CLAWS - INDEPENDENT DRIVE INSTALLATION MANUAL

Centurion Systems (Pty) Ltd
www.centsys.com
Company Profile

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**Icons used in this manual**

- **This icon indicates tips and other information that could be useful during the installation.**
- **This icon denotes variations and other aspects that should be considered during installation.**
- **This icon indicates warning, caution or attention! Please take special note of critical aspects that MUST be adhered to in order to prevent injury.**
- **This icon indicates areas where mechanical crushing may occur.**
ATTENTION

To ensure the safety of people and possessions, it is important that you read all the following instructions.

Incorrect installation or incorrect use of the product may cause serious harm to people and / or property.

The installer, being either professional or DIY, is the last person on the site who can ensure that the operator is safely installed, and that the whole system can be operated safely.

Warnings for the installer

CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS before beginning to install the product.

- All installation, repair, and service work to this product must be done by a suitably qualified person
- Do not activate the CLAWS unless you can see them and can determine that the CLAWS are clear of people, pets, vehicles or any obstructions
- Nothing must be placed, and nobody must be near the trench covers at any time. Always keep people and objects away from the spikes’ area of travel
- Children should be supervised to ensure that they do not play with or around the spikes and trench cover
- This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety
- Secure all easily-accessed CLAWS controls in order to prevent unauthorised use
- Do not in any way modify the components of the automated system
- Do not install the equipment in an explosive atmosphere. The presence of flammable gas or fumes is a serious danger to safety
- Before attempting any work on the system, cut electrical power and disconnect the batteries
- The mains power supply of the automated system must be fitted with an all-pole switch with contact opening distance of 3mm or greater. Use of a 5A thermal breaker with all-pole circuit break is recommended
- Make sure that an earth leakage circuit breaker with a threshold of 30mA is fitted upstream of the system
- Never short-circuit the battery and do not try to recharge the batteries with power supply units other than that supplied with the product, or manufactured by Centurion Systems (Pty) Ltd
• Make sure that the earthing system is correctly constructed, and that all metal parts of the system are suitably earthed

• Safety devices must be fitted to the installation to guard against mechanical movement risks such as crushing, dragging and shearing

• It is recommended that at least one warning indicator light be fitted to every system

• Always fit a warning sign visibly to the inside and outside of the entrance and exit

• The installer must explain and demonstrate the manual operation of the system in case of an emergency, and must hand the User Guide and Safety Instructions over to the end-user

• Explain these safety instructions to all persons authorised to use the system, and be sure that they understand the hazards associated with the system

• Do not leave packing materials (plastic, polystyrene, etc.) within reach of children as such materials are potential sources of danger

• Dispose of all waste products like packaging materials, worn-out batteries, etc. according to local regulations

• Always check the obstruction detection system and safety devices for correct operation

• Neither Centurion Systems (Pty) Ltd, nor its subsidiaries, accepts any liability caused by improper use of the product, or for use other than that for which the automated system was intended

• This product was designed and built strictly for the use indicated in this documentation. Any other use, not expressly indicated here, could compromise the service life/operation of the product and/or be a source of danger

• Everything not expressly specified in these instructions is not permitted
ATTENTION

For the detection of vehicles, we recommend installing Inductive Loop Detectors in preference to infrared beams. When installing the Loop detectors, positioning is very important for the safety of the vehicle:

- X refers to the distance required between the loops and CLAWS for free-exit
- Free-exit for uni-directional traffic, X must be greater than 500mm from the CLAWS
- For bi-directional traffic, X must also be greater than 500mm from the CLAWS
1. General Description

CLAWS barrier spikes are designed to enhance the security at the entrance to high-volume application. They provide a formidable deterrent to would-be criminals and due to their robust construction they are very difficult to defeat.

Clever modular design allows the CLAWS to be ordered ex-stock and can be configured into a variety of different lengths. The orientation of the spikes can also be easily changed depending on the direction of the traffic flow. Their external limit switches allow for safe operation of the system.

CLAWS are easy to install and use a standard SECTOR controller and a standard SECTOR gearbox, saving you time and reducing your spares inventory. They boast all-weather construction and have been designed to allow for all moving parts to be removed easily for quick and easy maintenance.

CLAWS also provide onboard support for a traffic light interface, and the Independent Drive CLAWS models have variable speed control and multiple Modes of Operation. The CLAWS Independent Drive system has its own drive mechanism and controller, and can work independently of traffic barriers, etc. It is available in both Flush Mount and Surface Mount variants.

The Flush Mount models are ideal for installations that require seamless access control for smooth-flowing traffic, whereas the Surface Mount models are mounted above the general surface of the roadway and create a traffic-calming bump for a safer access control point.

2. Product Specifications
2.1. Technical Specifications

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<td>220V AC +/-10% @ 50Hz</td>
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<tr>
<td>Motor Voltage</td>
<td>12V DC</td>
</tr>
<tr>
<td>Current Draw</td>
<td></td>
</tr>
<tr>
<td>Wiring Requirements</td>
<td>Battery-driven² - 2A charger</td>
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<tr>
<td>Spike Modules - Available lengths</td>
<td>1 metre and 1.5 metre</td>
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<tr>
<td>Spikes raise / lower time</td>
<td>1.2 sec</td>
</tr>
<tr>
<td>Daily operations - Max</td>
<td>As per co-installed SECTOR II</td>
</tr>
<tr>
<td>Daily Operations - Mains present</td>
<td>As per co-installed SECTOR II</td>
</tr>
<tr>
<td>Anti-corrosion - Main chassis</td>
<td>Hot dip galvanised Mild Steel</td>
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<tr>
<td>Spike material</td>
<td>85mm Mild Steel, electroplated and powder-coated</td>
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<tr>
<td>Maximum allowable axel weight</td>
<td>4000kg</td>
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<tr>
<td>Onboard receiver specifications</td>
<td>CENTURION code-hopping, multichannel, 433MHz with 500 remote control button storage capacity</td>
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2.2. Product Dimensions

2.2.1. Surface Mount

2.2.2. Flush Mount
INDEPENDENT DRIVE
SURFACE MOUNT INSTALLATIONS

Centurion Systems (Pty) Ltd
www.centsys.com
3. Product Identification

1. Boom pole
2. Spikes module assembly
3. Ramp plates
4. Trench cover plate
5. Spikes
6. Drive linkage assembly
7. SECTOR II

---

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<tr>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Top Coupler</td>
<td></td>
</tr>
<tr>
<td>Bottom Coupler</td>
<td></td>
</tr>
<tr>
<td>8x20 Dowel Pin</td>
<td></td>
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</table>
### 4. Tools Required

- 13mm, 17mm, and 19mm Spanners
- Ratchet
- 19mm, and 24mm Sockets
- Allen Key Set
- Mallet
- Tape Measure
- Spirit Level
- Torque Wrench
5. Introduction

This document describes the basic steps to follow when installing the surface-mountable CLAWS Spikes driven by an independently-powered gearbox. The installation described in this document is a 2.5 meter installation. For other installations, modules of 1.5 or 1.0 meters can be combined to achieve different widths.

