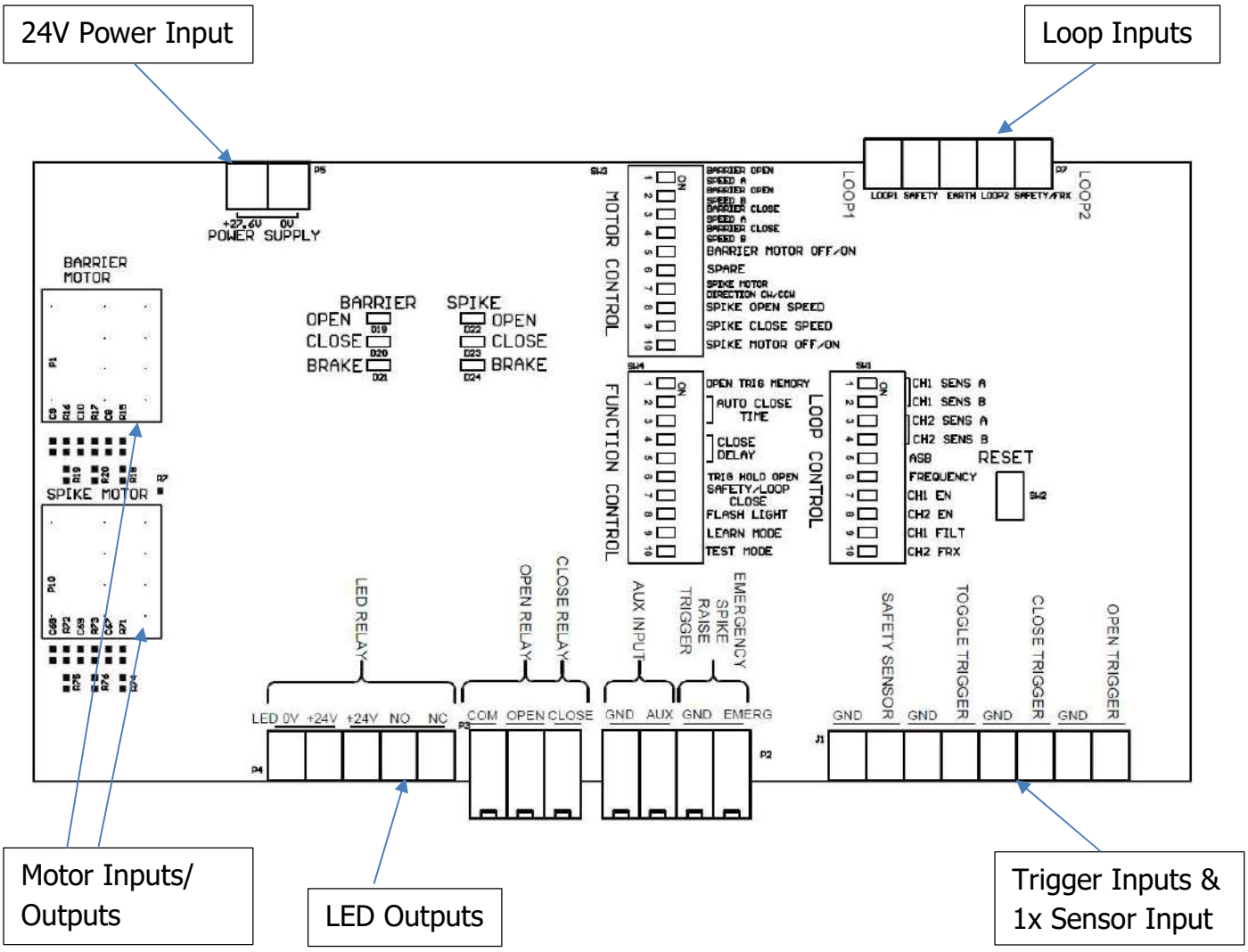
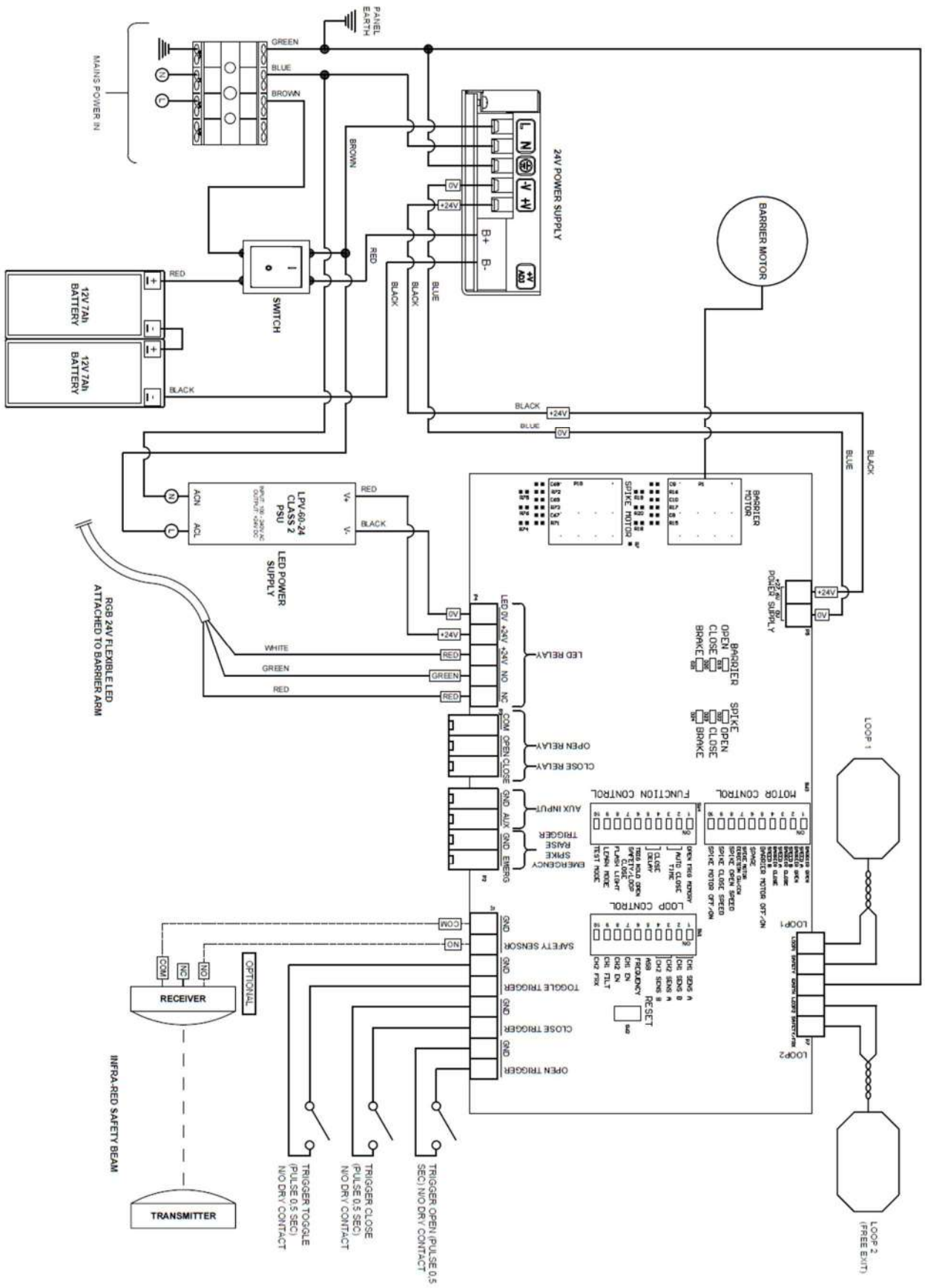
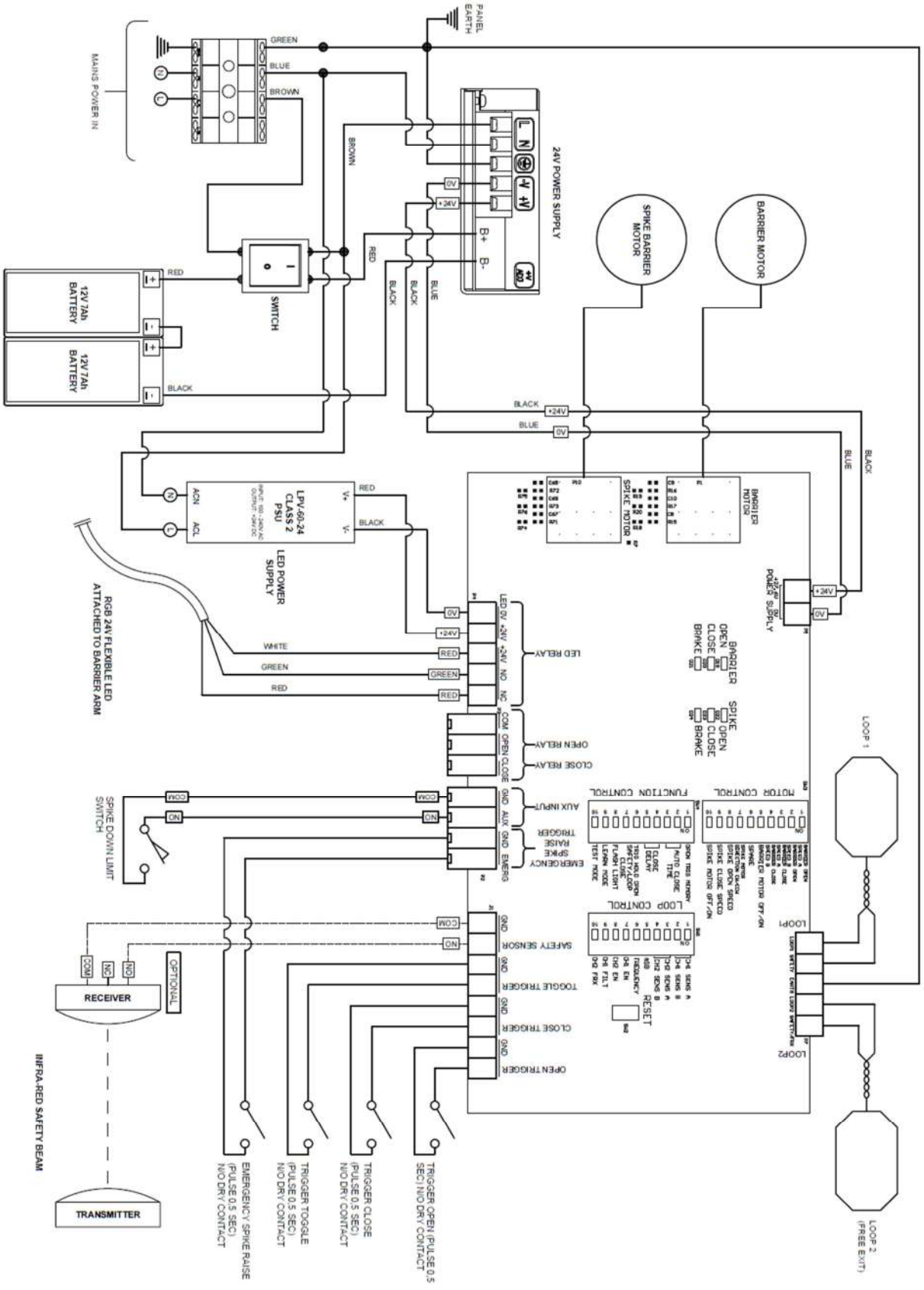


Figure 6: SBL106TUR Logic Controller

6.6. SBL106TUR Barrier Diagram and Devices Connections



6.7. SBL106TUR Raptor Spike Diagram and Devices Connections



6.8. SBL106TUR Safety Devices

The controller has inputs for two loops and an optional safety beam. For the controller to function, only one loop is required. The second loop can be connected in the case of a spike barrier, as a loop need to be installed in front and behind the channel housing the spikes.

As an added safety measure, an infra-red safety beam can be installed.

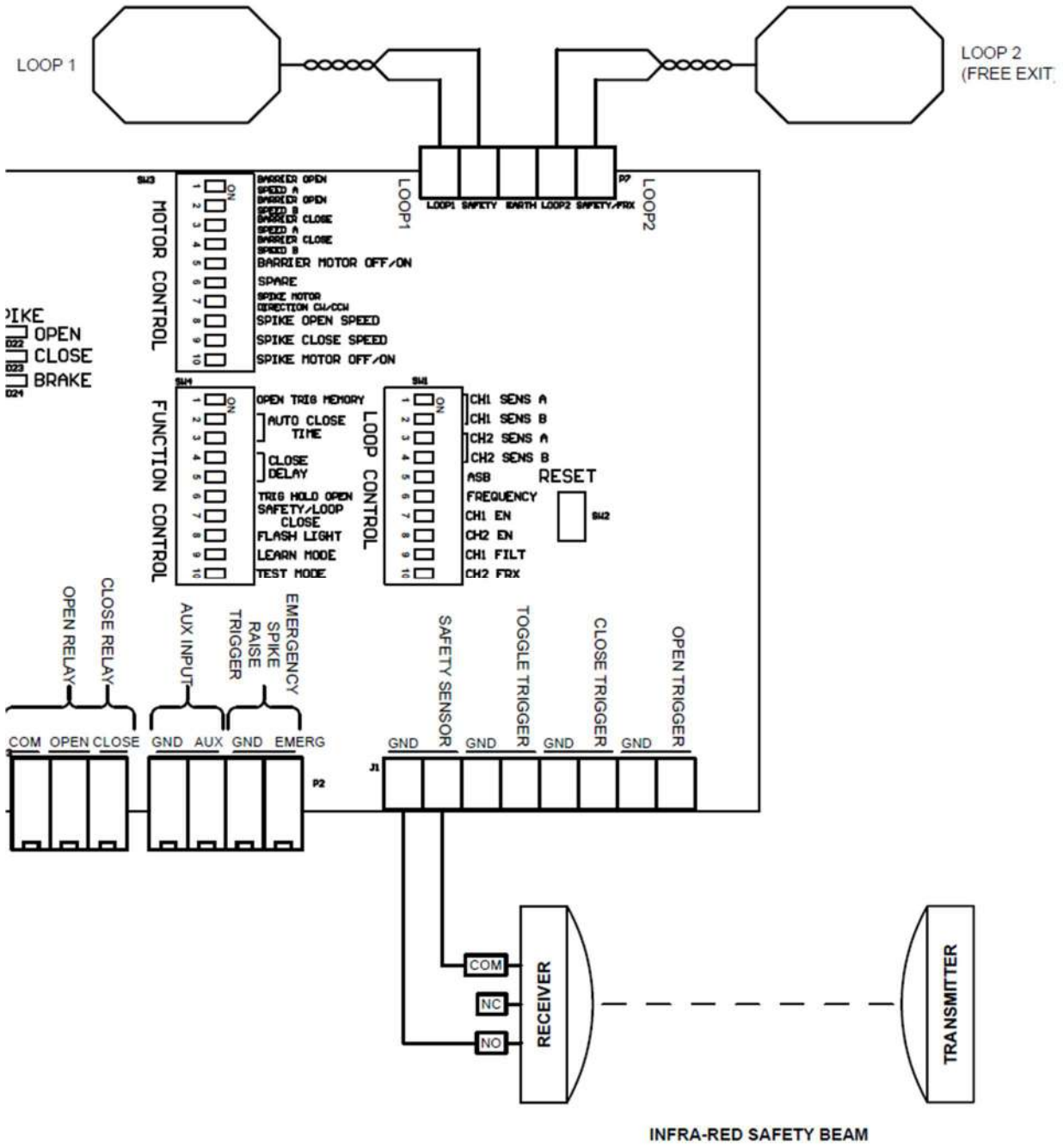


Figure 7: Safety Devices

6.9. SBL106TUR Indicator Devices

The barrier can be fitted with a colour changing red/ green LED light strip on the barrier arm, and/or a mounted traffic light.

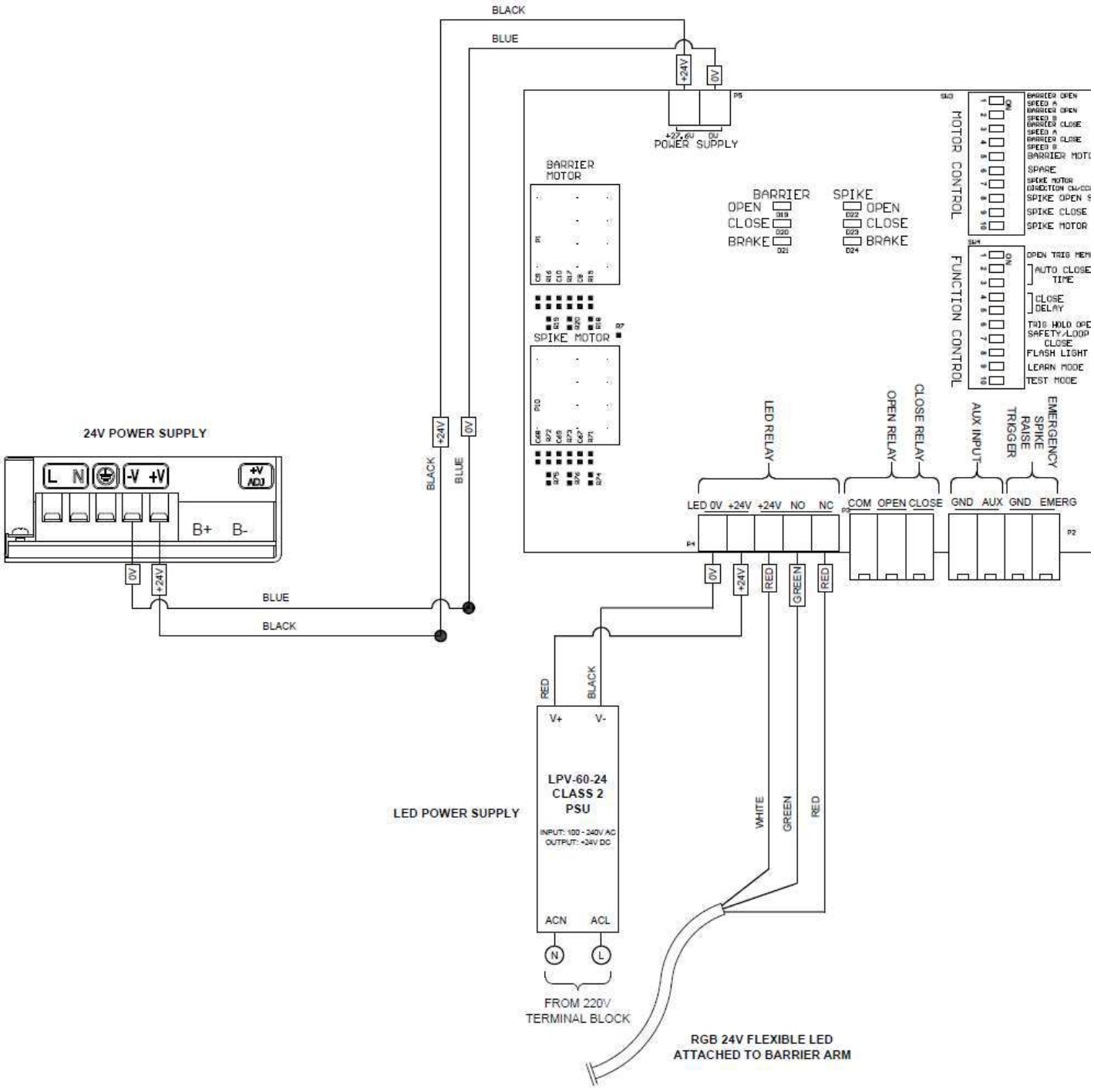


Figure 8: Indicator Devices

6.10. SBL106TUR Triggers & Inputs

Triggers are all normally open, dry contacts. These require a pulse 0.5 seconds (500 milliseconds) and no more than 0.8 seconds (800 milliseconds).

The Trigger Open acts as an emergency trigger when the contact is closed indefinitely. To activate this mode, ensure dipswitch 6 on function control is set to 'ON'.

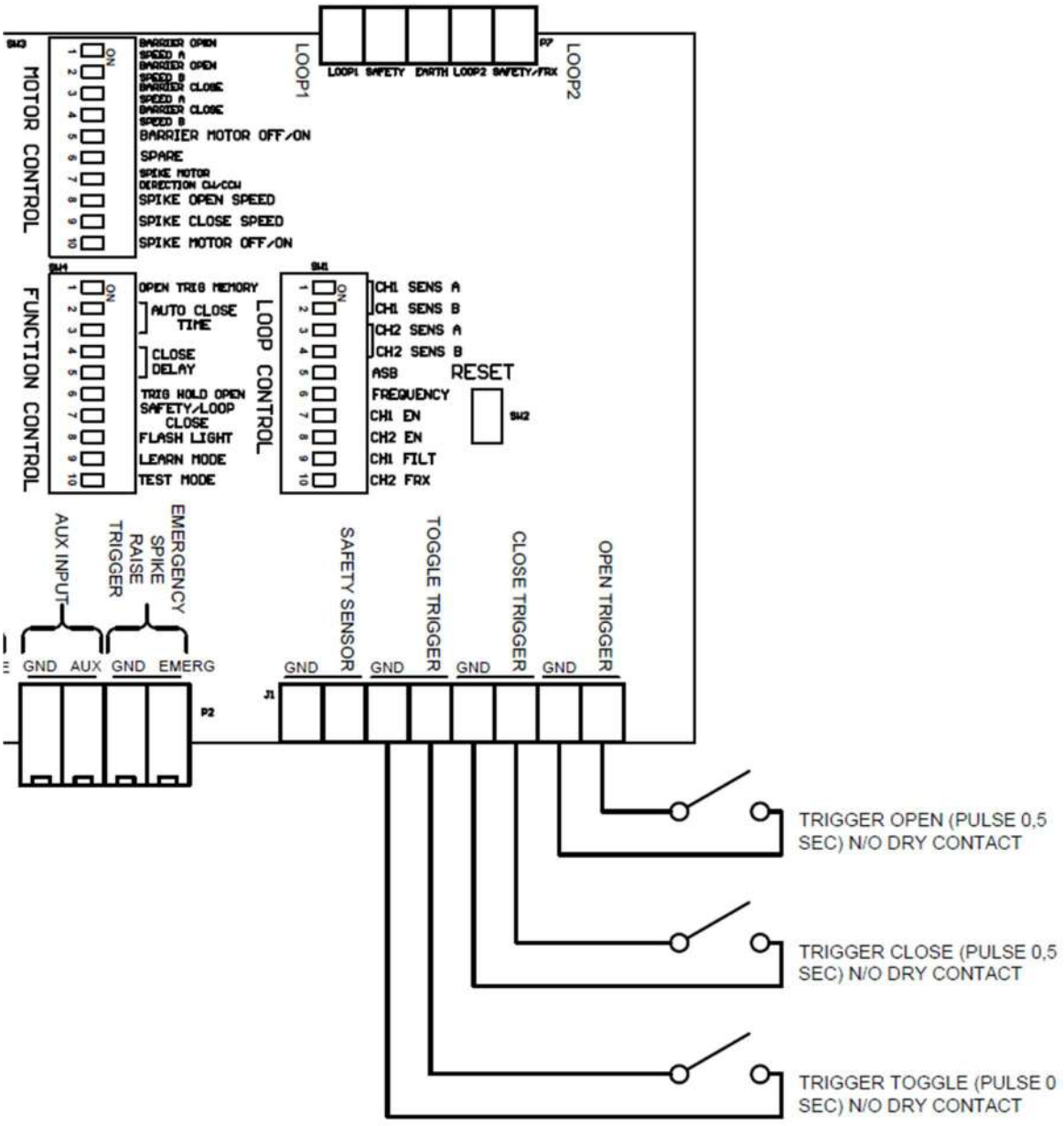


Figure 9: Triggers & Inputs

6.11. Standard Configuration (Pulse Trigger, Auto Close 20 Seconds)

- Ensure the barrier arm is connected. Select the appropriate dipswitches for the barrier arm length on the 'Motor Control' dipswitches (See section 6.12).
- Ensure Power and the loop is connected. For the Auto Close, only one loop is required to be connected.
- Set the dipswitches as per the table below.
- Connect the Trigger to 'Open Trigger'.
- Switch on power.
- Optional: Run 'LEARN MODE' on the 'Function Control' dipswitches by switching dipswitch 9 on for 5 seconds and then switch back to 'off'.
- Trigger the 'Open Trigger' on the panel.
- The barrier arm will open, time-out after 20 seconds, and close.

