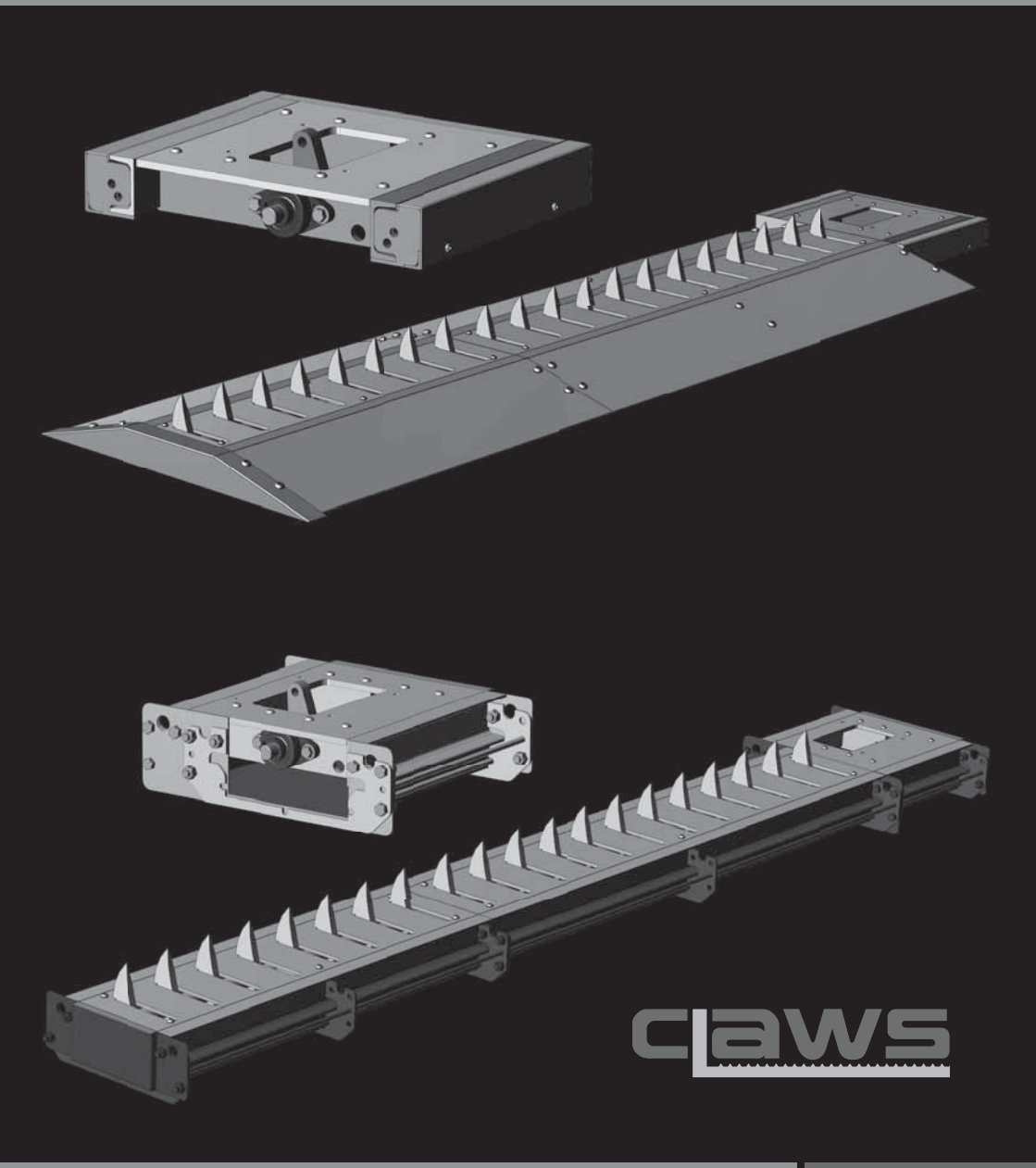
CLAWS - Direct Drive
Installation manual



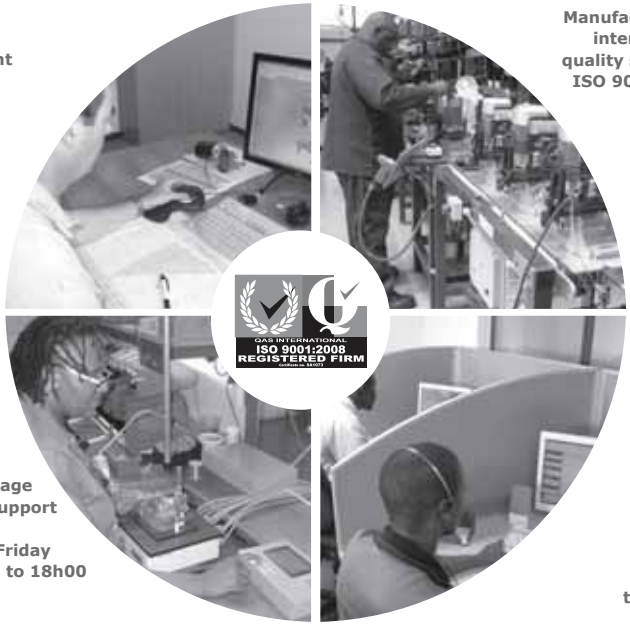
Centurion Systems (Pty) Ltd **www.centsys.com**

Company profile

1986 1990 1995 1999 Today

In-house R&D development team

Manufactures to international quality standard ISO 9001:2008



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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

IMPORTANT
SAFETY INSTRUCTIONS

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 on or near the trench covers at any time.
- No one 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 **CLAW** 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 a double pole switch with contact opening distance of 3mm or greater. Use of a 5A thermal breaker 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

1. General Description

CLAWS barrier spikes are designed to enhance the security at the entrance to high-volume sites. 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.

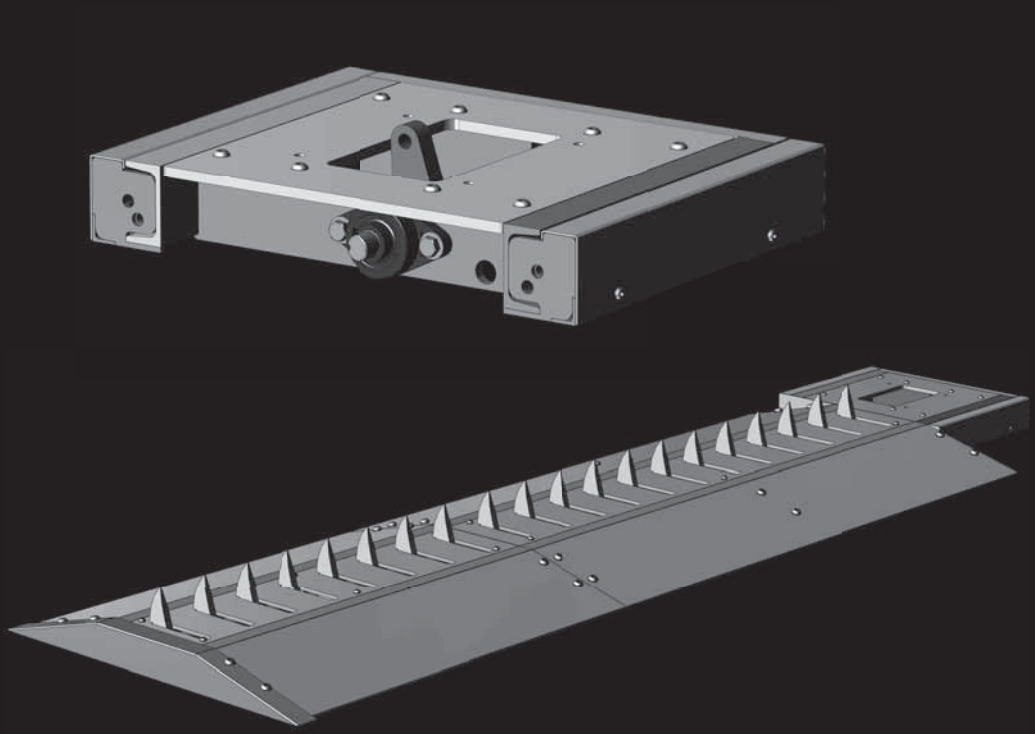
CLAWS are easy to install and use a standard SECTOR II controller and a standard SECTOR II gearbox, saving you time and reducing your spares inventory.
They boast all-weather construction and have been designed to allow for all moving parts to be removed easily for quick and easy maintenance.

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** Direct Drive system utilises the SECTOR II traffic barrier's drive mechanism. 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.

Direct Drive
Surface Mount Installations

claws



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2. Product Identification

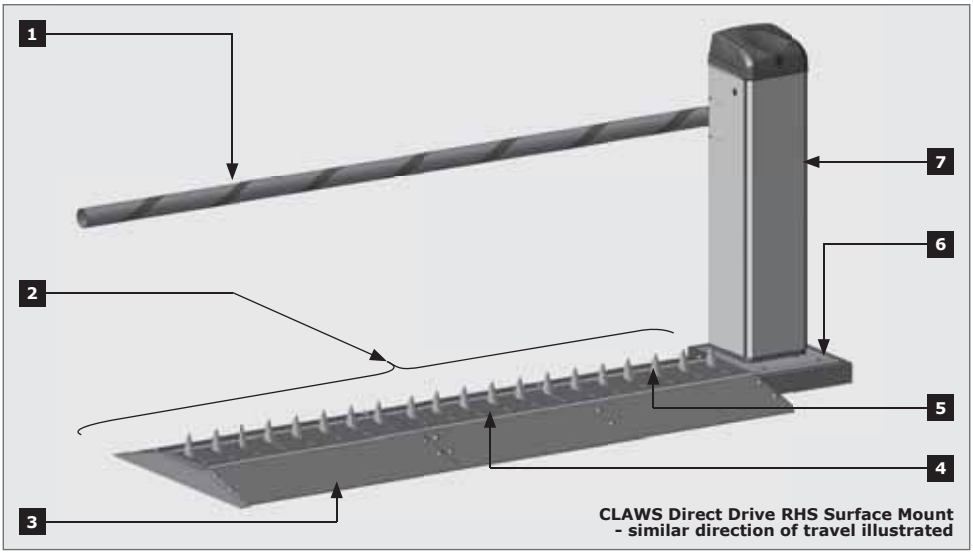
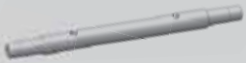


FIGURE 1. PRODUCT IDENTIFICATION

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

	Module Frame
	Linkage Frame
	Sandwich Plate
	Top Coupler
	Bottom Coupler
	8x20 Dowel Pin

	Short Drive Arm
	Long Drive Arm
	Linkage Drive Shaft
	Bearing Housing
	Hold Down Bracket
	Con-rod Assembly
	Linkage Cover Plate
	Linkage End Cover
	Module End Cover

3. Tools Required

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

4. Introduction

This document describes the basic steps to follow when installing the surface-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. For other installations, modules of 1.5 or 1.0 meters can be used to achieve different widths.

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

4.1. 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

4.1.1. 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

4.1.2. 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.

FIGURE 4. SPIKE IMPACT DIRECTION - SIMILAR

FIGURE 5. SPIKE IMPACT DIRECTION - OPPOSING

There are four types of typical installations. Refer to Section 4, 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

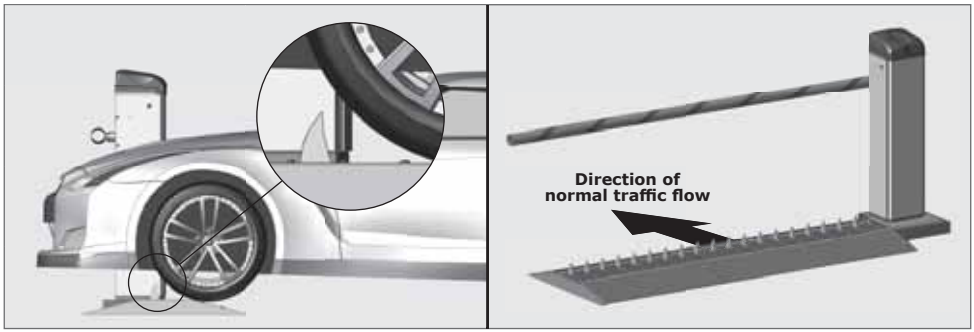


FIGURE 6. RHS SIMILAR DIRECTION OF TRAVEL

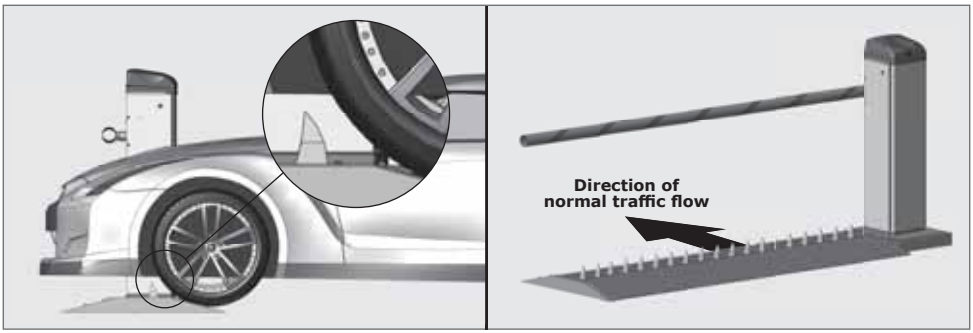


FIGURE 7. RHS OPPOSED DIRECTION OF TRAVEL

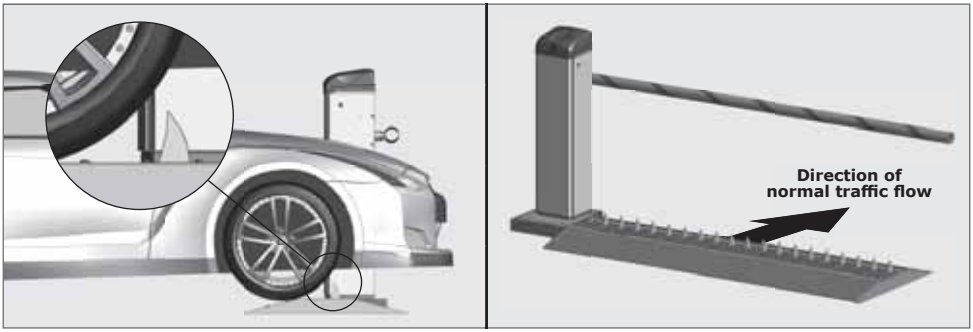


FIGURE 8. LHS SIMILAR DIRECTION OF TRAVEL

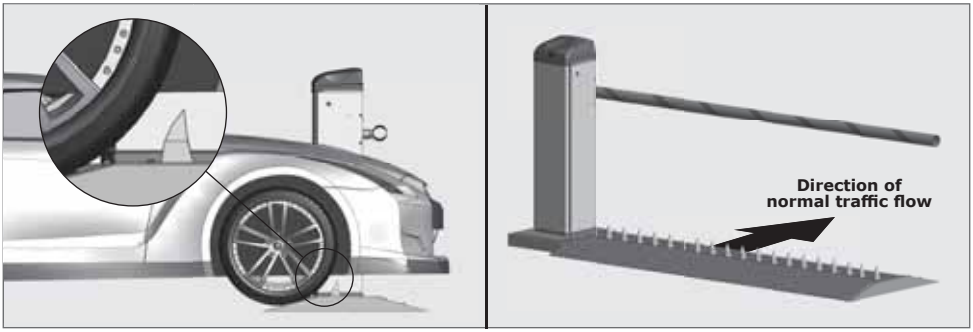
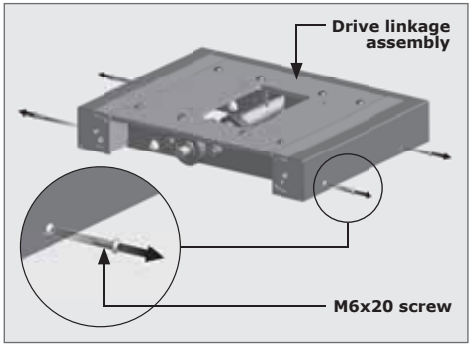


FIGURE 9. LHS OPPOSED DIRECTION OF TRAVEL

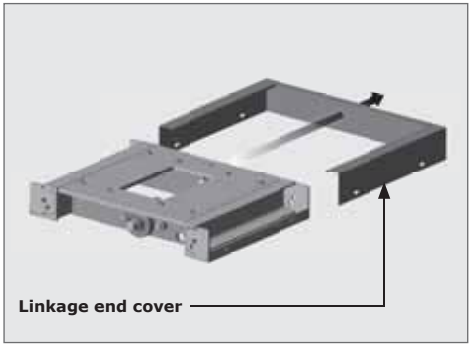
5. RHS Direct Drive Surface Mount - Similar Direction of Travel

5.1. Configuring the Drive Linkage Assembly for Right-hand Similar

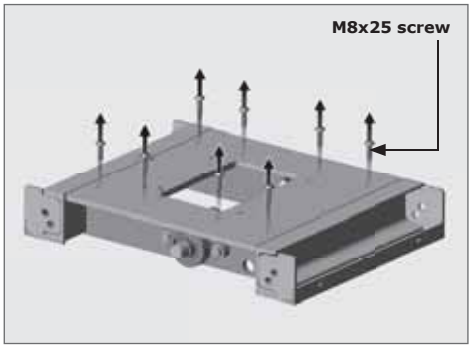
5.1.1. Stripping the drive linkage assembly



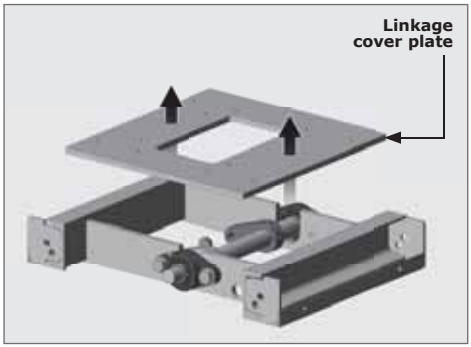
STEP 1 FIGURE 10



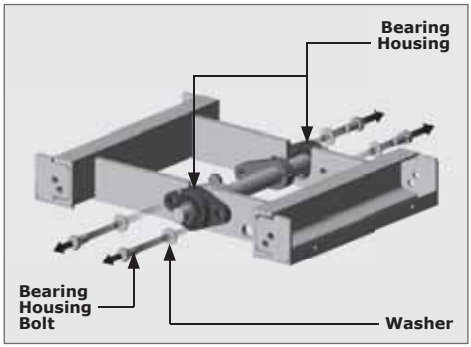
STEP 2 FIGURE 11



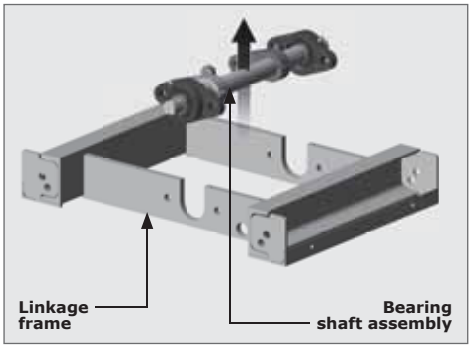
STEP 3 FIGURE 12



STEP 4 FIGURE 13



STEP 5 FIGURE 14



STEP 6 FIGURE 15

The unit is supplied with two drive arms, RHS and LHS (Section 5, Figure 16).

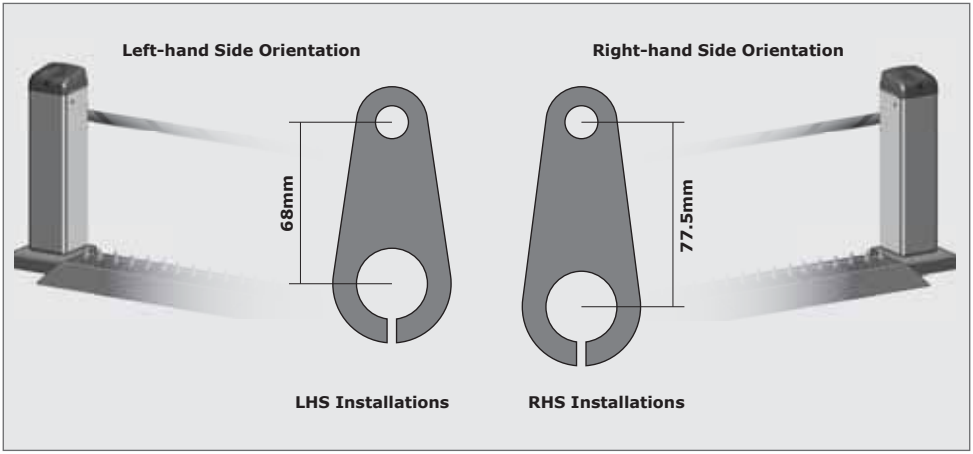
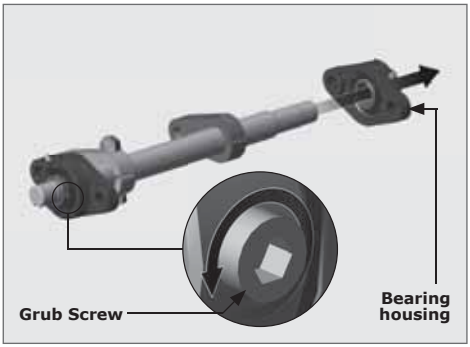
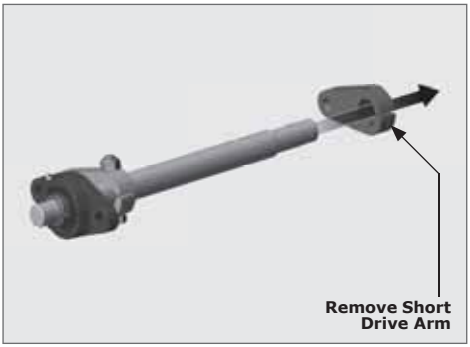


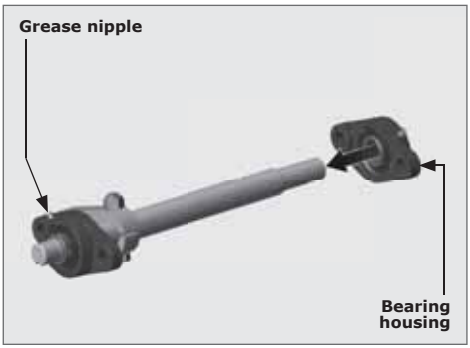
FIGURE 16



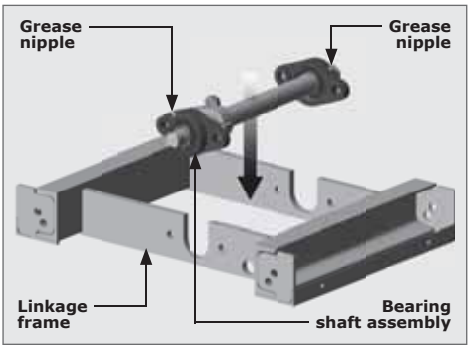
STEP 7 FIGURE 17



STEP 8 FIGURE 18



STEP 9 FIGURE 19



STEP 10 FIGURE 20

The grease nipples on the bearing housings must face up (Section 5, Figures 19 and 20). Take note of the orientation of the Linkage Frame, the Bearing Shaft Assembly, and the Drive Linkage Arm (Section 5, Figure 20).