The installation of the CLAWS Spikes requires a minimum of two persons.

5.1. Installation Configurations

The surface-mountable CLAWS Spikes can be installed in four different configurations. The configuration is dependent on two factors:

- Orientation of installation
- Direction of spike impact

5.1.1. Orientation of Installation

The orientation of installation is described as the side at which the drive linkage is installed when approaching the CLAWS Spikes. In other words, when driving up to the CLAWS Spikes, in the correct direction for traffic flow, and the drive is installed on the right-hand side of the vehicle, it’s deemed a right-hand installation. And when driving up to the CLAWS Spikes, in the correct direction for traffic flow, and the drive is installed on the left-hand side of the vehicle, it’s deemed a left-hand installation.

FIGURE 2. RHS CONFIGURATION

FIGURE 3. LHS CONFIGURATION
5.1.2. Spike Impact Direction

The CLAWS Spikes are designed to take a much larger impact in one direction. Thus, the CLAWS Spikes can be installed to take larger or more frequent impact in one direction. In other words, the spikes can be installed to face either towards oncoming traffic (similar) or face towards traffic (opposing) trying to enter from the wrong direction or lane (Section 3, Figure 1).

There are four types of typical installations. Refer to Section 5, Figures 2 and 3 to determine if the installation is left- or right-hand orientated. Secondly; pay attention to the spike impact direction:

- **Similar direction of travel** prevents vehicles from exiting whilst the boom pole is still down (Normal direction of traffic)
- **Opposing direction of travel** prevents vehicles entering against the flow of traffic whilst the boom pole is down
6. RHS Surface Mount - Similar Direction of Travel

6.1. Preparing the Drive Linkage Assembly

STEP 1

FIGURE 10

STEP 2

FIGURE 11

STEP 3

FIGURE 12

STEP 4

FIGURE 13

STEP 5

FIGURE 14

STEP 6

FIGURE 15
The drive linkage arm should point to a 5 o’clock position and the holes of the gearbox shaft and the linkage arm must line up as shown above.

Tighten the Countersunk M8x40 screw to 20Nm (Section 6, Figure 18).

6.2. Spike Module Assembly

6.2.1. Preparing the Spike Model assembly(ies) for installation
6.2.2. Attaching the Driven Link to the first spike module

Place the spikes into the down position to aid in the fitment of all the shaft couplings.

Ensure the Driven Link and the spikes are pointing in the same direction. (Section 6, Figures 25 to 28).
6.2.3. Aligning the Driven Linkage Arm to the Drive Linkage Arm.
6.2.4. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly. Ensure that the Sandwich Plate is lifted over the Driven Linkage Arm, so that the Driven Linkage Arm sits flush with the Drive Linkage Arm (Section 6, Figure 30).

Using six M12x25 bolts, fix one spike module to another (Section 6, Figure 33).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.
6.2.5. Assembling the shaft couplings
The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.

Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.
STEP 5
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they rotate freely.

6.2.6. Bolting down the assembly to the ground

If the SECTOR II and **CLAWS** are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. (Section 6.4.2.) These must be done before bolting the assembly to the ground. Once this preparation work has been completed, proceed with the installation below.

It is crucial that the surface it’s mounted on is a reasonably even surface as an uneven surface could result in an uneven binding of the spike shafts. This will result in premature failure.
6.2.7. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules and drive linkage unit combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 6, Figure 44).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

Steps 4-7 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and proximity sensor cable will need to be dug (Section 6.4.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed to the SECTOR II at a later stage.
6.3. Re-assembling the ramp plates and linkage cover

Leave out the four M8 screws and Spring Washers on the far end of the assembly as the module end cover will be assembled later.

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
6.4. Integrating the SECTOR II with the CLAWS

6.4.1. Directly mount THE SECTOR II onto the Independent Drive

6.4.1.1. Placing the gearbox cover into position

STEP 1

M10 Bolt

Washer

Gearbox cover

Blanking plate

FIGURE 66

STEP 2

M10 Bolt

Washer

Gearbox cover

Blanking plate

FIGURE 67

STEP 3

M12 Nut

Washer

Gearbox cover

FIGURE 68

STEP 4

M12 Nut

Washer

Gearbox cover

FIGURE 69

STEP 5

FIGURE 70

STEP 6

FIGURE 71
6.4.1.2. Placing the SECTOR II into position

6.4.2. Separately-placed CLAWS and SECTOR II

6.4.2.1. Running the conduit from the gearbox to the SECTOR II

**STEP 1**

Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.
STEP 8
Route the CLAWS and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

6.4.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

6.4.2.3. Placing the SECTOR II into position

6.4.3. Fitting the relay enclosure and its bracket
Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.

6.4.5. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.
STEP 2
Keeping the **CLAWS** Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

![FIGURE 91](image1.png)

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 6, Figure 93).

It can also be moved lower down for optimum space when working on the gearbox (Section 6, Figure 94).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 6, Figure 91).
STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
7. RHS Surface Mount - Opposing Direction of Travel

7.1. Preparing the Drive Linkage Assembly

**FIGURE 1**
- Step 1: M6x20 screw
- Linkage assembly
- Gearbox cover
- M12 Nut
- Washer

**FIGURE 2**
- Step 2: Drive linkage assembly
- Gearbox cover
- Linkage assembly

**FIGURE 3**
- Step 3: M12 Nut
- Washer

**FIGURE 4**
- Step 4: Drive linkage assembly
- M6x20 screw

**FIGURE 5**
- Step 5: Drive linkage assembly
- Linkage end cover

**FIGURE 6**
- Step 6: Drive linkage assembly
- Gearbox drive arm
The drive linkage arm should point to a 7 o’clock position and the holes of the gearbox shaft and the linkage arm must line up as shown above.