SBL106 MOTOR CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
3, 4	Barrier Close Speed – Med. Slow	S3	S4
1, 2	Barrier Open Speed (Depending on Barrier Length, see section 6.12)		
5	Barrier Motor Enable	ON	-
SBL106 FUNCTION CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
2, 3	Auto Close Timer – 20 Sec	-	S2, S3
4, 5	Close Delay – 2 Sec	S4	S5
6	Trigger Hold Open	ON	-
7	Safety / Loop Close	ON	-
SBL106 LOOP CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
7	Loop 1 Enable	ON	-
8	Loop 2 Enable	-	OFF

6.12. SBL106TUR Motor Control Dipswitch Settings

SBL106 MOTOR CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
1, 2	Barrier Open Speed – Long Pole	-	S1, S2
1, 2	Barrier Open Speed – Med. Long Pole	S1	S2
1, 2	Barrier Open Speed – Med Short Pole	S2	S1
1, 2	Barrier Open Speed – Short Pole	S1, S2	
3, 4	Barrier Close Speed – Slow	-	S3, S4
3, 4	Barrier Close Speed – Med. Slow	S3	S4
3, 4	Barrier Close Speed – Med. Fast	S4	S3
3, 4	Barrier Close Speed - Fast	S3, S4	-
5	Barrier Motor Enable	ON	OFF
7	Spike Motor Direction	CCW	CW
8	Spike Open Speed	FAST	SLOW
9	Spike Close Speed	FAST	SLOW
10	Spike Motor Enable	ON	OFF

Barrier Arm Length & Dipswitch Settings on MOTOR CONTROL		
Arm Length (m)	*On*	*Off*
2 - 3 Meters	S1, S2	-
3,5 – 4 Meters	S2	S1
4,5 – 5 Meters	S1	S2
6 Meters +	-	S1, S2

6.13. SBL106TUR Function Control Dipswitch Settings

SBL106 FUNCTION CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
1	Open Trigger Memory	ON	OFF
2, 3	Auto Close Timer – 20 Sec	-	S2, S3
2, 3	Auto Close Timer – 30 Sec	S2	S3
2, 3	Auto Close Timer – 60 Sec	S3	S2
2, 3	Auto Close Timer - Disable	S2, S3	-
4, 5	Close Delay – 0 Sec	-	S4, S5
4, 5	Close Delay – 2 Sec	S4	S5
4, 5	Close Delay – 4 Sec	S5	S4
4, 5	Close Delay – 6 Sec	S4, S5	-
6	Trigger Hold Open	ON	OFF
7	Safety / Loop Close	ON	OFF
8	Flash LED Relay	ON	OFF
9	LEARN MODE – Switch ON for 5 Seconds	ON	OFF
10	TEST MODE – 2 Second Auto Cycle (For factory testing. Open 2 second delay, Close 2 second delay. No safety input required)	ON	OFF

The Auto close timer is the time the barrier arm takes to close when no vehicle enters the loop detection area. This is factory set to 20 seconds (dipswitches 2 & 3 'OFF'). It can be disabled in case of a toggle trigger to control opening and closing manually.

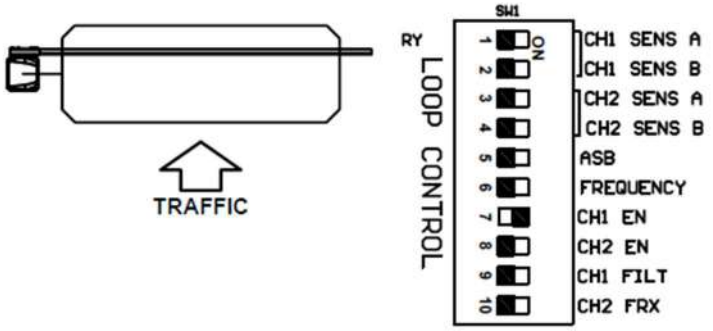
The close delay is the time the barrier arm takes to auto-close when a vehicle has passed the loop (if dipswitch 7 is set to 'ON', auto-close is activated). This is factory set to 2 seconds (dipswitch 4 'ON' and 5 'OFF').

Trigger Hold open (Dipswitch 6 'ON') will open the barrier and keep it open on an extended trigger in an emergency / fire situation.

6.14. SBL106TUR Loop Control Dipswitch Settings

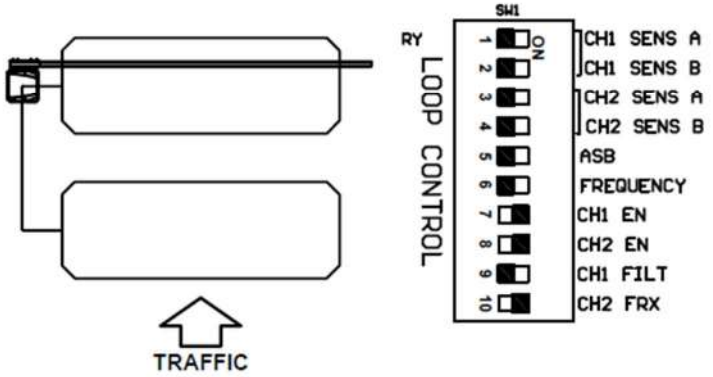
SBL106 LOOP CONTROL Dipswitch Settings			
Switch No.	*Function*	*On*	*Off*
1, 2	Loop 1 Sensitivity – 0.02%	-	S1, S2
1, 2	Loop 1 Sensitivity – 0.05%	S1	S2
1, 2	Loop 1 Sensitivity – 0.1%	S2	S1
1, 2	Loop 1 Sensitivity – 0.5%	S1, S2	-
3, 4	Loop 2 Sensitivity – 0.02%	-	S3, S4
3, 4	Loop 2 Sensitivity – 0.05%	S3	S4
3, 4	Loop 2 Sensitivity – 0.1%	S4	S3
3, 4	Loop 2 Sensitivity – 0.5%	S3, S4	-
5	ASB	ON	OFF
6	Frequency	Low	High
7	Loop 1 Enable	ON	OFF
8	Loop 2 Enable	ON	OFF
9	Loop 1 Filter	2 Sec	0 Sec
10	Loop 2 Mode	Frx Free Exit	Safety

The loop settings can be adjusted for the required situation. See below image for examples of common configurations.



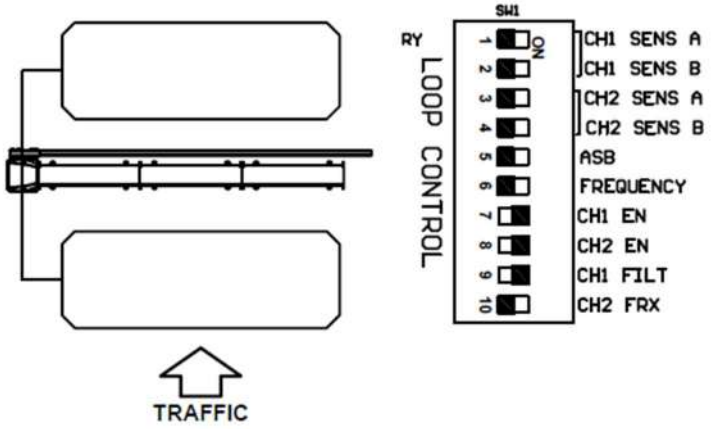
LOOP CONTROL DIPSWITCH SETTINGS FOR 1x LOOP

LOOP CONTROL SWITCH	ON	OFF	DESCRIPTION
1, 2	-	2, 3	LOOP SENSITIVITY - 0.02%
6	-	6	FREQUENCY - HIGH
7	7	-	LOOP 1 ENABLE



LOOP CONTROL DIPSWITCH SETTINGS FOR 2x LOOP (FREE EXIT)

LOOP CONTROL SWITCH	ON	OFF	DESCRIPTION
1, 2	-	2, 3	LOOP SENSITIVITY - 0.02%
6	-	6	FREQUENCY - HIGH
7	7	-	LOOP 1 ENABLE
8	8	-	LOOP 2 ENABLE
10	10	-	LOOP 2 MODE - FREE-EXIT



LOOP CONTROL DIPSWITCH SETTINGS FOR 2x LOOP (FOR SPIKE BARRIER)

LOOP CONTROL SWITCH	ON	OFF	DESCRIPTION
1, 2	-	2, 3	LOOP SENSITIVITY - 0.02%
6	-	6	FREQUENCY - HIGH
7	7	-	LOOP 1 ENABLE
8	8	-	LOOP 2 ENABLE
9	9	-	LOOP 1 FILTER - 2 SEC.
10	-	10	LOOP 2 MODE - SAFETY

Figure 10: Loop Settings

6.15. Push-to-open/ Push-to-close Trigger for a Remote Control or push button

The toggle trigger can be used for a remote control or a pushbutton. This requires a trigger to open the barrier and a trigger to close. This will ignore the auto-close time after a vehicle passes the loop (If used). It will also ignore the time-out 20 or 30 seconds if no vehicle passes over the loop, so the barrier will open on a trigger and stay open indefinitely until triggered to lower.

For safety of the barrier arm not closing on a vehicle accidentally when triggering the toggle to close, set dipswitch 7 on Loop Control to 'ON'.

When dipswitch 7 on Loop Control is 'ON', if a vehicle is over the loop or detected by a safety beam when the trigger to close is received, the barrier will not close when vehicle is detected during closing. The barrier will not allow closing until all safety devices are cleared; a new trigger must now be applied to close the barrier.

6.16. Emergency/ Fire Hold-open trigger

To open a standard auto close barrier indefinitely, using a regular normally open trigger, set function dipswitch no. 6 on the function control block to 'ON', in which case the barrier will remain open as long as the trigger is present.

After the latch is removed, the barrier will time out (standard 20 second time-out) and close, providing there is no vehicle detected by any of the safety devices.

6.17. Barrier Arm LED Connections & Placement

(Note: The LED strip on the barrier arm is an optional extra on certain models)

The RGB LED strip is fitted to the barrier arm, in the recess of the extrusion, and covered by a frosted white plastic cover.

Connections for this LED is described in the diagrams.

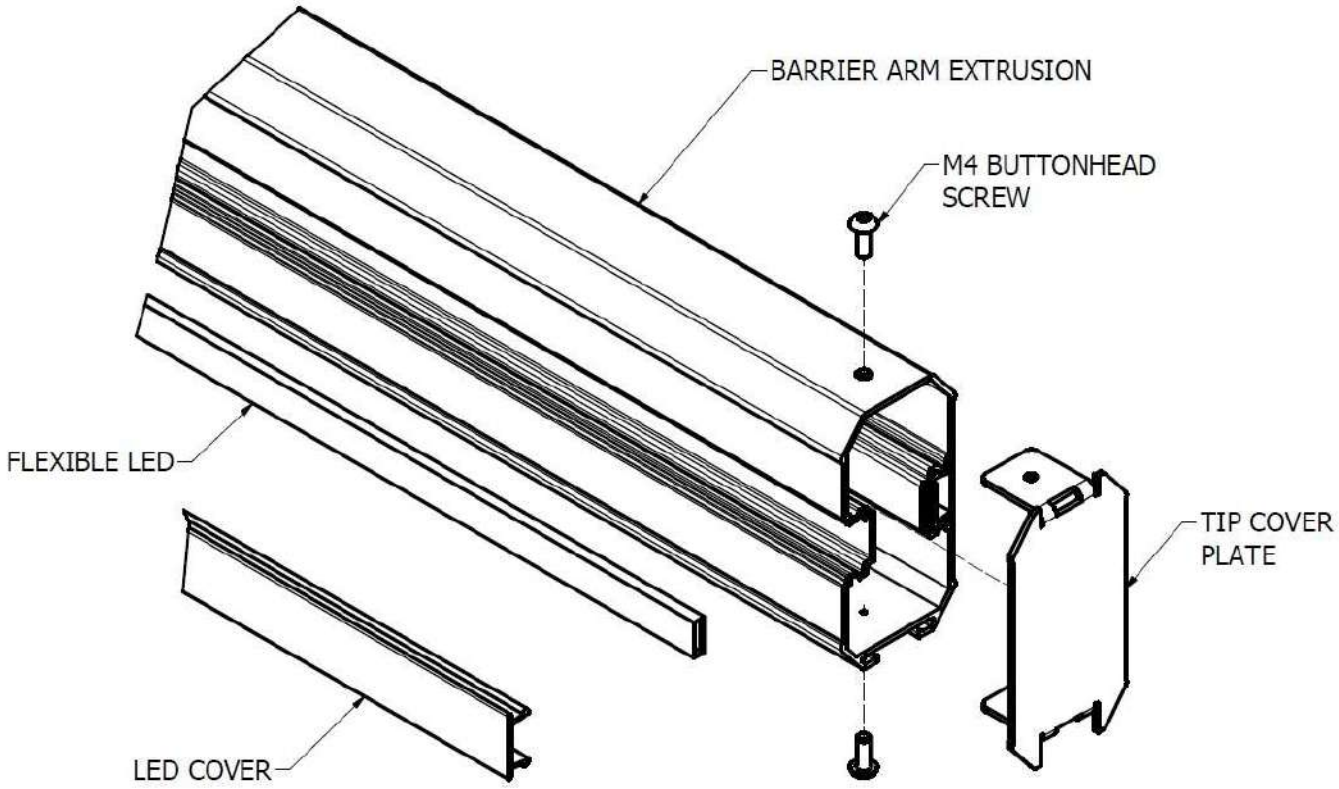


Figure 11: Barrier Arm LED and Tip Front Assembly

7. OPERATION

7.1. Emergency Manual Release

In case of fault or exhaustion of the batteries in the event of a power failure, the barrier arm can be lifted manually to the open position.

The barrier arm is mechanically locked in both the up and down positions. To release the mechanical lock in the down position, the manual release lever must be used.

Open the cabinet door. Switch power off to the unit and wait 5 seconds

Pull the release lever towards you and push it back. Proceed to lift the barrier arm by hand.

Remember to make sure the release lever is fully back when barrier operation is restored.

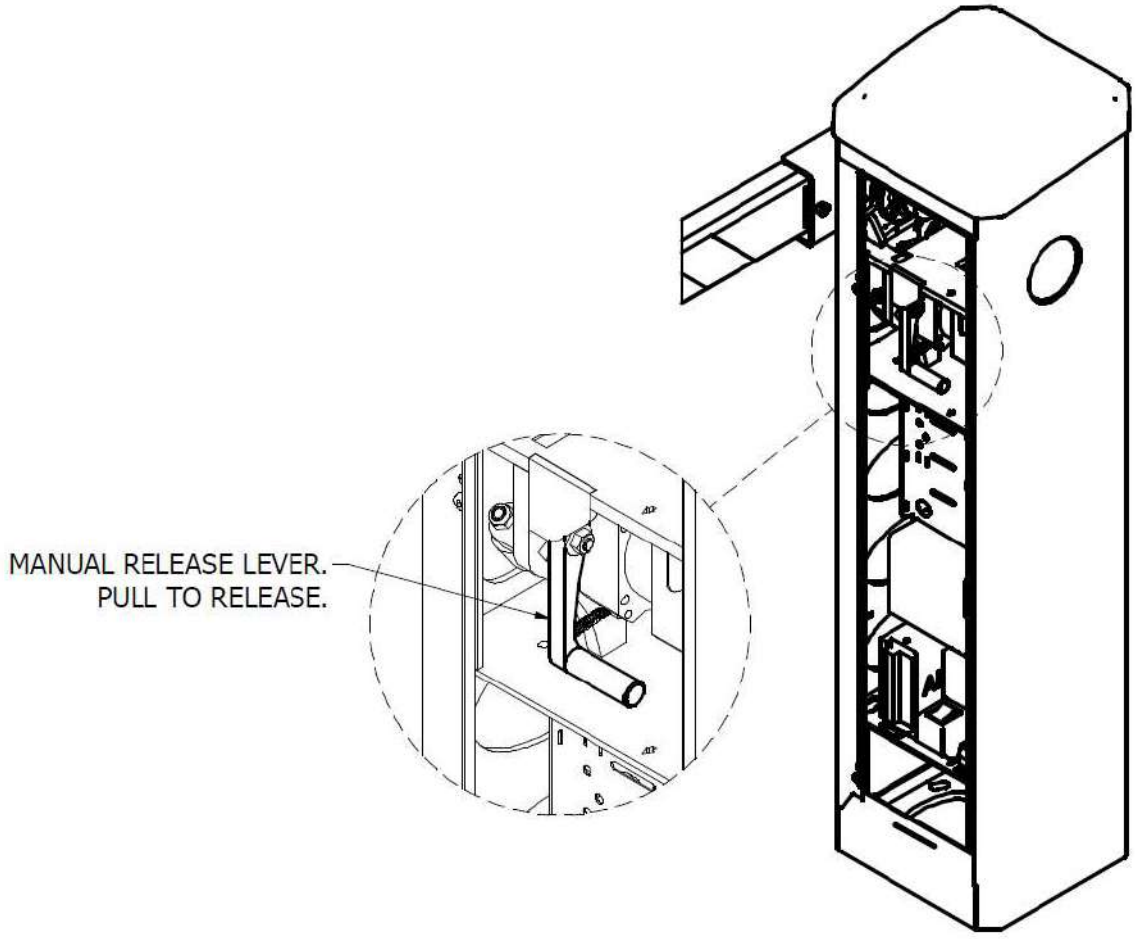


Figure 12: Emergency Manual Release Lever

7.2. Spring Assembly and Table

The barrier arm is counterbalanced by means of a spring mechanism. It is essential for the effective operation of the barrier to have the correct springs and tension.

For 3-meter, 3,5 meter and 4-meter barrier arms, 2 springs are required. For barrier arms larger than 4 meters, 4 springs are required. Each barrier has a different force required for the springs to act as a counterweight to the barrier arm.

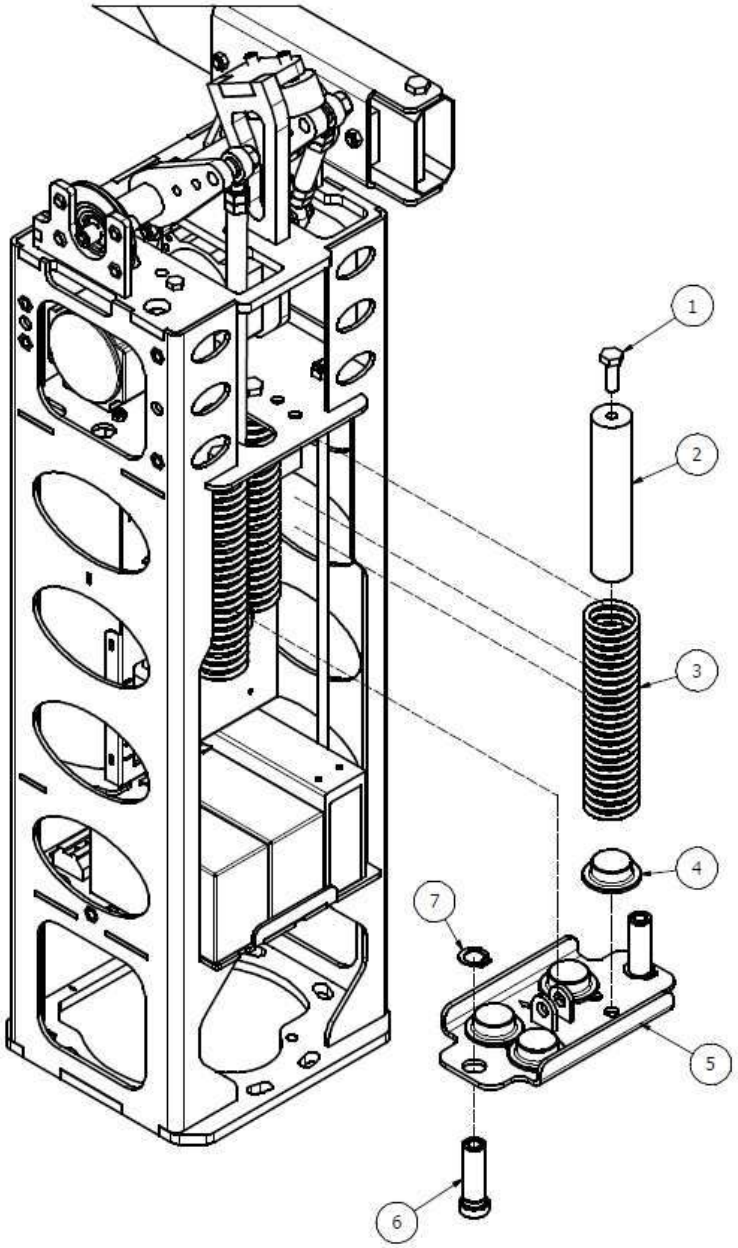


Figure 13: Spring Assembly

Spring Assembly for 2 Springs		
No	*Qty*	*Description*
1	2	M10x30 Hex bolt
2	2	Spring Cylinder Housing
3	2	Spring (See table)
4	2	Spring Seat Housing
5	1	Compression Plate
6	2	Spring Guide
7	2	18 External Circlip

Spring Assembly for 4 Springs		
No	*Qty*	*Description*
1	4	M10x30 Hex bolt
2	4	Spring Cylinder Housing
3	4	Spring (See table)
4	4	Spring Seat Housing
5	1	Compression Plate
6	2	Spring Guide
7	2	18 External Circlip

The spring plate can accommodate either 2 springs or 4 springs. The spring table serves as a guide to placing the correct springs for the length of barrier arm. When the barrier arm changes, the springs need to be changed and the spring tension needs to be adjusted.

When using 4 springs, 2 of one type and 2 of another type, the springs need to be staggered as per Figure 15 to retain even compression. For instance, on a 4,5-meter barrier when using 2 blue springs and 2 yellow springs, place the blue springs on positions marked 'A' and the yellow springs on the positions marked 'B'.

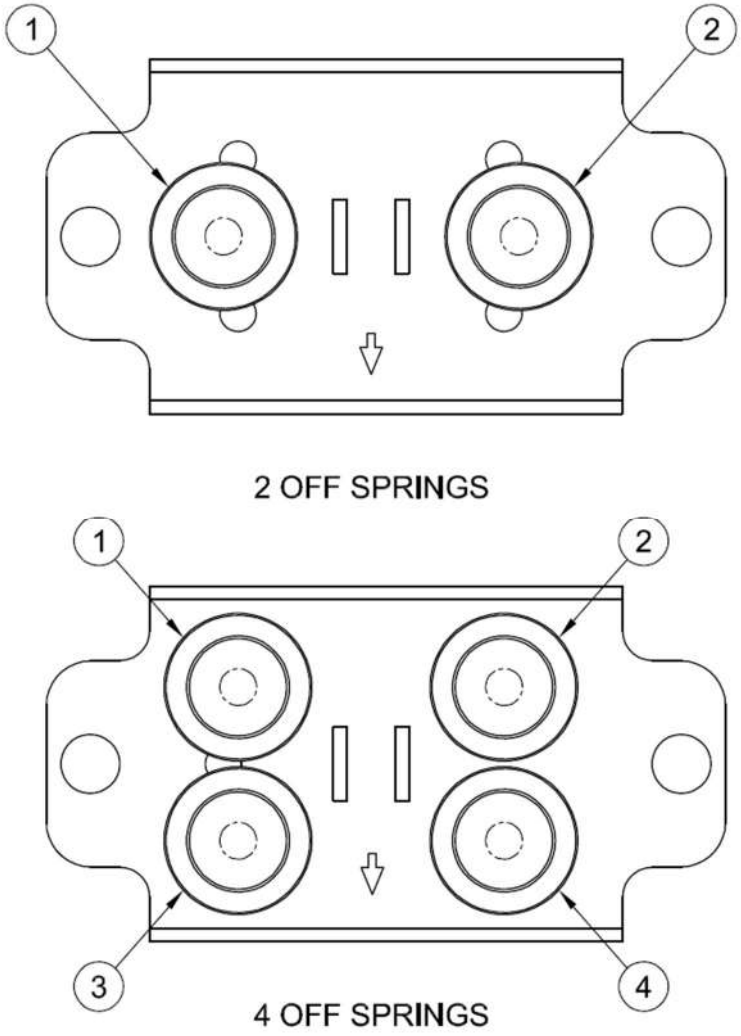


Figure 14: Positions of 2 and 4 Springs (All springs alike)

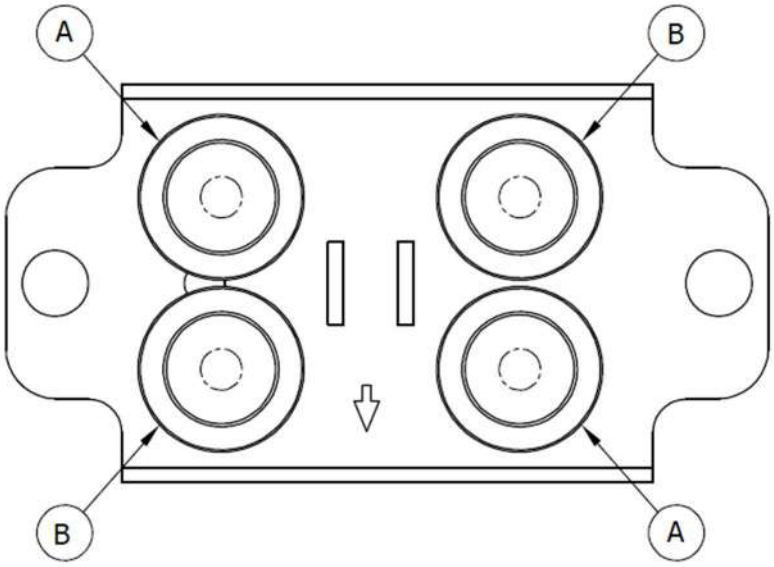


Figure 15: Staggering 4 Springs (Dissimilar springs)

Springs to Barriers Arm table and spring tension adjustment			
Barrier Arm Length	*Qty of Springs*	*Colour of Springs*	*Rod End Arm Adjustment*
3 Meter	2	2 Yellow	Full Extension
3,5 Meter	2	2 Yellow	Half Extension
4 Meter	2	2 Yellow	Full Extension
4,5 Meter	4	4 Yellow	Half Extension
5 Meter	4	4 Yellow	Full Extension
5,5 Meter	4	2 Gold, 2 Yellow	No Extension
6 Meter	4	2 Gold, 2 Black	No Extension

7.3. Adjusting spring tension (Rod arm extension)

The length of the arm can adjust by loosening the hex nuts on the rod end bearings and turning the shaft clockwise or anti-clockwise, which will adjust the length between the rod end bearings.