Once assembled with the long drive arm, the layout should look as shown in Section 5, Figure 21.

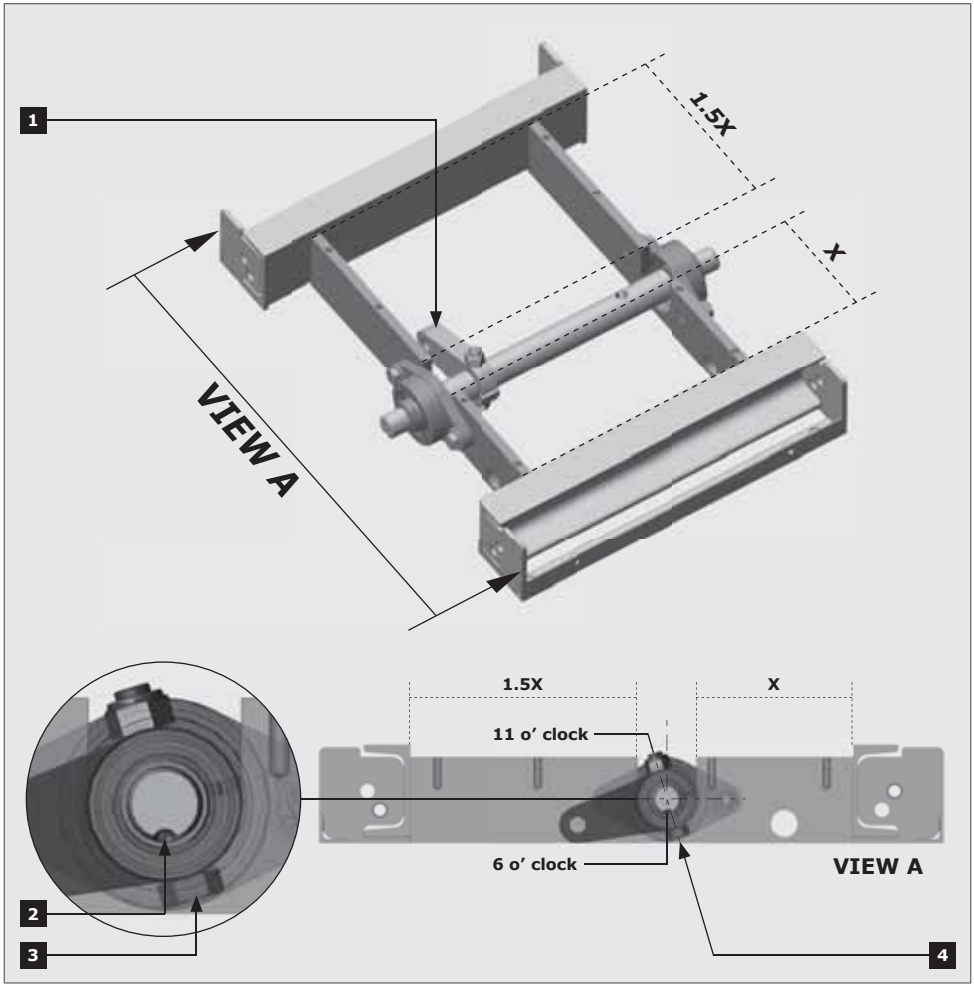


FIGURE 21

1. The drive arm must point towards the longer side of the drive linkage assembly (1.5x)
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (11 o'clock)

STEP 11
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 12
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 5, Figure 22).

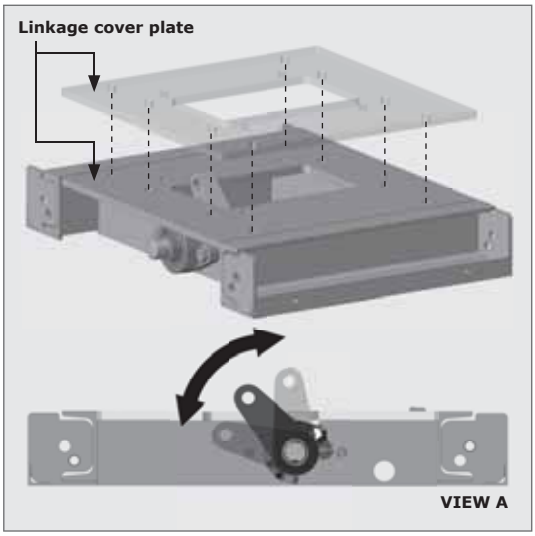
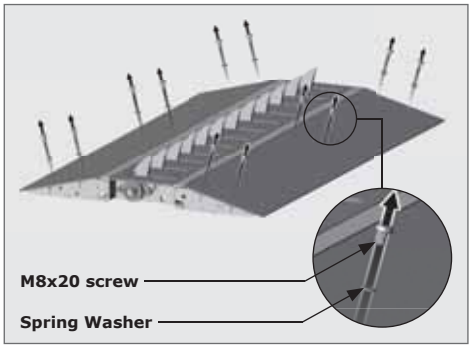


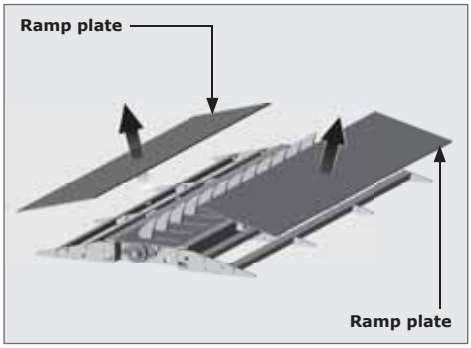
FIGURE 22

5.2. Spike Module Assembly

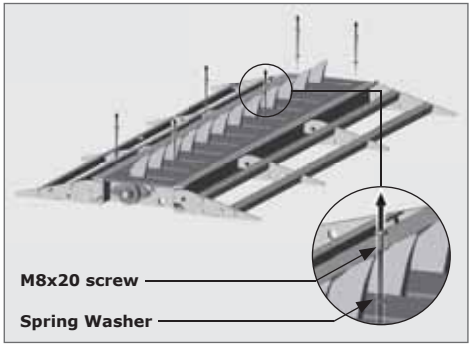
5.2.1. Preparing the Spike Module assembly(ies) for installation



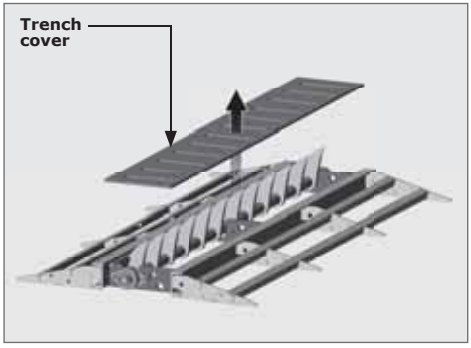
STEP 1 **FIGURE 23**



STEP 2 **FIGURE 24**

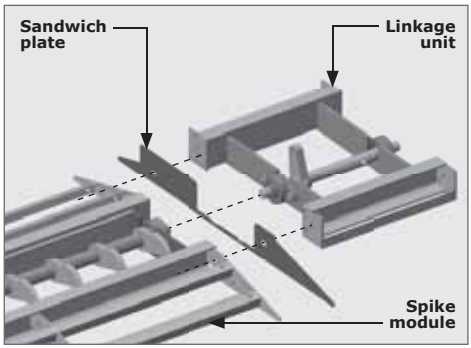


STEP 3 **FIGURE 25**

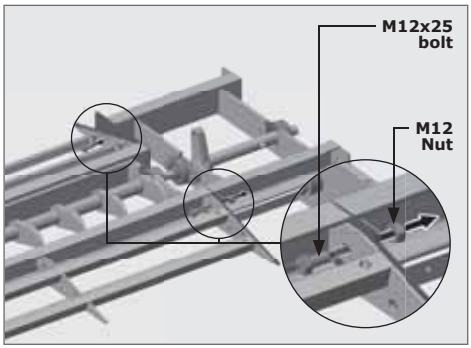


STEP 4 **FIGURE 26**

5.2.2. Attaching the drive linkage unit to the spike module



STEP 1 **FIGURE 27**



STEP 2 **FIGURE 28**

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 5, Figure 27).

STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 5, Figure 29).

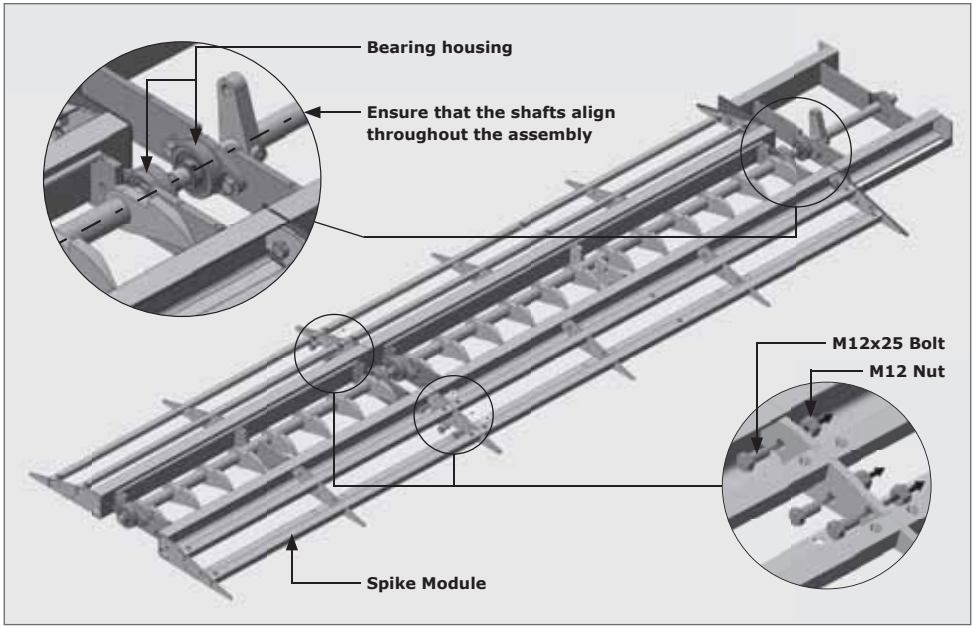


FIGURE 29

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

5.2.3. Bolting down the assembly to the ground

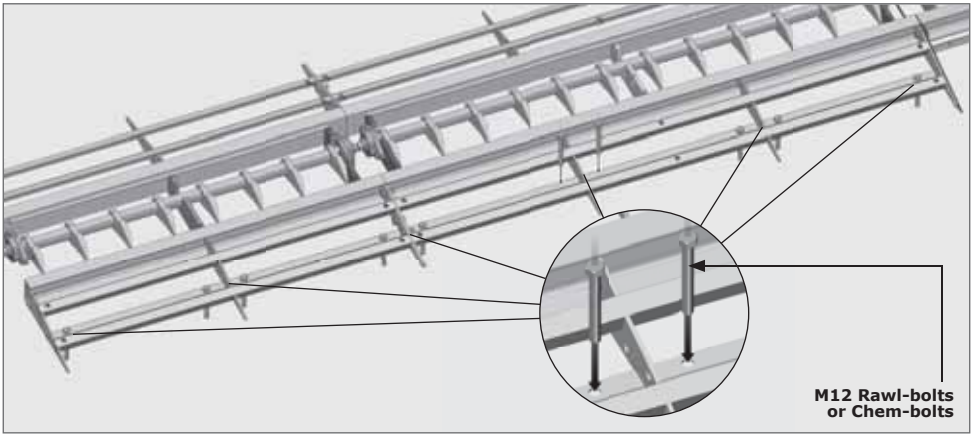


FIGURE 30

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.

5.2.4. 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.

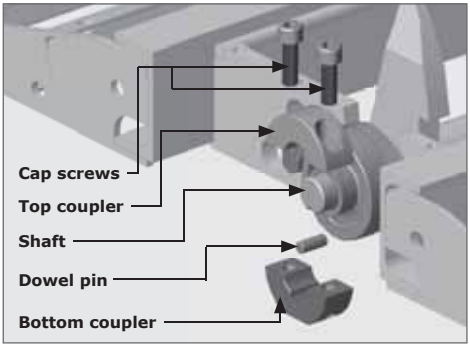


FIGURE 31. SHAFT COUPLER

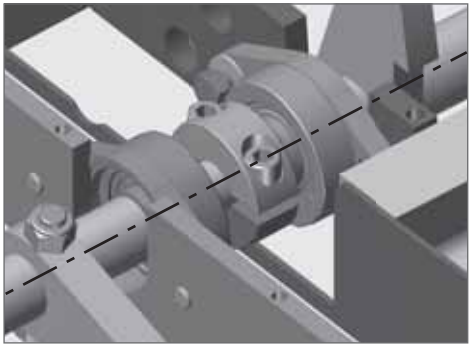
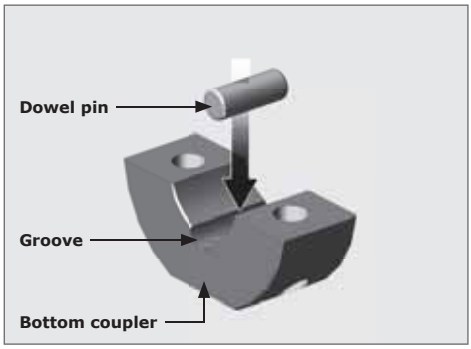
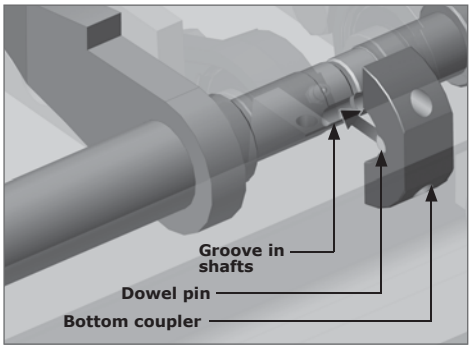


FIGURE 32

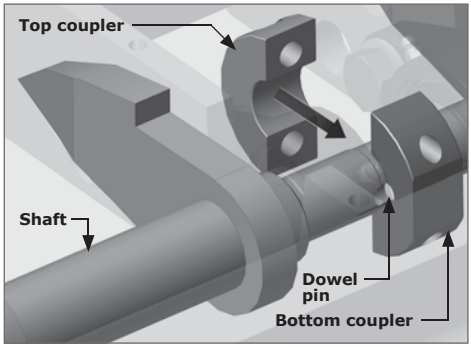
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



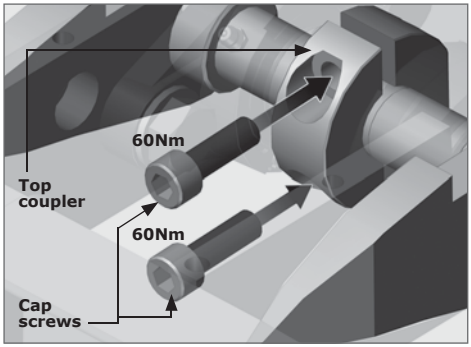
STEP 1 **FIGURE 33**



STEP 2 **FIGURE 34**



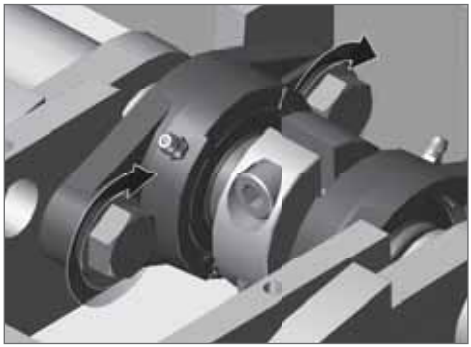
STEP 3 **FIGURE 35**



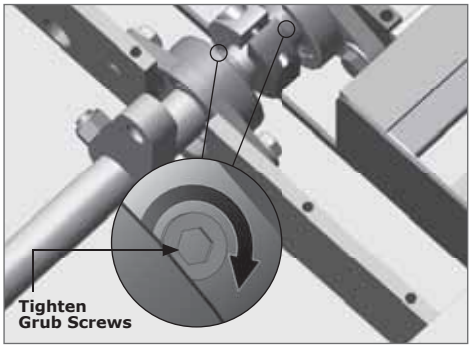
STEP 4 **FIGURE 36**

STEP 5

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

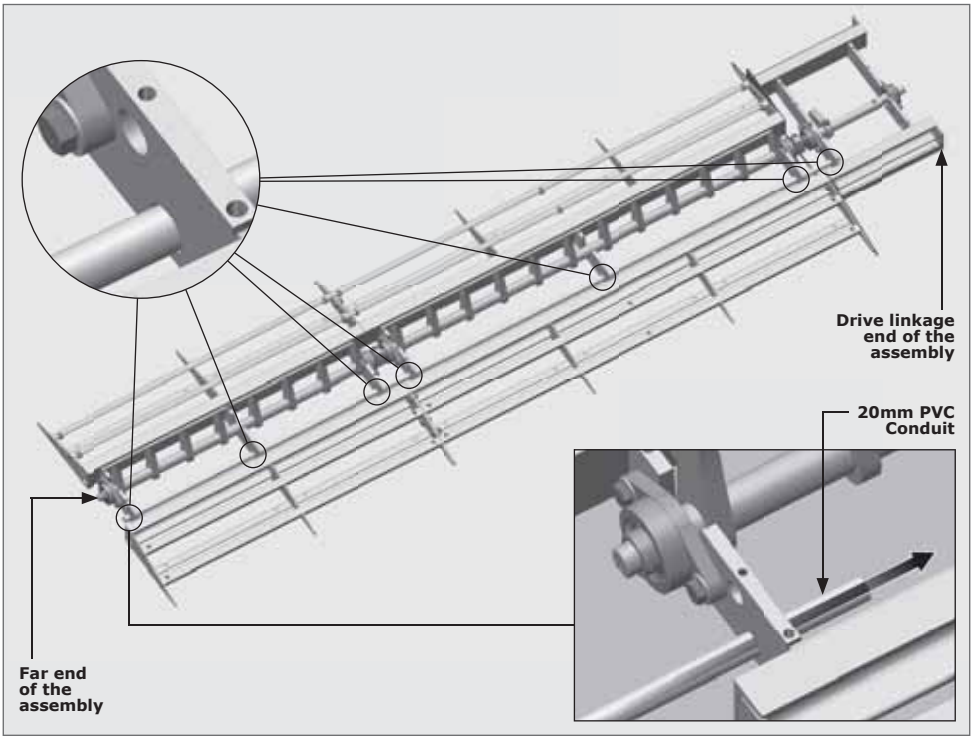


STEP 6 **FIGURE 37**



STEP 7 **FIGURE 38**

5.2.5. Proximity sensor installation



STEP 1 **FIGURE 39**

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 110mm is added to this to account for the modules and coupling (Refer to Section 5, Figure 40).