Tighten the Countersunk M8x40 screw to 20Nm (Section 7, Figure 9).

7.2. Spike Module Assembly

7.2.1. Preparing the Spike Model assembly(ies) for installation
7.2.2. Attaching the Driven Link to the first spike module

Place the spikes into the down position to aid in the fitment of all the shaft couplings.

Ensure the Driven Link and the spikes are pointing in the same direction. (Section 7, Figures 16 to 19).
7.2.3. Aligning the Driven Linkage Arm to the Drive Linkage Arm.
7.2.4. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly. Ensure that the Sandwich Plate is lifted over the Driven Linkage Arm, so that the Driven Linkage Arm sits flush with the Drive Linkage Arm (Section 7, Figure 21).

Using six M12x25 bolts, fix one spike module to another (Section 7, Figure 24).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.
7.2.5. Assembling the shaft couplings

The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.

Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.
STEP 5
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

7.2.6. Bolting down the assembly to the ground

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. (Section 7.4.2.) These must be done before bolting the assembly to the ground. Once this preparation work has been completed, proceed with the installation below.

It is crucial that the surface it’s mounted on is a reasonably even surface as an uneven surface could result in an uneven binding of the spike shafts. This will result in premature failure.
7.2.7. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules and drive linkage unit combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 7, Figure 35).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

Steps 4-5 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and proximity sensor cable will need to be dug (Section 7.4.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed to the SECTOR II at a later stage.
7.3. Re-assembling the ramp plates and linkage cover

Leave out the four M8 screws and Spring Washers on the far end of the assembly as the module end cover will be assembled later.

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
STEP 4
M8x20 screw
Spring Washer

STEP 5
Linkage end cover

STEP 6
M6x20 screw

STEP 7
Module end cover

STEP 8
M8x20 screw
Spring Washer

FIGURE 50
FIGURE 51
FIGURE 52
FIGURE 53
FIGURE 54

SECTION 7
RHS SURFACE MOUNT - OPPOSING DIRECTION OF TRAVEL
7.4. Integrating the SECTOR II with the CLAWS

7.4.1. Directly mount the SECTOR II onto the Independent Drive

7.4.1.1. Placing the gearbox cover into position

![Diagram of SECTOR II integration](FIGURE 55)

**STEP 1**

- M10 Bolt
- Blanking plate
- Gearbox cover

![Diagram of SECTOR II integration](FIGURE 56)

**STEP 2**

- M10 Bolt
- Blanking plate
- Gearbox cover

![Diagram of SECTOR II integration](FIGURE 57)

**STEP 3**

- M12 Nut
- Blanking plate
- Gearbox cover

![Diagram of SECTOR II integration](FIGURE 58)

**STEP 4**

- M12 Nut
- Blanking plate
- Gearbox cover

![Diagram of SECTOR II integration](FIGURE 59)

**STEP 5**

- M12 Nut
- Blanking plate
- Gearbox cover

![Diagram of SECTOR II integration](FIGURE 60)

**STEP 6**

- M12 Nut
- Blanking plate
- Gearbox cover
7.4.1.2. Placing the SECTOR II into position

7.4.2. Separately-placed CLAWS and SECTOR II

7.4.2.1. Running the conduit from the gearbox to the SECTOR II

STEP 1
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.
STEP 8
Route the CLAWS and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

7.4.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

7.4.2.3. Placing the SECTOR II into position

7.4.3. Fitting the relay enclosure and its bracket
Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.

7.4.5. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.
STEP 2
Keeping the CLAWS Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 7, Figure 82).

It can also be moved lower down for optimum space when working on the gearbox (Section 7, Figure 83).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 7, Figure 80).
STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
8. LHS Surface Mount - Similar Direction of Travel

8.1. Preparing the Drive Linkage Assembly

STEP 1

FIGURE 1

STEP 2

FIGURE 2

STEP 3

FIGURE 3

STEP 4

FIGURE 4

STEP 5

FIGURE 5

STEP 6

FIGURE 6
The drive linkage arm should point to a 7 o’clock position and the holes of the gearbox shaft and the linkage arm must line up as shown above.

Tighten the Countersunk M8x40 screw to 20Nm (Section 8, Figure 9).

**8.2. Spike Module Assembly**

**8.2.1. Preparing the Spike Model assembly(ies) for installation**
8.2.2. Attaching the Driven Link to the first spike module

Place the spikes into the down position to aid in the fitment of all the shaft couplings.

Ensure the Driven Link and the spikes are pointing in the same direction. (Section 8, Figures 16 to 19).
8.2.3. Aligning the Driven Linkage Arm to the Drive Linkage Arm.
8.2.4. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly. Ensure that the Sandwich Plate is lifted over the Driven Linkage Arm, so that the Driven Linkage Arm sits flush with the Drive Linkage Arm (Section 8, Figure 21).

Using six M12x25 bolts, fix one spike module to another (Section 8, Figure 24).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.
8.2.5. Assembling the shaft couplings

The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.

Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.
**STEP 5**
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

It is crucial that the surface it’s mounted on is a reasonably even surface as an uneven surface could result in an uneven binding of the spike shafts. This will result in premature failure.

**8.2.6. Bolting down the assembly to the ground**

If the SECTOR II and **CLAWS** are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. (Section 8.4.2.) These must be done before bolting the assembly to the ground. Once this preparation work has been completed, proceed with the installation below.
8.2.7. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules and drive linkage unit combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 8, Figure 35).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

Steps 4-7 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and proximity sensor cable will need to be dug (Section 8.4.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed to the SECTOR II at a later stage.
8.3. Re-assembling the ramp plates and linkage cover

Leave out the four M8 screws and Spring Washers on the far end of the assembly as the module end cover will be assembled later.