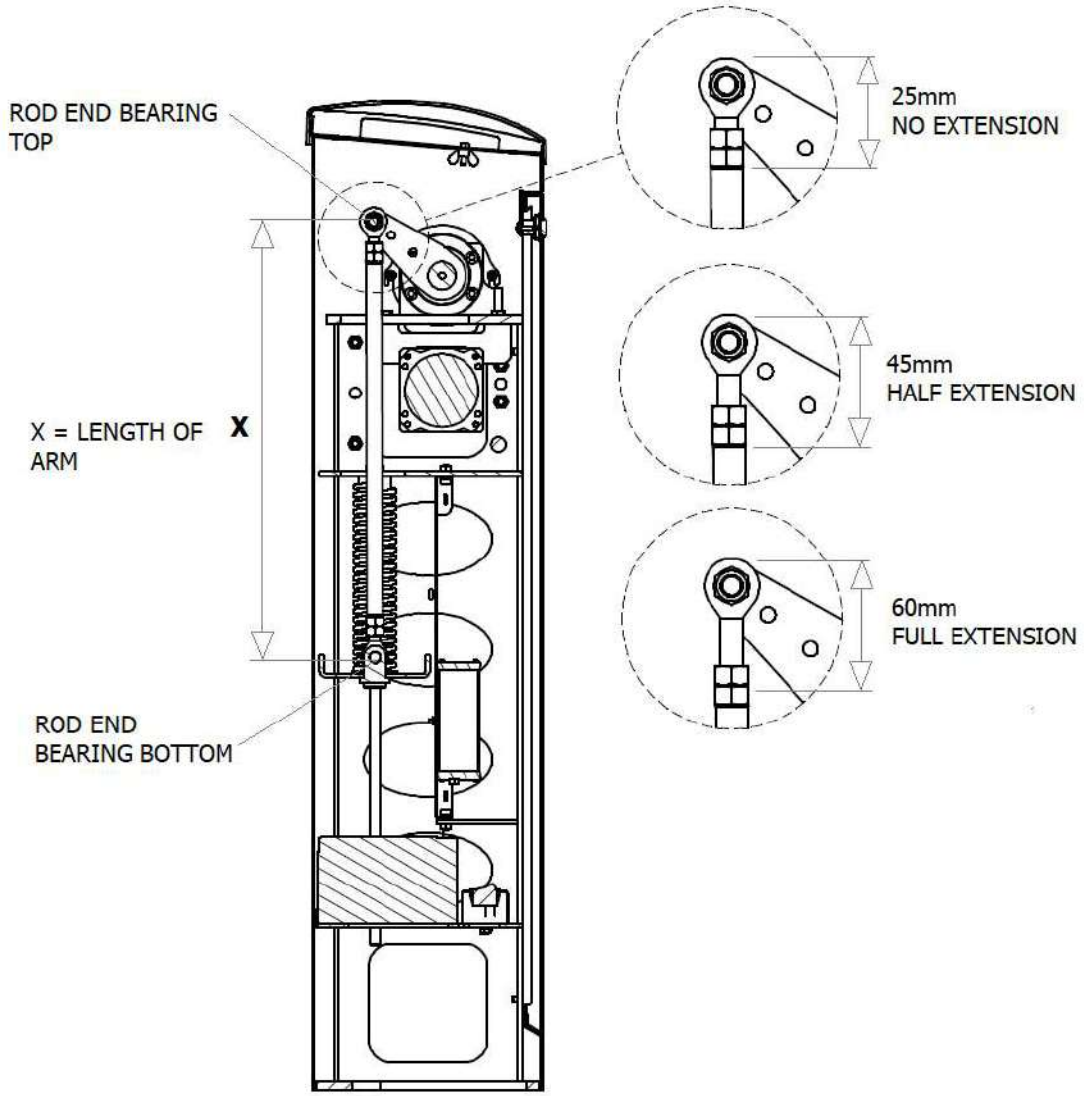


Figure 16: Adjusting Spring Tension

7.4. Testing spring balancing/ tension

With the barrier in closed position and power switched off, pull and return the release lever and gently raise the barrier arm. Let go, the barrier arm should settle at approximately 45 degrees.

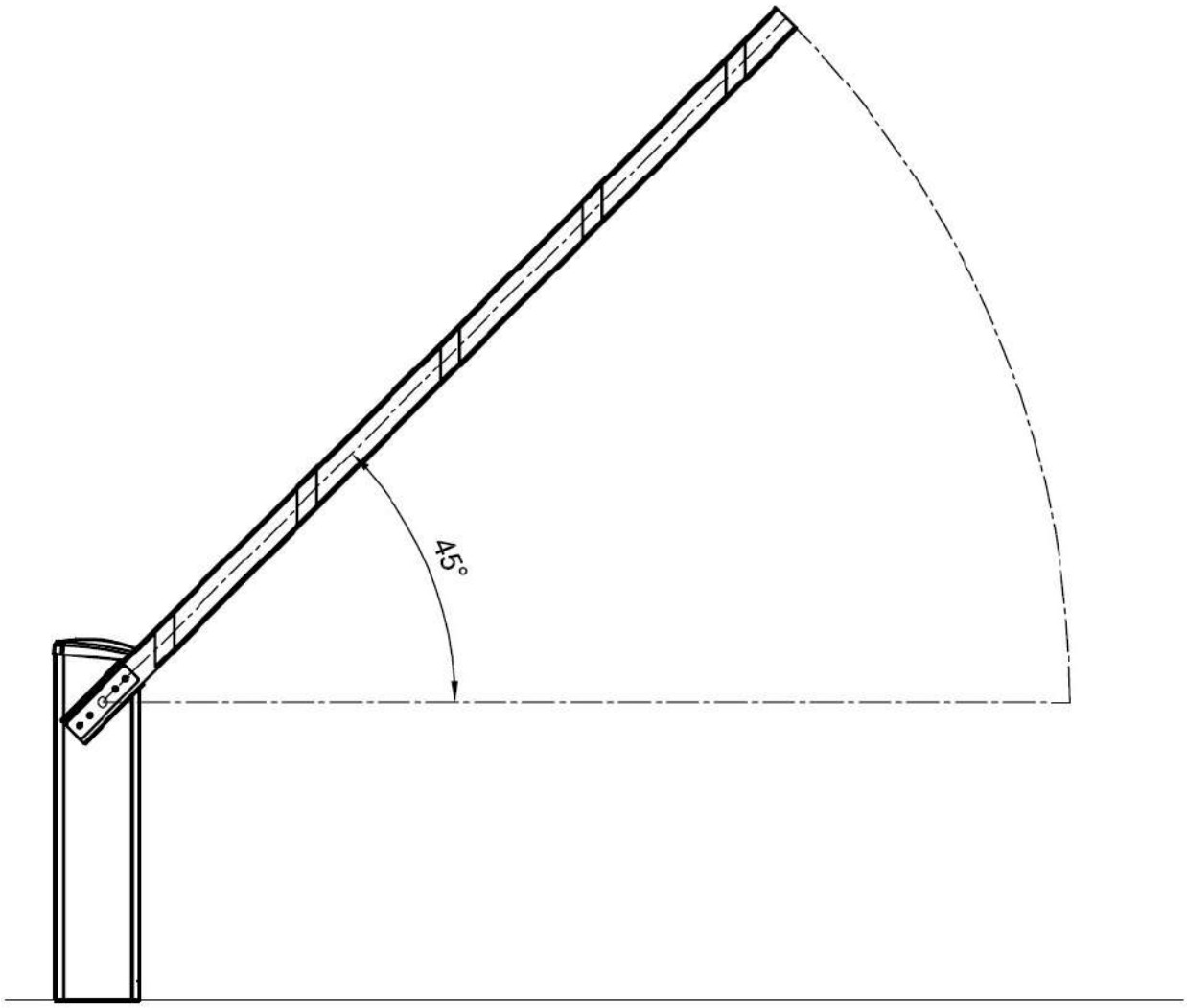


Figure 17: Testing spring balance/ tension

7.5. Changing the barrier arm length

Ensure power is off and the arm is in the closed position.

Remove the arm as per section 8.6, page 44 in this manual. Replace the arm with the new length and adjust the level and position as per section 8.10, page 51.

The degrees of travel might need adjusting as per section 8.12, page 57.

Replace and adjust the springs as per the spring table to the corresponding barrier arm length in section 7.2, page 31 & section 7.3, page 35.

After the arm is fixed in the correct position, switch on power. Recalibrate the controller as per section 9.1, page 75.

Test the barrier and resolve any issues using the troubleshoot guide in section 11, page 83.

8. INSTALLATION

8.1. Tool List

The following tool list should be used for installation and testing the barrier. The tool list should not be considered to be exclusive.

Velocity Barrier Installation and test Tool List	
Qty	*Tool*
1	External Circlip Pliers, Range 10-25mm
2	Impact Hammer Drill
3	½ Inch Socket Ratchet
4	22 Combination Spanner
5	19 Combination Spanner + 19 Hexagon Socket
6	17 Combination Spanner + 17 Hexagon Socket
7	13 Combination Spanner + 13 Hexagon Socket
8	10 Combination Spanner
9	8 Combination Spanner
10	7 Combination Spanner
11	Hexagon Allen Long L Shape Key Set (Require 2, 4, 5, 6, 8, 10, 12)
12	Hammer (450g Claw or Ball-pein 450g)
13	Flat 4mm Top Screwdriver
14	Q20 Multi-Purpose Lubricant (Silicone Free)
15	Grinder & Diamond cutting disk for cutting loops
16	Loop sealer (Den Braven Hybriflex-540)
17	Caulking Gun (for loop sealer)
18	Rubber mallet
19	Hacksaw / Cutting disk to cut aluminium tube for cutting jack-knife
20	Stanley Trimming Knife/ Scissors (to cut jack-knife foam and covering)
21	Side Cutter 160mm

8.2. Preparation of the Mounting Plinth and Conduits

The plinth should be prepared at least five days in advance to allow sufficient curing time. The plinth should be 400mm (w) x 400mm (l) x 350mm deep and cast to 15-20MPa strength.

A narrower plinth/curb can be used, based on a professional builder's recommendation. Conduits for power and data communications and safety/closing loop (if required) should be installed prior to casting the plinth. The conduit should be either flush or protruding maximum 15mm above the plinth. The conduit can be 20-60mm diameter sleeve, with a gentle bend to allow for easy cable pulling during installation.

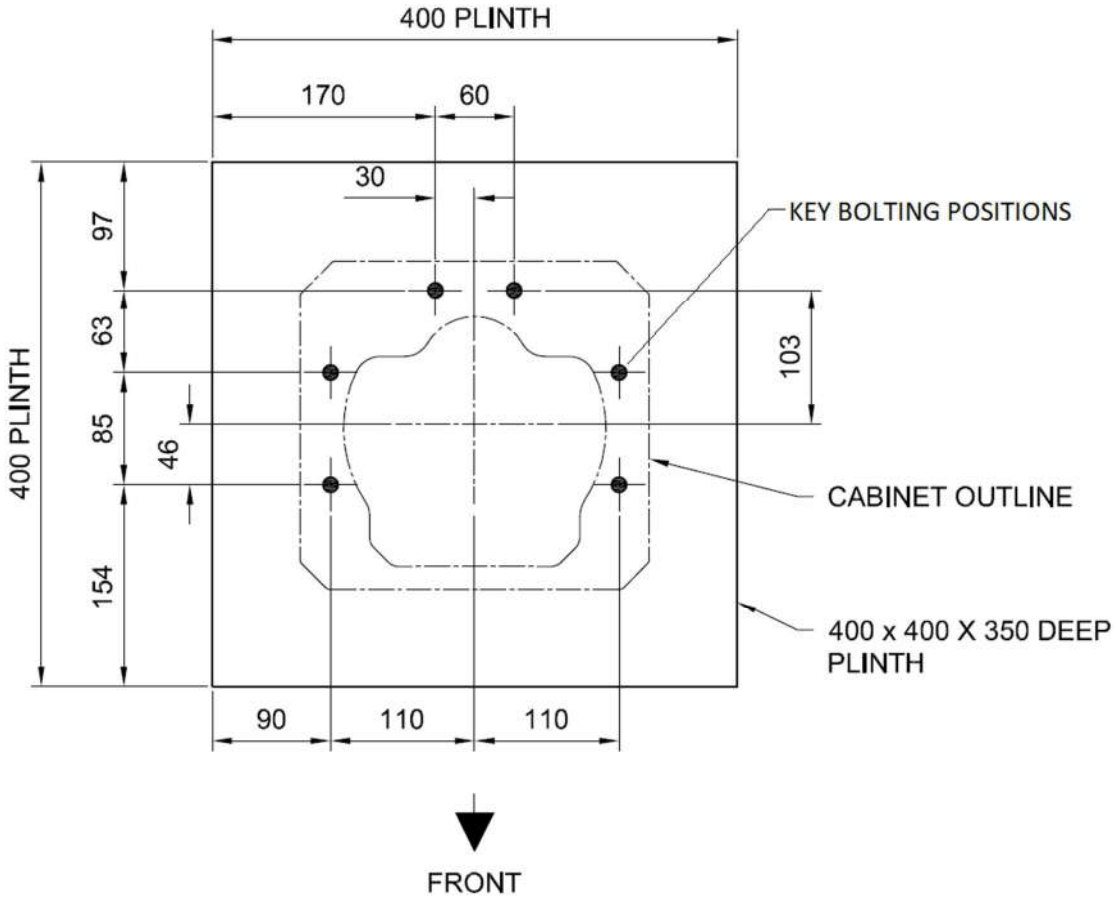


Figure 18: Plan View – Plinth with Conduit Position, Cabinet Outline & Bolting Positions

Special care should be taken during the placing of the conduit(s) in order to avoid the bolting positions. The conduit(s) should, therefore, be 175mm below finished level of the plinth before it is turned vertical for termination.

The recommended anchors include M10x75mm coach bolts with a nylon plug or M10x140mm chemical anchors.

On request, a drilling jig can be obtained from Turnstar to use as a template for marking holes required for bolting and conduit positions.

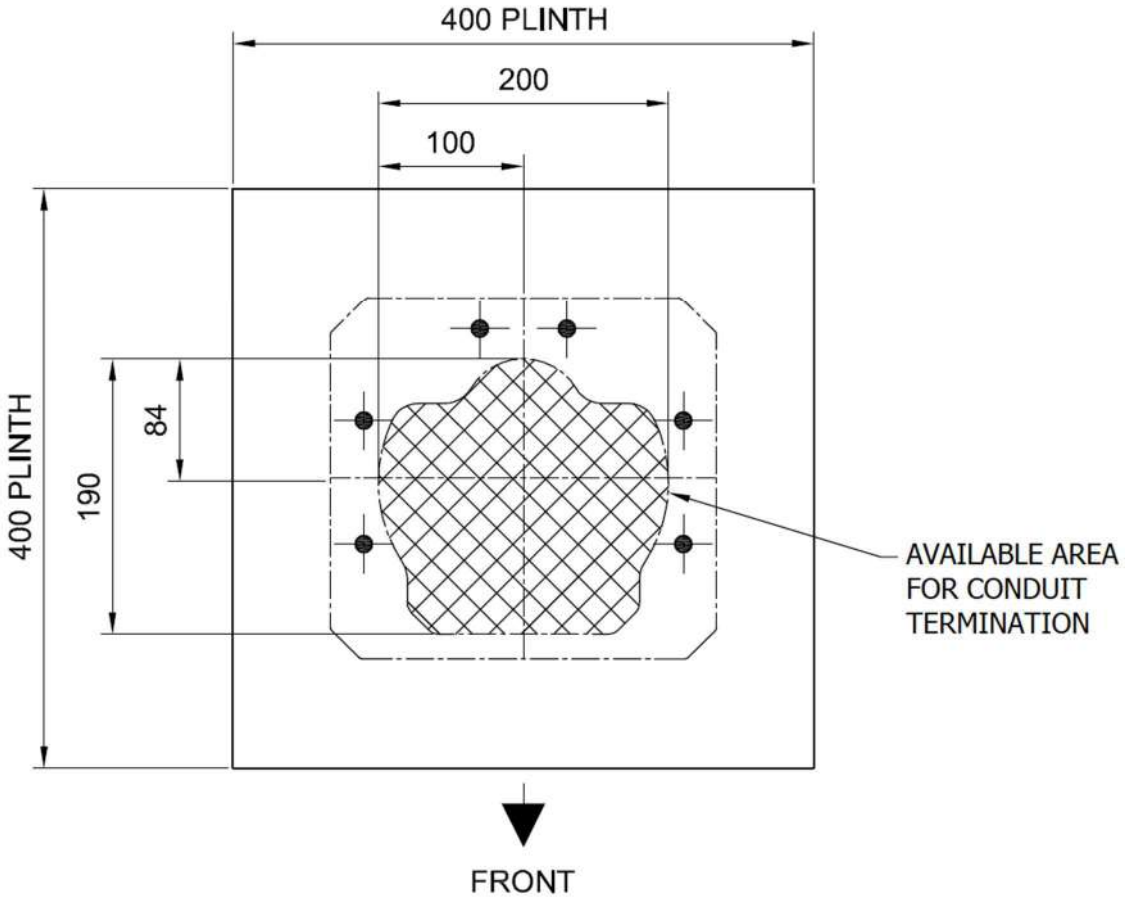


Figure 19: Plan View – Available Area for Conduit Termination

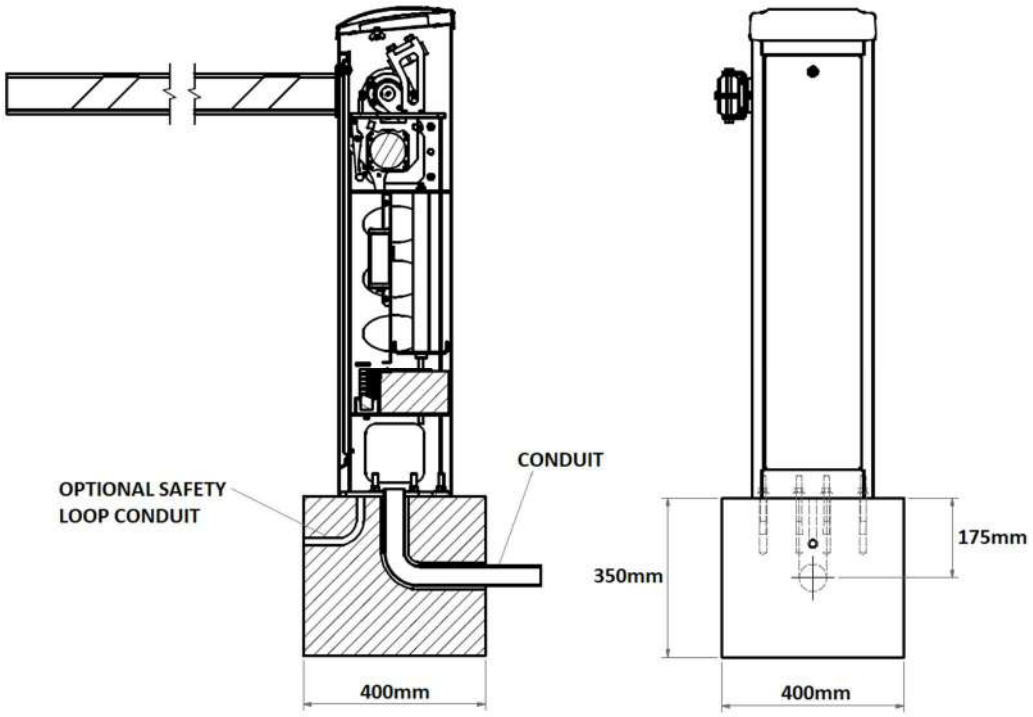


Figure 20: Elevation Side Section and Front

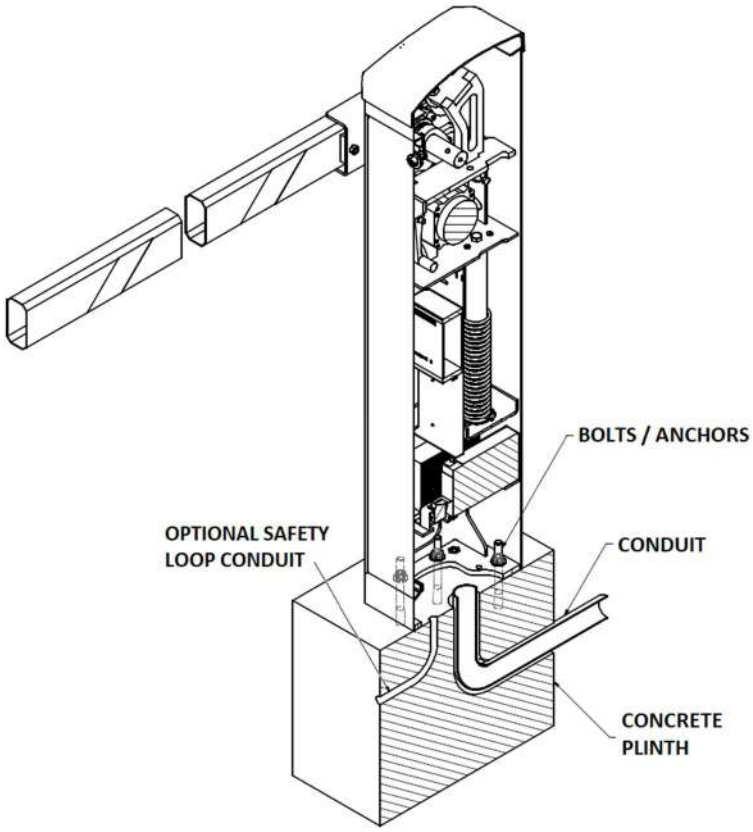


Figure 21: Isometric Section

8.3. Example of a Barrier Installation

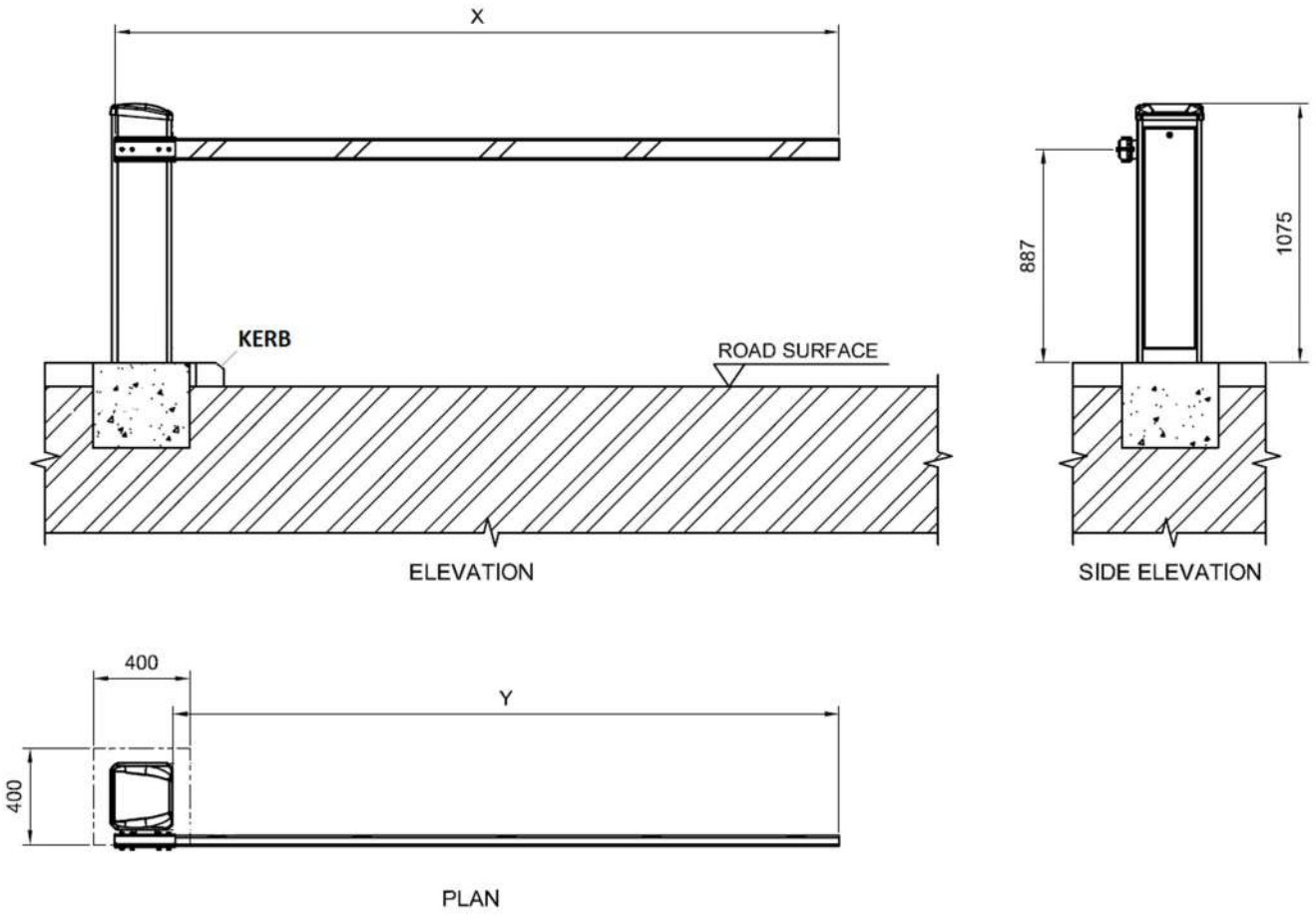


Figure 22: Drawing of Standard Barrier

Standard Installation Openings Speed			
Length Designation	*Opening Speed*	*X*	*Y*
3 Meter	1,2 seconds	3000mm	2760mm
3,5 Meter	1,2 seconds	3500mm	3260mm
4 Meter	1,2 seconds	4000mm	3760mm
4,5 Meter	2 seconds	4500mm	4260mm
5 Meter	2,5 seconds	5000mm	4760mm
5,5 Meter	2,5 seconds	5500mm	5290mm
6 Meter	3 seconds	6000mm	5760mm