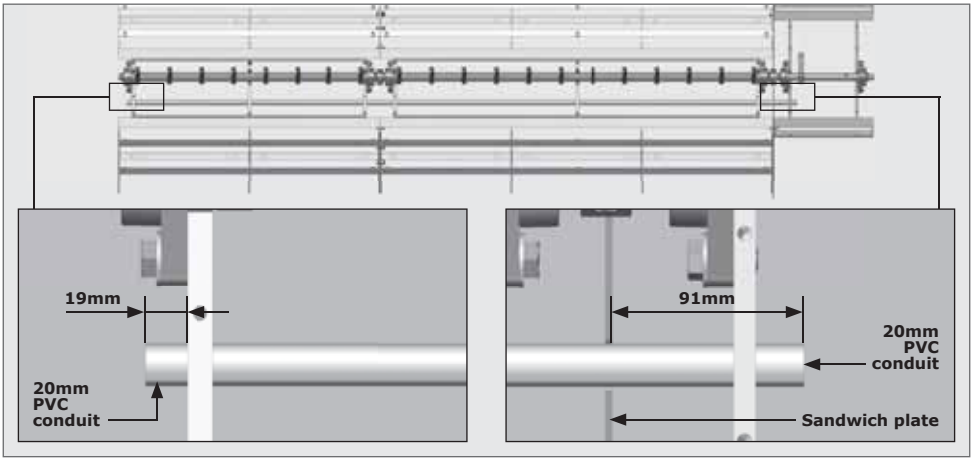
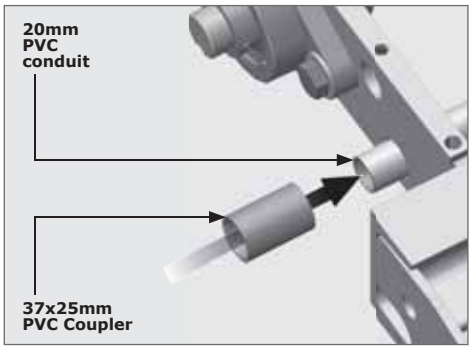
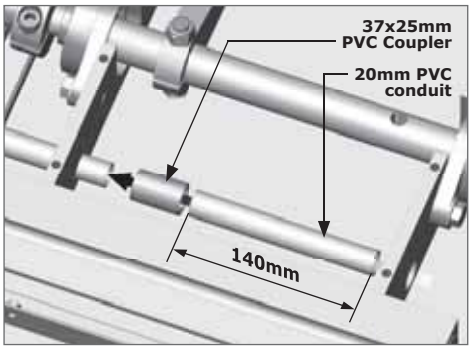


FIGURE 40

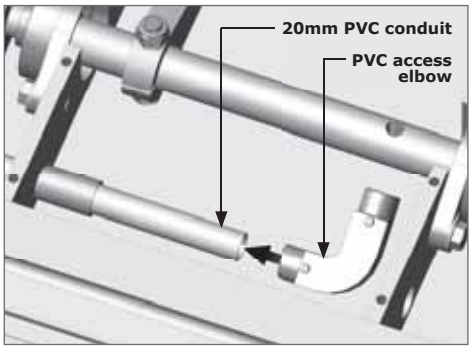
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



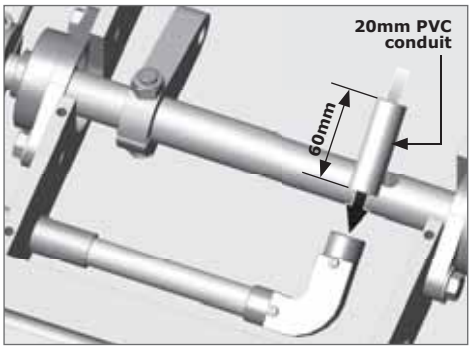
STEP 2 FIGURE 41



STEP 3 FIGURE 42



STEP 4 FIGURE 43



STEP 5 FIGURE 44

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

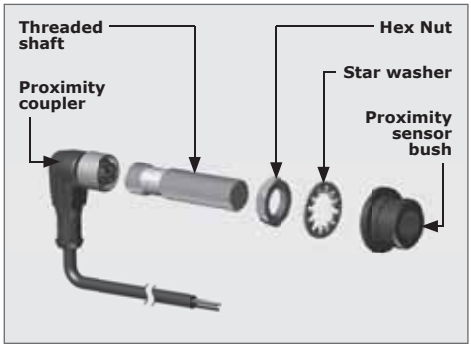


FIGURE 45. PROXIMITY SENSOR

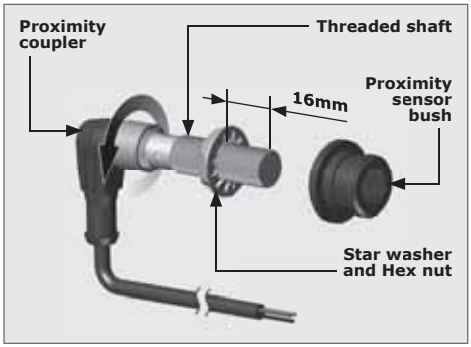


FIGURE 46. PROXIMITY SENSOR

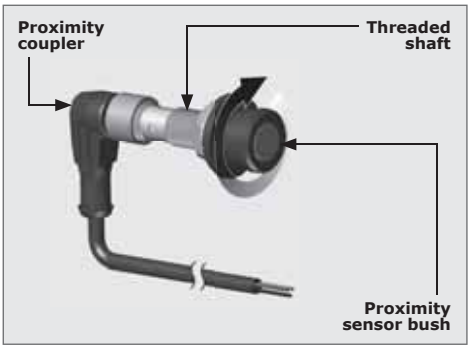
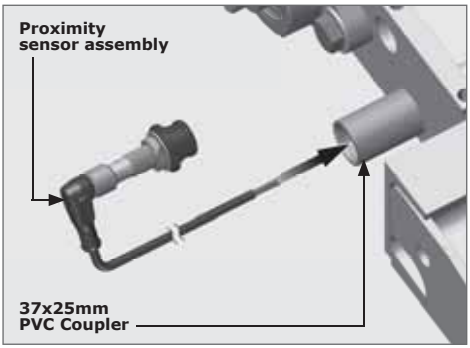


FIGURE 47. PROXIMITY SENSOR



STEP 6 FIGURE 48

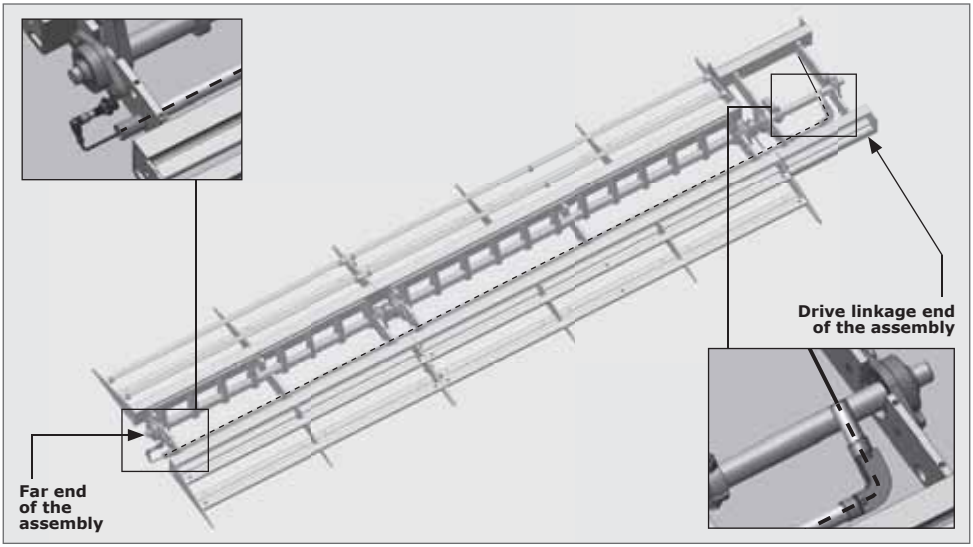
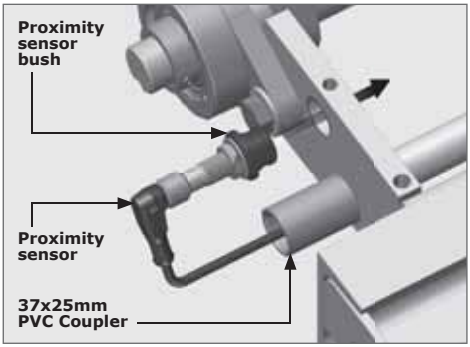
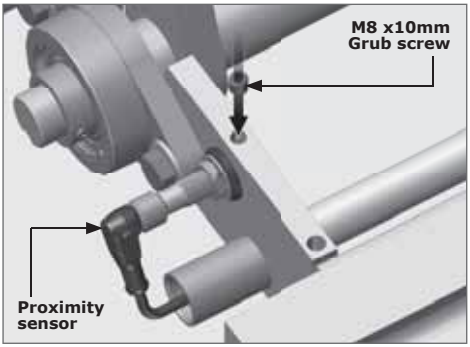


FIGURE 49

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.

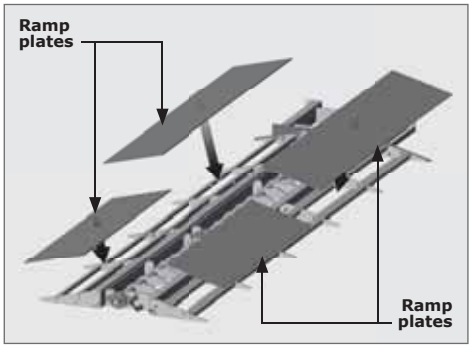


STEP 7 FIGURE 50

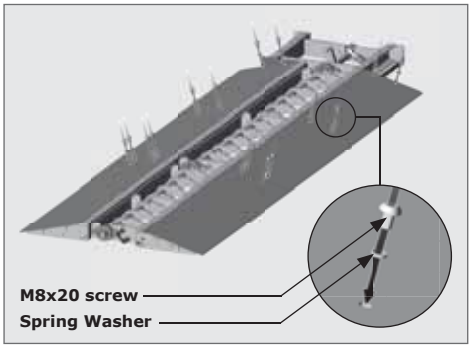


STEP 8 FIGURE 51

5.3. Re-assembling the ramp plates and linkage cover

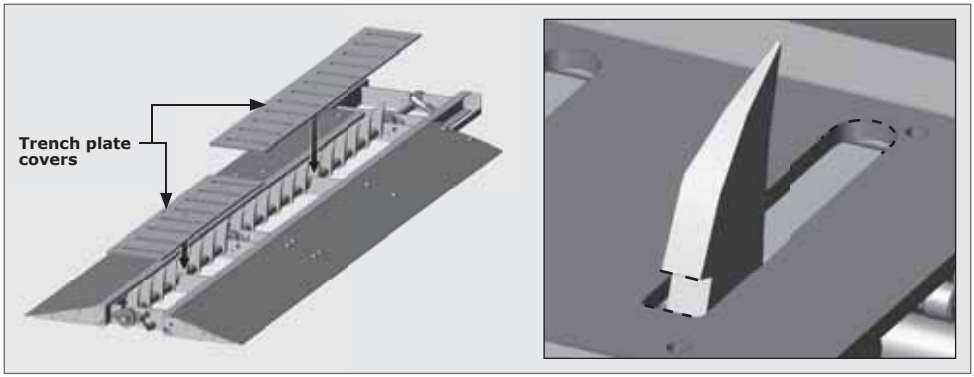


STEP 1 FIGURE 52



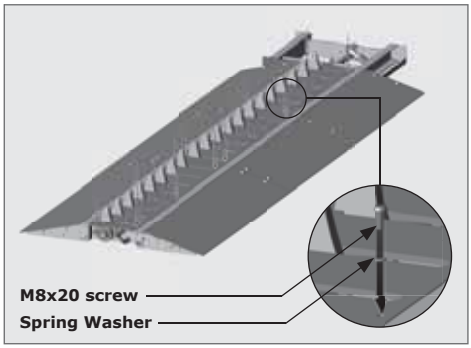
STEP 2 FIGURE 53

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.

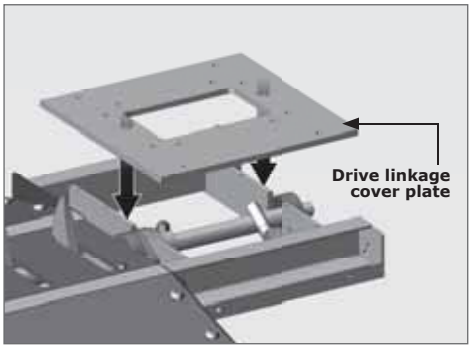


STEP 3 FIGURE 54

Take notice 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.

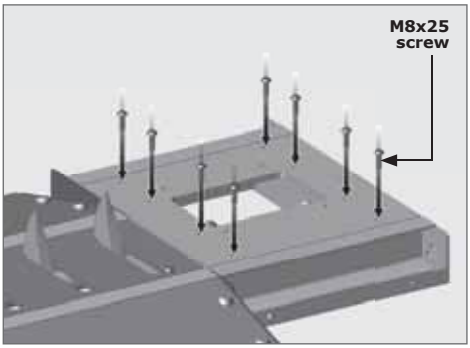


STEP 4 FIGURE 55

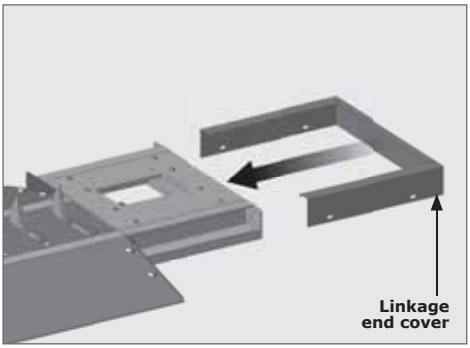


STEP 5 FIGURE 56

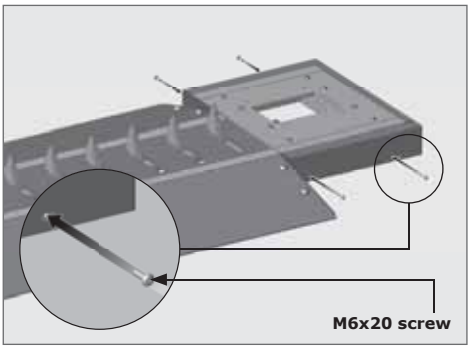
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 5, Figure 22).



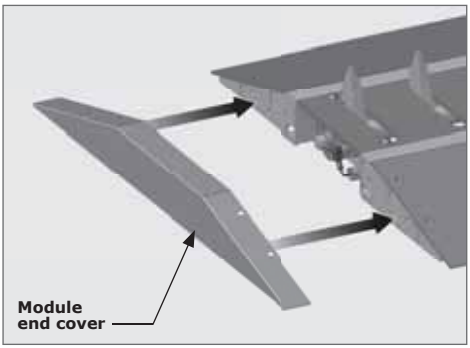
STEP 6 FIGURE 57



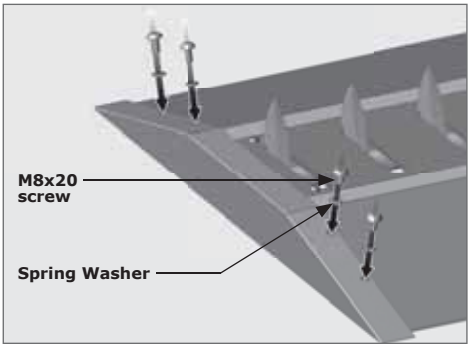
STEP 7 FIGURE 58



STEP 8 FIGURE 59



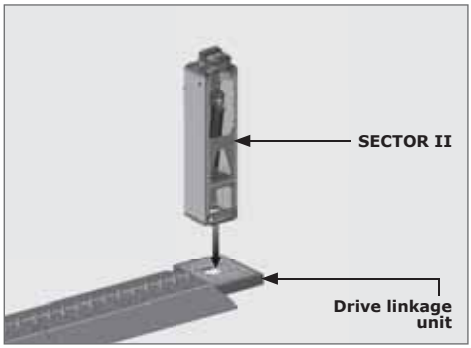
STEP 9 FIGURE 60



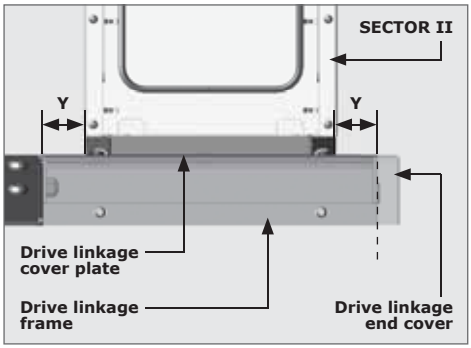
STEP 10 FIGURE 61

5.4. Integrating the SECTOR II with the CLAWS

5.4.1. Placing the SECTOR II into position

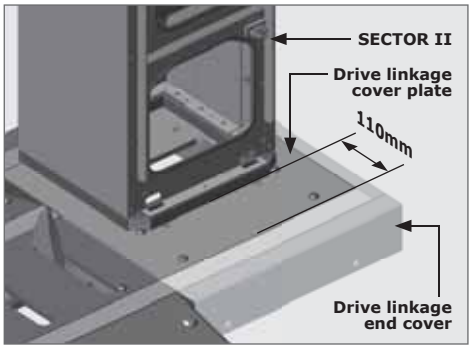


STEP 1 FIGURE 62

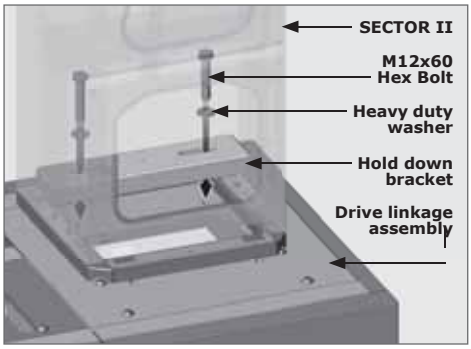


STEP 2 FIGURE 63

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 110mm from the front edge of the Linkage Cover Plate. (Section 5, Figure 64).



STEP 3 FIGURE 64

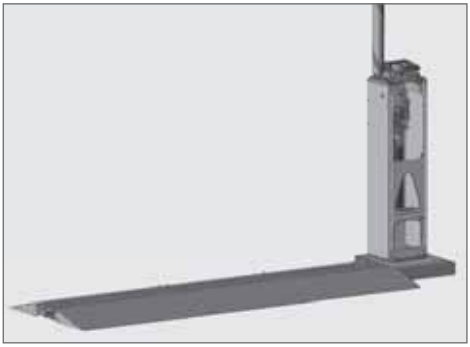


STEP 4 FIGURE 65

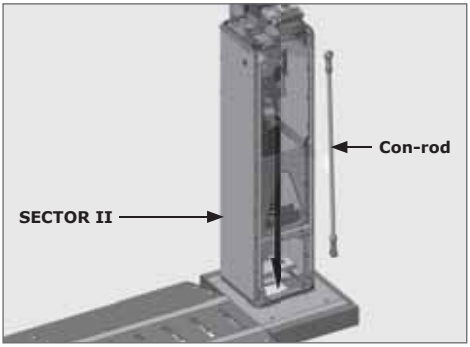
5.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling the boom pole.

5.4.3. Inserting the Con-rod



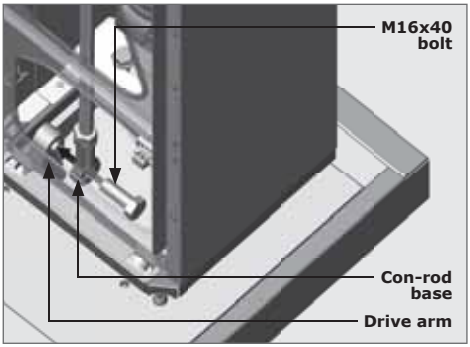
STEP 1 FIGURE 66



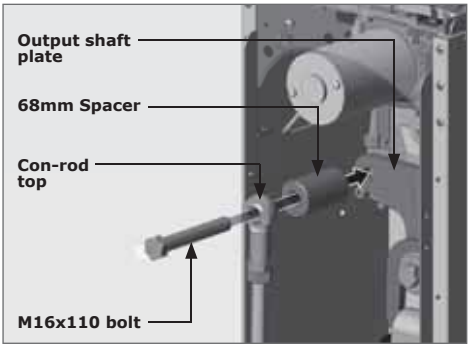
STEP 2 FIGURE 67

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



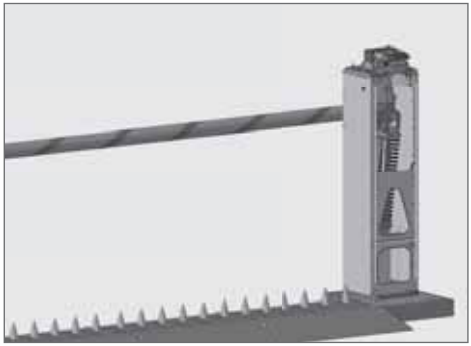
STEP 3 FIGURE 68



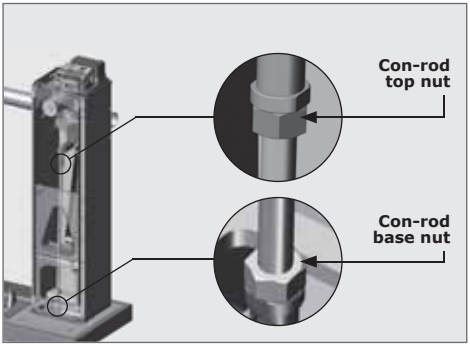
STEP 4 FIGURE 69

5.4.4. Adjusting the CLAWS spikes

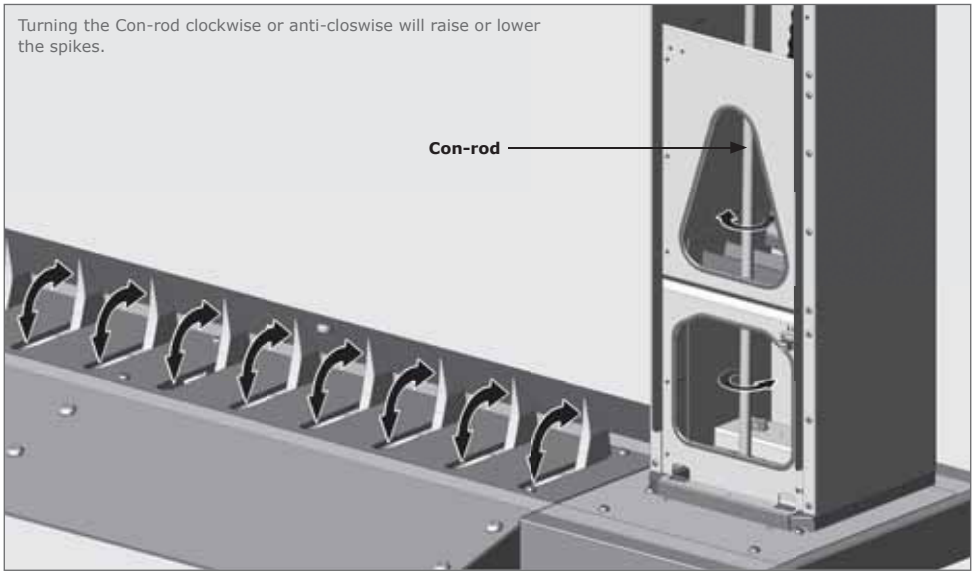
The CLAWS spikes will raise during this procedure!