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
STEP 4

FIGURE 52

Spring Washer
M8x20 screw

STEP 5

FIGURE 53

Linkage end cover

STEP 6

FIGURE 54

M6x20 screw

STEP 7

FIGURE 55

Module end cover

STEP 8

FIGURE 56

M8x20 screw
Spring Washer
8.4. Integrating the SECTOR II with the CLAWS

8.4.1. Directly mount THE SECTOR II onto the Independent Drive

8.4.1.1. Placing the gearbox cover into position

**STEP 1**

**FIGURE 57**

**STEP 2**

**FIGURE 58**

**STEP 3**

**FIGURE 59**

**STEP 4**

**FIGURE 60**

**STEP 5**

**FIGURE 61**

**STEP 6**

**FIGURE 62**
8.4.1.2. Placing the SECTOR II into position

8.4.2. Separately-placed CLAWS and SECTOR II

8.4.2.1. Running the conduit from the gearbox to the SECTOR II

STEP 1
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.
STEP 8
Route the **CLAWS** and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

8.4.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

8.4.2.3. Placing the SECTOR II into position

8.4.3. Fitting the relay enclosure and its bracket
Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.

8.4.5. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.
STEP 2

Keeping the **CLAWS** Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70º by pivoting it upward from the bottom for better viewing of the LCD screen (Section 8, Figure 84).

It can also be moved lower down for optimum space when working on the gearbox (Section 8, Figure 85).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 8, Figure 82).
FIGURE 84. CLAWS CONTROLLER AND BRACKET AT FIXED 70° POSITION

FIGURE 85. TEMPORARY CLAWS CONTROLLER AND BRACKET POSITION

Push the two tabs found at the top end of the CLAWS controller outwards to unclip it (1), and lift the controller from its bracket (2).

STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
9. RHS Surface Mount - Opposing Direction of Travel

9.1. Preparing the Drive Linkage Assembly
The drive linkage arm should point to a 5 o'clock position and the holes of the gearbox shaft and the linkage arm must line up as shown above.

Tighten the Countersunk M8x40 screw to 20Nm (Section 9, Figure 9).

9.2. Spike Module Assembly

9.2.1. Preparing the Spike Model assembly(ies) for installation
9.2.2. Attaching the Driven Link to the first spike module

Place the spikes into the down position to aid in the fitment of all the shaft couplings.

Ensure the Driven Link and the spikes are pointing in the same direction. (Section 9, Figures 16 to 19).
9.2.3. Aligning the Driven Linkage Arm to the Drive Linkage Arm.

FIGURE 19

FIGURE 20
9.2.4. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly. Ensure that the Sandwich Plate is lifted over the Driven Linkage Arm, so that the Driven Linkage Arm sits flush with the Drive Linkage Arm (Section 9, Figure 21).

Using six M12x25 bolts, fix one spike module to another (Section 9, Figure 24).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.
9.2.5. Assembling the shaft couplings

The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.

Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.
SECTION 9

LHS SURFACE MOUNT - OPPOSING DIRECTION OF TRAVEL

STEP 7
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

FIGURE 33

9.2.6. Bolting down the assembly to the ground

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. (Section 9.4.2.) These must be done before bolting the assembly to the ground. Once this preparation work has been completed, proceed with the installation below.

FIGURE 31

FIGURE 32

STEP 5

STEP 6

It is crucial that the surface it’s mounted on is a reasonably even surface as an uneven surface could result in an uneven binding of the spike shafts. This will result in premature failure.
9.2.5. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules and drive linkage unit combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 9, Figure 35).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

Steps 4-7 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and proximity sensor cable will need to be dug (Section 9.4.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed to the SECTOR II at a later stage.
8.3. Re-assembling the ramp plates and linkage cover

---

Leave out the four M8 screws and Spring Washers on the far end of the assembly as the module end cover will be assembled later.

---

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
STEP 4  
FIGURE 52  

STEP 5  
FIGURE 53  

STEP 6  
FIGURE 54  

STEP 7  
FIGURE 55  

STEP 8  
FIGURE 56
9.4. Integrating the SECTOR II with the CLAWS

9.4.1. Directly mount THE SECTOR II onto the Independent Drive

9.4.1.1. Placing the gearbox cover into position
9.4.1.2. Placing the SECTOR II into position

9.4.2. Separately-placed CLAWS and SECTOR II

9.4.2.1. Running the conduit from the gearbox to the SECTOR II

STEP 1
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.
STEP 8
Route the **CLAWS** and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

9.4.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

9.4.2.3. Placing the SECTOR II into position

9.4.3. Fitting the relay enclosure and its bracket
Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.

8.4.5. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.
**STEP 2**

Keeping the **CLAWS** Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 9, Figure 84).

It can also be moved lower down for optimum space when working on the gearbox (Section 9, Figure 85).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 9, Figure 82).
FIGURE 84. CLAWS CONTROLLER AND BRACKET AT FIXED 70° POSITION

FIGURE 85. TEMPORARY CLAWS CONTROLLER AND BRACKET POSITION

Push the two tabs found at the top end of the CLAWS controller outwards to unclip it (1), and lift the controller from its bracket (2).

FIGURE 86. UNCLIPPING THE CLAWS CONTROLLER FROM ITS BRACKET

STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
INDEPENDENT DRIVE
FLUSH MOUNT INSTALLATIONS

Centurion Systems (Pty) Ltd
www.centsys.com
10. Product Identification

1. Boom pole
2. Spikes module assembly
3. Trench cover plate
4. Spikes
5. Drive linkage assembly
6. SECTOR II

FIGURE 1. PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>Module Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linkage Frame</td>
</tr>
<tr>
<td>Sandwich Plate</td>
</tr>
<tr>
<td>Top Coupler</td>
</tr>
<tr>
<td>Bottom Coupler</td>
</tr>
<tr>
<td>8x20 Dowel Pin</td>
</tr>
</tbody>
</table>
## 11. Tools Required

- 13mm, 17mm, and 19mm Spanners
- Ratchet
- 19mm, and 24mm Sockets
- Allen Key Set
- 20mm and 50mm Hole Saw
- Mallet
- Tape Measure
- Spirit Level
- Torque Wrench
- Conduit Spring for 20mm conduit
12. Introduction

This document describes the basic steps to follow when installing the flush-mountable CLAWS Spikes driven directly from a SECTOR II Barrier by a “push-pull” linkage system. The installation described in this document is a 2.5 meter installation which utilises modules of 1.5 and 1.0 meters.