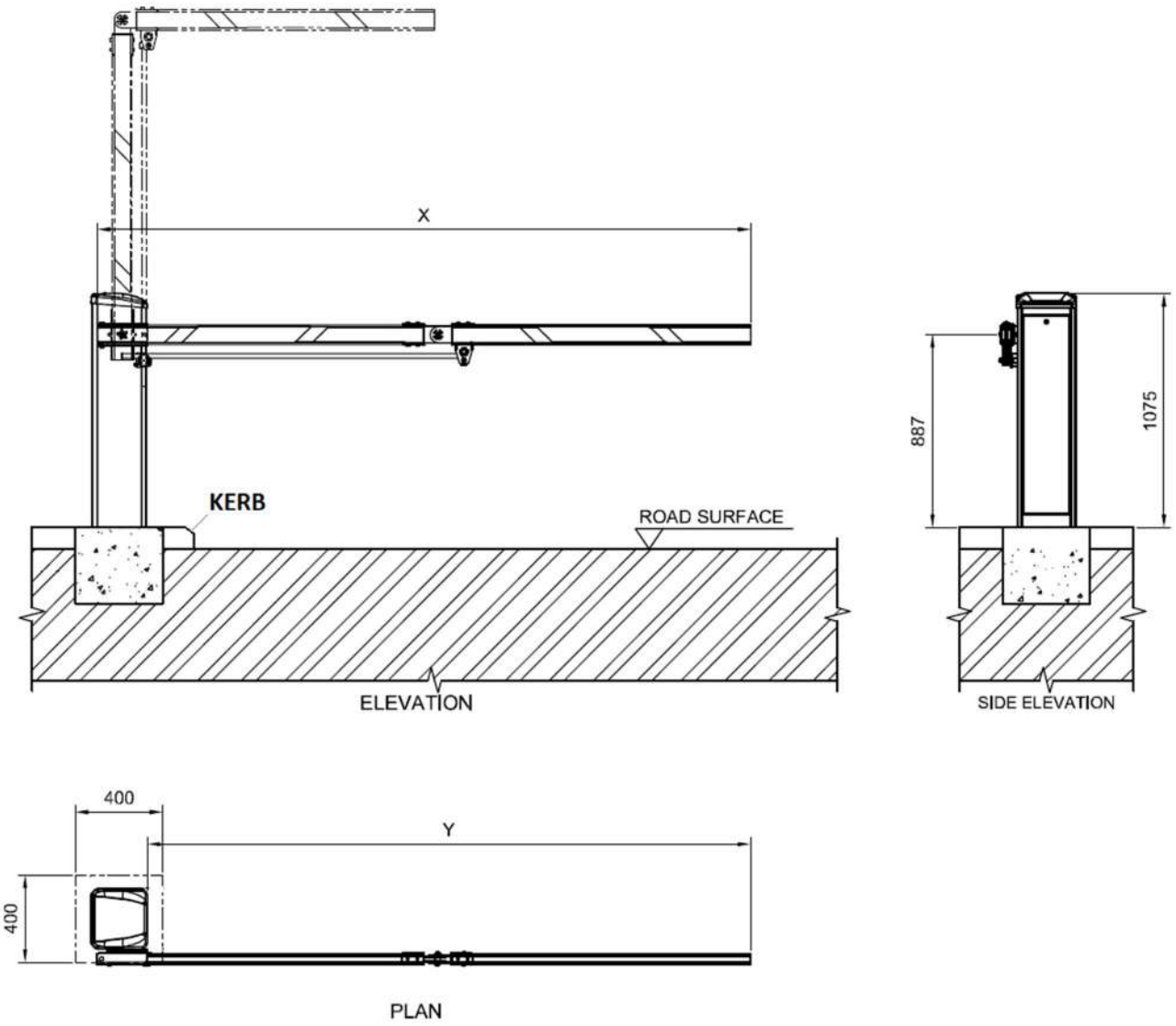


Figure 23: Drawing of Articulated Arm (Jack-Knife)

Jack-Knife Installation Openings and Speeds			
Length Designation	*Opening Speed*	*X*	*Y*
3 Meter	1,5 seconds	3000mm	2760mm
3,5 Meter	1,5 seconds	3500mm	3260mm
4 Meter	2 seconds	4000mm	3760mm
4,5 Meter	2,5 seconds	4500mm	4260mm

8.4. Examples of installations of Barrier with Inductive Loops

For safety and automatic closing, the most common system used is an inductive loop. The loop consists of a turned wire installed in the roadway which the controller uses to detect the presence of a metallic object.

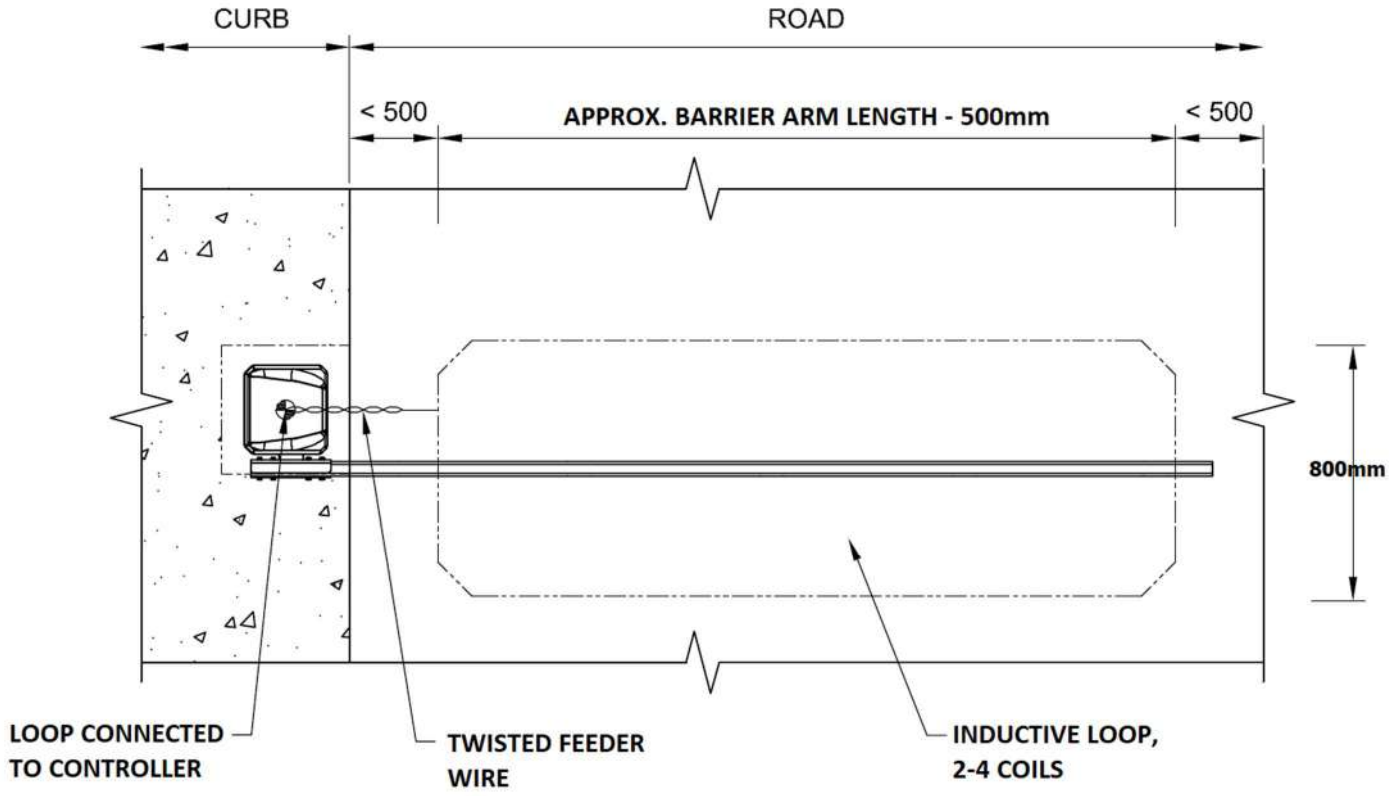


Figure 24: Typical Safety/Closing Loop

For detailed information on installation of the inductive loops, see section 8.17.

8.5. Preparation for Installation

To prepare for installation, the cabinet of the barrier should be removed for easy access to the internal structure. This will make it easier to position, level and bolt down.

8.6. Step 1: Removing the Barrier Clamp

Remove the barrier arm clamp. If the clamp is not fitted, the barrier arm clamp can be found inside the cabinet. Open the cabinet door to find the barrier arm clamp at the base of the internal frame.

Barrier Arm Clamp Parts		
No	*Qty*	*Description*
1	2	M8 x 70 Hex Bolt, Zinc Plated
2	1	Barrier Arm
3	6	M10x30 Hex Bolt, High Tensile
4	1	Washer
5	1	M10 Nyloc Hex Nut, Zinc Plated
6	1	M10 x 110 Hex Bolt, Zinc Plated
7	1	Barrier Arm Clamp
8	2	M8 Nyloc Hex Nut, Zinc Plated
9	1	M16 Nyloc Hexnut, Zinc Plated
10	1	Crown Connector

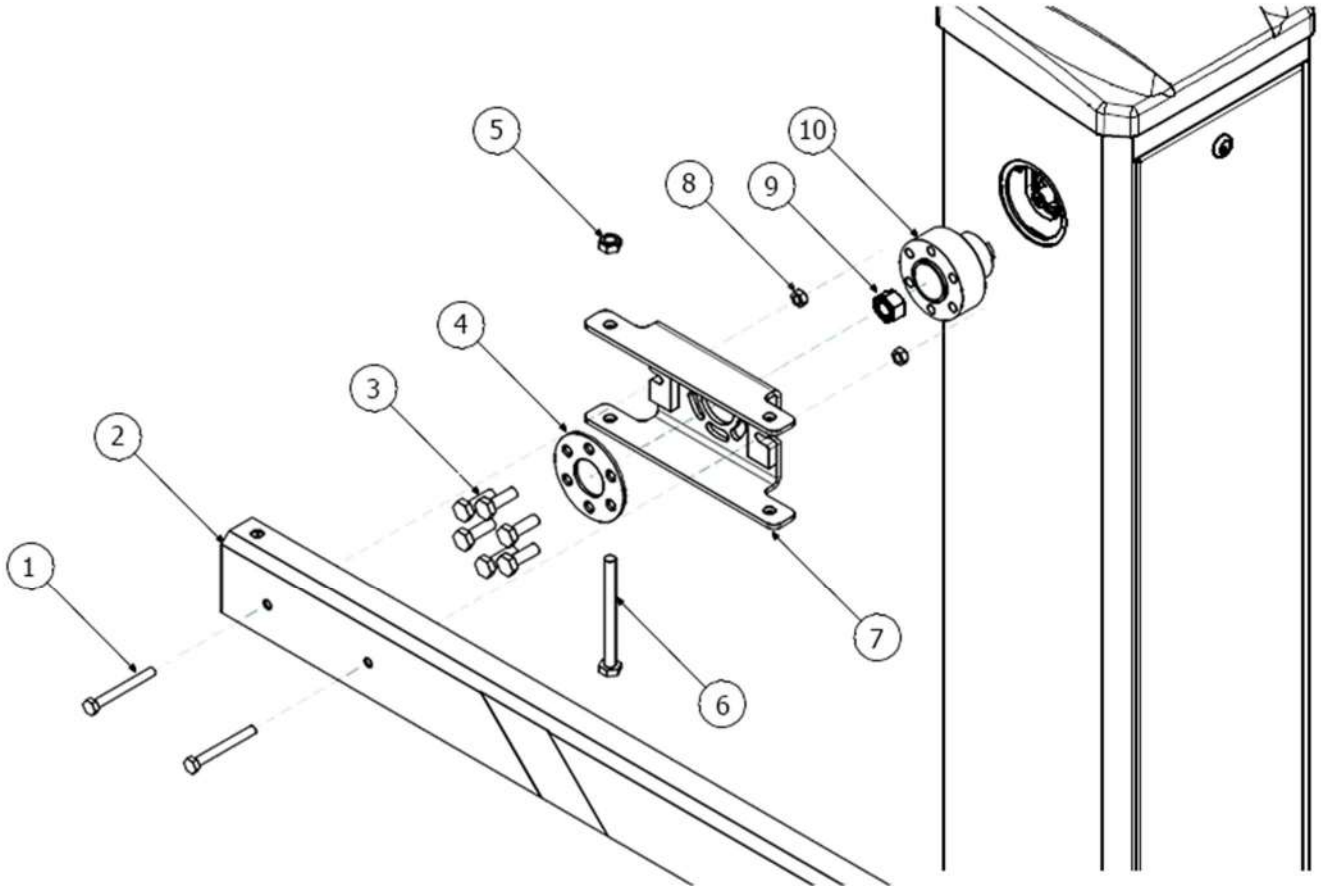


Figure 25: Removal of Barrier Arm Clamp Assembly

8.7. Step 2: Removing the Top Cover and Cabinet

Open the cabinet door with the supplied key. Place door to the side.

Remove the two wing nuts inside the cabinet which fasten the top cover to the cabinet. Lift off top cover and place to the side. Unbolt the cabinet by unscrewing the four bolts found on the side lips of the door cavity as shown.

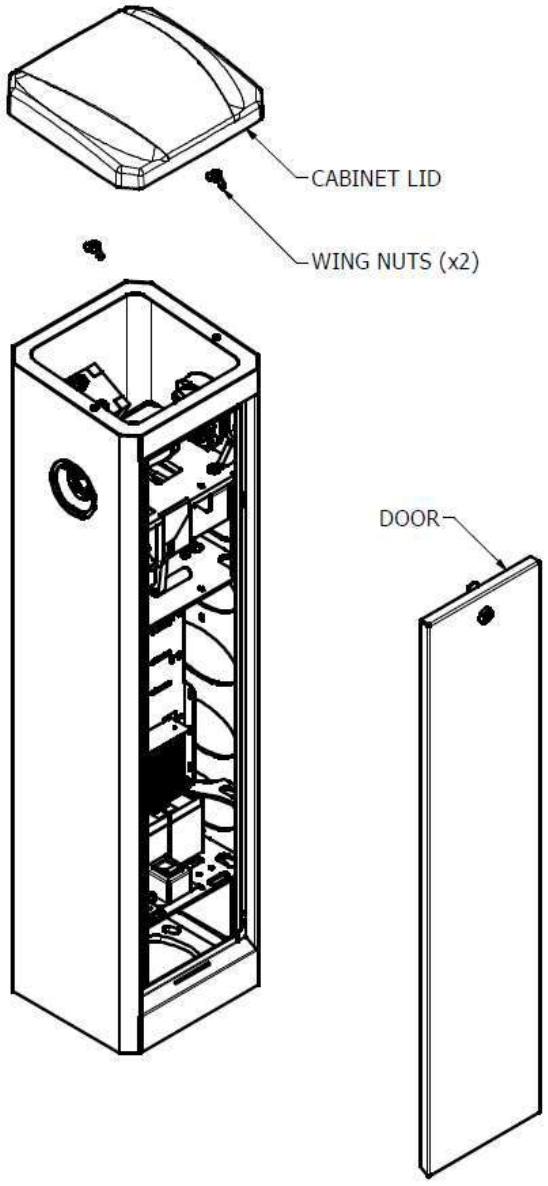


Figure 26: Removal of the Door & Top Cover

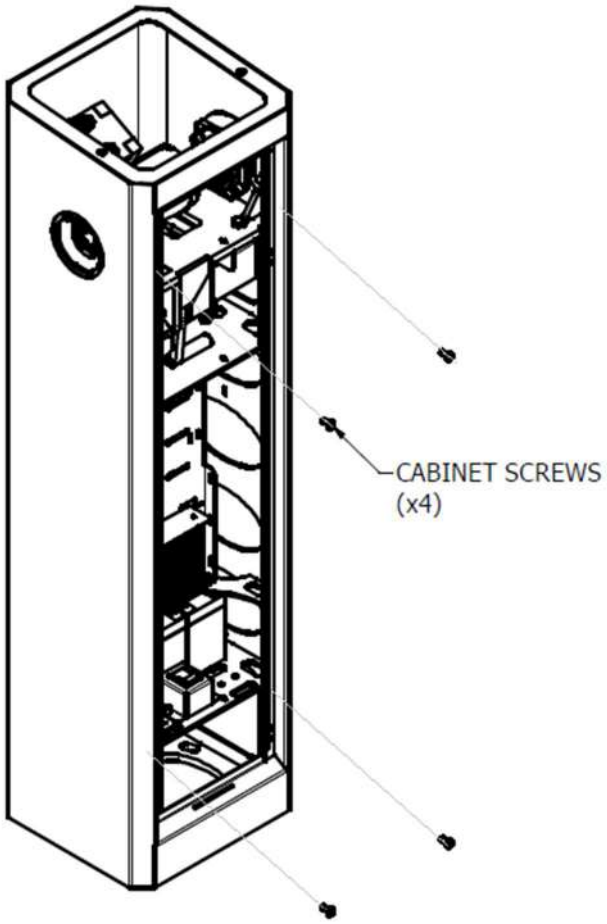


Figure 27: Unbolting the Cabinet

Lift cabinet up and off the internal frame. Never use the lid as a handle.

The internal structure is now accessible and can be bolted to the plinth.

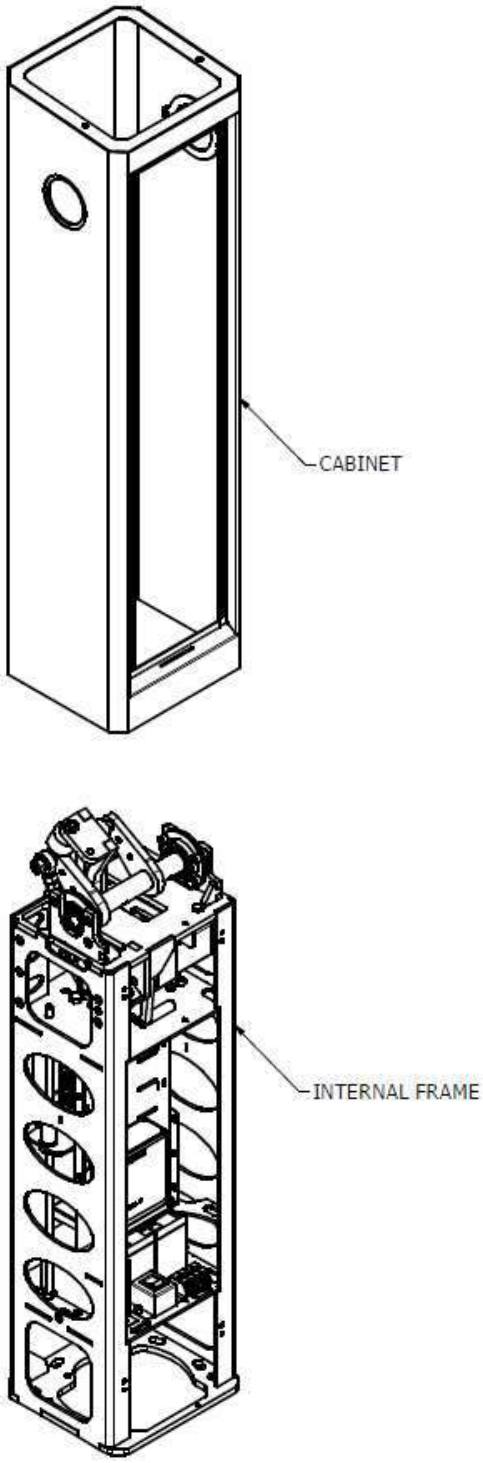


Figure 28: Removing the Cabinet

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8.8. Replacing the Cabinet on to the internal frame

Slide the cabinet over the internal frame. If bolting holes are not lining up with the frame holes, insert a number 3 allen head key into the locating hole in order to then insert and turn the bolt into the frame. When all four screws are in place, tighten these. See Figure 29.

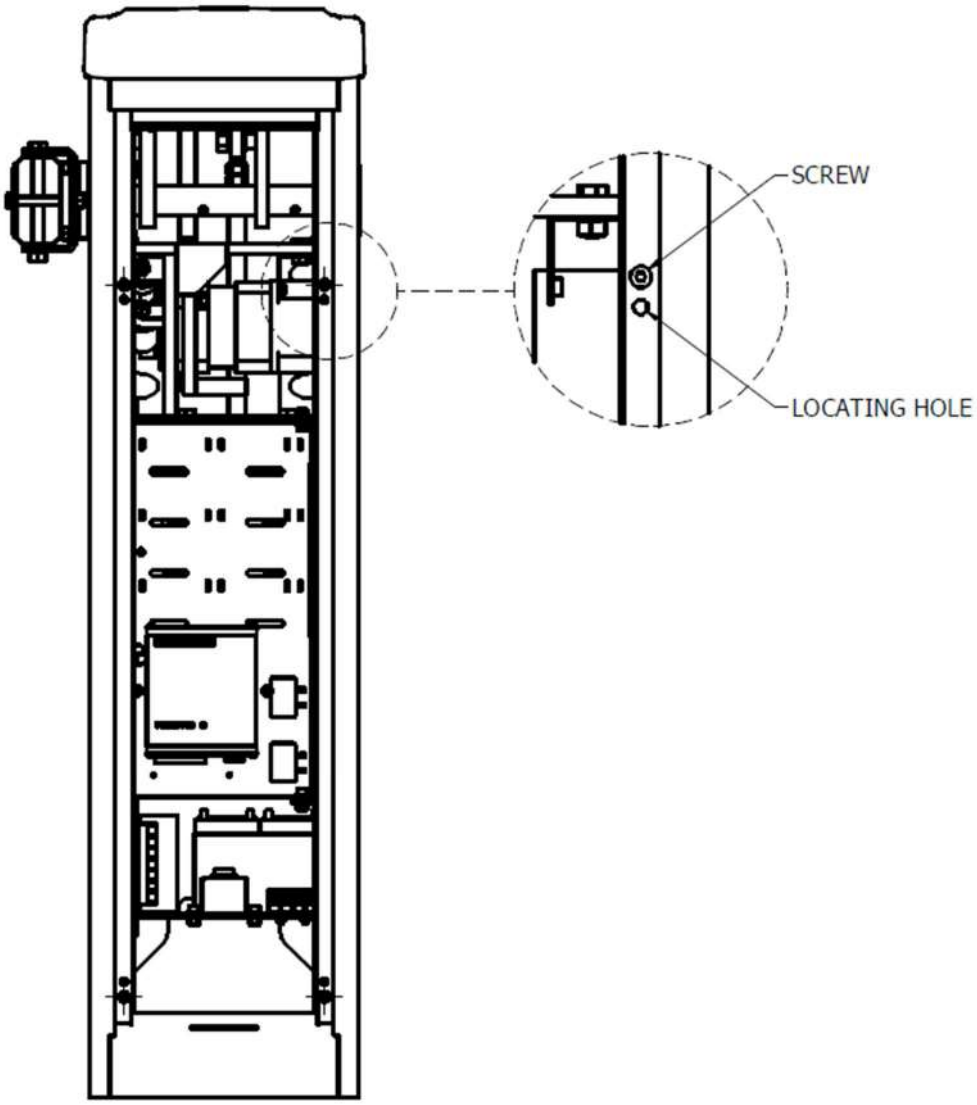

Figure 29: Locating holes and bolting positions

8.9. Step 3: Fixing Internal Frame

The internal frame has a base plate with 6 slots for bolting the unit. The slots are for adjusting the barrier frame slightly to the left or the right before tightening. It is suggested to use a minimum of 4 bolts to secure the unit to the plinth.