STEP 1 **FIGURE 70**



STEP 2 **FIGURE 71**



STEP 3 **FIGURE 72**

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 5, Figure 73).

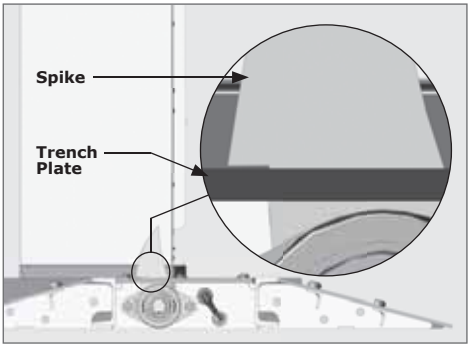
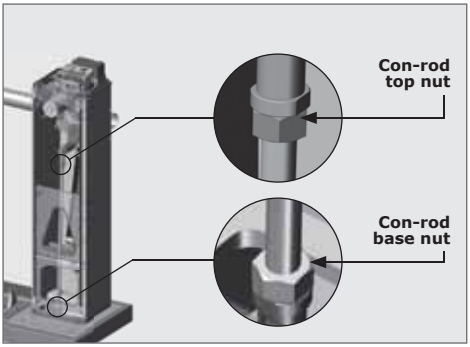


FIGURE 73



STEP 4

FIGURE 74

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 5, Figures 75 and 76).

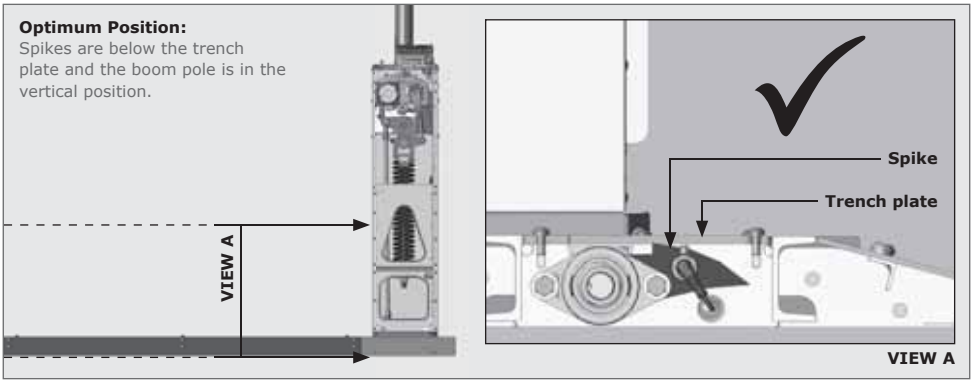


FIGURE 75

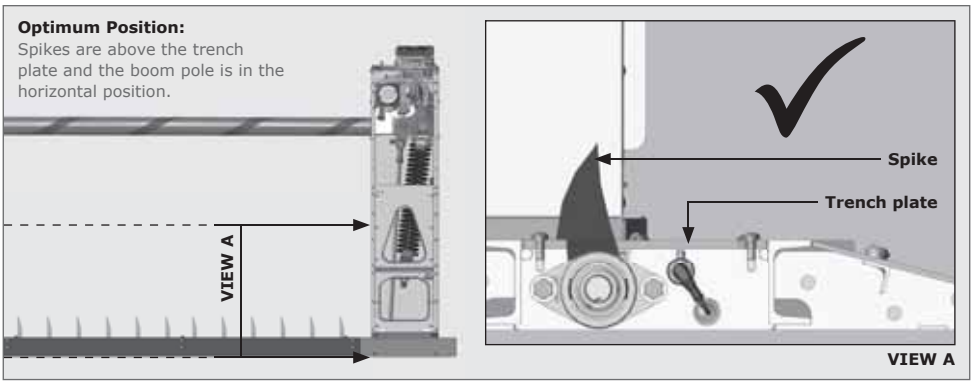
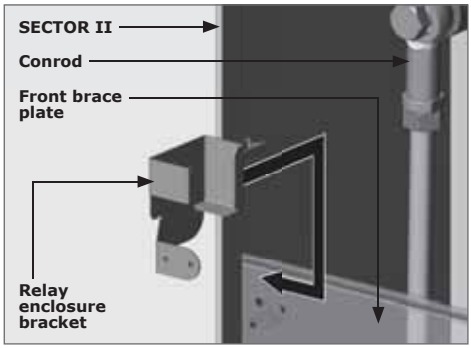


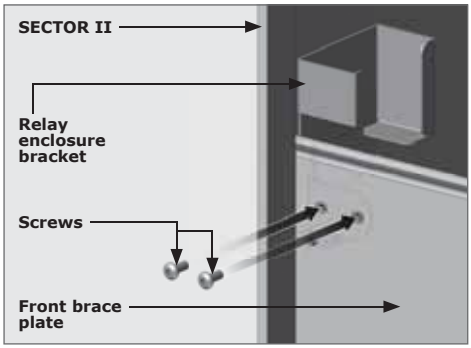
FIGURE 76

5.5. Completing the Assembly

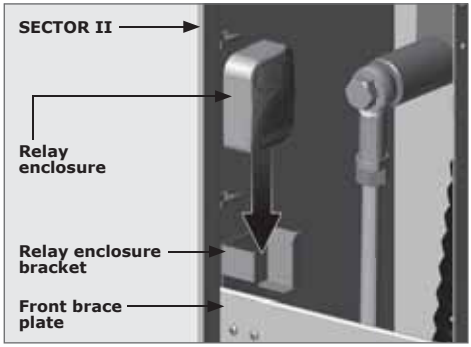
5.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 77



STEP 2 FIGURE 78



STEP 3 FIGURE 79

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

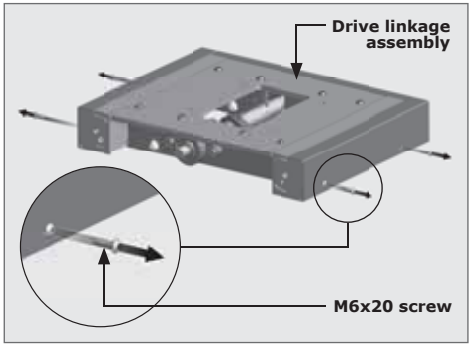
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

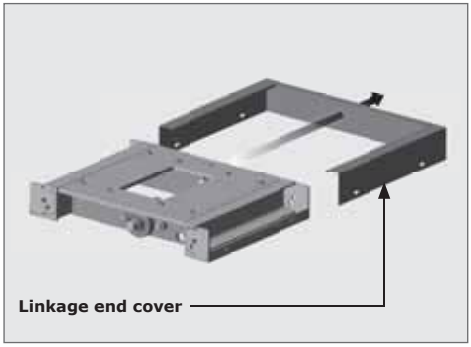
6. RHS Direct Drive Surface Mount - Opposing Direction of Travel

6.1. Configuring the Drive Linkage Assembly for Right-hand Similar

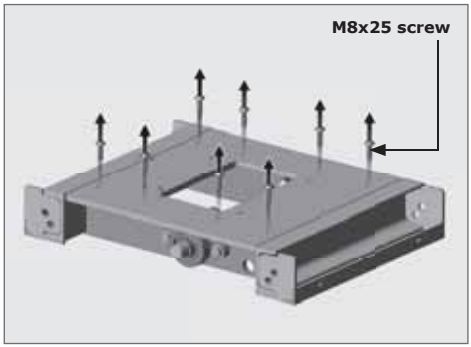
6.1.1. Stripping the drive linkage assembly



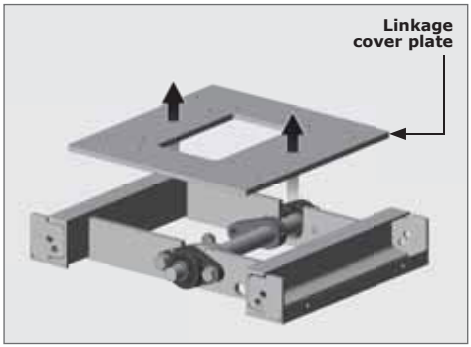
STEP 1 FIGURE 1



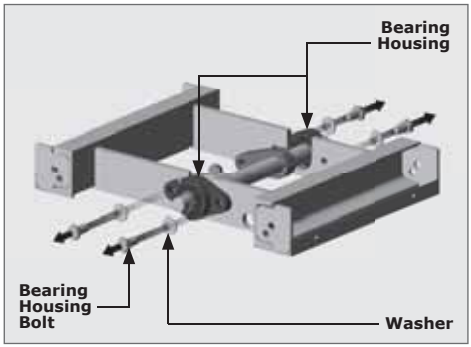
STEP 2 FIGURE 2



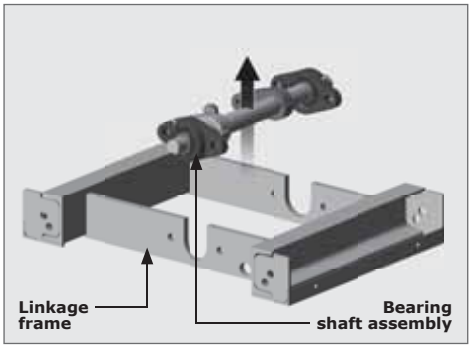
STEP 3 FIGURE 3



STEP 4 FIGURE 4



STEP 5 FIGURE 5



STEP 6 FIGURE 6

The unit is supplied with two drive arms, RHS and LHS (see Section 6, Figure 7).

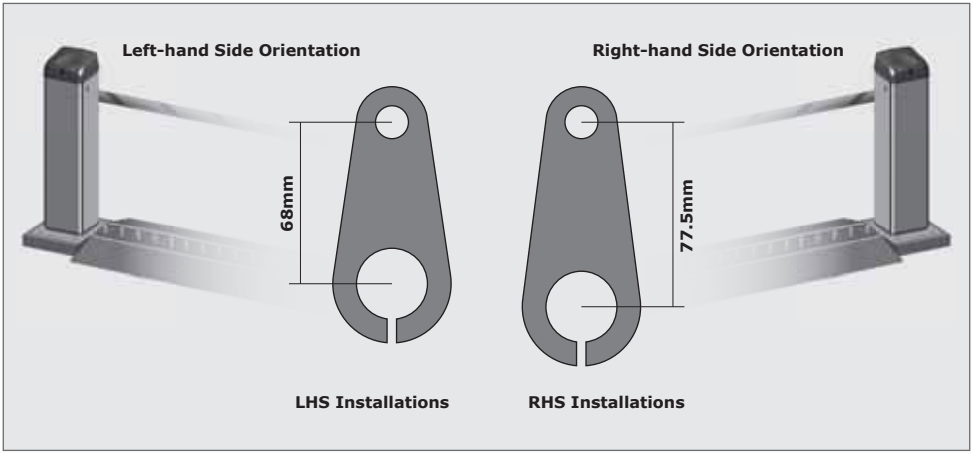
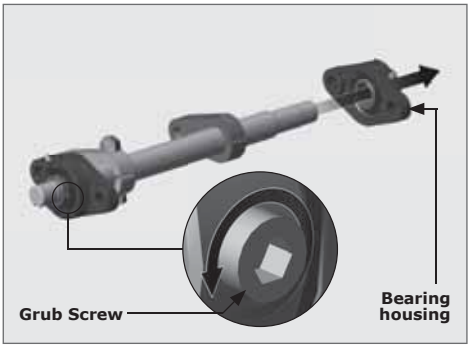
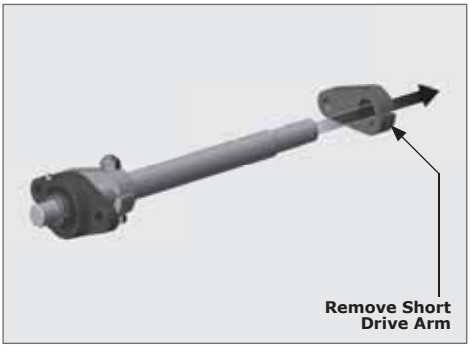


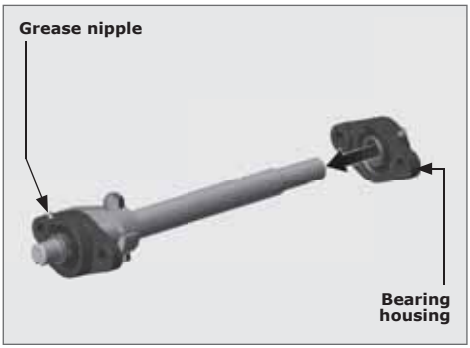
FIGURE 7



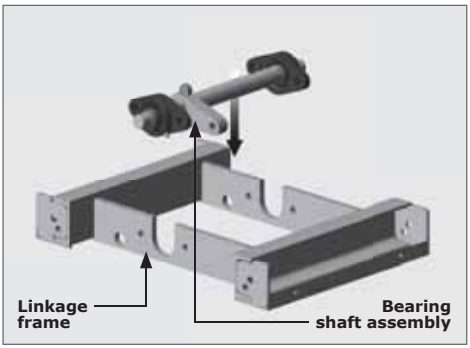
STEP 7 FIGURE 8



STEP 8 FIGURE 9



STEP 9 FIGURE 10



STEP 10 FIGURE 11

The grease nipples on the bearing housings must face up (Section 6, Figures 10 and 11). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 6, Figure 11).

Once assembled with the long drive arm, the format should look as shown in Section 6, Figure 12.

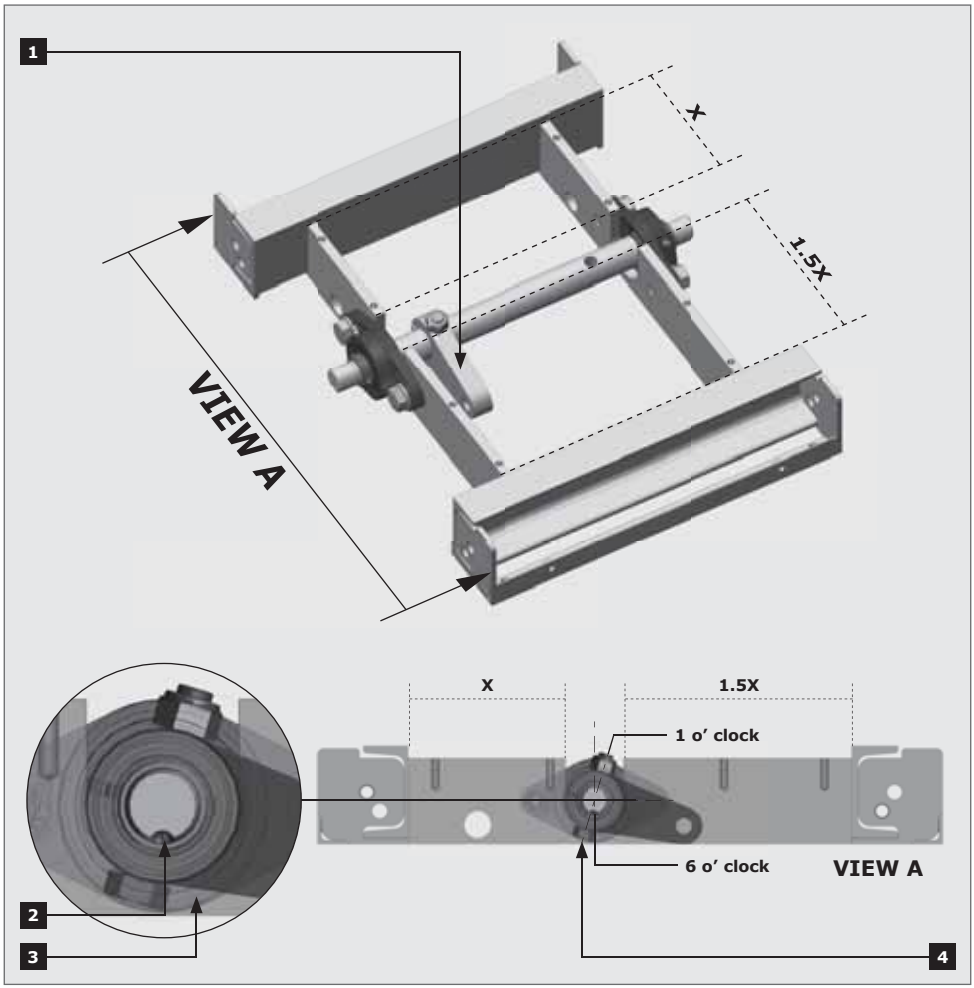


FIGURE 12

1. The drive arm must point towards the longer side of the drive linkage assembly (1.5x)
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (1 o'clock)

STEP 11

Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 12
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 6, Figure 13).

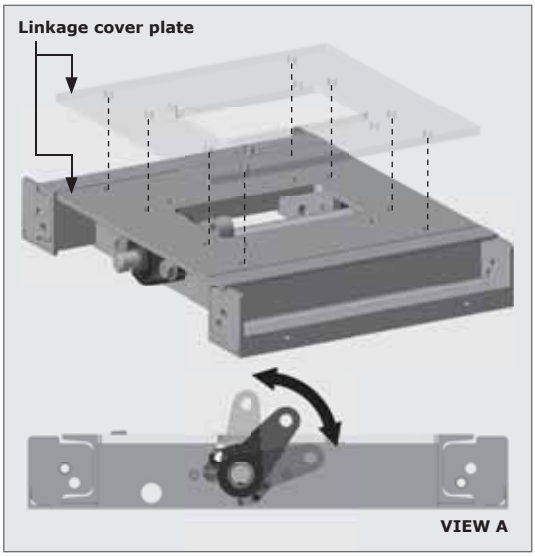
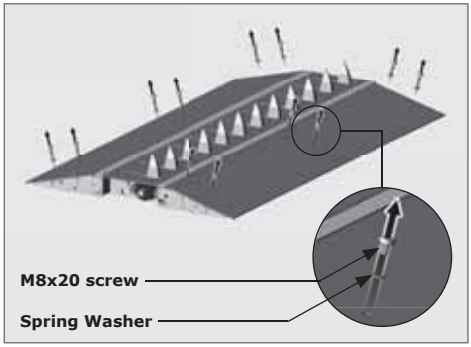


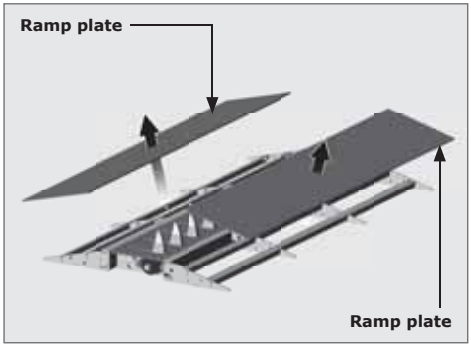
FIGURE 13

6.2. Spike Module Assembly

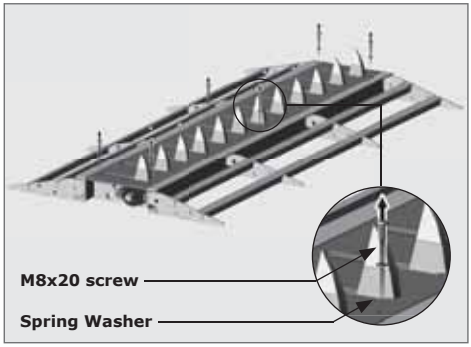
6.2.1. Preparing the Spike Module assembly(ies) for installation



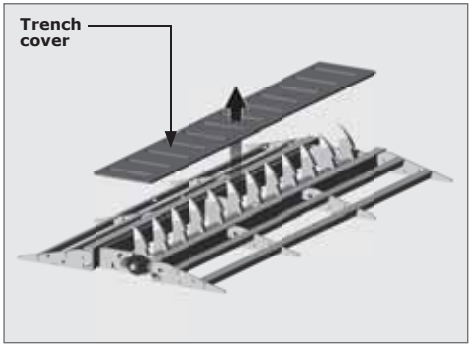
STEP 1 **FIGURE 14**



STEP 2 **FIGURE 15**

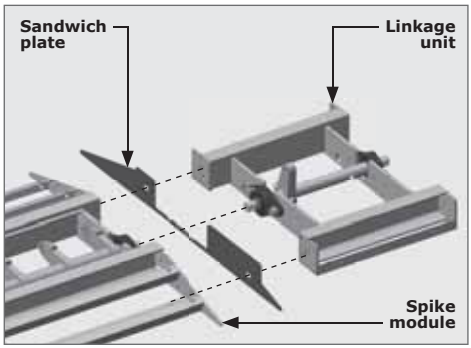


STEP 3 **FIGURE 16**

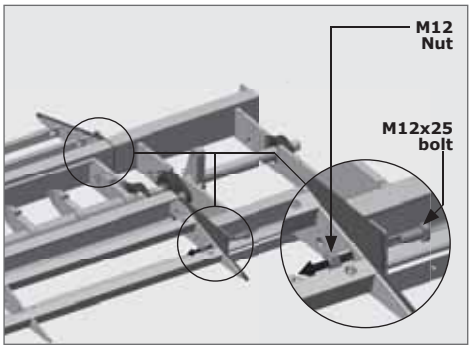


STEP 4 **FIGURE 17**

6.2.2. Attaching the drive linkage unit to the spike module



STEP 1 FIGURE 18



STEP 2 FIGURE 19

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 6, Figure 18).