The installation of the CLAWS Spikes requires a minimum of two persons.

12.1. Installation Configurations

The flush-mountable CLAWS Spikes can be installed in four different configurations. The configuration is dependent on two factors:

- Orientation of installation
- Direction of spike impact

12.1.1. Orientation of Installation

The orientation of installation is described as the side at which the drive linkage is installed when approaching the CLAWS Spikes. In other words, when driving up to the CLAWS Spikes, in the correct direction for traffic flow, and the drive is installed on the right-hand side of the vehicle, it’s deemed a right-hand installation. And when driving up to the CLAWS Spikes, in the correct direction for traffic flow, and the drive is installed on the left-hand side of the vehicle, it’s deemed a left-hand installation.
12.1.2. Spike Impact Direction

The CLAWS Spikes are designed to take a much larger or more frequent impact in one direction. The spikes can be installed to face either towards oncoming traffic (similar) or face towards traffic (opposing) trying to enter from the wrong direction or lane.

There are four types of typical installations. Refer to Section 11, Figures 2 and 3 to determine if the installation is left- or right-hand orientated. Secondly; pay attention to the spike impact direction:

- **Similar direction of travel** prevents vehicles from exiting whilst the boom pole is still down (Normal direction of traffic)
- **Opposing direction of travel** prevents vehicles entering against the flow of traffic whilst the boom pole is down

![FIGURE 4. SPIKE IMPACT DIRECTION - SIMILAR](image)

![FIGURE 5. SPIKE IMPACT DIRECTION - OPPOSING](image)

![FIGURE 6. RHS SIMILAR DIRECTION OF TRAVEL](image)
Note the orientation of the gearbox coupler notch is at the 9 o’clock position and that the gearbox drive arm is up as shown in Section 13, Figure 14.
13.2. Spike Module Assembly

13.2.1. Preparing the Spike Module assembly(ies) for installation

13.2.2. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly.
STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 13, Figure 20).

![Figure 20](image_url)

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.

13.2.3. Assembling the shaft couplings
The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.

**STEP 1**

**FIGURE 23**

**STEP 2**

**FIGURE 24**

**STEP 3**

**FIGURE 25**

**STEP 4**

**FIGURE 26**

**STEP 5**
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

**STEP 6**

**FIGURE 27**

**STEP 7**

**FIGURE 28**
FIGURE 29. CORRECTLY ALIGNED SPIKE AND DRIVE MODULES

- Gearbox
- Drive arm

VIEW A

VIEW B

VIEW A

VIEW B
13.2.4. Proximity sensor installation

STEP 1

The length of the PVC conduit will be relative to the length of the spike modules combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 13, Figure 31).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

It is necessary to bend PVC conduit to circumvent the gearbox bulkhead to continue. The use of a conduit spring is recommended to avoid collapsing the pipe. Section 13, Figure 34 below is a guideline that can be used to achieve this.

Connect the bent piece of conduit to the PVC coupler installed in Section 13, Figure 33 Step 3. After it is connected, it should resemble Section 13, Figure 35.
Steps 6-9 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and cables will need to be dug (Refer to Section 13.5.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed up the SECTOR II at a later stage.
13.2.5. Attaching the End Covers to the Assembly

13.2.5.1. Attaching the Module End cover

13.2.5.2. Attaching the Linkage Unit End cover
13.3. Preparing the Trench and Drainage System

Drainage pipes must be laid at one or both ends of the trench to allow water to flow either into storm water drains or into any other area away from the installation. Section 13, Figure 52 shows two recommended drainage configurations. Once complete, hold the draining pipes in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. This must be done before any concrete is poured (Section 13.5.2.).

Make sure the drain pipes do not interfere with the structure when it is in the trench.
13.3.1. Concreting the Assembly into the Trench.

Ensure that the drain pipes will not interfere with the structure when it is placed in the trench.

Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

**Do not pour any concrete into the gutter of the spikes module or drive link assembly.**

![Diagram of trench and concrete foundation](image)

**FIGURE 53**

**STEP 3**

![Diagram of CLAWS flush mount installation](image)

**FIGURE 54. OVERVIEW OF CIVIL LAYOUT**

The Value of ‘X’ in a:

- **3m Configuration**: 3 420mm
- **4.5m Configuration**: 4 920mm
- **6m Configuration**: 6 420mm
13.4. Re-assembling the trench plates

**STEP 1**

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.

**STEP 2**

FIGURE 56

[Diagram showing the M8x20 screw and Spring Washer]
13.5.  Integrating the SECTOR II with the CLAWS

13.5.1.  Directly mount THE SECTOR II onto the Independent Drive

13.5.1.1.  Placing the gearbox cover into position
13.5.1.2. Placing the SECTOR II into position

FIGURE 64

FIGURE 65
13.5.2. Separately-placed CLAWS and SECTOR II

13.5.2.1. Running the conduit from the gearbox to the SECTOR II

**STEP 1**
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.

Drill a 20mm hole through the gutter plate using a 20mm hole saw for the proximity sensor conduit.

---

**FIGURE 66**

**STEP 2**

**FIGURE 67**

**STEP 3**

**FIGURE 68**

**STEP 4**

**FIGURE 69**

**STEP 5**
STEP 8
Route the **CLAWS** and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

13.5.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

13.5.2.3. Placing the SECTOR II into position

---

Figure 75: Manual Override

Figure 76: Figure 77

**STEP 1**

By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

**STEP 2**

SECTOR II

Nut

Heavy duty washer

Hold down bracket

Figure 76: **FIGURE 76**

Figure 77: **FIGURE 77**
13.5.3. Fitting the relay enclosure and its bracket

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.
13.5.4. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.

FIGURE 81
STEP 2
Keeping the CLAWS Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70º by pivoting it upward from the bottom for better viewing of the LCD screen (Section 13, Figure 84).