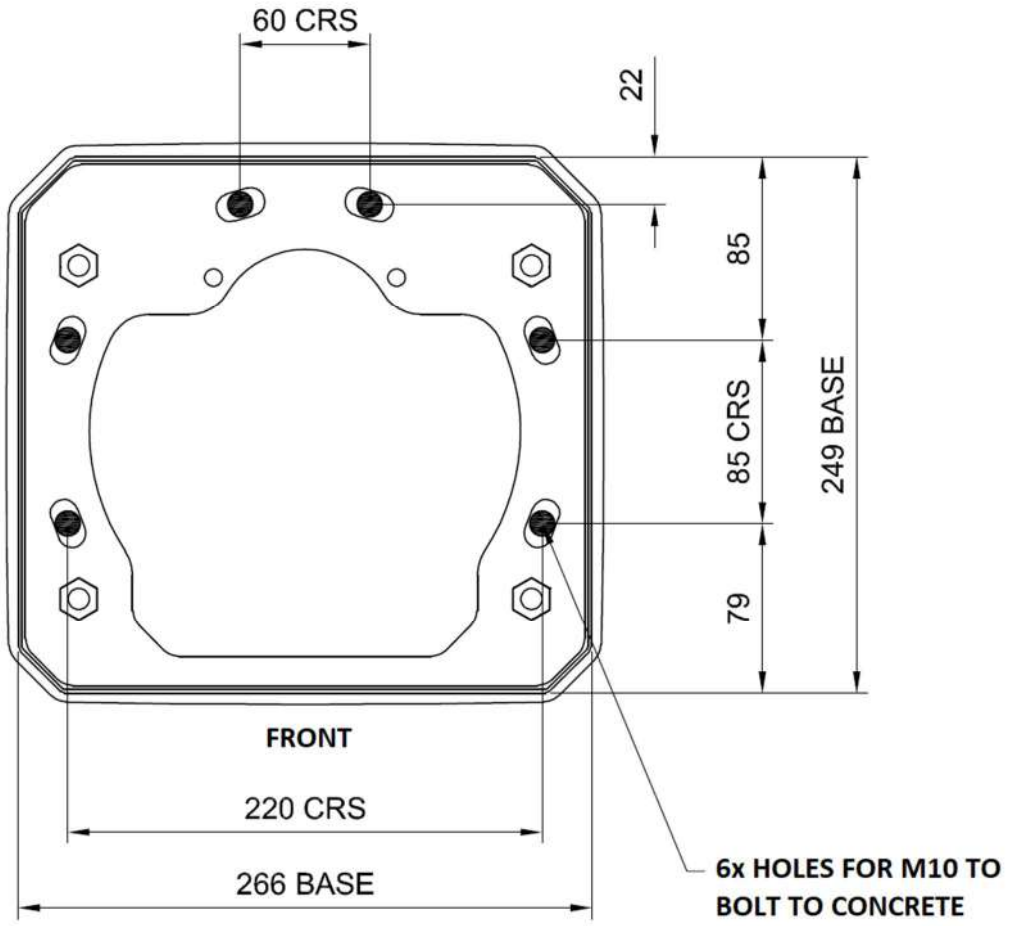

Figure 30: Bolting Positions

Place frame on plinth. Level frame using the 4x corner bolts and lock in place with the locking nuts. Mark bolting holes on plinth. Remove frame and drill holes. Replace frame on plinth and bolt down.

The internal frame can be slightly rotated 3 degrees left or 3 degrees right by loosening the M10 anchors in the slots in the base and rotating the frame.

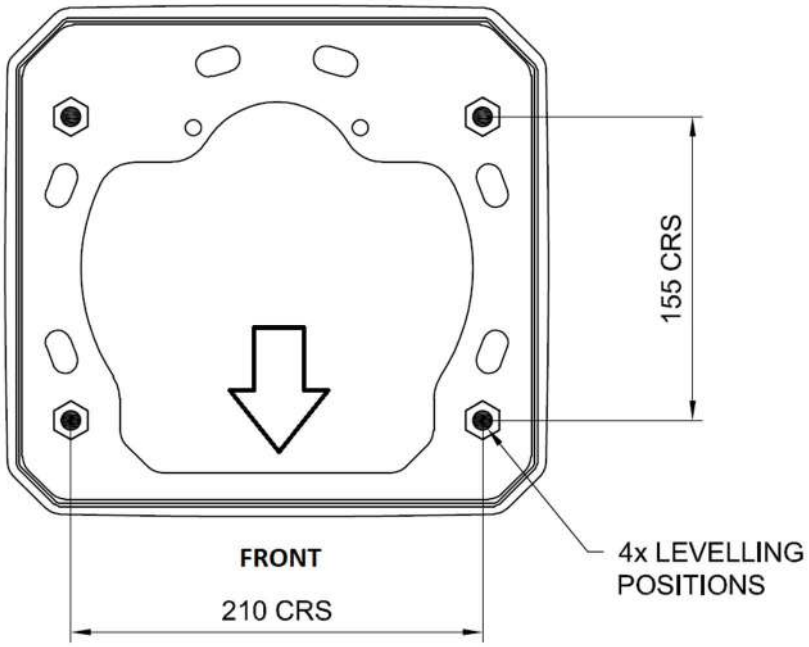

Figure 31: Frame Levelling Adjustment

Fit the barrier arm clamp (section 8.6, page 44) and the aluminium barrier arm. Ensure the springs are in place.

Connect power and switch power on (section 6.2, page 14). The barrier arm will lower. Check alignment.

The internal frame can be rotated maximum 3 degrees either left or right by loosening the anchor bolts and turning the internal frame. Retighten the anchor bolts.

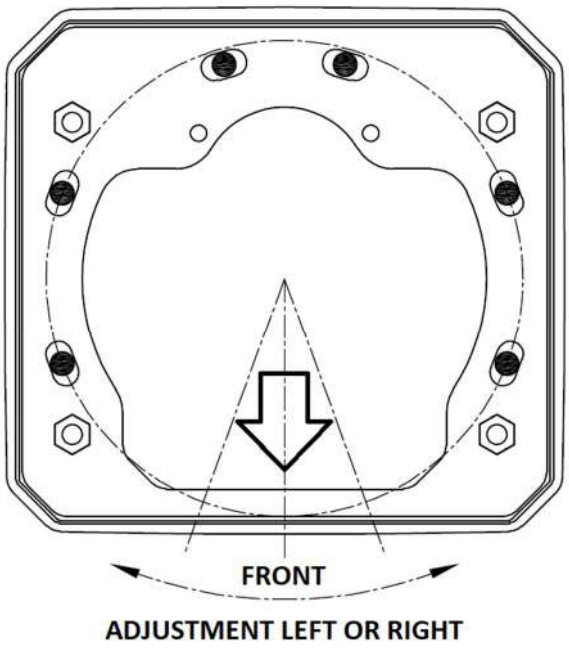

Figure 32: Frame Adjustment Left or Right

8.10. Replacing the Barrier Arm

Replace the barrier arm, following the reverse in section 8.6, page 44. Take note of the below.

Make sure the mechanism is in the down position so that when the barrier arm is placed, it is also in the down position. The rod end arm will be resting on the top rubber buffer as per Figure 33. This buffer is the 'down' buffer.

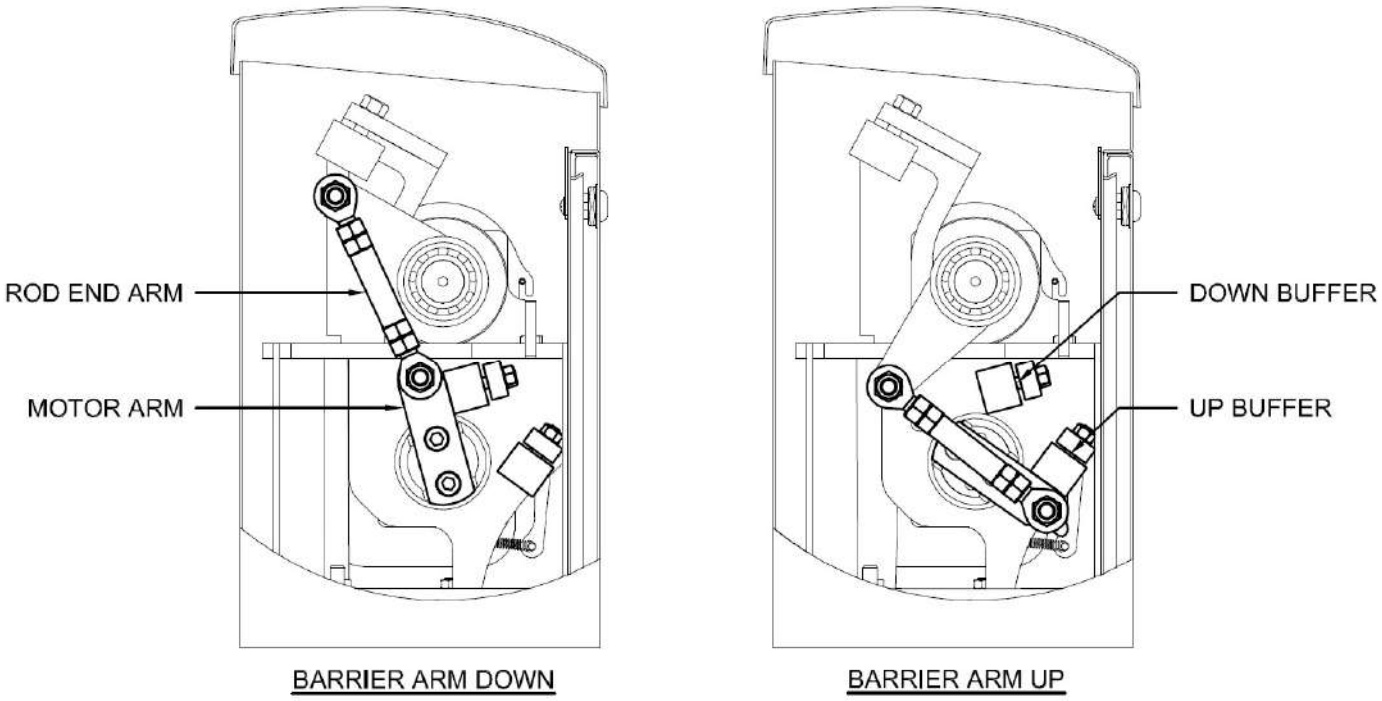

Figure 33: Rod End Arm Positions

When the barrier arm is raised up, the motor arm will rotate anti-clockwise downward to the bottom buffer. This buffer is the 'up' buffer.

When connecting the barrier clamp to the shaft, make sure the crown connector aligns and fits into the shaft before tightening the M16 hex nut. If the splines do not engage, the barrier arm will drop down on testing. See Figure 34.

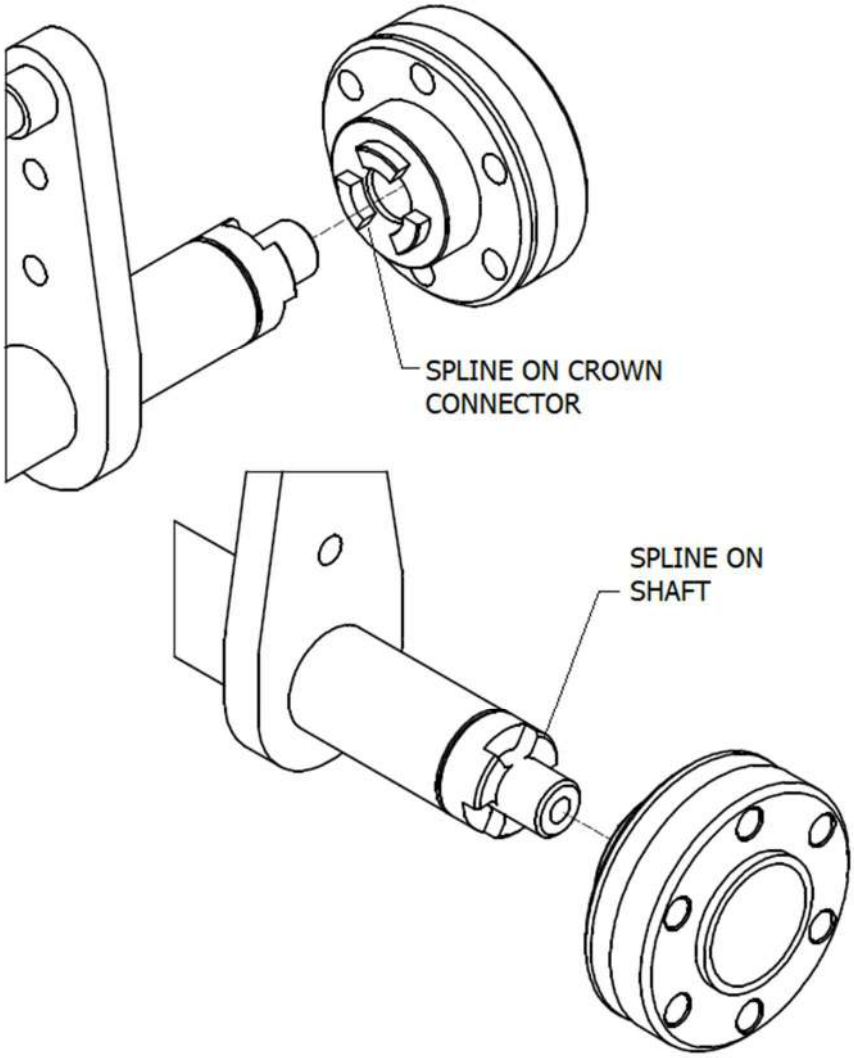

Figure 34: Spline between crown connector and shaft

Power can now be connected to test the barrier and to continue adjusting the barrier arm. See section 6, page 13 for connections and section 9, page 75 for testing.

8.11. Adjusting the Barrier Arm

On an uneven road surface, it might be desirable to adjust the arm of the barrier to be parallel with the road surface. This might be a slight adjustment to please the eye, by using a spirit level, or it might be a stricter adjustment to adjust to the road surface.

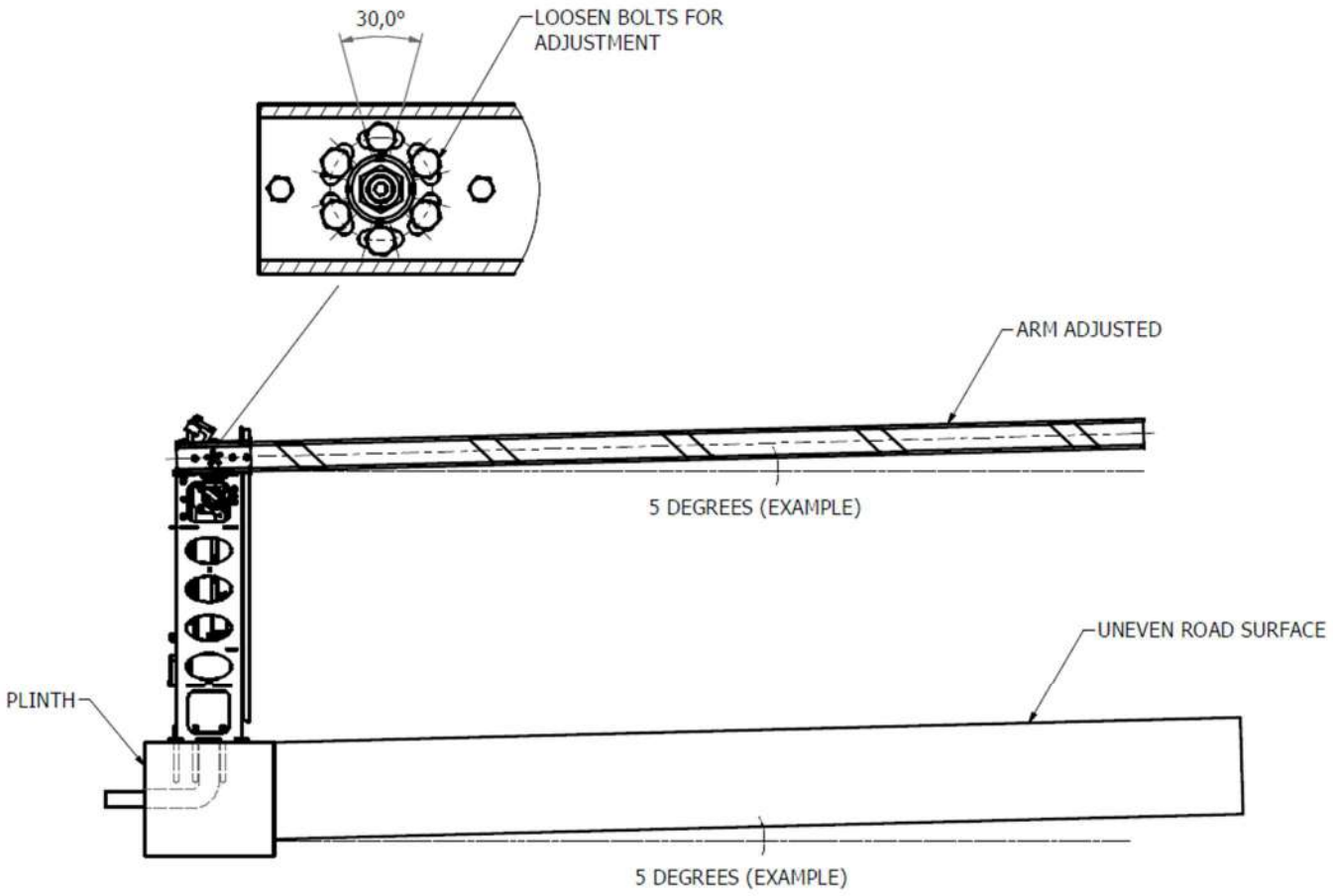

Figure 35: Barrier Arm Adjustment

The adjustment can be done by removing the safety plate of the barrier arm clamp, and then the barrier arm to expose the arm holder. There are 6 off M10 hex bolts fixing the bracket to the crown connector. Each slot allows 30 degrees maximum movement, 15 degrees clockwise and 15 degrees anti-clockwise.

Loosen the bolts and adjust the bracket to the required position. Fix the bolts again, in alternate sequence, until tight.

Run the barrier in test mode using dipswitch 10 on the function control block. Check the motion and degrees of travel. The standard operation of the barrier is to travel approximately 90 degrees. However, in cases of severe barrier arm adjustment, the barrier arm may appear to 'overshoot'.

In Figure 36 below, barrier arm is shown in the normal operation, travelling 90 degrees from closed to fully open.

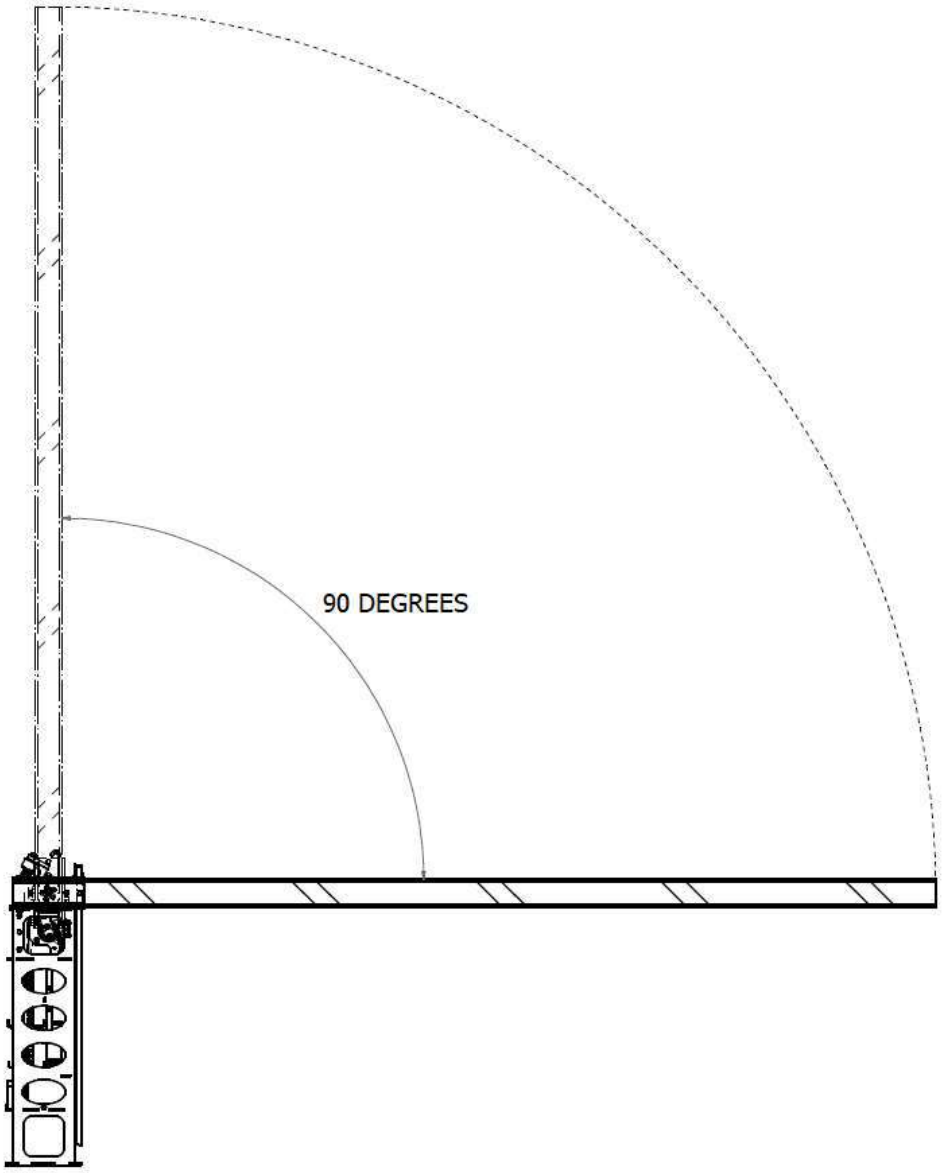

Figure 36: Arm shown in normal operation

In Figure 37, barrier arm is shown, possibly requiring adjustment. Travel is still 90 degrees but overshoots the vertical position and may not look pleasing to the eye.

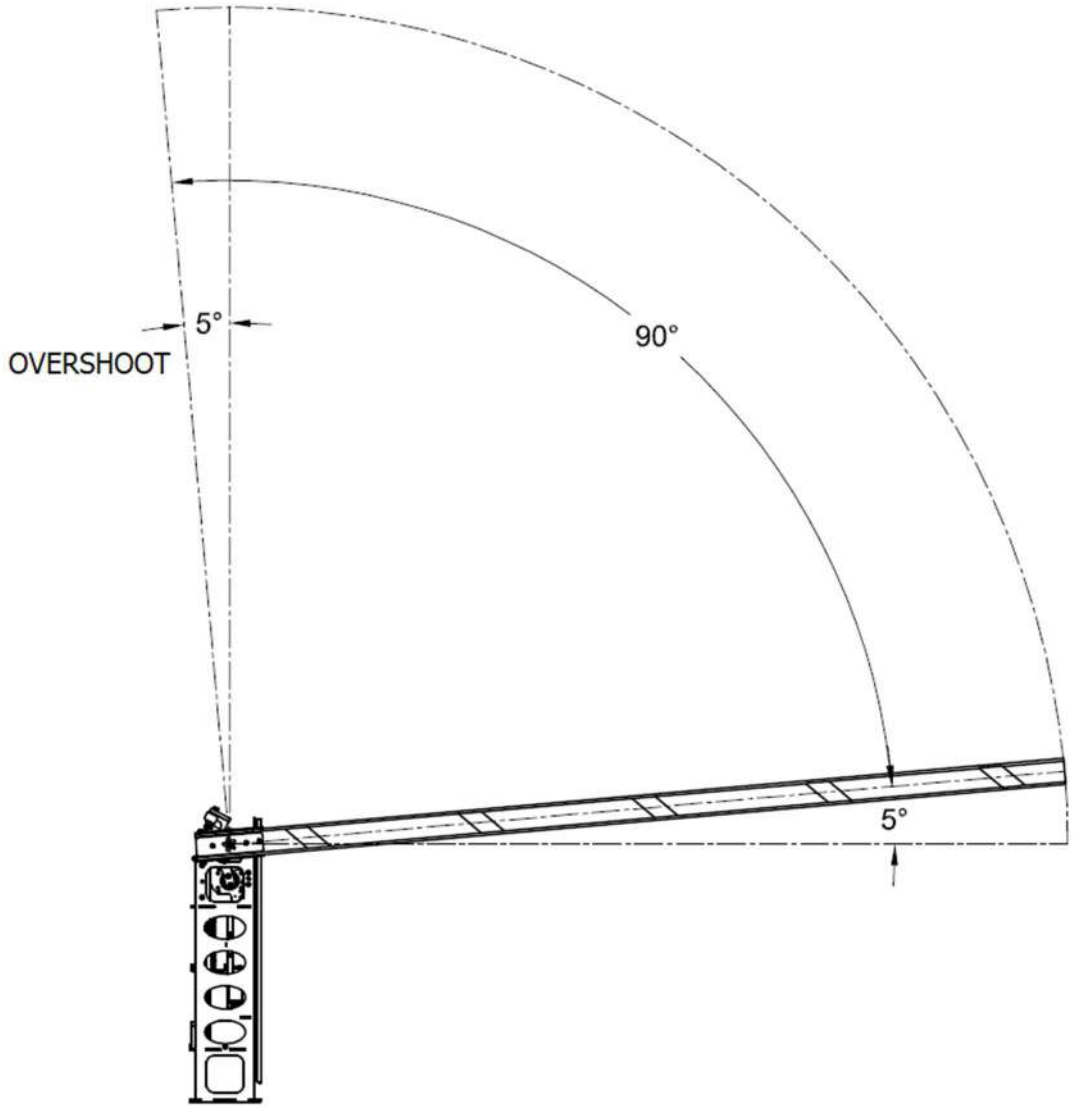

Figure 37: Arm shown in 90-degree operation and apparent overshoot

Switch off cycle mode and power and refer to section 8.12, page 57.