STEP 3

Using six M12x25 bolts, fix one spike module to another (Section 6, Figure 20).

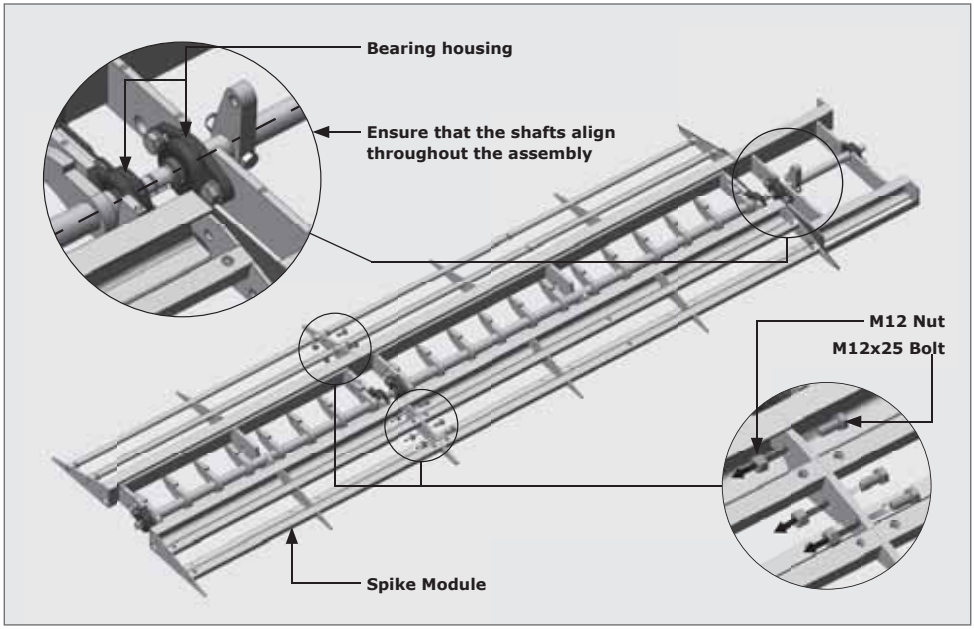


FIGURE 20

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

6.2.3. Bolting down the assembly to the ground

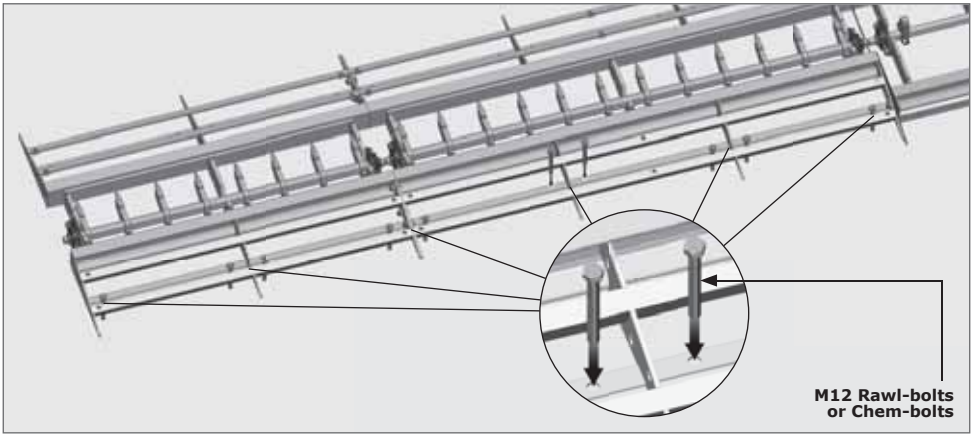


FIGURE 21

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.

6.2.4. 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.

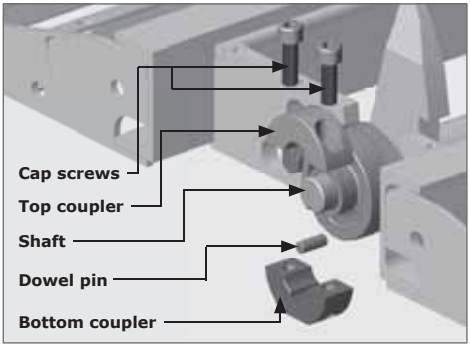


FIGURE 22. SHAFT COUPLER

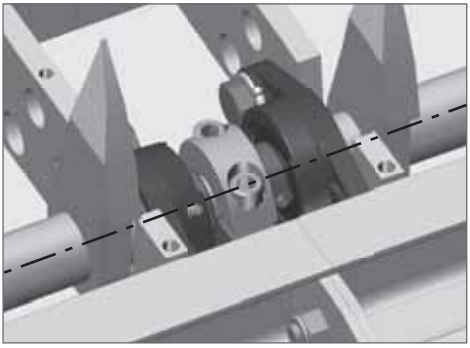
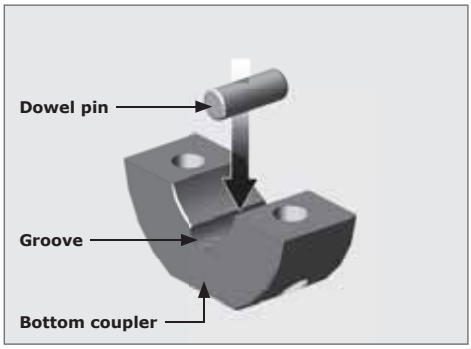
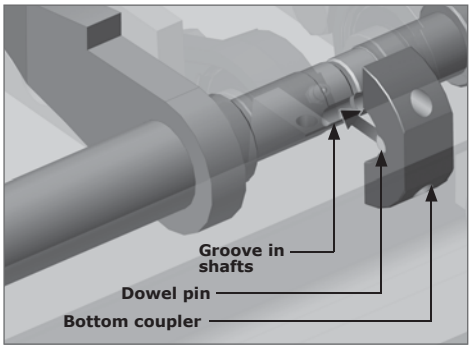


FIGURE 23

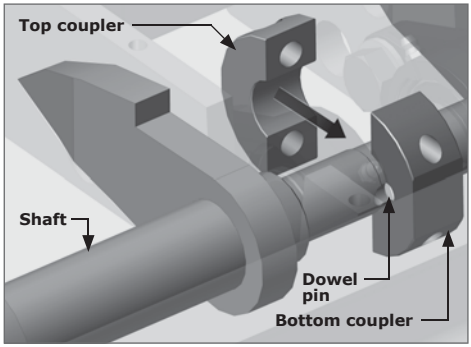
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



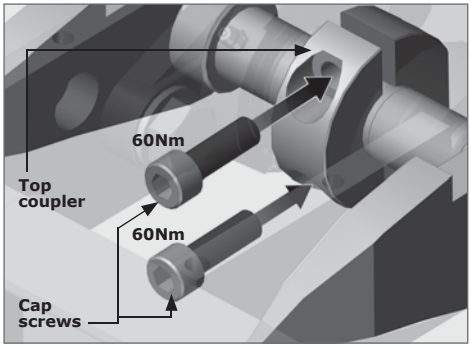
STEP 1 **FIGURE 24**



STEP 2 **FIGURE 25**



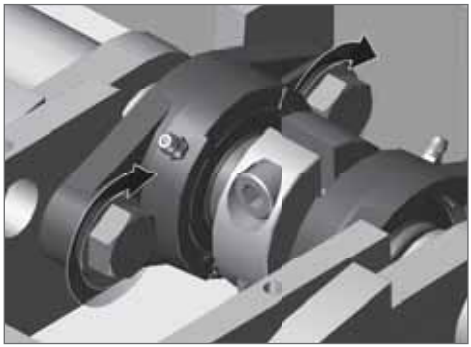
STEP 3 **FIGURE 26**



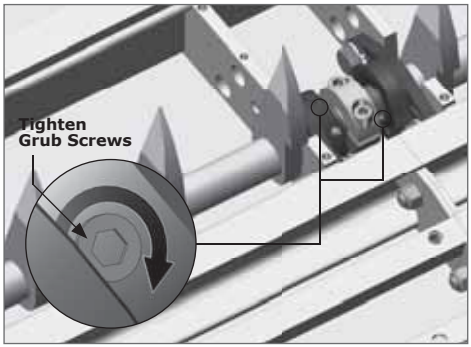
STEP 4 **FIGURE 27**

STEP 5

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



STEP 6 **FIGURE 28**



STEP 7 **FIGURE 29**

6.2.5. Proximity sensor installation

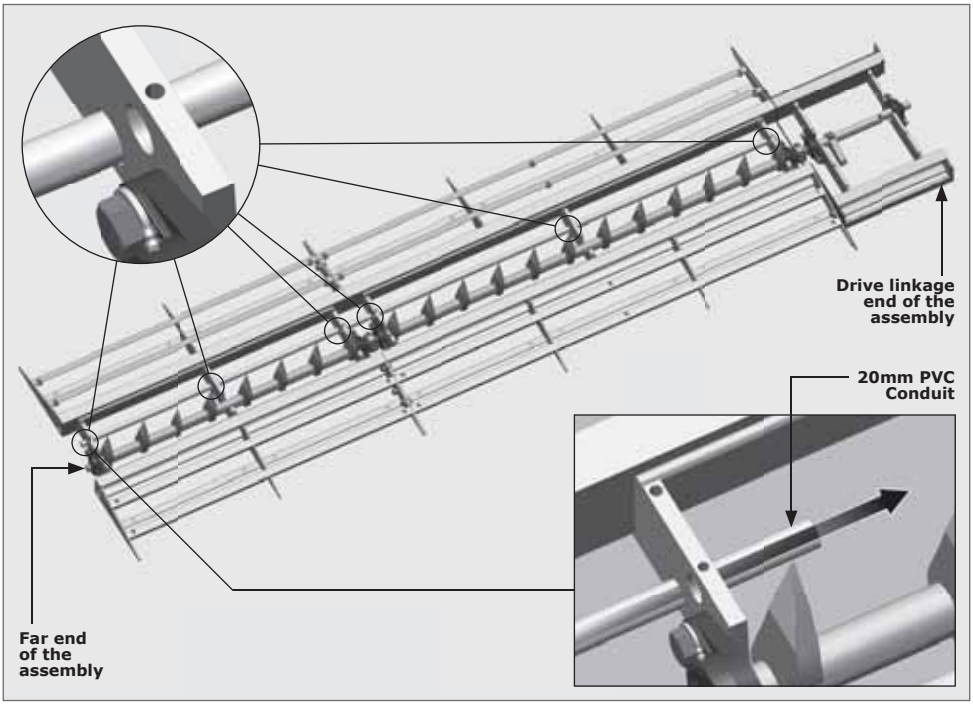


FIGURE 30

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 110mm is added to this to account for the modules and coupling (Refer to Section 6, Figure 31).

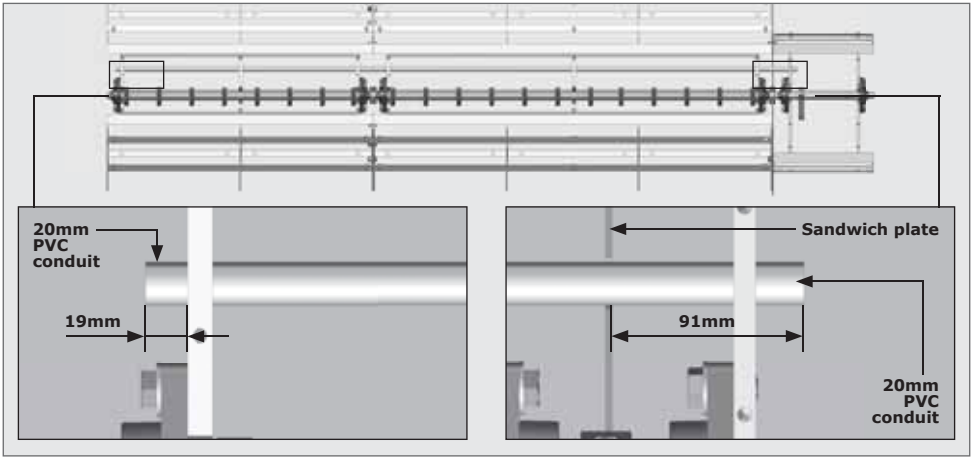
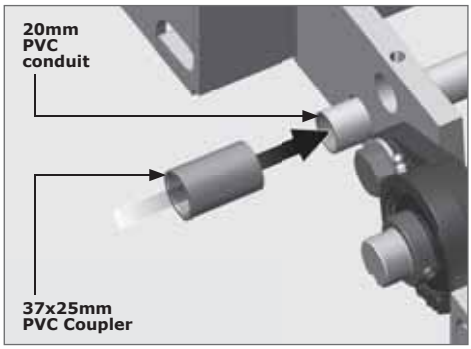
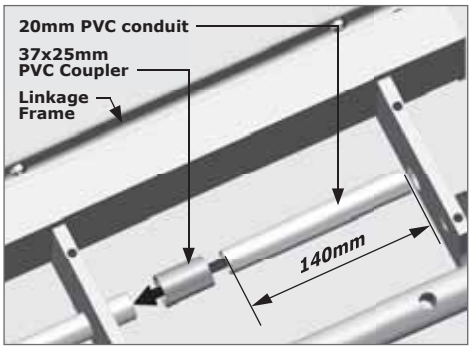


FIGURE 31

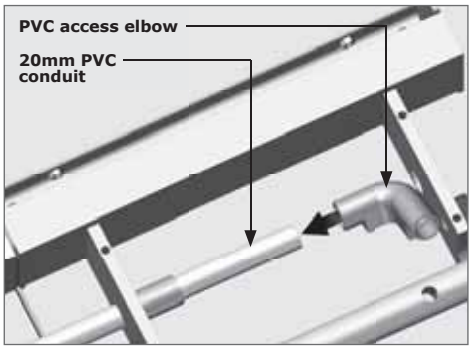
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



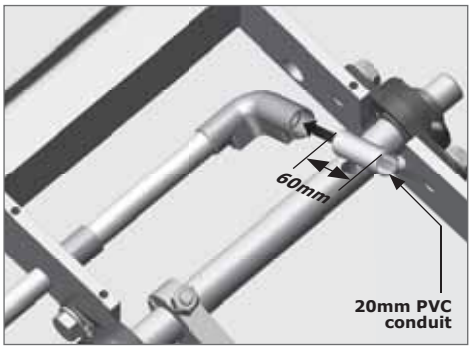
STEP 2 FIGURE 32



STEP 3 FIGURE 33



STEP 4 FIGURE 34



STEP 5 FIGURE 35

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

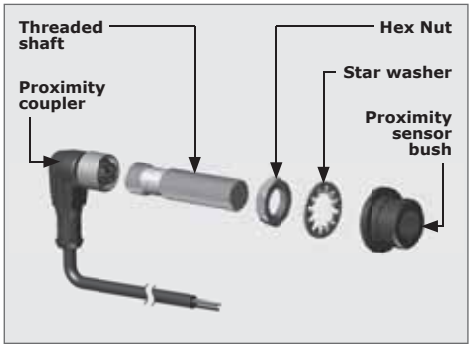


FIGURE 36. PROXIMITY SENSOR

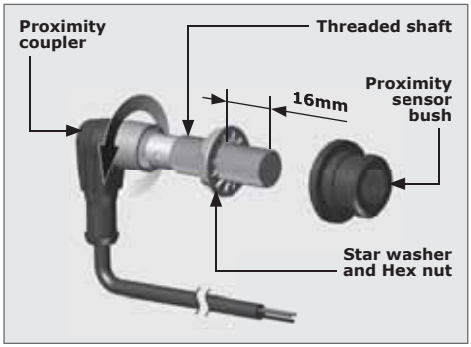


FIGURE 37. PROXIMITY SENSOR

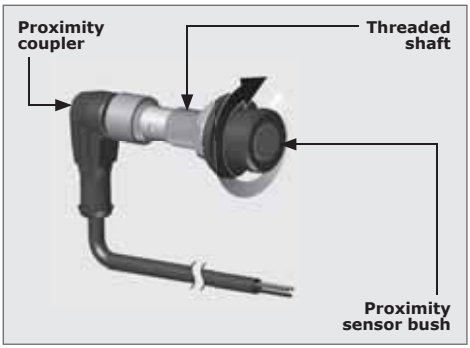
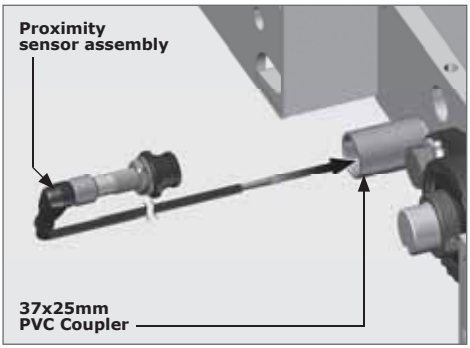


FIGURE 38. PROXIMITY SENSOR



STEP 6 FIGURE 39

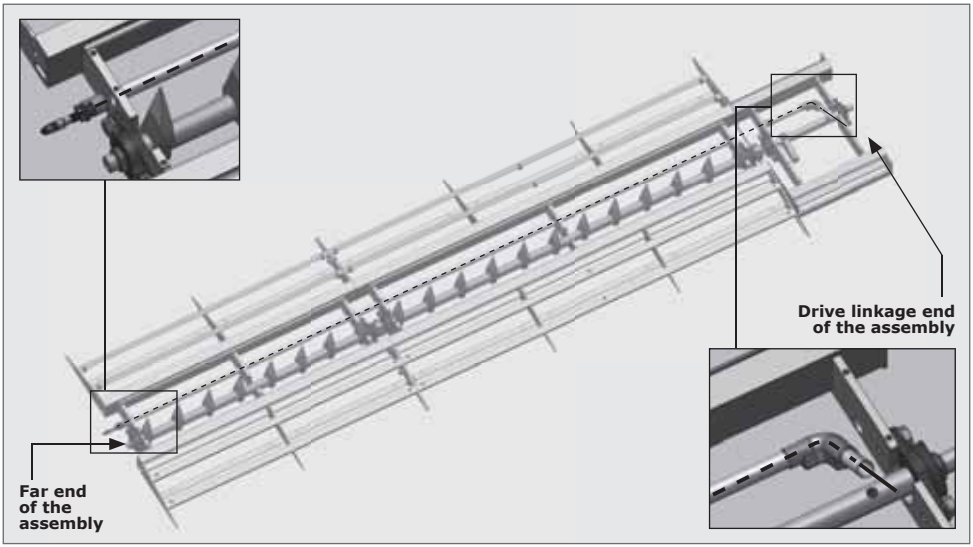
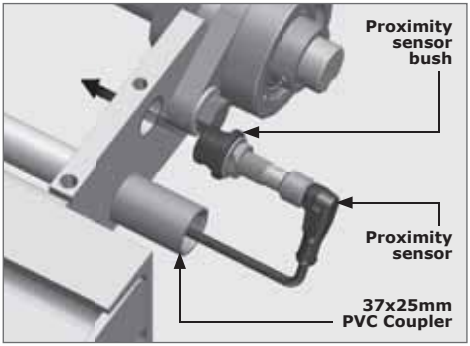
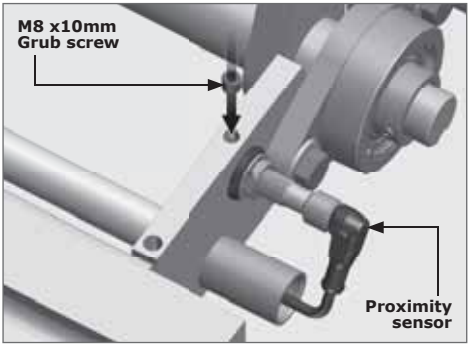


FIGURE 40

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.

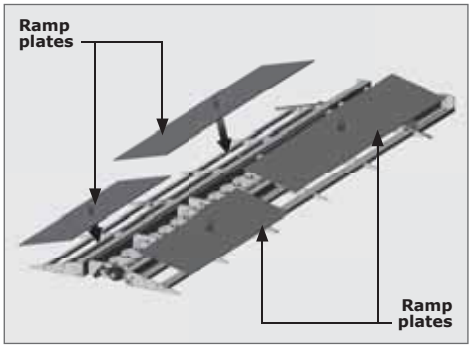


STEP 7 FIGURE 41

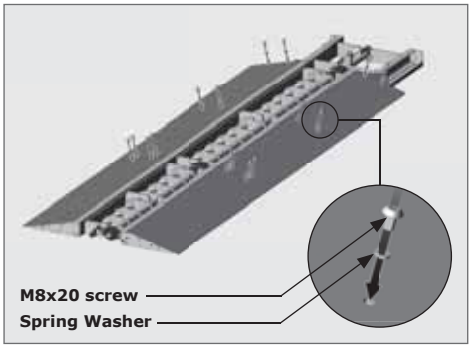


STEP 8 FIGURE 42

6.3. Re-assembling the ramp plates and linkage cover

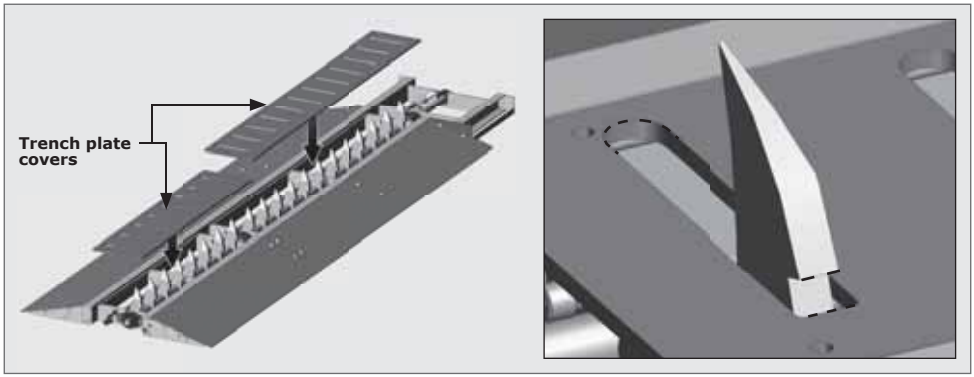


STEP 1 FIGURE 43



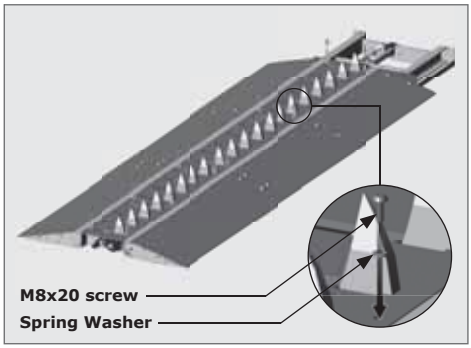
STEP 2 FIGURE 44

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.