It can also be moved lower down for optimum space when working on the gearbox (Section 13, Figure 85).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 13, Figure 82).
FIGURE 84. CLAWS CONTROLLER AND BRACKET AT FIXED 70° POSITION

FIGURE 85. TEMPORARY CLAWS CONTROLLER AND BRACKET POSITION

Push the two tabs found at the top end of the CLAWS controller outwards to unclip it (1), and lift the controller from its bracket (2).

FIGURE 86. UNCLIPPING THE CLAWS CONTROLLER FROM ITS BRACKET

STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
14. RHS Flush Mount - Opposing Direction of Travel

14.1. Preparing the Drive Linkage Assembly

Note the orientation of the gearbox coupler notch is at the 3 o’clock position and that the gearbox drive arm is down as shown in Section 14, Figure 5.
14.2. Spike Module Assembly

14.2.1. Preparing the Spike Module assembly(ies) for installation

14.2.2. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly.
STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 14, Figure 11).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.

14.2.3. Assembling the shaft couplings
The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.

**STEP 1**

**FIGURE 14**

**STEP 2**

**FIGURE 15**

**STEP 3**

**FIGURE 16**

**STEP 4**

**FIGURE 17**

**STEP 5**

Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

**STEP 6**

**FIGURE 18**

**STEP 7**

**FIGURE 19**
FIGURE 20. CORRECTLY ALIGNED SPIKE AND DRIVE MODULES
14.2.4. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 14, Figure 22).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

It is necessary to bend PVC conduit to circumvent the gearbox bulkhead to continue. The use of a conduit spring is recommended to avoid collapsing the pipe. Section 14, Figure 25 below is a guideline that can be used to achieve this.

STEP 5
Connect the bent piece of conduit to the PVC coupler installed in Section 14, Figure 24 Step 3. After it is connected, it should resemble Section 14, Figure 26.
Steps 6-9 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and cables will need to be dug (Refer to Section 14.5.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed up the SECTOR II at a later stage.
14.2.5. Attaching the End Covers to the Assembly

14.2.5.1. Attaching the Module End cover

14.2.5.2. Attaching the Linkage Unit End cover
14.3. Preparing the Trench and Drainage System

Drainage pipes must be laid at one or both ends of the trench to allow water to flow either into storm water drains or into any other area away from the installation. Section 14, Figure 41 shows two recommended drainage configurations. Once complete, hold the drainage pipes in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. This must be done before any concrete is poured (Section 14.5.2.).

Make sure the drain pipes do not interfere with the structure when it is in the trench.
14.3.1. Concreting the Assembly into the Trench.

Ensure that the drain pipes will not interfere with the structure when it is placed in the trench.

Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

![Diagram of remaining trench cavity]

**Do not pour any concrete into the gutter of the spikes module or drive link assembly.**

![Diagram of concrete foundation and top structure]

STEP 3

Ensure that the drain pipes will not interfere with the structure when it is placed in the trench.

The Value of 'X' in a:  
- **3m Configuration:** 3 420mm  
- **4.5m Configuration:** 4 920mm  
- **6m Configuration:** 6 420mm

![Diagram of CLAWS flush mount installation and dimension X]

FIGURE 42

FIGURE 43. OVERVIEW OF CIVIL LAYOUT
14.4. Re-assembling the trench plates

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
14.5. Integrating the SECTOR II with the CLAWS

14.5.1. Directly mount THE SECTOR II onto the Independent Drive

14.5.1.1. Placing the gearbox cover into position

**FIGURE 46**

**FIGURE 47**

**FIGURE 48**

**FIGURE 49**
14.5.1.2. Placing the SECTOR II into position

STEP 1  FIGURE 53  STEP 2  FIGURE 54

SECTOR II
Gearbox cover

SECTOR II
M12x60 Hex Bolt
Heavy duty washer
Hold down bracket
Gearbox
14.5.2. Separately-placed CLAWS and SECTOR II

14.5.2.1. Running the conduit from the gearbox to the SECTOR II

**STEP 1**
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.

Drill a 20mm hole through the gutter plate using a 20mm hole saw for the proximity sensor conduit.
STEP 8
Route the CLAWS and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

14.5.2.2. Placing the gearbox cover into position
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

**14.5.2.3. Placing the SECTOR II into position**

**STEP 1**

**FIGURE 65**

**STEP 2**

**FIGURE 66**
14.5.3. Fitting the relay enclosure and its bracket

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.
14.5.4. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.
STEP 2
Keeping the **CLAWS** Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 14, Figure 72).

It can also be moved lower down for optimum space when working on the gearbox (Section 14, Figure 73).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 14, Figure 70).
FIGURE 72. CLAWS CONTROLLER AND BRACKET AT FIXED 70º POSITION

FIGURE 73. TEMPORARY CLAWS CONTROLLER AND BRACKET POSITION

Push the two tabs found at the top end of the CLAWS controller outwards to unclip it (1), and lift the controller from its bracket (2).

FIGURE 74. UNCLIPPING THE CLAWS CONTROLLER FROM ITS BRACKET

STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
Note the orientation of the gearbox coupler notch is at the 3 o’clock position and that the gearbox drive arm is down as shown in Section 15, Figure 5.
15.2. Spike Module Assembly

15.2.1. Preparing the Spike Module assembly(ies) for installation

STEP 1

FIGURE 7

M8x20 screw
Spring Washer

FIGURE 8

STEP 2

Trench cover

15.2.2. Attaching the drive linkage assembly to the spike module

STEP 1

FIGURE 9

Drive Linkage assembly
Sandwich plate
Spike module

FIGURE 10

STEP 2

M12 Nut
M12x25 bolt

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly.
STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 15, Figure 11).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.

15.2.3. Assembling the shaft couplings
The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.

**STEP 1**

**FIGURE 14**

**STEP 2**

**FIGURE 15**

**STEP 3**

**FIGURE 16**

**STEP 4**

**FIGURE 17**

**STEP 5**

Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

**STEP 6**

**FIGURE 18**

**STEP 7**

**FIGURE 19**
FIGURE 20. CORRECTLY ALIGNED SPIKE AND DRIVE MODULES
15.2.4. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 15, Figure 22).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

It is necessary to bend PVC conduit to circumvent the gearbox bulkhead to continue. The use of a conduit spring is recommended to avoid collapsing the pipe. Section 15, Figure 25 below is a guideline that can be used to achieve this.