8.12. Adjusting the Rod End Arm to decrease the degrees of travel

The barrier arm can be adjusted to have a smaller degree of travel in the up position, in case a ceiling or overhang is in the way when the barrier is open. The rod end arm can be adjusted to decrease the travel of the arm when moving up, which will limit the opening angle. The minimum angle that can be achieved is 80 degrees.

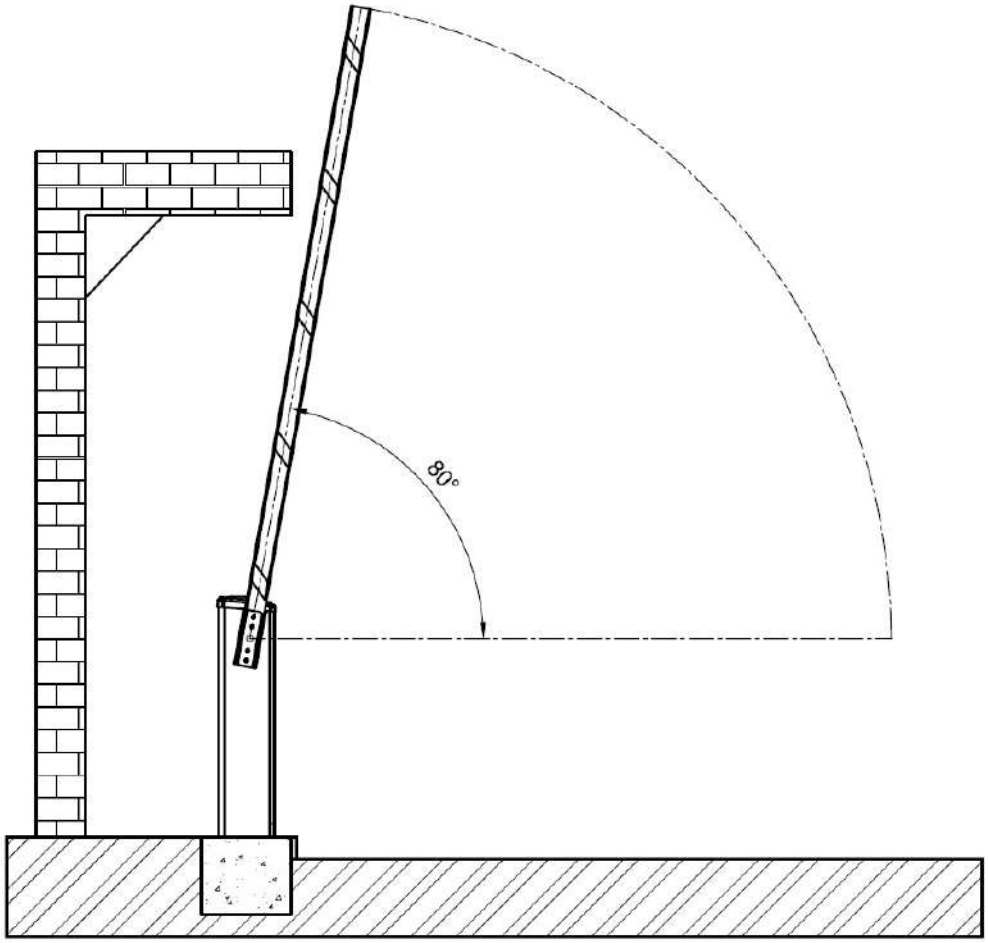

Figure 38: Opening limitation required on barrier arm

The rod end arm connects to the motor drive arm and the shaft drive arm and has a left-hand thread on one end and a right-hand thread on the other end. The center section of the rod end arm can be rotated to increase/ decrease the distance between the link arm rod end bearings, which will adjust the angle of opening on the barrier arm.

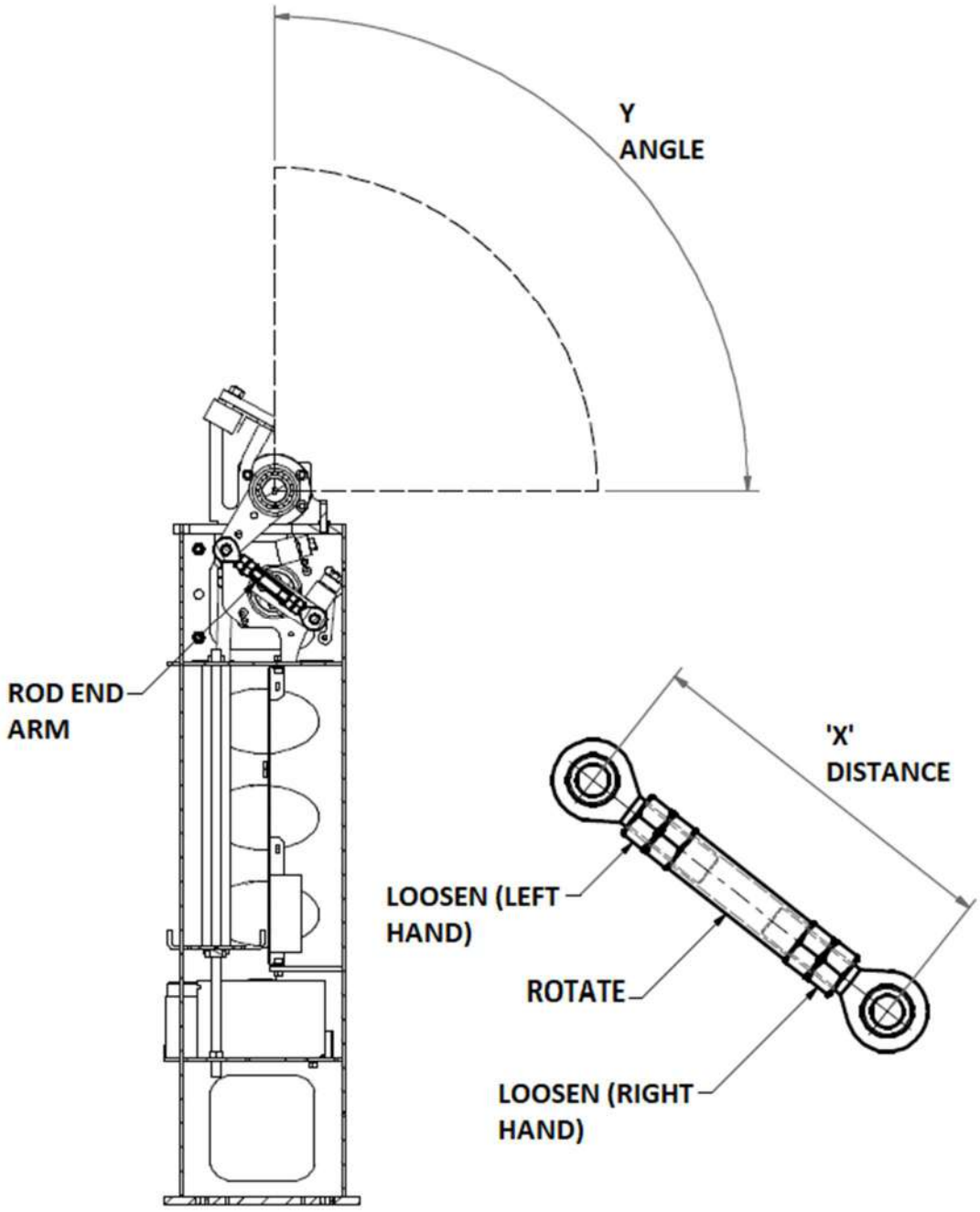

Figure 39: Rod End Arm Adjustment

Loosen the two nuts on the ends as shown. Rotate the centre part by using a 17 spanner on one of the welded nuts. As the dimension between X decreases, the opening angle Y will also decrease, and vice-versa. Retighten the nuts on either end. Switch power on and wait for the barrier arm to lower.

Remove the cover plate and barrier arm and re-adjust the barrier arm clamp as per section 8.11, page 54.

8.13. Completing the installation

Once satisfied with the operation, switch power off, remove the cover plate, barrier arm and barrier arm holder. Apply the learn sequence as per section 9.1, page 75 and use the test dipswitch 10 on the function control block.

Fit the cabinet back onto the frame. Fit the barrier arm holder, barrier arm and cover plate. Finally, fit the top cover.

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8.14. Calculation for the Articulated Arm (Jack-Knife)

The barrier arm cutting length for the articulated arm assembly can be calculated using the required length of the barrier and the height from the floor to the ceiling.

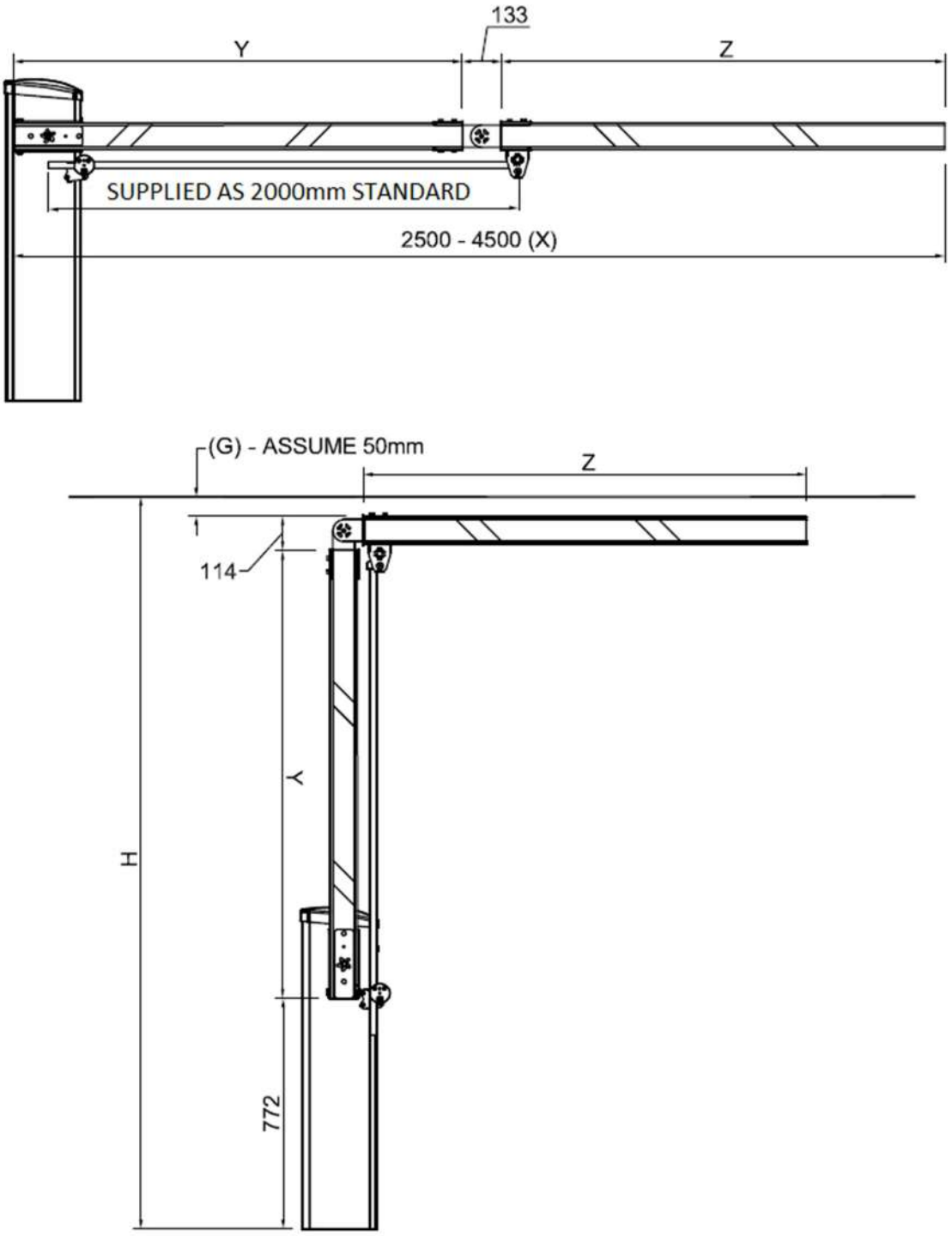

Figure 40: Articulated Arm (Jack-Knife) Calculation

The calculation to solve Z and Y is as follows:

H = Height from floor to underside of ceiling (mm)

G = Gap between top of barrier and underside of ceiling (assume 50mm).

X = Total length of barrier required.

Y = H – 886mm - G

Z = X - Y – 133mm

8.15. Assembly of the Jack-Knife arms

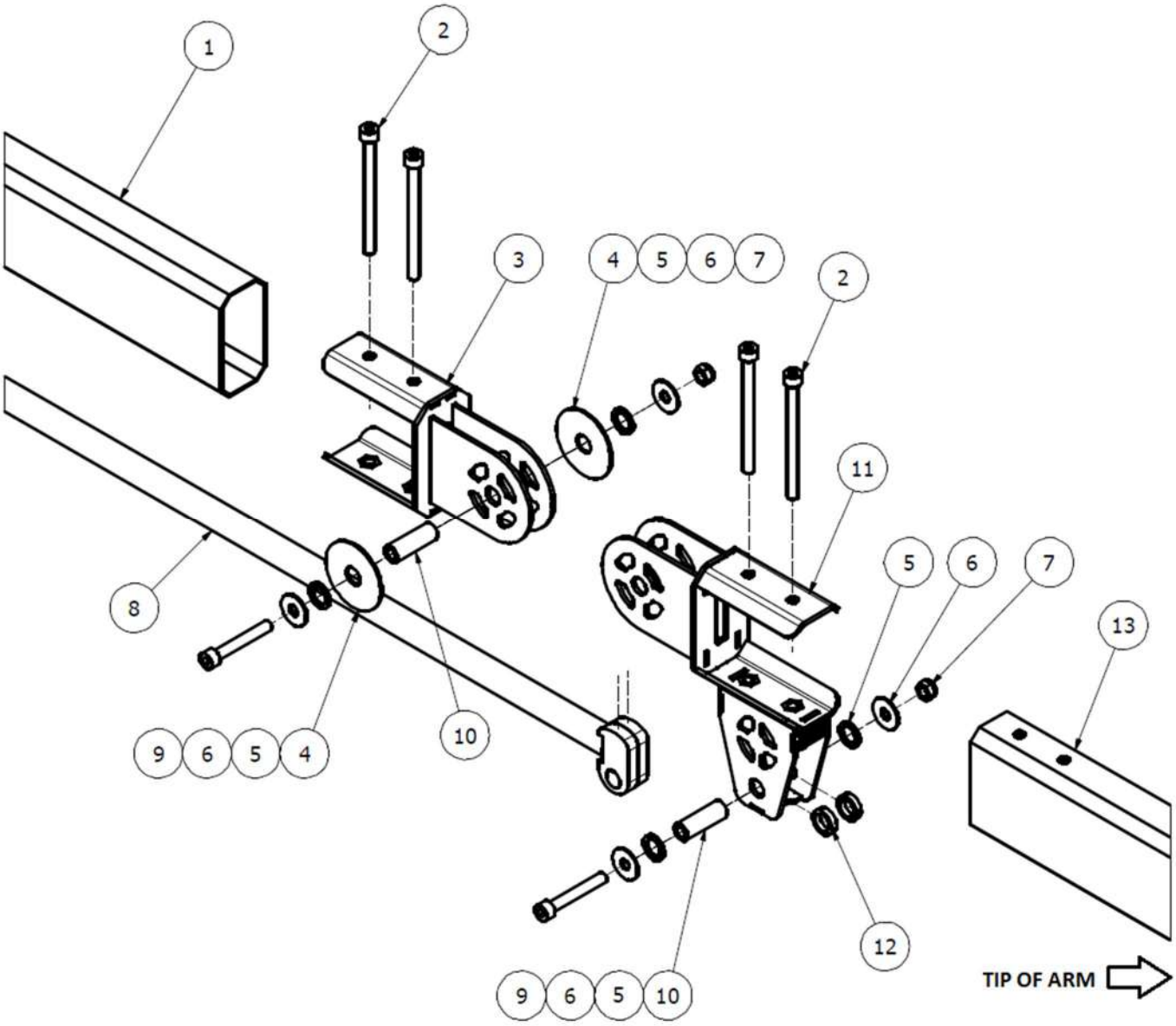

Figure 41: Articulated Arm Knuckle Assembly

Articulated Arm Knuckle Assembly		
No	*Qty*	*Description*
1	1	Rear Barrier Arm
2	4	M8 x 100 Socket head screw

3	1	Rear Jack-Knife Knuckle
4	2	55 Shim
5	4	20x14 Bush
6	4	25x8 Shim
7	2	M8 Hex Nyloc nut
8	1	Actuator Arm
9	2	M8 x 55 Socket head screw
10	2	40mm 14x8 Runner
11	1	Front Jack-Knife Knuckle
12	2	5mm 20x14 Inner Bush
13	1	Front Barrier Arm

Articulated Arm Pivot Clamp Assembly		
No	*Qty*	*Description*
1	1	Articulated Arm Bracket
2	2	M8 x 40 Socket head screw
3	2	M8 x 25 Socket head screw
4	2	M6 x 16 Set screw
5	1	M8 x 60 Stainless Steel Carriage bolt
6	2	Diameter 8mm Flat washer
7	2	608 Bearing
8	1	Actuator Arm (Shown in Knuckle Assembly on Pivot Arm)
9	1	Pivot Clamp
10	1	40mm 14x8 Runner
11	1	M8 Hex nut

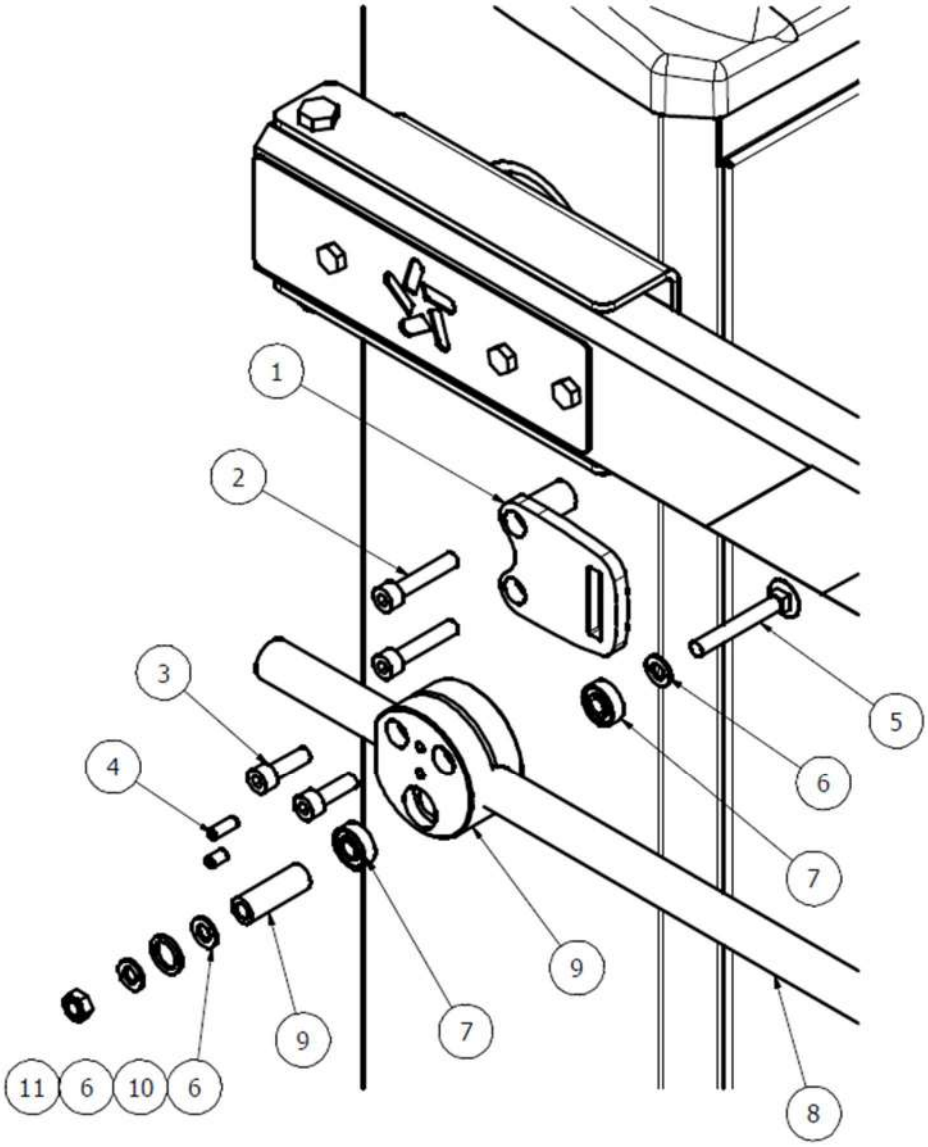

Figure 42: Articulated Arm Pivot Clamp Assembly

To assemble the articulated arm pivot clamp, prepare the cabinet by knocking out the 'punch-out' holes with a hammer and a screw driver whilst the cabinet is off the frame. Replace the cabinet and barrier arm clamp. Use two M8 x 40 screws to bolt the bracket to the frame, through the cabinet. See section 8.8, page 48 for more details.

After assembling the articulated arm, adjust the tip to be level. Adjusting the rod length will raise or lower the tip.

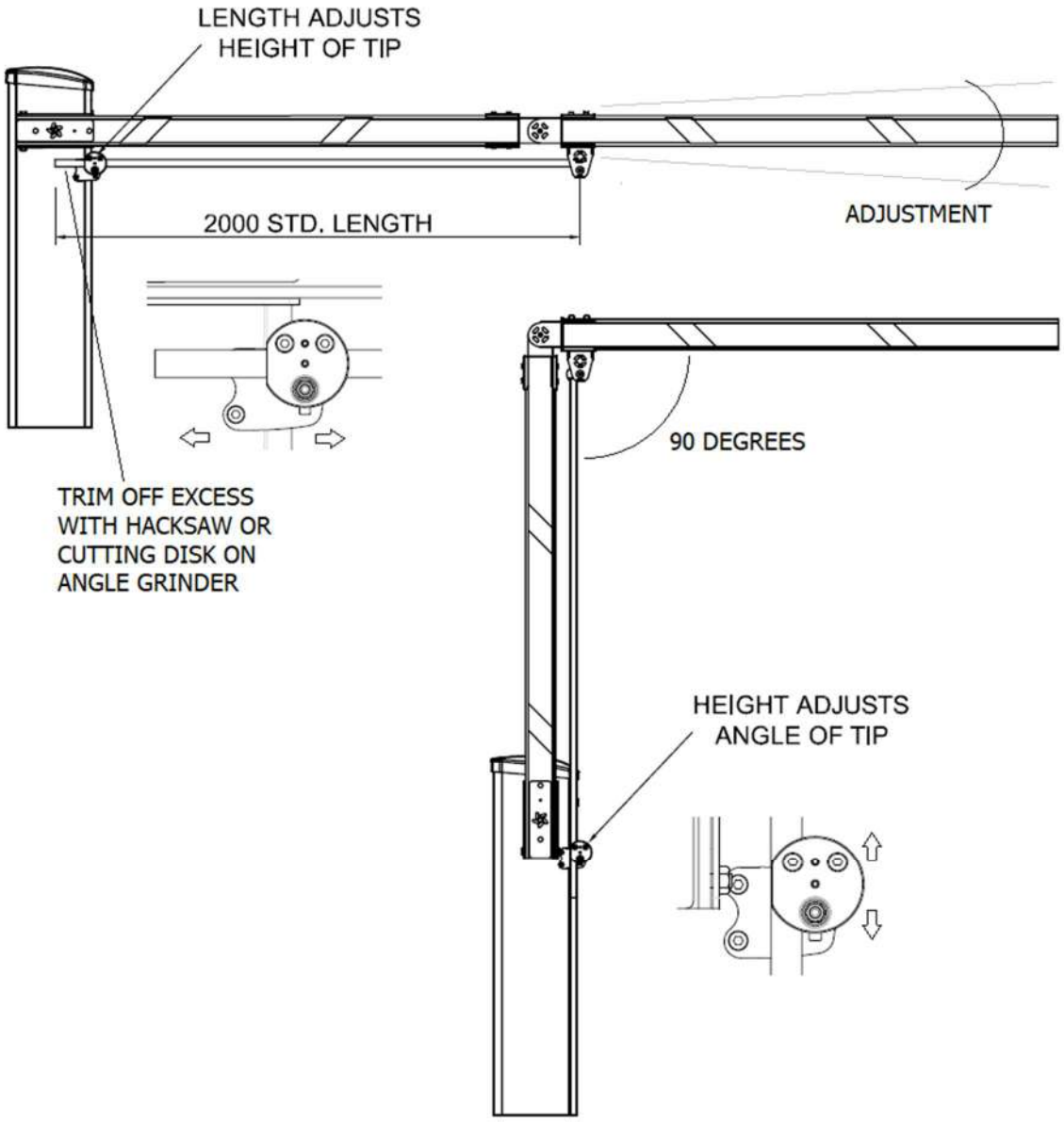

Figure 43: Adjustment of Barrier Arm tip

8.16. Switching the Barrier Arm from Left to Right

To switch the barrier arm from one side to the other, start by removing the end cap as shown in Figure 44. Remove the arm clamp assembly and also remove the seal for the arm clamp side (The seal is similar to removing the end cap).