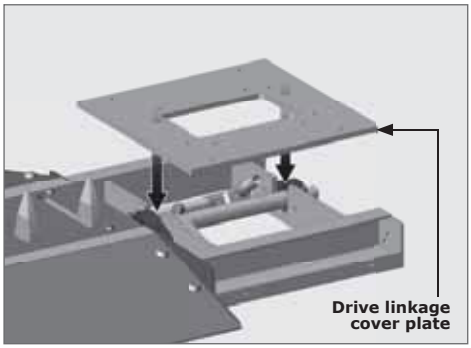


STEP 3 FIGURE 45

Take notice 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.

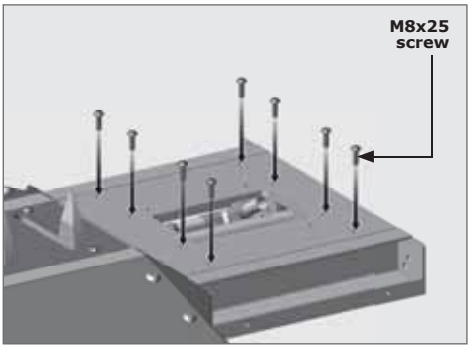


STEP 4 FIGURE 46

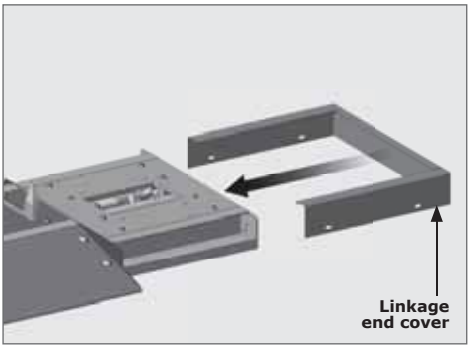


STEP 5 FIGURE 47

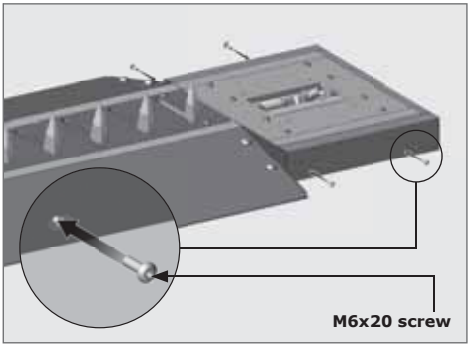
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back top Section 6, Figure 13).



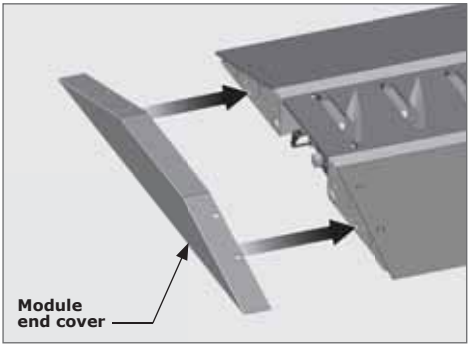
STEP 6 FIGURE 48



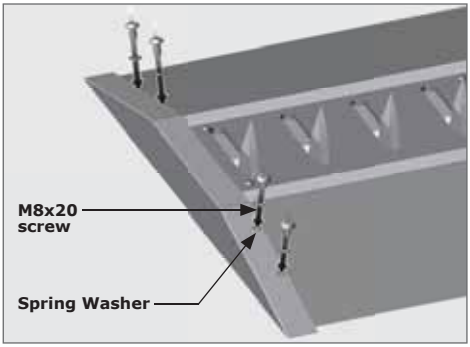
STEP 7 FIGURE 49



STEP 8 FIGURE 50



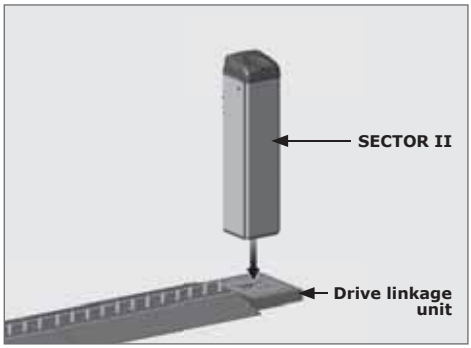
STEP 9 FIGURE 51



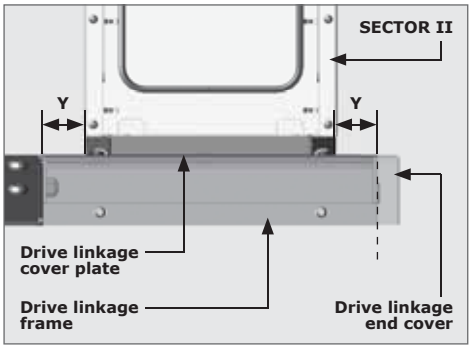
STEP 10 FIGURE 52

6.4. Integrating the SECTOR II with the CLAWS

6.4.1. Placing the SECTOR II into position

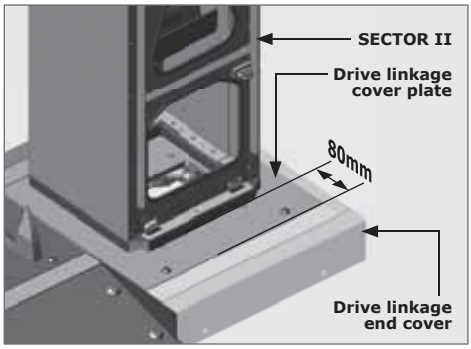


STEP 1 FIGURE 53

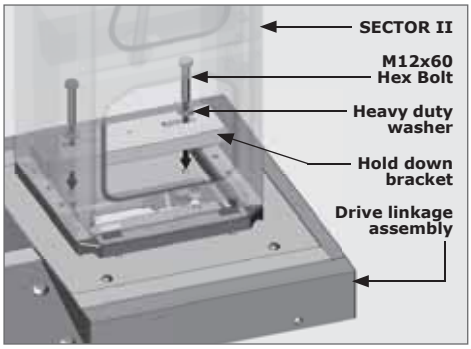


STEP 2 FIGURE 54

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 80mm from the front edge of the Linkage Cover Plate. (Section 6, Figure 55).



STEP 3 FIGURE 55

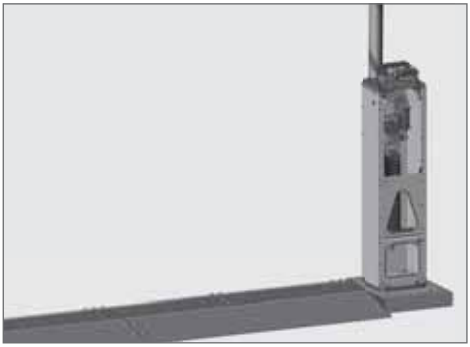


STEP 4 FIGURE 56

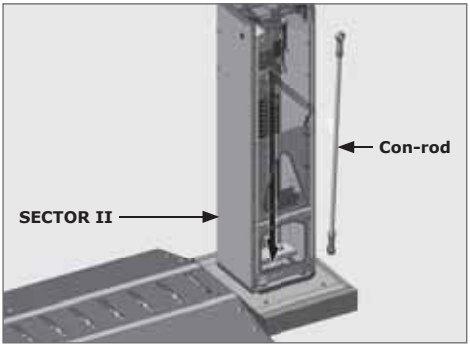
6.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

6.4.3. Inserting the Con-rod



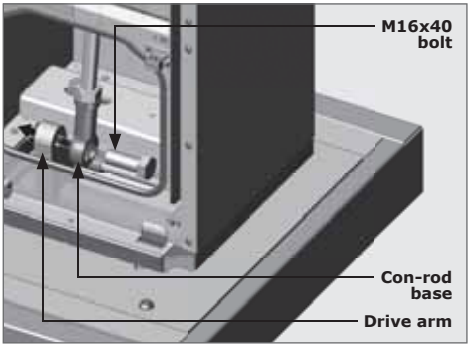
STEP 1 FIGURE 57



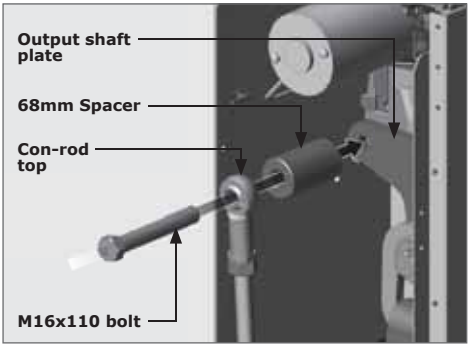
STEP 2 FIGURE 58

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



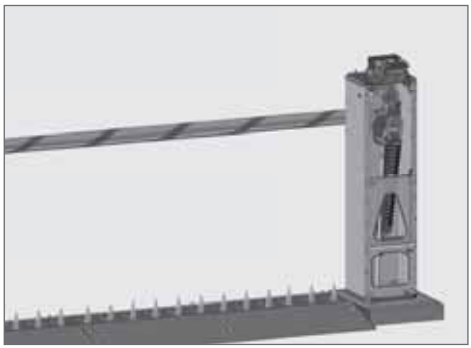
STEP 3 FIGURE 59



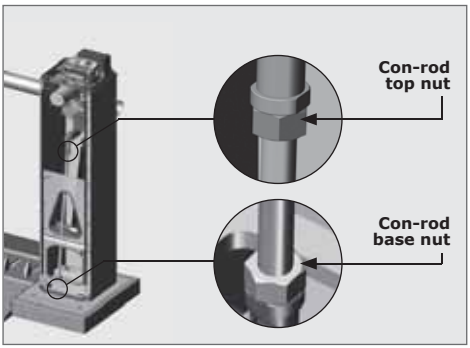
STEP 4 FIGURE 60

6.4.4. Adjusting the CLAWS spikes

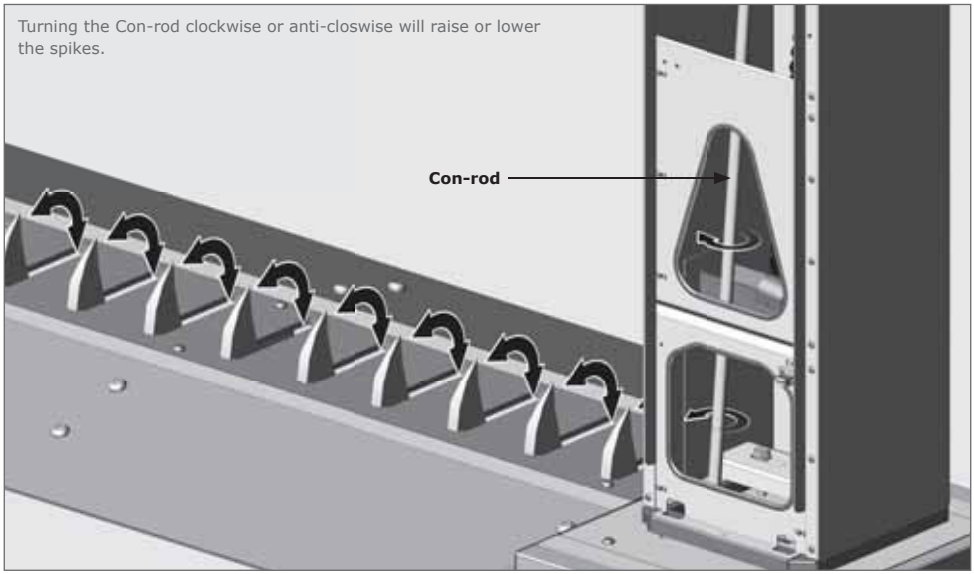
The CLAWS spikes will raise during this procedure!



STEP 1 **FIGURE 61**



STEP 2 **FIGURE 62**



STEP 3 **FIGURE 63**

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 6, Figure 64).

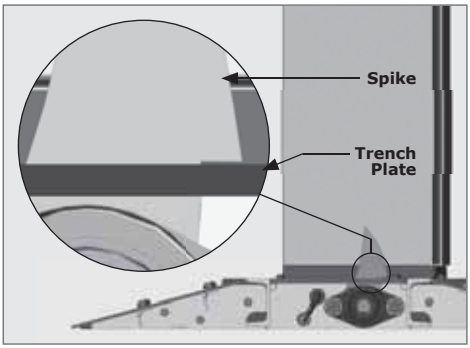
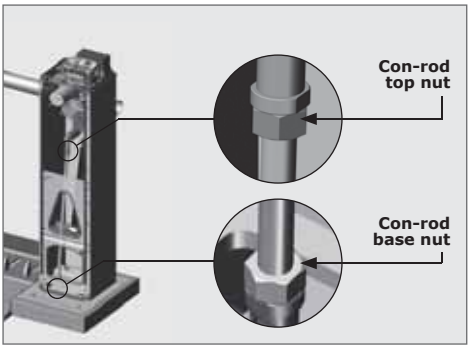


FIGURE 64



STEP 4

FIGURE 65

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 6, Figures 66 and 67).

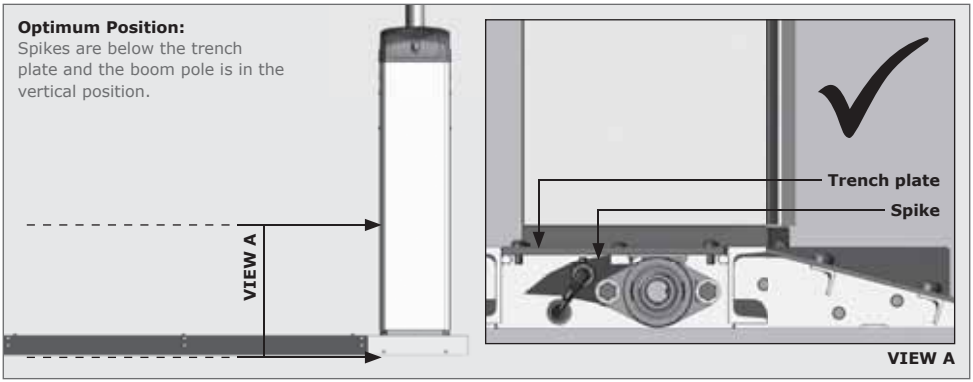


FIGURE 66

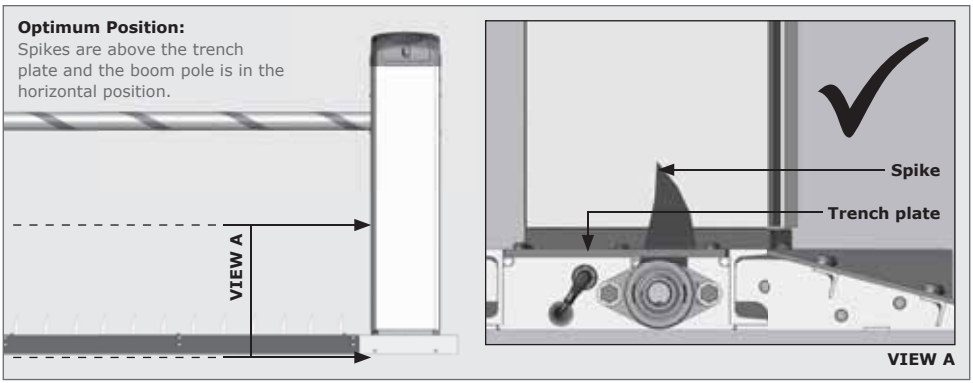
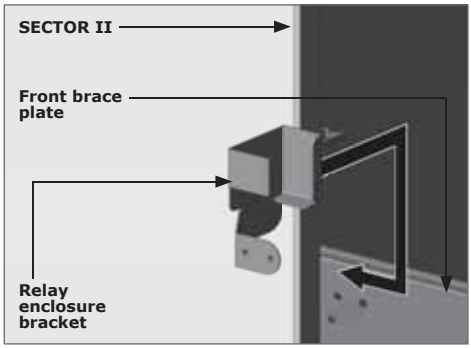


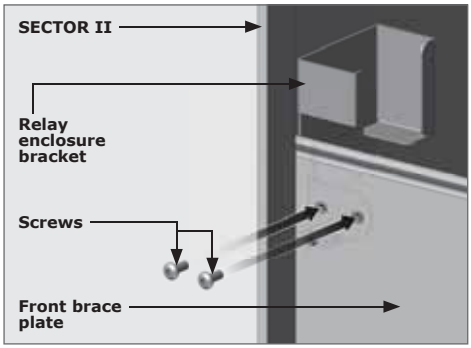
FIGURE 67

6.5. Completing the Assembly

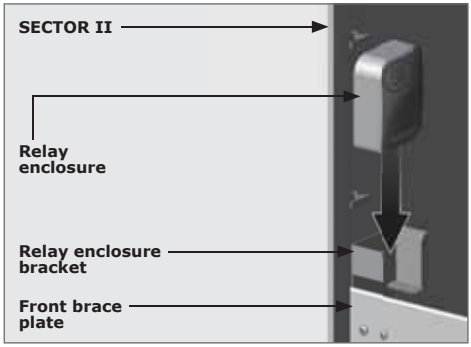
6.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 68



STEP 2 FIGURE 69



STEP 3 FIGURE 70

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

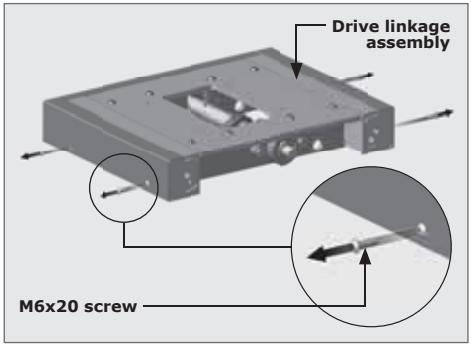
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

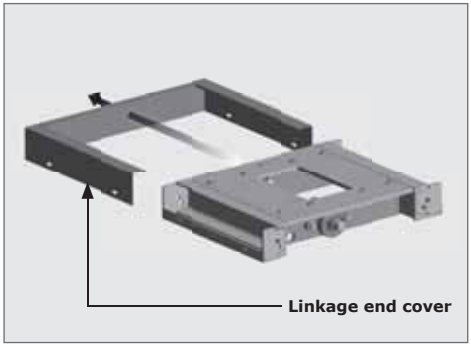
7. LHS Direct Drive Surface Mount - Similar Direction of Travel

7.1. Configuring the Drive Linkage Assembly for Left-hand Similar

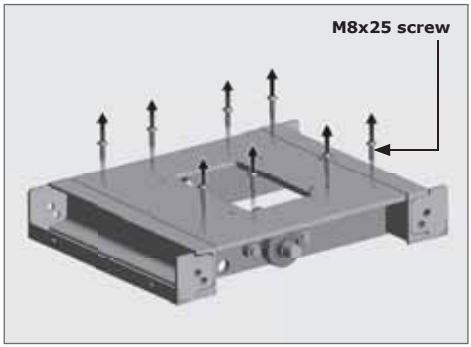
7.1.1. Stripping the drive linkage assembly



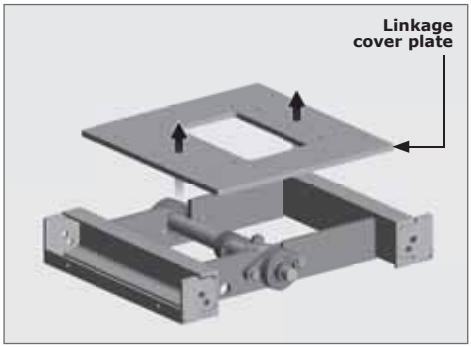
STEP 1 FIGURE1



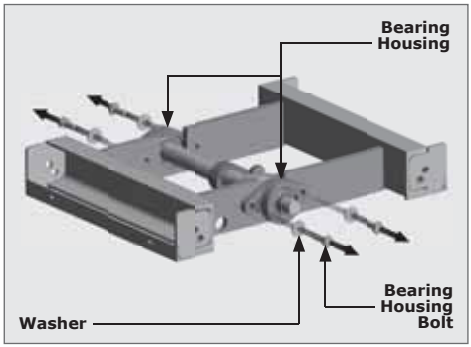
STEP 2 FIGURE 2



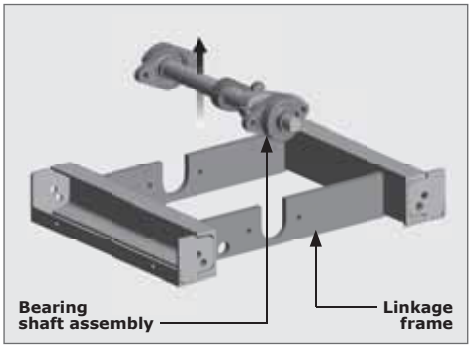
STEP 3 FIGURE 3



STEP 4 FIGURE 4



STEP 5 FIGURE 5



STEP 6 FIGURE 6

The unit is supplied with two drive arms, RHS and LHS (see Section 7, Figure 7).