STEP 5
Connect the bent piece of conduit to the PVC coupler installed in Section 14, Figure 24 Step 3. After it is connected, it should resemble Section 15, Figure 26.
Steps 6-7 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and cables will need to be dug (Refer to Section 15.5.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed up the SECTOR II at a later stage.
15.2.5. Attaching the End Covers to the Assembly

15.2.5.1. Attaching the Module End cover

Figures 36 and 37 illustrate the process of attaching the Module End cover. The steps are as follows:

**STEP 1**
- Insert the Module End Cover into the far end of the assembly.

**STEP 2**
- Secure the Module End Cover using an M12x25 bolt and M12 nut.

15.2.5.2. Attaching the Linkage Unit End cover

Figures 38 and 39 depict the attachment of the Linkage Unit End cover. The steps include:

**STEP 1**
- Place the Linkage Unit End Cover on the far end of the assembly.

**STEP 2**
- Fasten the Linkage Unit End Cover with an M12x25 bolt and M12 nut.
15.3. Preparing the Trench and Drainage System

Drainage pipes must be laid at one or both ends of the trench to allow water to flow either into storm water drains or into any other area away from the installation. Section 15, Figure 41 shows two recommended drainage configurations. Once complete, hold the drainage pipes in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. This must be done before any concrete is poured (Section 15.5.2.).

Make sure the drain pipes do not interfere with the structure when it is in the trench.
14.3.1. Concreting the Assembly into the Trench.

Ensure that the drain pipes will not interfere with the structure when it is placed in the trench.

Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

Do not pour any concrete into the gutter of the spikes module or drive link assembly.

The Value of ‘X’ in a:

- 3m Configuration: 3 420mm
- 4.5m Configuration: 4 920mm
- 6m Configuration: 6 420mm

FIGURE 42

FIGURE 43. OVERVIEW OF CIVIL LAYOUT
15.4. Re-assembling the trench plates

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
15.5. Integrating the SECTOR II with the CLAWS

15.5.1. Directly mount THE SECTOR II onto the Independent Drive

15.5.1.1. Placing the gearbox cover into position

---

**STEP 1**

**FIGURE 46**

**STEP 2**

**FIGURE 47**

**STEP 3**

**FIGURE 48**

**STEP 4**

**FIGURE 49**

**STEP 5**

**FIGURE 50**

**STEP 6**

**FIGURE 51**
15.5.1.2. Placing the SECTOR II into position

**STEP 1**

**FIGURE 53**

**STEP 2**

**FIGURE 54**

**Manual override**

**M12x20 Screw**

**SECTOR II**

**M12x60 Hex Bolt**

**Heavy duty washer**

**Hold down bracket**

**Gearbox cover**

**Gearbox**
15.5.2. Separately-placed CLAWS and SECTOR II

15.5.2.1. Running the conduit from the gearbox to the SECTOR II

**STEP 1**
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.

Drill a 20mm hole through the gutter plate using a 20mm hole saw for the proximity sensor conduit.
STEP 8
Route the **CLAWS** and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.

15.5.2.2. Placing the gearbox cover into position
15.5.2.3. Placing the SECTOR II into position

By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.
15.5.3. Fitting the relay enclosure and its bracket

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.
15.5.5. Fitting the CLAWS controller to the SECTOR II

Take note of the orientation of the fasteners above.

FIGURE 70
STEP 2
Keeping the CLAWS Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 15, Figure 73).

It can also be moved lower down for optimum space when working on the gearbox (Section 15, Figure 74).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 15, Figure 71).
STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
Note the orientation of the gearbox coupler notch is at the 9 o’clock position and that the gearbox drive arm is up as shown in Section 16, Figure 5.
16.2. Spike Module Assembly

16.2.1. Preparing the Spike Module assembly(ies) for installation

16.2.2. Attaching the drive linkage assembly to the spike module

Take note of the orientation of the Sandwich Plate to the Linkage Assembly before fixing them to the spike module assembly.
STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 16, Figure 11).

To assist with the alignment and adjustment of the shafts, loosen (but do not remove) the bolts on all of the bearing housings.

16.2.3. Assembling the shaft couplings
The coupler is used to connect and align the shafts together.

It is essential that the coupler is assembled correctly; failing to do so will result in slipping of the spikes which is undesirable.
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.

**STEP 1**

**STEP 2**

**STEP 3**

**STEP 4**

**STEP 5**
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.

**STEP 6**

**STEP 7**
STEP 7
Repeat this coupling process for additional spike modules. Once all shafts have been coupled, check that they move freely.
16.2.4. Proximity sensor installation

The length of the PVC conduit will be relative to the length of the spike modules combined. Ensure that a further 38mm is added to this to account for the modules and coupling (Refer to Section 16, Figure 22).
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.

It is necessary to bend PVC conduit to circumvent the gearbox bulkhead to continue. The use of a conduit spring is recommended to avoid collapsing the pipe. Section 16, Figure 25 below is a guideline that can be used to achieve this.

STEP 5
Connect the bent piece of conduit to the PVC coupler installed in Section 16, Figure 24 Step 3. After it is connected, it should resemble Section 16, Figure 26.
Steps 6-9 is only applicable if the SECTOR II will be mounted directly onto the CLAWS Gearbox. If they are going to be mounted separately, a trench for the conduit and cables will need to be dug (Refer to Section 16.5.2.).

Please ensure that the moving mechanical parts do not rub against the conduit or cables.
There should be ample cable left over on the drive linkage end, as the wiring will need to be routed up the SECTOR II at a later stage.
16.2.5. Attaching the End Covers to the Assembly

16.2.5.1. Attaching the Module End cover

16.2.5.2. Attaching the Linkage Unit End cover
16.3. Preparing the Trench and Drainage System

Drainage pipes must be laid at one or both ends of the trench to allow water to flow either into storm water drains or into any other area away from the installation. Section 16, Figure 43 shows two recommended drainage configurations. Once complete, hold the drainage pipes in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and CLAWS are to be separated, a trench for the conduit and cables will need to be dug, and the wiring harnesses will need to be extended in relation to the distance between the gearbox and SECTOR II. This must be done before any concrete is poured (Section 16.5.2.).

Make sure the drain pipes do not interfere with the structure when it is in the trench.
16.3.1. Concreting the Assembly into the Trench.