Replace the seal on the opposite side and reinstall the arm clamp assembly on the opposite side. Finally, replace the end cap on the original side where the arm clamp assembly was located.

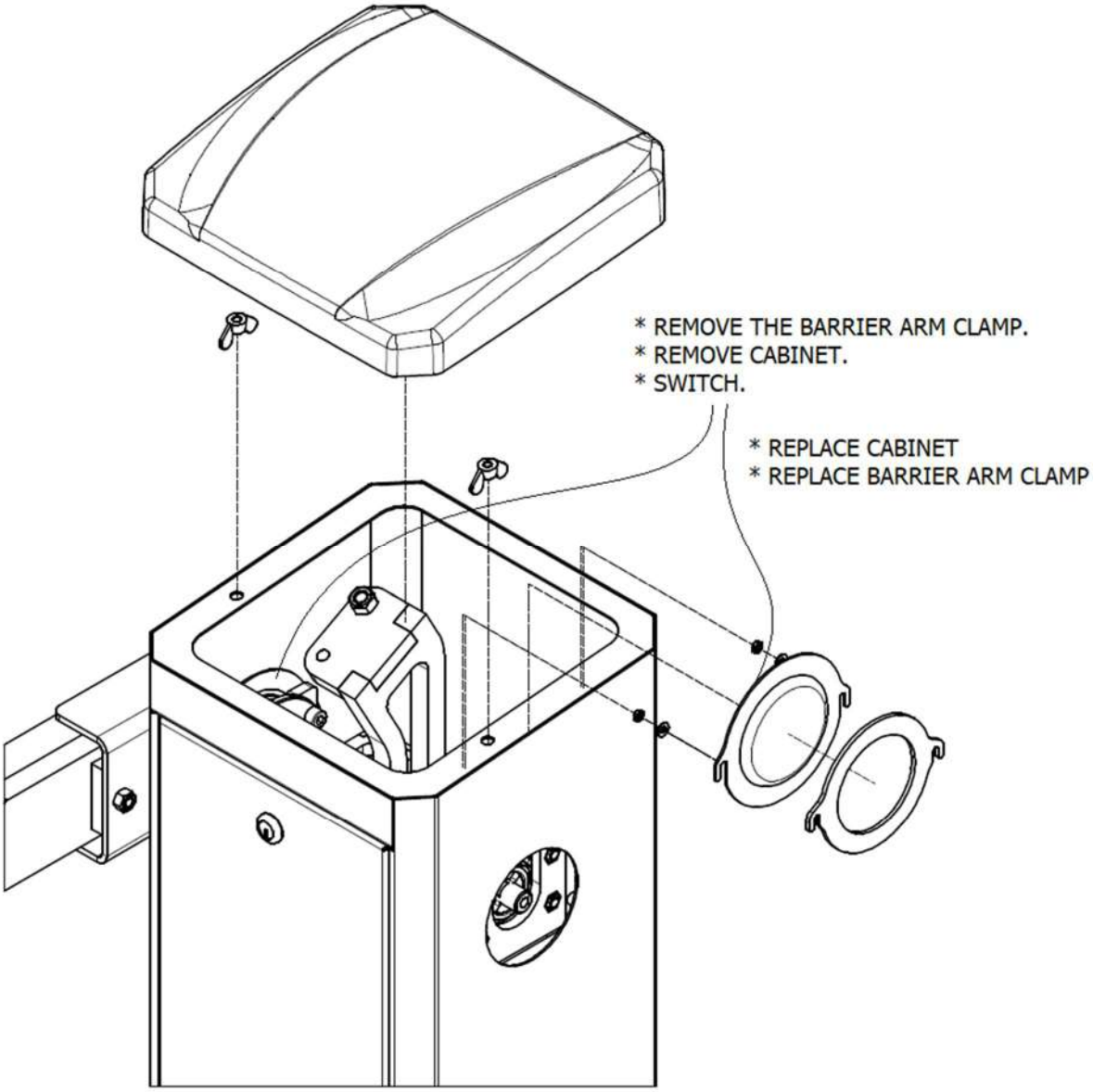

Figure 44: Removing the End Cap

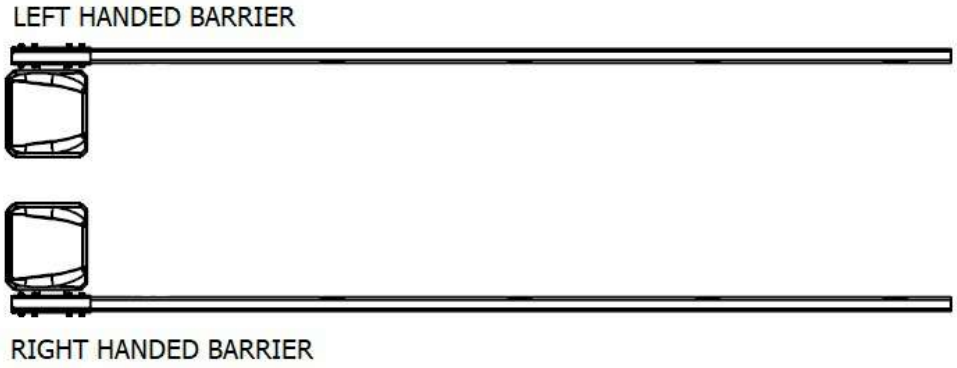

Figure 45: Left- and Right-Handed Barrier Arrangement

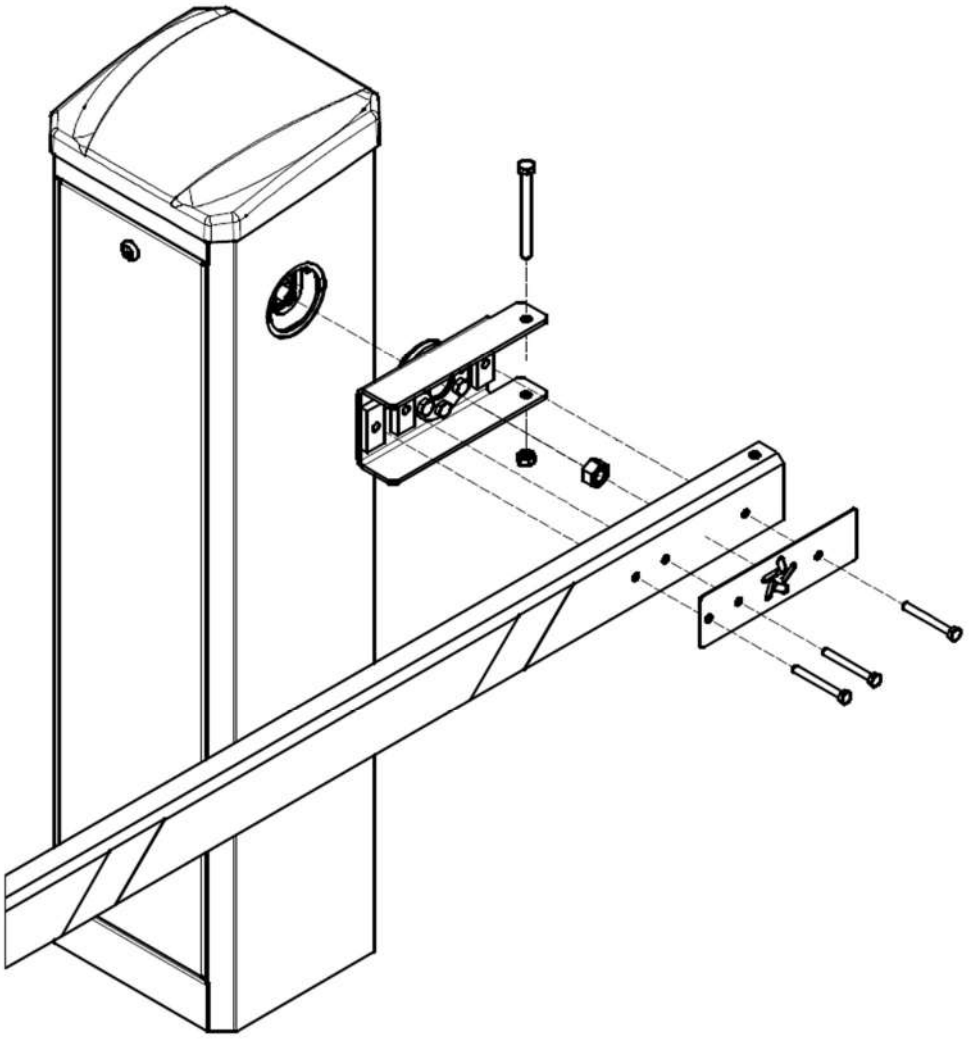

Figure 46: Replacing the Arm Clamp, Barrier Arm and Cover Plate (Left-Hand as shown)

8.17. Preparation and installation of the Inductive Loop

The loop consists of several turns of wire and a 'feeder' which enters the cabinet through a conduit or a cut in the roadway and/or in the kerb. The feeder should be twisted.

The loop and feeder should be made from insulated copper wire with a minimum cross-sectional area of 1.5mm. The feeder should be twisted with at least 20 turns per meter. Joints in the wire are not recommended and must be soldered and made waterproof. Joints could lead to incorrect operation of the detector.

The loop should be either square or rectangular in shape with a minimum distance of 800mm to 1 meter between opposite sides. Normally 3 turns of wire are used in the loop. Large loops with a perimeter of greater than 10 meters should use 2 turns while small loops with a perimeter of less than 6 meters should use 4 turns.

Crosstalk is a term used to describe the interference between two adjacent loops. To avoid incorrect operation of the detector, the loops should be at least 2 meters apart.

When two loops are used near each other it is recommended that 3 turns be used for one and 4 turns for the other to prevent crosstalk. Alternatively, the two loops can be operated at different frequencies. Refer to section 6.14 of the loop settings.

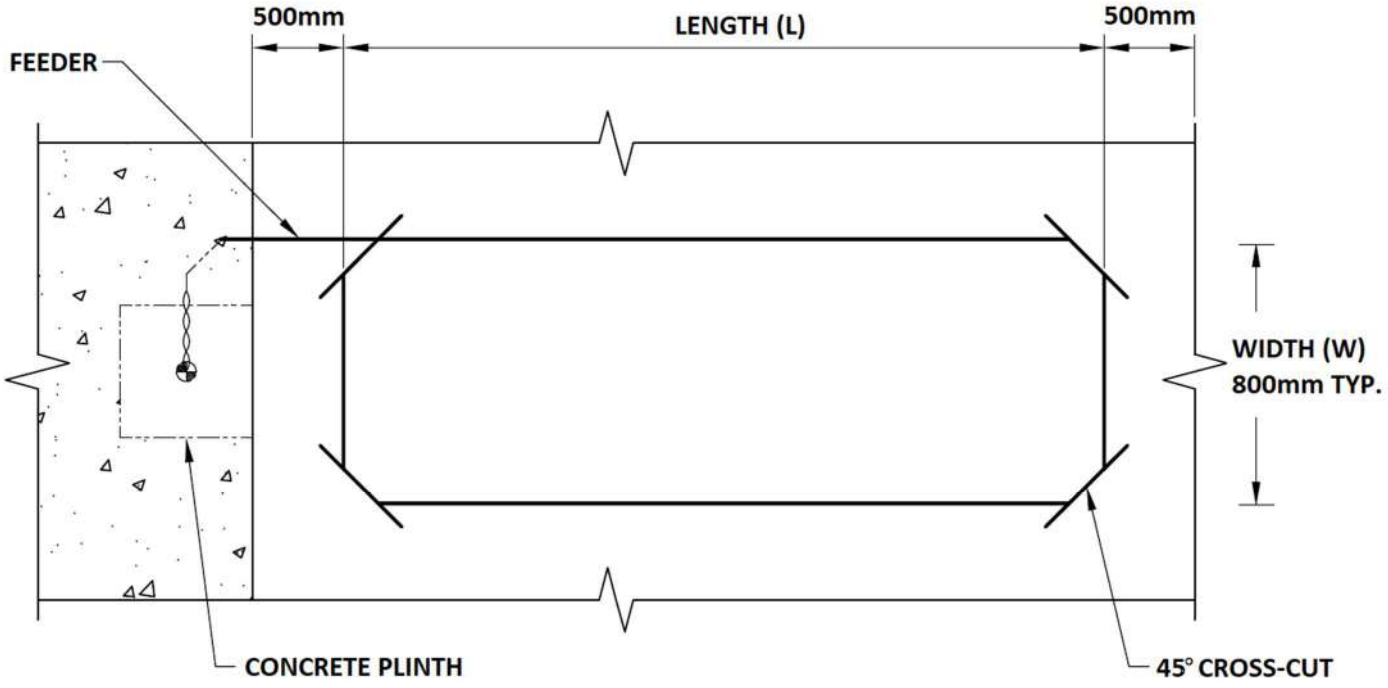

Figure 47: Loop Installation Plan View

Loop Installation Size, Perimeter of cut in roadway and Number of Coils			
Roadway	*Suggested Loop Size*	*Perimeter*	*Turns*
2500mm	1500mm (L) x 800mm (W)	4600mm	4
3000mm	2000mm (L) x 800mm (W)	5600mm	4
3500mm	2500mm (L) x 800mm (W)	6600mm	3
4000mm	3000mm (L) x 800mm (W)	7600mm	3
4500mm	3500mm (L) x 800mm (W)	8600mm	3
5000mm	4000mm (L) x 800mm (W)	9600mm	3
6000mm	5000mm (L) x 800mm (W)	11600mm	2

TAKE NOTE – The perimeter is only the length of the slot cut-out. The wire length is estimated as Perimeter x Coils + Length of Feeder

For the loop installation, slots should be cut into the roadway using a masonry cutting tool. A 45° cut should be made across the corners to ensure a gentle bend on the wire. The slot should be approximately 4mm wide and 30mm to 50mm deep. Remember to extend the slot from one of the corners to the roadside to accommodate the feeder.

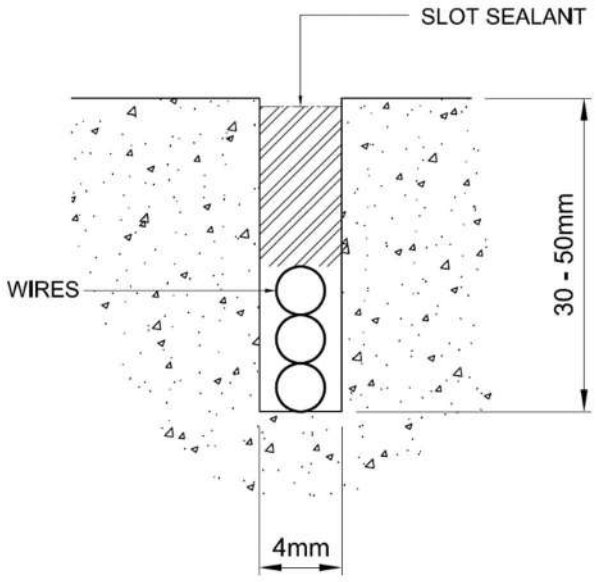

Figure 48: Loop Cut Section View in Roadway

Best results are obtained when a single length of wire is used with no joints. This may be achieved by running the wire from the detector to the loop, around the loop for the requisite number of turns and then back to the cabinet. The feeder portion of the wire must then be twisted (minimum 20 turns per meter) and connected to the loop terminals. Remember that twisting the feeder will shorten its length, so ensure a long enough feeder wire is used.

For connecting the loop wire to the controller, see wiring diagrams.

Once the loop and feeder wires have been placed in the slot, the slot is filled with a suitable filler for joint sealing and precast concrete joints. The recommended filler is Hybriflex-540 from Den Braven.

8.18. Loop Installation for Trucks

To install an inductive loop system for trucks, two loops should be used and installed approximately 1000mm apart. This increases the detection area and thereby increased the chance of detection, though there is always a risk that the bed area of the truck might not be detected.

The loop sensitivity can also be adjusted and tested to detect a metal object higher off the ground, as is the case with the trailer of a truck.

For connecting the loop wire to the controller, see wiring diagrams.

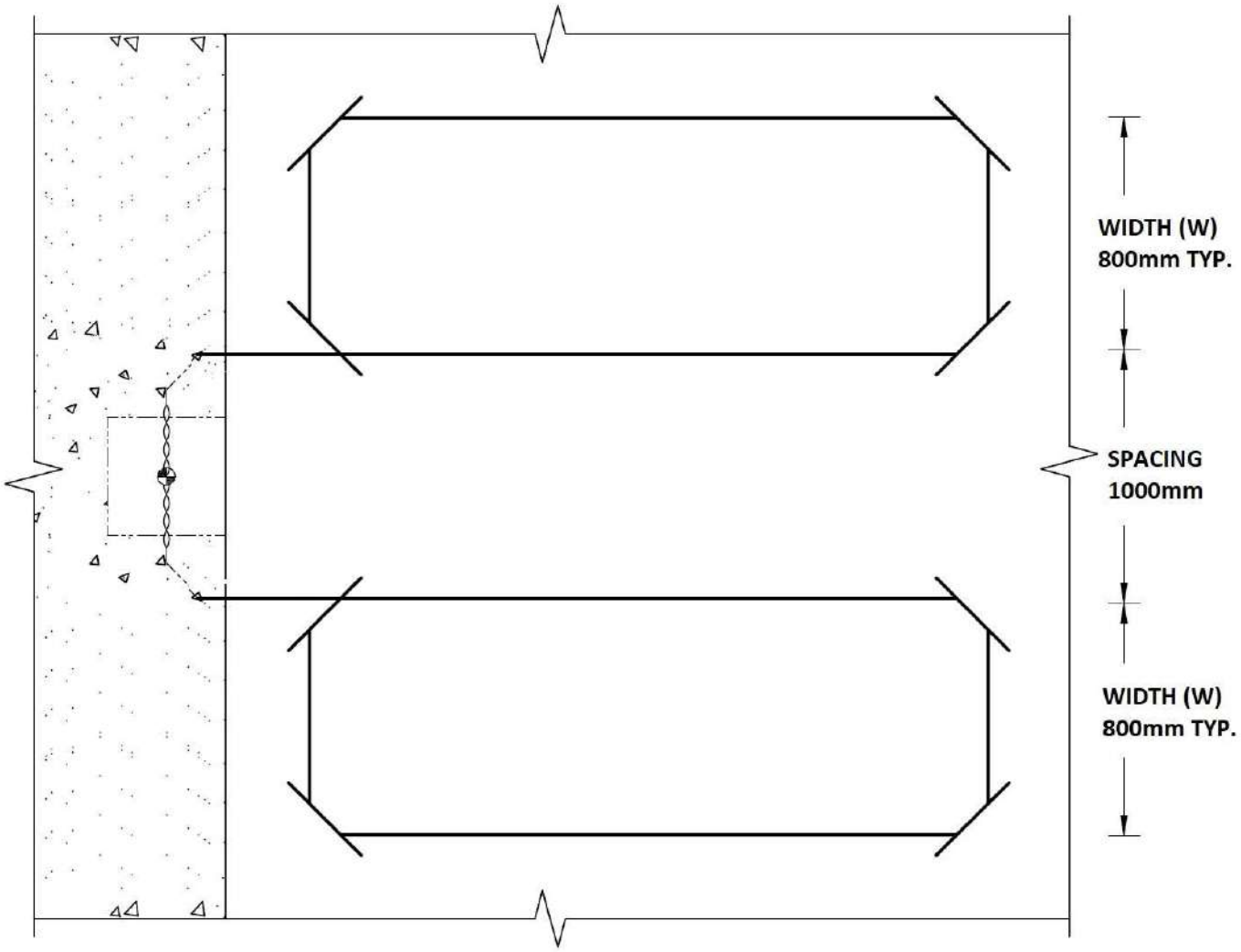

Figure 49: Loop installation example for Trucks

8.19. Loop Installation for Free-Exit

A free-exit configuration allows a vehicle to exit from one side of the barrier freely. Two loops are installed where one loop (free exit loop) will trigger the controller to open the barrier and the loop on the far side (safety/ closing loop) will signal to the controller to close the barrier when a vehicle has passed over and cleared the loop.

While a vehicle is over the safety/ closing loop, the barrier will remain open.

For connecting the loop wire to the controller, see wiring diagrams.

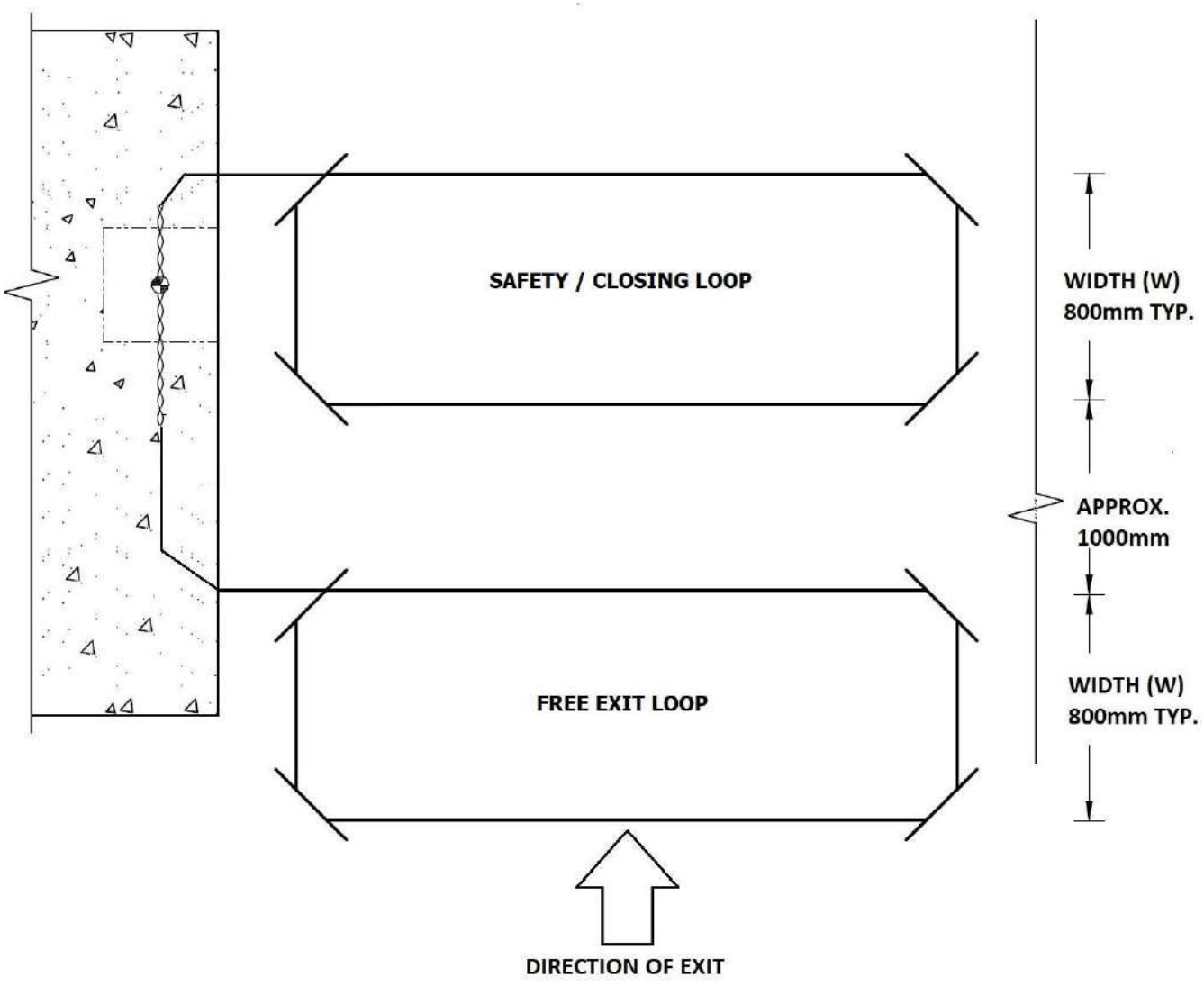

Figure 50: Loop installation for free exit

8.20. Loop installation beneath paving

The loop can also be installed directly below paving. A small diameter PVC pipe can be used (typically 25mm diameter) and this must be buried below the paving bricks. The paving can then be reinstalled above the PVC pipe.