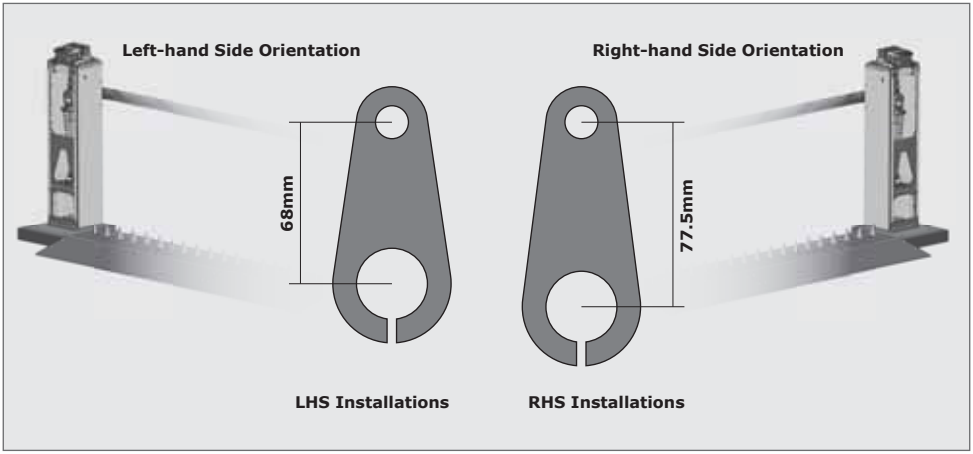
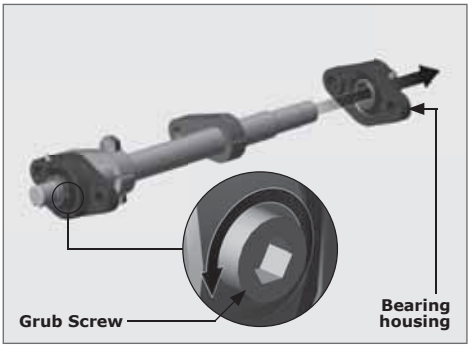
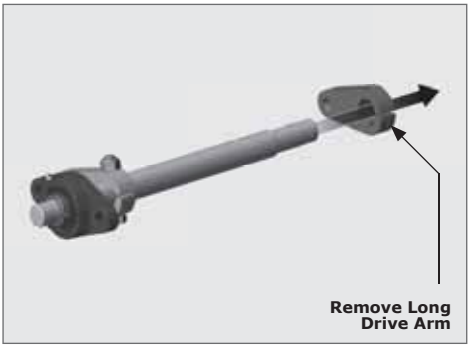


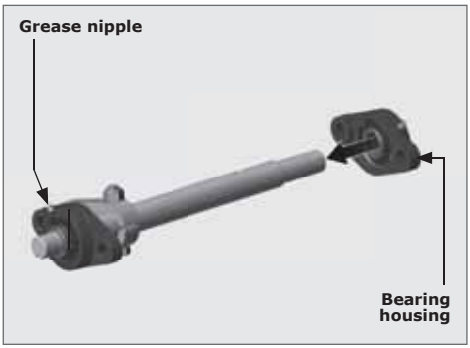
FIGURE 7



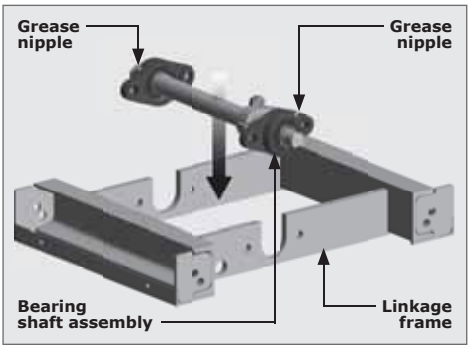
STEP 7 FIGURE 8



STEP 8 FIGURE 9



STEP 9 FIGURE 10



STEP 10 FIGURE 11

The grease nipples on the bearing housings must face up (Section 7, Figures 10 and 11). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 7, Figure 11).

Once assembled with the short drive arm, the format should look as shown in Section 7, Figure 12.

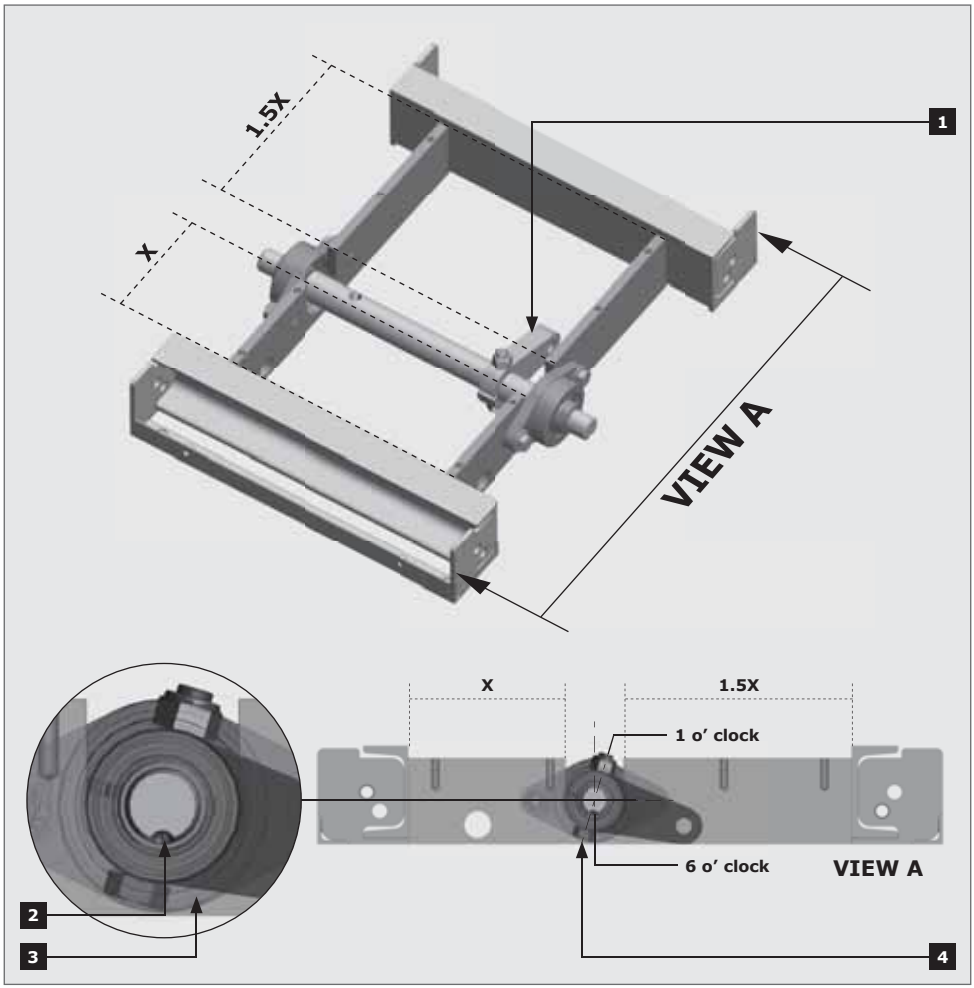


FIGURE 12

1. The drive arm must point towards the longer side of the drive linkage assembly (1.5x)
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (1 o'clock)

STEP 11
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

Step 12
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 7, Figure 13).

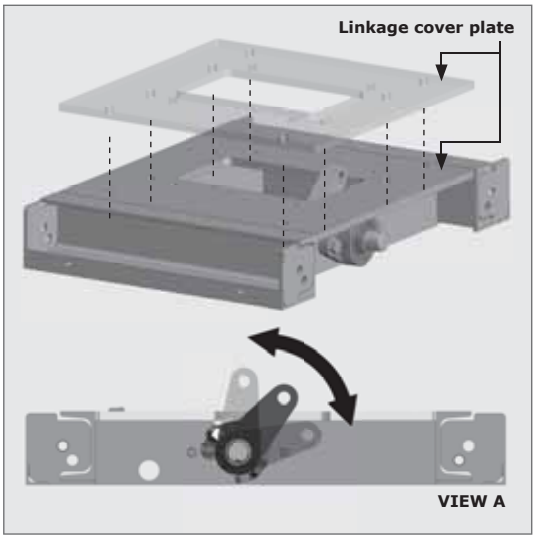
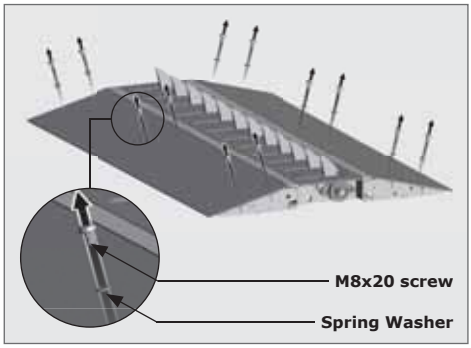


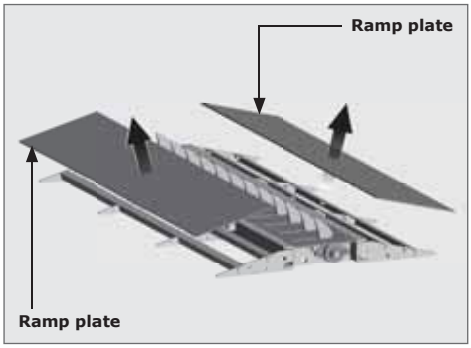
FIGURE 13

7.2. Spike Module Assembly

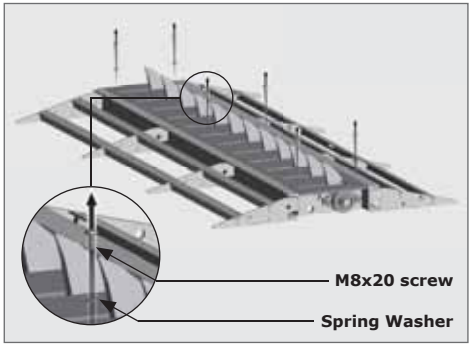
7.2.1. Preparing the Spike Module assembly(ies) for installation



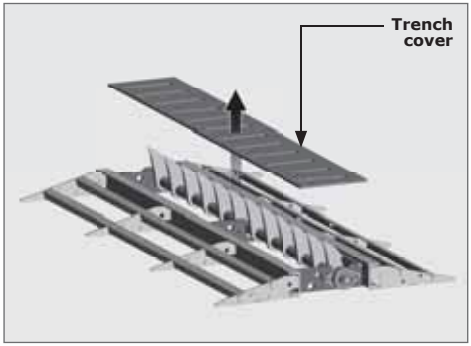
STEP 1 FIGURE 14



STEP 2 FIGURE 15

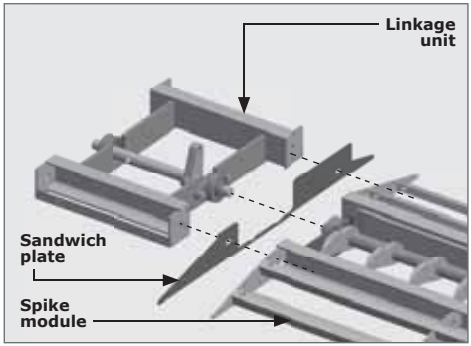


STEP 3 FIGURE 16

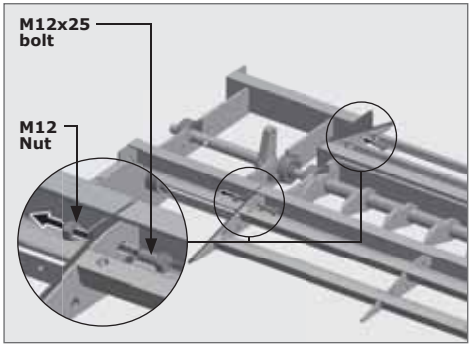


STEP 4 FIGURE 17

7.2.2. Attaching the drive linkage unit to the spike module



STEP 1 FIGURE 18



STEP 2 FIGURE 19

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 7, Figure 18).

Step 3
Using six M12x25 bolts, fix one spike module to another (Section 7, Figure 20).

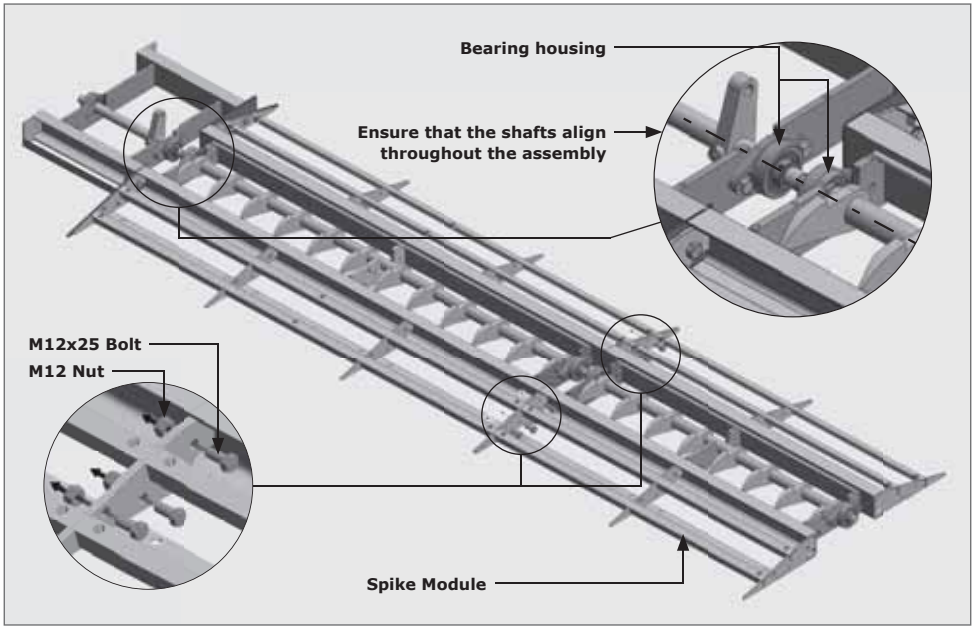


FIGURE 20

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

7.2.3. Bolting down the assembly to the ground

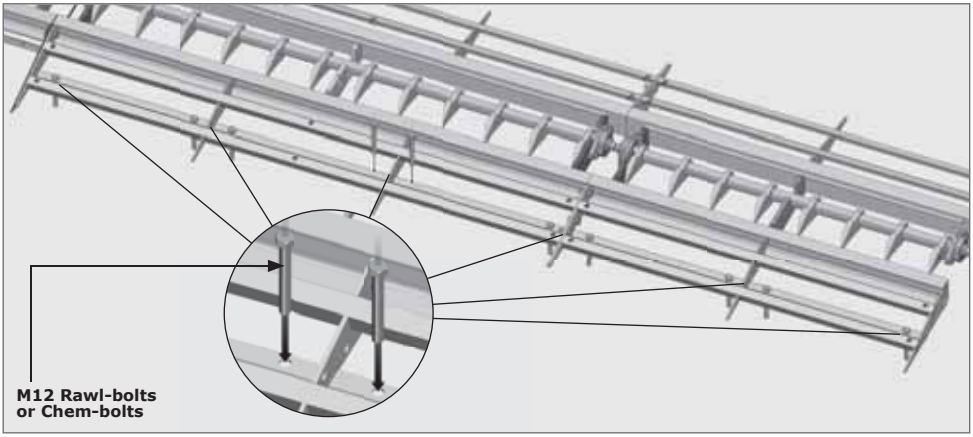


FIGURE 21

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.

7.2.4. 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.

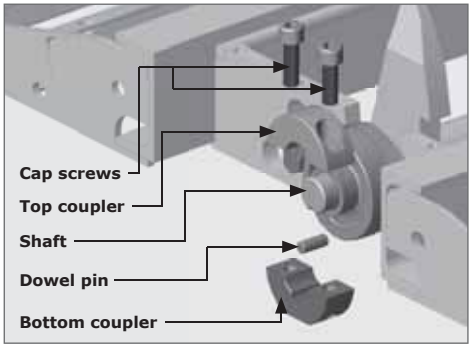


FIGURE 22. SHAFT COUPLER

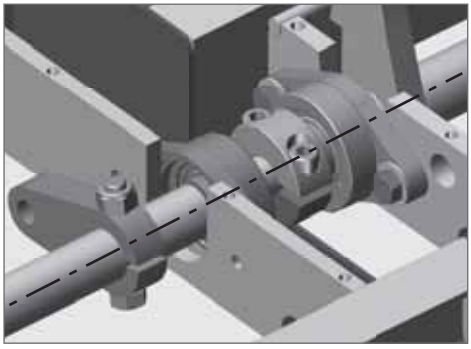
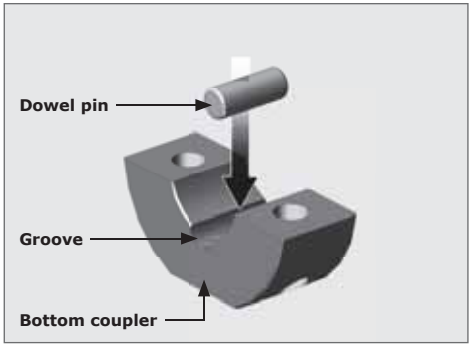
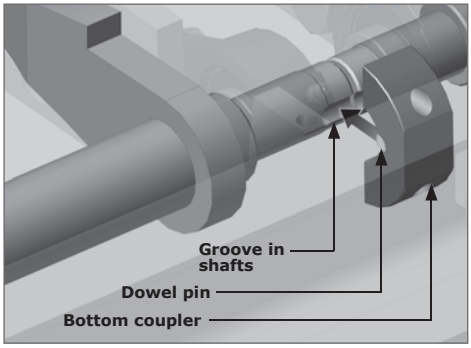


FIGURE 23

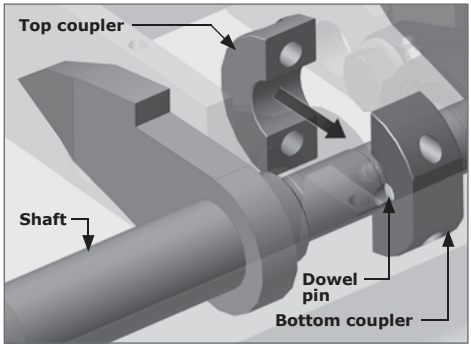
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



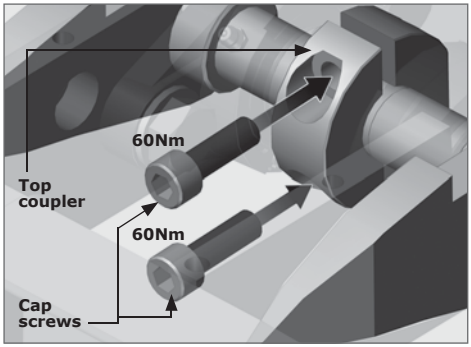
STEP 1 **FIGURE 24**



STEP 2 **FIGURE 25**



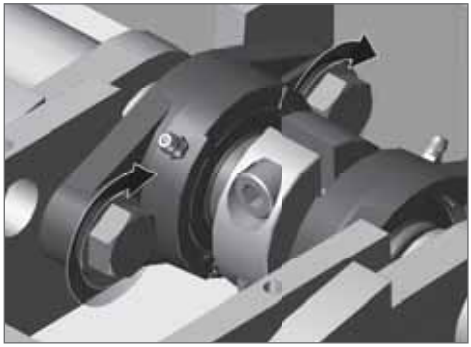
STEP 3 **FIGURE 26**



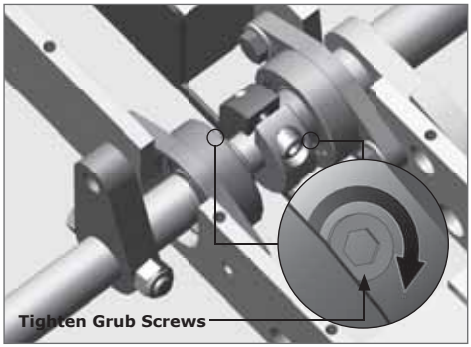
STEP 4 **FIGURE 27**

STEP 5

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

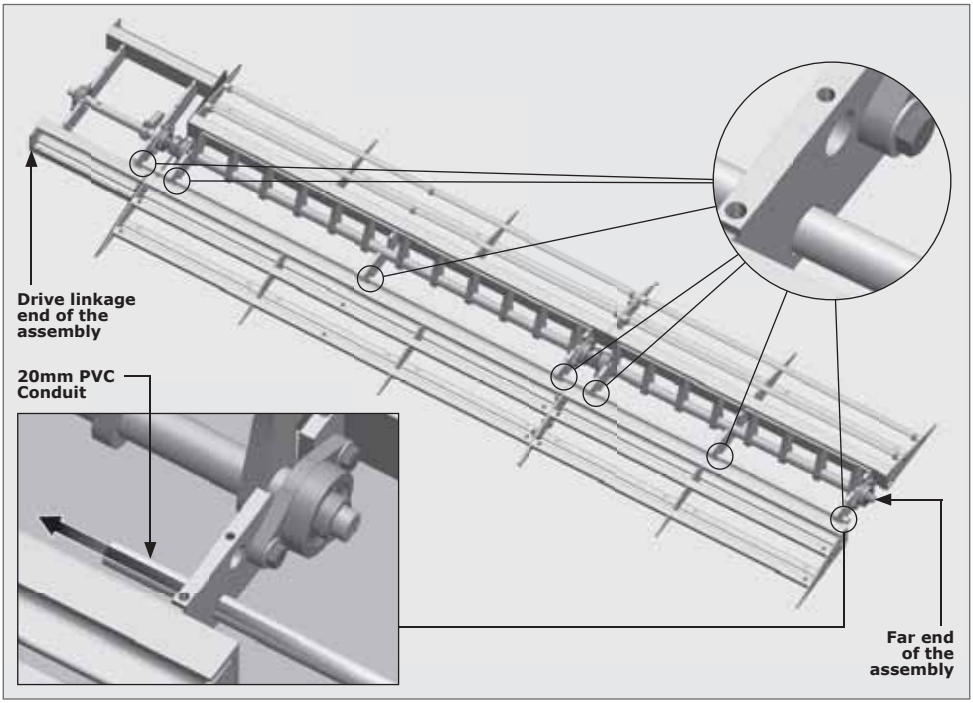


STEP 6 **FIGURE 28**



STEP 7 **FIGURE 29**

7.2.5. Proximity sensor installation



STEP 1 **FIGURE 30**

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 110mm is added to this to account for the modules and coupling (Refer to Section 7, Figure 31).