Ensure that the drain pipes will not interfere with the structure when it is placed in the trench.

Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

**Do not pour any concrete into the gutter of the spikes module or drive link assembly.**

![Figure 44: STEP 3](image1)

![Figure 45: OVERVIEW OF CIVIL LAYOUT](image2)

The Value of 'X' in a:

- **3m Configuration:** 3 420mm
- **4.5m Configuration:** 4 920mm
- **6m Configuration:** 6 420mm
16.4. Re-assembling the trench plates

Take note of the slot orientation in the trench cover plates before it is placed back into position. The spike must rest on the straight edge of the slot when it is in its upright position.
16.5. Integrating the SECTOR II with the CLAWS

16.5.1. Directly mount THE SECTOR II onto the Independent Drive

15.5.1.1. Placing the gearbox cover into position
16.5.1.2. Placing the SECTOR II into position

STEP 1  FIGURE 55  STEP 2  FIGURE 56

SECTOR II

Gearbox cover

SECTOR II

M12x60 Hex Bolt

Heavy duty washer

Hold down bracket

Gearbox

Manual override

M12x20 Screw

Hold down bracket

Gearbox cover
SECTION 16  
LHS FLUSH MOUNT - OPPOSING DIRECTION OF TRAVEL

16.5.2. Separately-placed CLAWS and SECTOR II

16.5.2.1. Running the conduit from the gearbox to the SECTOR II

**STEP 1**
Dig a trench for the conduit from the gearbox to the desired position of the SECTOR II.

Drill a 20mm hole through the gutter plate using a 20mm hole saw for the proximity sensor conduit.

**STEP 2**

**FIGURE 57**

**STEP 3**

**FIGURE 58**

**STEP 4**

**FIGURE 59**

**STEP 5**

**FIGURE 60**
16.5.2.2. Placing the gearbox cover into position

STEP 8
Route the **CLAWS** and Proximity sensor cables in the conduit to the SECTOR II.

STEP 9
Cast a plinth for the SECTOR II according to the SECTOR II installation manual.
By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.

16.5.2.3. Placing the SECTOR II into position

By removing the M12x20 screw and placing an allen key through the hole, the gearbox release screw can be loosened.
16.5.3. Fitting the relay enclosure and its bracket

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 17).

Complete the installation of the SECTOR II as per its full installation manual.
16.5.4. Fitting the CLAWS controller to the SECTOR II

STEP 1

Take note of the orientation of the fasteners above.
STEP 2
Keeping the **CLAWS** Controller bracket horizontal, slide the top insulation sleeves into the top slot of the bracket. Ensure that the bottom insulation sleeves line up with the bottom slot of the bracket to follow the slot as the bracket drops to its resting place.

The bracket can be moved into a set angle of 70° by pivoting it upward from the bottom for better viewing of the LCD screen (Section 16, Figure 75).

It can also be moved lower down for optimum space when working on the gearbox (Section 16, Figure 76).

Ensure that the bracket is placed in the standard vertical position when done to enable the SECTOR II access door to be closed (Section 16, Figure 73).
STEP 3
Connect harness and power supply. Refer to the wiring diagrams and controller settings.
FIGURE 78. CONNECTING THE TWO CONTROLLERS

NOTE:
The lug connections below are found under the isolator switches of the SECTOR II. Do not connect these to the battery terminals!

Proximity sensor connected to the far end of the CLAWS assembly
18. SECTOR II & CLAWS Controller Settings

18.1. SECTOR II Controller settings

<table>
<thead>
<tr>
<th>4. Modes of Operation</th>
<th>4.1. Operating mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Set to any mode applicable, Simplex (SMX), Complex (CMX) or PLC (PLC))</td>
</tr>
</tbody>
</table>

11. Spikes Mode

11.1. Spike interface

<table>
<thead>
<tr>
<th>11. Spikes Mode</th>
<th>11.1. Spike interface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Set to any mode applicable, Safe (SAF), or Secure (SEC))</td>
</tr>
</tbody>
</table>

18.2. CLAWS Controller settings

<table>
<thead>
<tr>
<th>4. Modes of Operation</th>
<th>4.1. Operating mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Set to Spike Mode (SPK))</td>
</tr>
</tbody>
</table>

TABLE 1

TABLE 2
19. Installation Handover

Once the installation has been successfully completed and tested, it is important to explain the operation and safety requirements of the system to the end-user.

NEVER ASSUME THE USER KNOWS HOW TO SAFELY OPERATE AUTOMATED ROADWAY SPIKES!

Even if the user has used such a system before, it does not mean he knows how to SAFELY operate it. Make sure that the user fully understands the following safety requirements before finally handing over the site.

The following needs to be understood by the user:

- How to operate the manual override mechanism
  *(Show them how by demonstration)*
- How co-installed safety loops and all other safety features work
  *(Show them how by demonstration)*
- All the features and benefits of the spikes
- All the safety considerations associated with operating automated roadway spikes.

The user should be able to pass this knowledge on to all other users of the automated system and must be made aware of this responsibility.

- Do not activate the **CLAWS** unless you can see it and can determine that its area of travel is clear of people, pets, or other obstructions
- **NO ONE MAY PASS OVER RAISING SPIKES.** Always keep people and objects away from the spikes
- **NEVER LET CHILDREN OPERATE OR PLAY WITH THE SPIKE CONTROLS,** and do not allow children or pets near the spike area
- Be careful with moving parts and avoid close proximity to areas where fingers or hands could be pinched
- Secure all easily-accessed spike controls in order to prevent its unauthorised use
- Keep the automated spikes system properly maintained, and ensure that all working areas are free of objects that could affect its operation and safety
- On a monthly basis, check the obstruction detection system and safety devices for correct operation
- All repair and service work to this product must be done by a suitably qualified person
- This product was designed and built strictly for the use indicated in this documentation. Any other use, not expressly indicated here, could compromise the good condition/operation of the product and/or be a source of danger!

Neither Centurion Systems (Pty) Ltd, nor its subsidiaries, accepts any liability caused by improper use of the product, or for use other than that for which the automated system was intended.

Ensure that the customer is in possession of the user guide and that you have completed the installation details in the back of the manual.