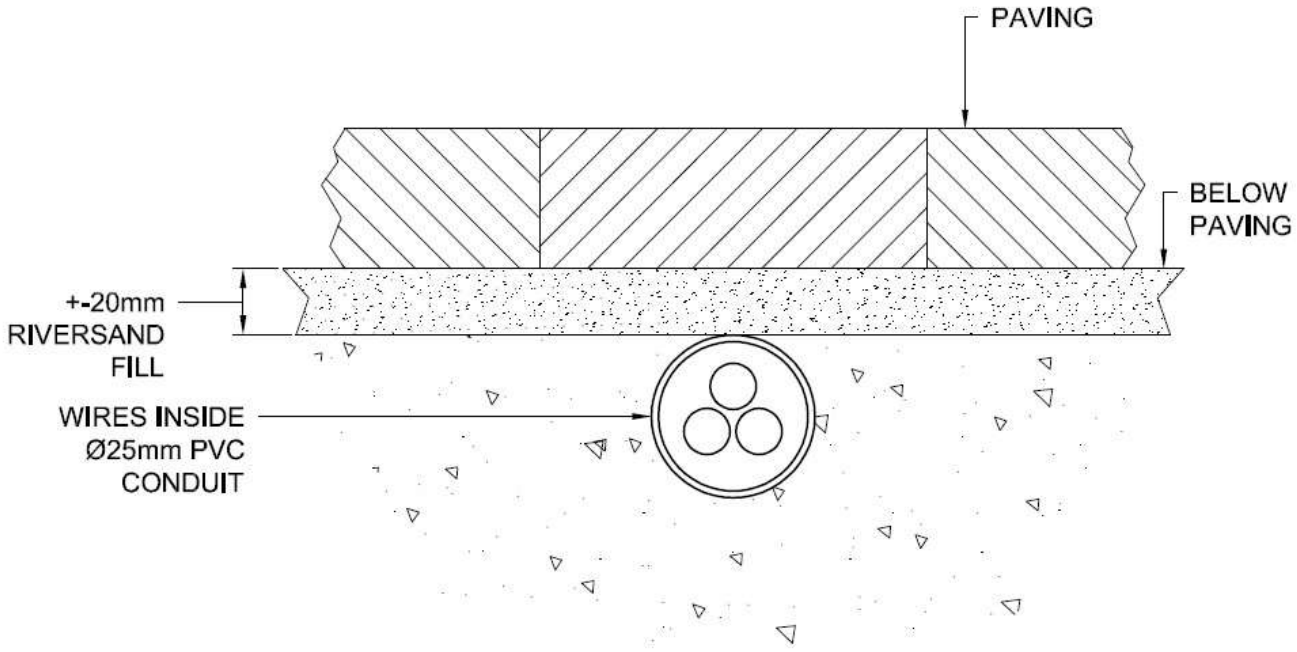

Figure 51: Loop installed below paving

8.21. Reinforcing below road surface

The existence of reinforced steel below the road surface has the effect of reducing the inductance, and therefore the sensitivity, of the loop detection system. Hence, where reinforcing exists 2 turns should be added to the normal loop.

The ideal minimum spacing between the loop and the cable and steel reinforcing is 150mm, although this is not always practically possible. The slot depth should be kept as shallow as possible, taking care that the feeder remains exposed after the sealing compound has been applied.

8.22. Loop geometry

Loops should be rectangular in shape.

In general, loops having a circumference measurement in excess of 10 meters should be installed using two turns of wire, while loops of less than 10 meters in circumference, should have three turns or more. Loops having a circumference measurement less than 6 meters

should have four turns. It is good practice at time of installation to construct adjacent loops with alternate three and four turn windings.

The detection height is by rule of thumb twice the width or shortest side of the loop. This rating is provided the loop is set to 0.02% change which is the normal maximum sensitivity setting.

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9. TESTING

9.1. Learn Mode

When starting the barrier up after any adjustments are made, such as the barrier arm length changed, any mechanical maintenance or program parameters changed, the barrier needs to go through a learning cycle to calibrate the controller settings. To do this, use dipswitch 9 on the function control on the SBL106 controller.

With the barrier in the down position and powered on, switch the dipswitch on for 5 seconds and then off. The barrier will start the learning cycle by raising the arm slowly to the open position, pause 2 seconds and then move down to the closing position. After this cycle is completed, the programmer has successfully calibrated.

9.2. Connecting to a Card Reader

The trigger wires should be connected to a normally open relay output on a card reader or access controller. This should have a current rating of at least 100mA and the trigger should close for 500 milliseconds or less.

9.3. Testing the Triggers

With the unit in stand-by mode (power on, barrier arm down, light on motor status showing 'close' and 'brake'), trigger the unit.

The barrier will open and remain open for 20 seconds. The barrier will then close.

Note that this can be 20, 30 or 60 seconds if dipswitch 2 and 3 is configured on the function control dipswitch block. See section 6.13.

9.4. Obstruction Hit Test

Trigger the barrier and the arm will open. As the barrier arm is descending, stop the arm by hand during closing. The motor will stop and reverse to the open position and will wait for a time-out or loop/safety beam to auto close, or if in toggle, will remain open until the toggle input is triggered again.

9.5. Testing the Inductive Loop

With the trigger and loop connected, trigger the unit and the barrier will open and remain open. Before the 20 second time-out passes, hold a metallic object, like the barrier door, over the loop and remove it. The barrier will close after 2 seconds.

Note the auto-close time is factory set to 0, 2, 4 or 6 seconds and can be changed with dipswitches 4 and 5 on the function control dipswitch block. See section 6.13.

9.6. Testing the Traffic Light

The Traffic Light can be mounted to either side of the cabinet, by clearing the 'punch-outs' and fixing directly to the frame in the threaded holes provided. The traffic light can only be mounted on the opposite side of the cabinet to the barrier arm.

10. PARTS

10.1. Casing Assembly Parts

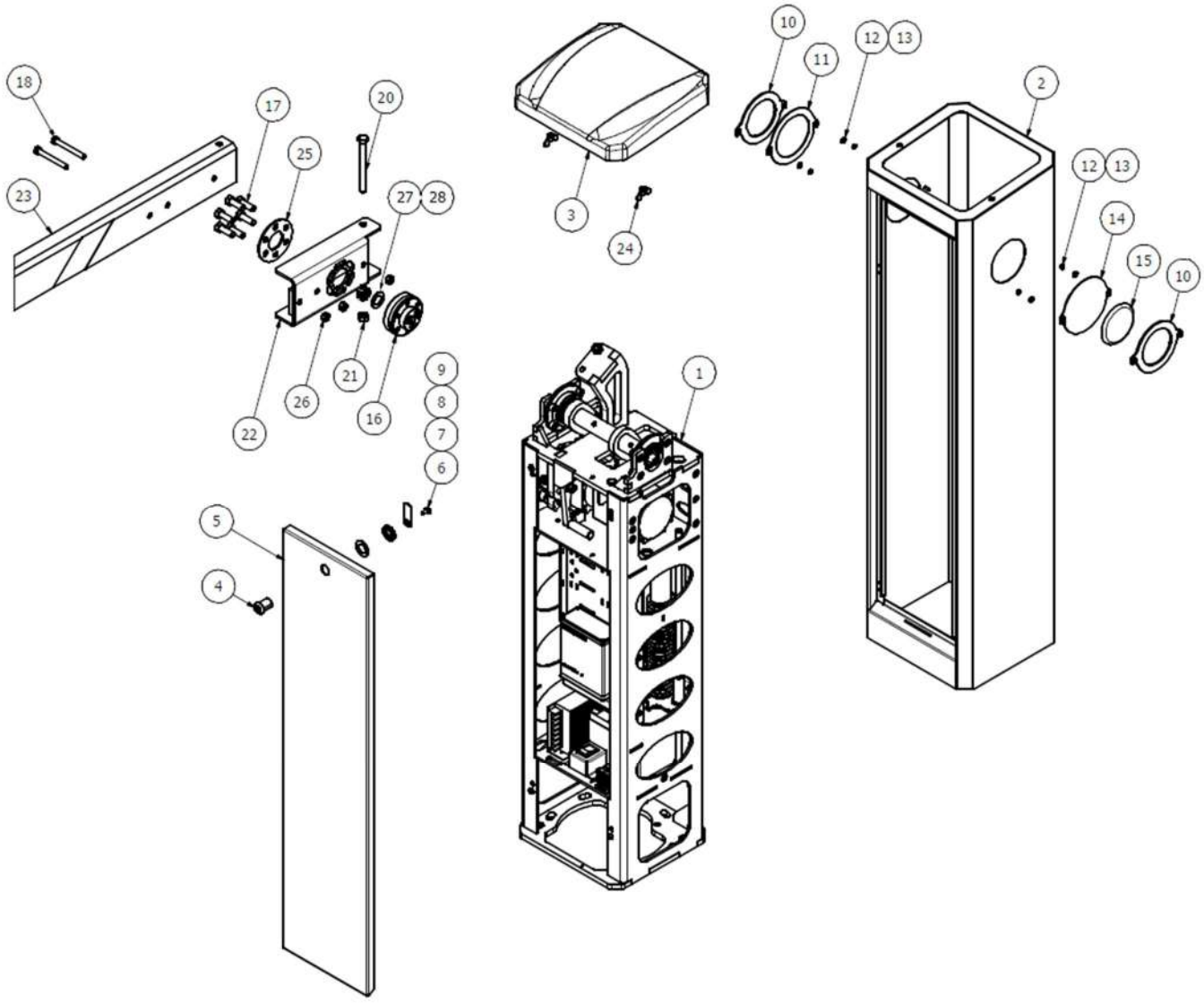
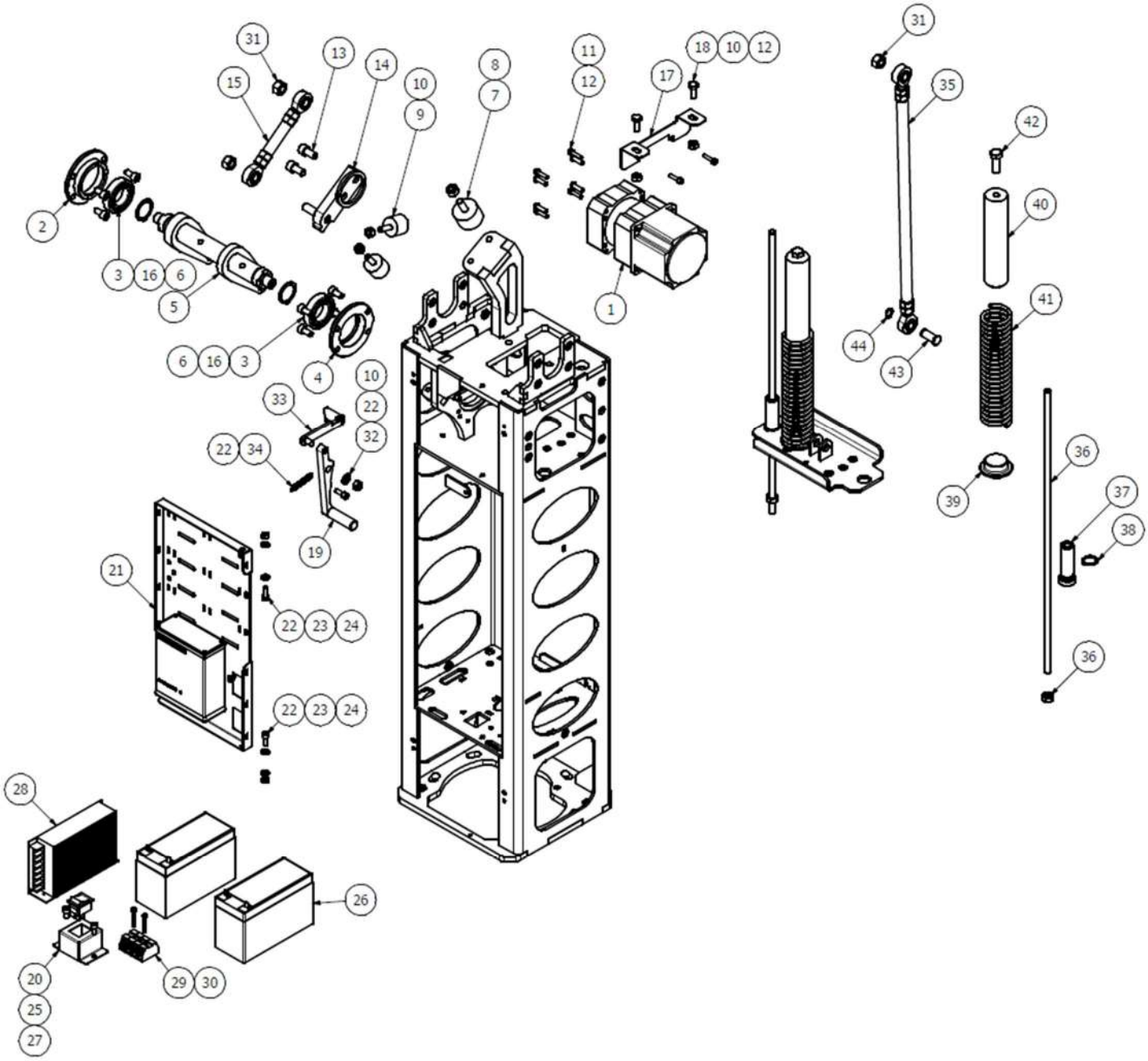


Figure 52: Exploded View

Casing Assembly Parts			
No	*Qty.*	*Description*	*Part Number*
1	1	Frame Assembly	
2	1	Casing	
3	1	Lid	

4	1	Camlock, 22mm Barrel	
5	1	Door	
6	1	Camlock Washer	
7	1	Camlock Hex Nut	
8	1	Camlock Screw	
9	1	Camlock Cam	
10	2	Seal	
11	1	Seal Backing	
12	4	M4 Hex Nut	
13	4	M4 Flat Washer	
14	1	End Cap Plate	
15	1	End Cap	
16	1	Crown Connector	
17	4	M10 x 30 Hex Bolt, Zinc Plated	
18	2	M8 x 70 Hex Bolt, Zinc Plated	
20	1	M10 x 120 Hex Bolt, Zinc Plated	
21	1	M10 Nyloc Hex Nut, Zinc Plated	
22	1	Arm Holder	
23	1	Barrier Arm	
24	2	M6 Wing Nut, zinc plated	M6-WN-ZP
25	1	Washer	VEVB-LC-09
26	3	M8 Hex Nut, zinc plated	M8-HN-ZP
27	1	M16 Flat Washer	
28	1	M16 Hex Nut, Zinc Plated	

10.2. Frame Assembly Parts



Frame Assembly Parts			
No	*Qty.*	*Description*	*Part Number*
1	1	Motor 24 BLDC 100W	MTR-BLDC24-01
2	1	Segmented Bearing Ring	VEVB-MA-10
3	2	55 OD x 30 ID x 13 H Deep Groove Ball Bearing	6006-2RS1-DGBB

4	1	Bearing Ring	VEVB-MA-11
5	1	Shaft Weldment	VEVB-WM-04
6	2	30x1,5 Externa Circlip, zinc plated	30x1,5-CCEX-ZP
7	1	40x10 Rubber Buffer	40x10-RBR-BFR
8	1	M10 Hex Nut, zinc plated	M10-HN-ZP
9	2	30x8 Rubber Buffer	30x8-RBR-BFR
10	5	M8 Hex Nut, zinc plated	M8-HN-ZP
11	4	M6 x 20 Button Head Cap Screw, zinc plated	M6x20-BHCS-ZP
12	6	M5 x 20 Socket Head Cap Screw, zinc plated	M5x20-SHCS-ZP
13	2	M10 x 20 Socket Head Cap Screw, zinc plated	M10x20-SHCS-ZP
14	1	Motor Shaft Link	VEVB-WM-07
15	1	Link Arm	VEVB-SA-06
16	7	M8 x 16 Socket Head Cap Screw, zinc plated	M8x16-SHCS-ZP
17	1	Motor Brace Plate	VEVB-LC-33
18	2	M8 x 20 Hex Set Screw, zinc plated	M8x20-HSS-ZP
19	1	Pull Handle	VEVB-WM-01
20	1	Switch Plate	VEVB-LC-38
21	1	Control Panel Assembly	VEVB-SA-08
22	3	M6 x 16 Socket Head Cap Screw, zinc plated	M6x16-SHCS-ZP
23	4	M6 x 12 Plain Flat Washer, zinc plated	M6x12-PFW-ZP
24	4	M6 Hex Nut, zinc plated	M6-HN-ZP
25	1	Power Switch 220V	
26	2	12V 7AH Sealed Battery	BAT-12V-7AH
27	2	M6 x 12 Socket Head Cap Screw, zinc plated	M6x12-SHCS-ZP
28	1	Power Supply – 4,5A > 24 volt	PMT-24V100W1AA
29	1	Connector Block Black	8621594
30	2	M4 x 30 Slotted Cheese Head Screw, zinc plated	M4x30-SCHS-ZP

31	3	M12 Hex Nut, zinc plated	M12-HN-ZP
32	1	M8 x 16 Plain Flat Washer, zinc plated	M8x16-PFW-ZP
33	1	Release Cam	VEVB-WM-16
34	1	Release Pin Spring	VEVB-PT-04
35	1	Rod End Arm Assembly	VEVB-SA-01
36	2	Spring Guide Rail	VEVB-WM-14
37	2	Spring Guide	VEVB-MA-04
38	2	20 x 1,2 External Circlip, zinc plated	20x1,2-CCEX-ZP
39	2	Spring Seat Housing	VEVB-MA-03
40	2	Spring Cylinder Housing	VEVB-MA-15
41	2	Spring	
42	2	M10 x 30 Hex Set Screw, zinc plated	M10x30-HSS-ZP
43	1	Spring Arm Pin	VEVB-MA-16
44	1	12 x 1 External Circlip, zinc plated	12x1-CCEX-ZP

10.3. Suggested Critical Spare Parts

Critical Spares		
No	*Description*	*Part Number*
1	SBL106TUR Controller	SBL106TUR
2	Power Supply Unit	(As per supplied version)
3	12V 7AH Sealed Battery	BAT-12V-7AH
4	Compression Springs	(As per spring table)
5	Aluminium arm	(As per barrier length)
6	30x8 Rubber Buffer (Small Buffers)	30x8-RBR-BFR
7	40x10 Rubber Buffer (Large Buffers)	40x10-RBR-BFR
8	12 Rod End Bearing Left Hand	POS12-LH
9	12 Rod End Bearing Right Hand	POS12-RH

11. TROUBLESHOOTING

Fault Finding			
Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
POWER	LED on Power Supply is off.	Power Source Error.	Check 220VAC / 110VAC power from source to determine the error.
		Power supply requires reset.	Press 'Reset' button on power supply.
	LED is on at Power Supply but SBL106 controller lights are off.	Incorrect polarity from Power Supply to Controller.	Reverse polarity.
		Faulty controller.	Replace controller.
BARRIER ARM	Barrier does not raise when triggered.	Faulty trigger.	Check continuity on trigger. Trigger should be normally open and pulsed for 500ms or less.
		Barrier motor not enabled.	Ensure dipswitch 5 on motor control block is set to on.
	Barrier closes and then reopens as if a collision has occurred.	Override handle engaged.	Check that the handle for the mechanical override is in the down position. Push the handle down which will reverse the mechanical override arm to its resting position. Apply learn procedure.
	Changing the distance of motor travel by adjusting the rubber buffers or rod end arm length.	Controller requires setting.	Apply learn procedure in section 9.1, page 75.
	During learn mode, barrier arm does not lower after 3 seconds and stays open.	Safety sensors are detecting.	Check that the loop and/ or beam is clear of obstacles and that the controller does not detect anything. If the detection

			persists apply the learn procedure.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
BARRIER ARM	Barrier does not raise correctly or gets stuck during operation.	Check spring guides and spring guide plate.	If spring guide is vibrating and getting stuck, remove the spring guides, clean them, and replace. Apply lubrication to guide rails.
		Check spring tension.	Refer to spring tension table. Spring tension can be adjusted by lengthening / shortening the spring arm. After adjusting spring tensions, apply learn procedure.
		Check that power from the Power Supply is set to correct voltage.	Turn the potentiometer on the Power Supply unit and measure the output voltage. The output voltage should be 27.6V.
	Barrier arm operation is slow.	Check that power from the Power Supply is set to correct voltage.	Turn the potentiometer on the Power Supply unit and measure the output voltage. The output voltage should be 27.6V.

	During Closing, the barrier slows down substantially before reaching the closed position and then speeds up rapidly to the closed position (The motion is not smooth).	Check spring tension.	Refer to spring table in section 7.2, page 31. The springs are too weak. Spring tension should be increased by shortening the spring arm. Refer to spring adjustment in section 7.2, page 35. After adjusting spring tension, apply learn procedure in section 9.1, page 75.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
BARRIER ARM	Barrier arm raise motion is not smooth and seems fast or/ and the down motion is too slow.	Check spring tension.	Refer to spring table in section 7.2, page 31. The springs are too strong. Spring tension should be decreased by lengthening the spring arm. Refer to spring adjustment in section 7.2, page 35. After adjusting spring tension, apply learn procedure in section 9.1, page 75.
	If following an up/ down collision cycle, when the barrier arm is coming down, the barrier travels but does not reach the fully down position.		
	Barrier arm behaves erratically, does not open fully and struggles to close.	Check spring tension.	Refer to spring adjustment in section 7.2, page 35. Ensure spring guides are clean and lubricated so the movement is smooth.

			After adjusting spring tension, apply learn procedure in section 9.1, page 75.
		Check for any damage on the motor cable.	Replace motor if required.
	Barrier arm behaves erratically, starts and stops.	Check spring tension.	Refer to spring adjustment in section 7.2, page 35. Ensure spring guides are clean and lubricated so the movement is smooth. After adjusting spring tension, apply learn procedure in section 9.1, page 75.
		Safety sensors are detecting.	Check loop and / or beam for false signals.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
BARRIER ARM	Springs are making a creaking sound when compressed.	Springs are being deformed when compressed.	Check that the springs are acting in a straight line. Ensure the springs are aligned in their respective housings. The spring cylinder housing (top) and spring seat housing (bottom) must be aligned.
	Barrier internally makes a squeaking sound during operation.	Parts require lubrication.	Lubricate rod end bearings attached to the motor drive, spring drive and guides. (Suggest using Q20 or an alternative silicone-based lubricant.)
	Barrier arm is not level with the roadway.	Barrier arm coupling slipped.	Readjust and tighten fully (all 6 bolts) at the desired level position. Refer to section 8.11, page 54.
		Crown 'Spline' coupling is not on the correct toot and is misaligned.	Check that crown 'spline' coupling is on the correct tooth (section 8.10, page 51)
	Barrier arm stays open for extended period after trigger.	Extended trigger from access control equipment.	Check that the trigger duration is less than 500ms.
			Ensure function dipswitch 16 on function setting block is set to OFF.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
BARRIER ARM	Barrier Arm behaving erratically and/ or moving slowly. Barrier encounters collision on the way up.	Spring plate on guides not running linear.	Check that the spring plate is running straight and linear during entire motion. Check that nuts are tightened on the spring guide bushes. If they are loose, the plate won't run linear. Ensure the stainless-steel spring guides are running straight. If necessary, loosen them and readjust so that the spring plate motion is smooth. Lubricate spring bushes with lubricant such as Q20.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
POWER FAILURE	Barrier arm does not operate in the event of power failure.	Batteries may be exhausted.	Check battery connections.
		Power Supply not charging.	Check Power Supply is charging batteries. Voltage on charge should be 27.6V. Use a multi meter to check.
		Batteries are expired.	Replace 2x off 12v 7Ah Batteries.
	Barrier arm opens immediately on power failure.	Batteries not connected.	Check that batteries are connecting.
		Relay not engaging.	Check relay on Power Supply. Test by pushing button. Replace Power Supply if necessary.
LOOP & SAFETY BEAM	Loop detector light flashes.	Faulty loop.	Check loop continuity. Replace loop if necessary.
	Loop light goes on erratically.	Faulty loop, detecting or interference.	Check that loop is not too close to a moving or swinging gate. Loop

			might be next to power cabling, causing interference.
			Change loop frequency or sensitivity.
		Loop leads too long.	Check that leads connected to the controller are not too long from the turns in the wire to where it is connected to the controller.
	Loop detect light on.	Faulty loop.	Check loop continuity. Replace loop if necessary.
		Swing gate or sliding gate interference.	Check that loop is not too close to a moving or swinging gate. Loop might be next to power cabling, causing interference.
			Change loop frequency or sensitivity.

Area	*Fault*	*Possible Cause(s)*	*Corrective Actions*
ARTICULATED ARM	Articulated arm (Jack-Knife) is slow when opening.	Spring tension insufficient.	Refer to spring table in section 7.2, page 31. The springs are too weak. Spring tension should be increased by shortening the spring arm. Refer to spring adjustment in section 7.2, page 35. After adjusting spring tension, apply learn procedure in section 9.1, page 75.

DOCUMENT REVISION HISTORY

- Edition 1:
  - First release
- Edition 1.1:
  - Updates to the Logic Dip-switch settings on all diagrams.
  - Various checks on wording fixed.
- Edition 1.2:
  - Added Barrier ARM Led Wiring and exploded view.
  - Updated all Wiring Diagrams
  - Included setting control to 110v.
- Edition 1.2.1:
  - Added fault finding no 22.
  - Added Revision History (Section 12).
- Edition 1.2.2 (15-08-2019):
  - Updated Diagram for 6.7 Courtesy / Traffic Light Connections on relay connections.
  - Updated Diagram on Figure 9: Connections for Barrier Arm LED.
- Edition 1.2.3 (12-02-2020):
  - Updated layout for Fault Finding.
  - Added Faults, Causes and Actions.
- Edition 1.3. (03-03-2020):
  - Removed Loop Diagrams and added connections for LD106, LD113B and LD102.
  - Added fault finding: Check that spring plate is running straight and linear.
- Edition 1.4.0 (20-05-2020):
  - Removed VL700 Diagrams.
  - Added SBL106TUR diagrams.
  - Removed Courtesy Light Connections to VL700.
  - Removed all references to VL700 Connections.