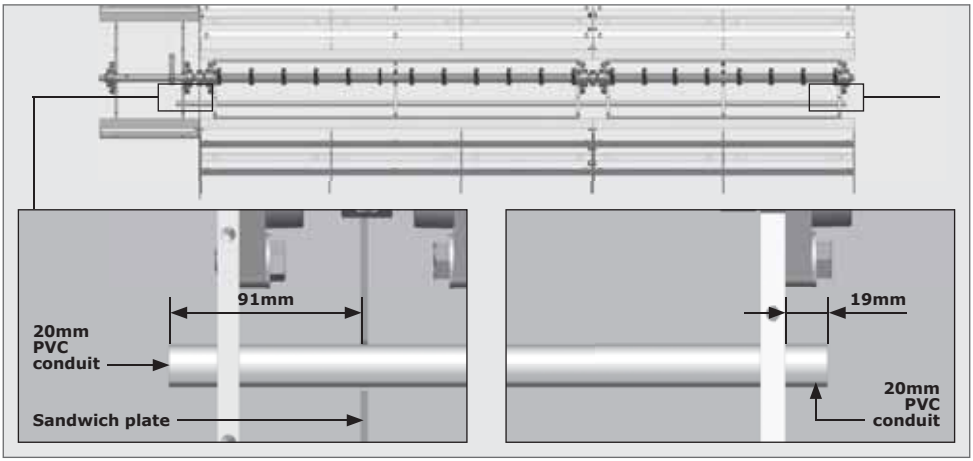
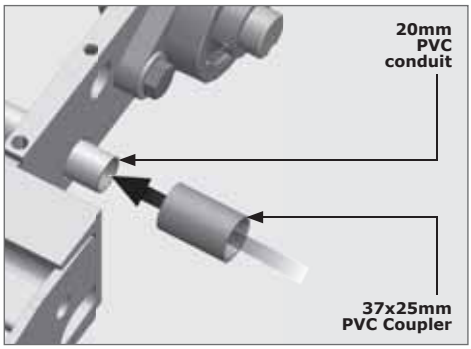
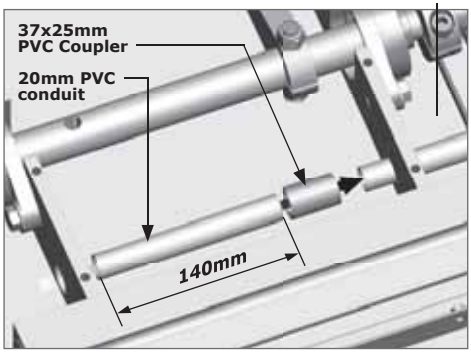


FIGURE 31

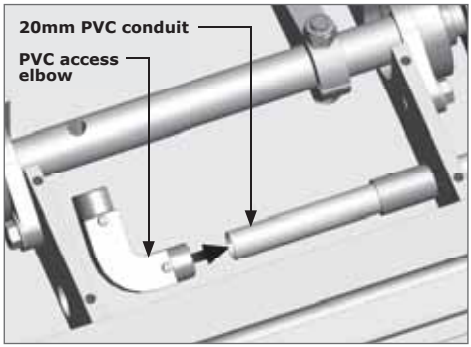
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



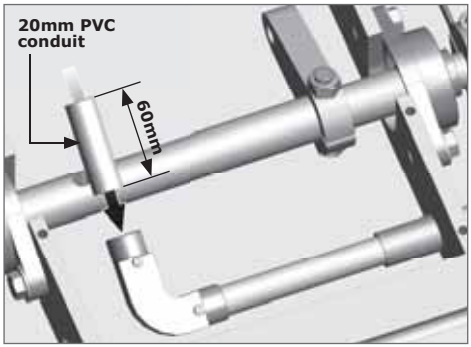
STEP 2 FIGURE 32



STEP 3 FIGURE 33



STEP 4 FIGURE 34



STEP 5 FIGURE 35

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

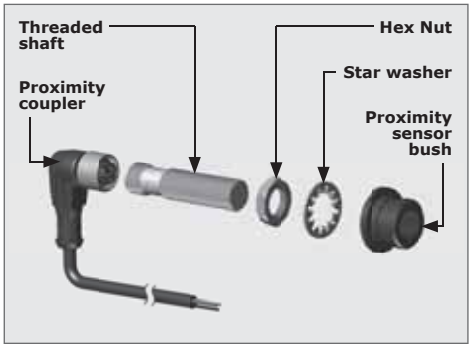


FIGURE 36. PROXIMITY SENSOR

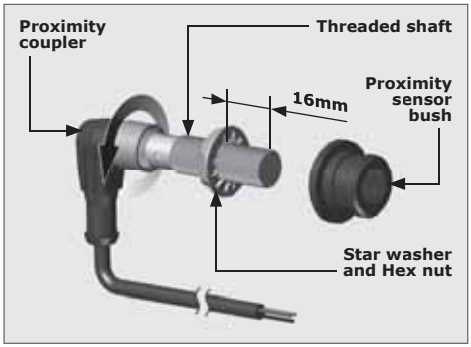


FIGURE 37. PROXIMITY SENSOR

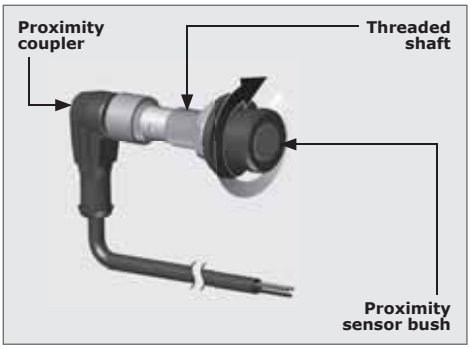
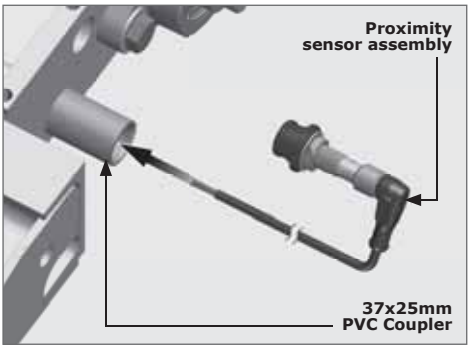


FIGURE 38. PROXIMITY SENSOR



STEP 6 FIGURE 39

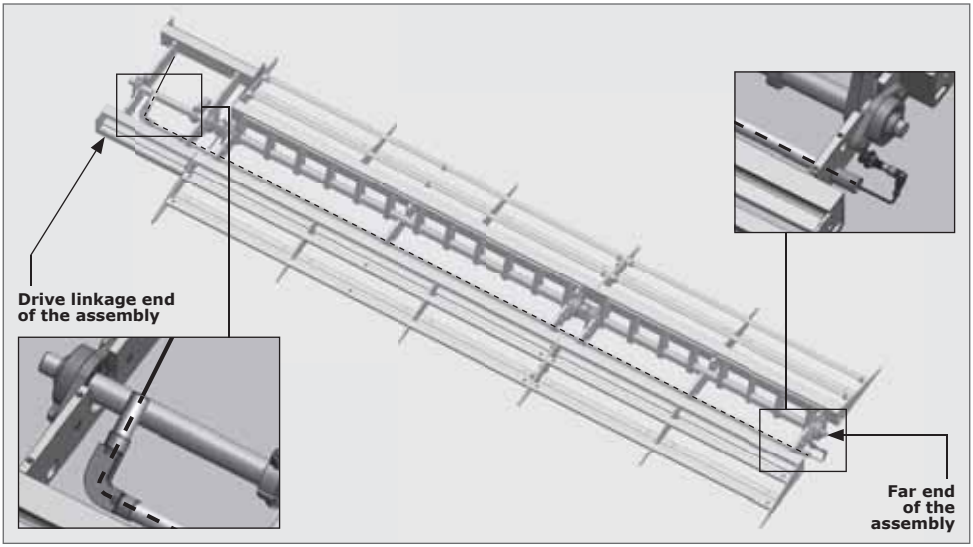
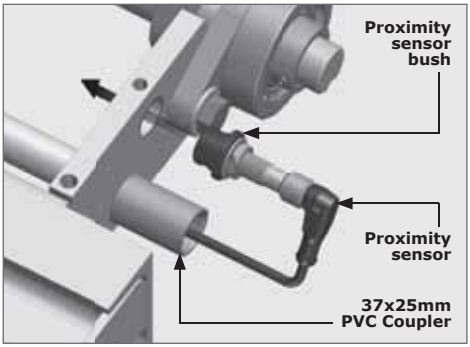
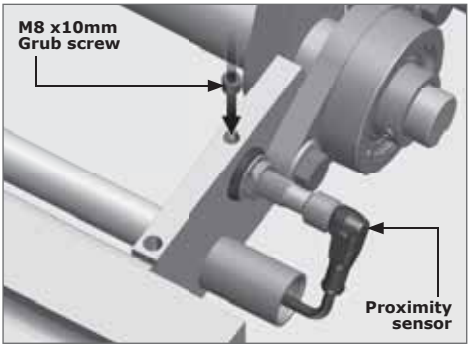


FIGURE 40

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.

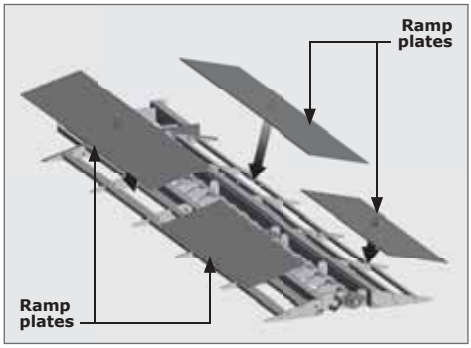


STEP 7 FIGURE 41

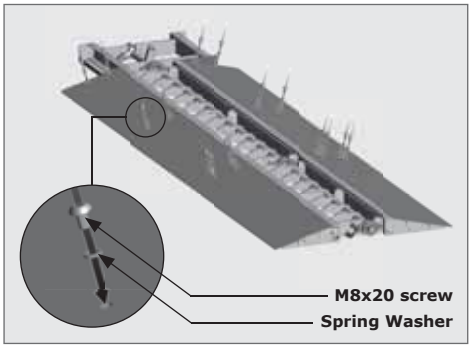


STEP 8 FIGURE 42

7.3. Re-assembling the ramp plates and linkage cover

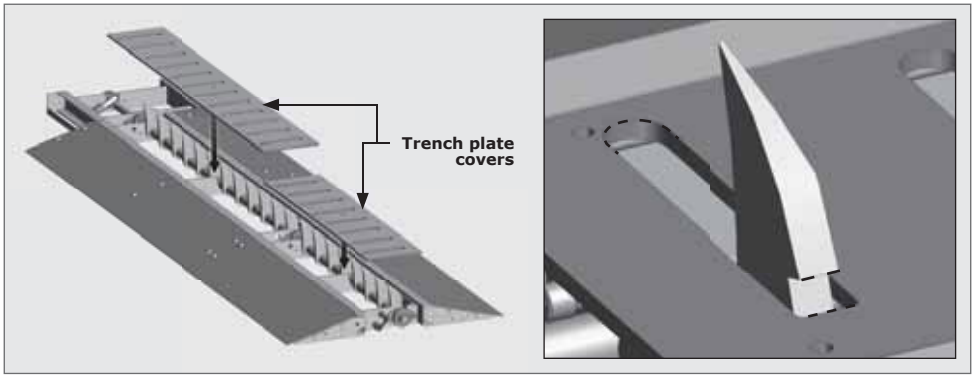


STEP 1 FIGURE 43



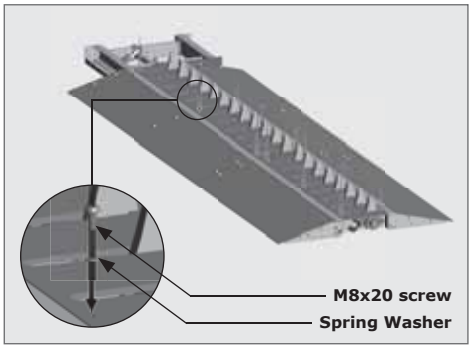
STEP 2 FIGURE 44

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.

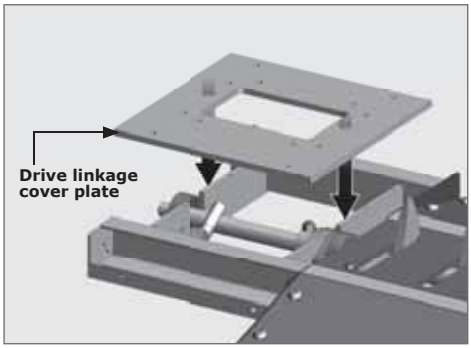


STEP 3 FIGURE 45

Take notice 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.

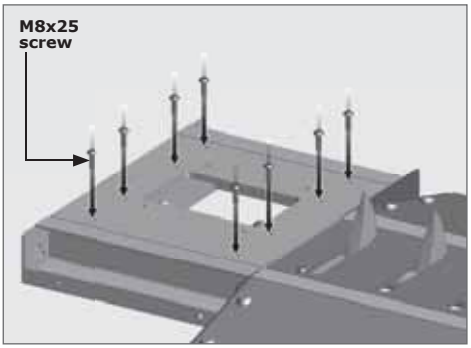


STEP 4 FIGURE 46

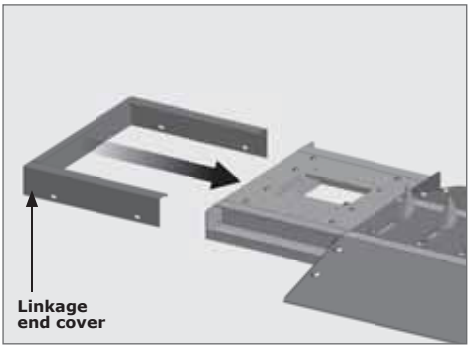


STEP 5 FIGURE 47

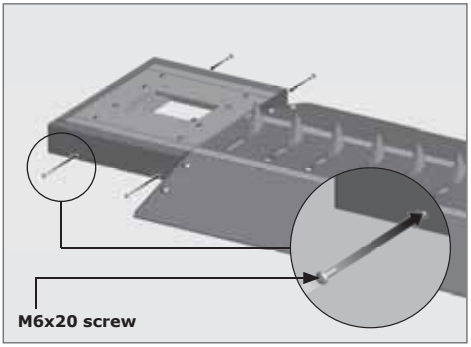
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 7, Figure 13).



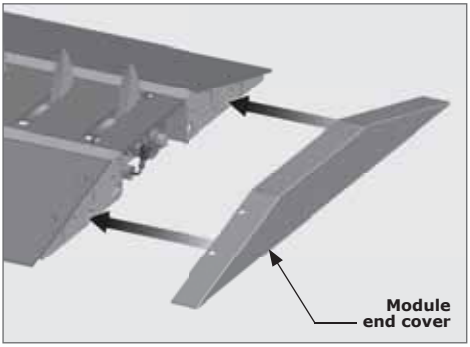
STEP 6 FIGURE 48



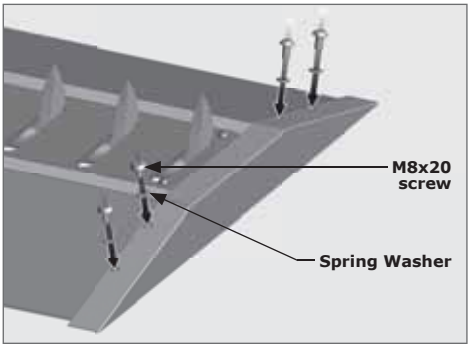
STEP 7 FIGURE 49



STEP 8 FIGURE 50



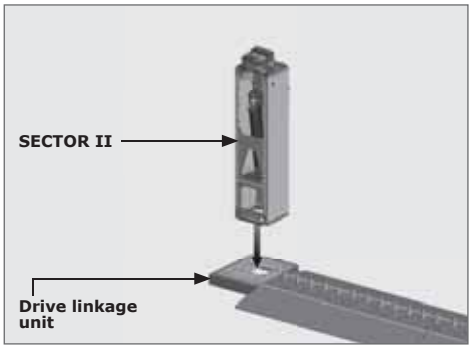
STEP 9 FIGURE 51



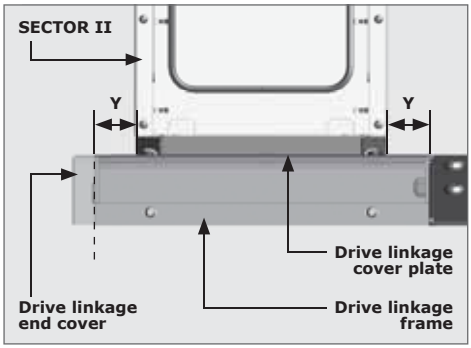
STEP 10 FIGURE 52

7.4. Integrating the SECTOR II with the CLAWS

7.4.1. Placing the SECTOR II into position

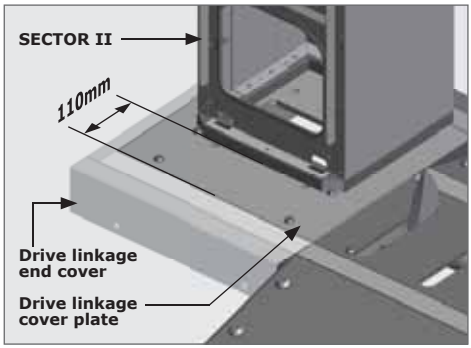


STEP 1 FIGURE 53

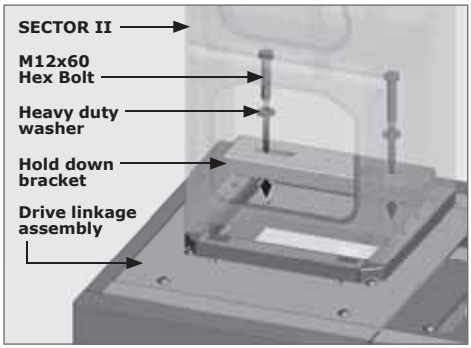


STEP 2 FIGURE 54

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 110mm from the front edge of the Linkage Cover Plate. (Section 7, Figure 55).



STEP 3 FIGURE 55

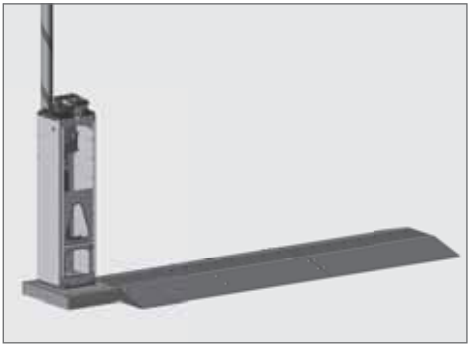


STEP 4 FIGURE 56

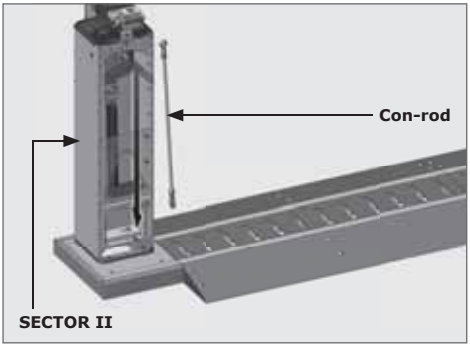
7.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

7.4.3. Inserting the Con-rod



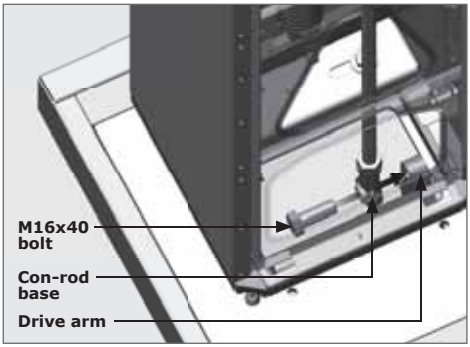
STEP 1 FIGURE 57



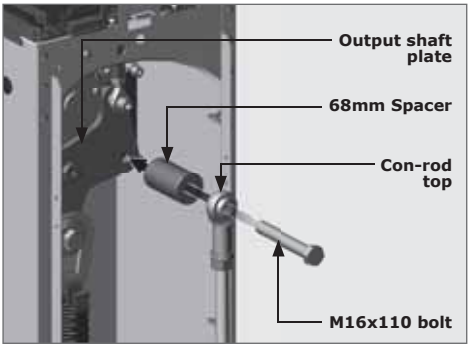
STEP 2 FIGURE 58

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



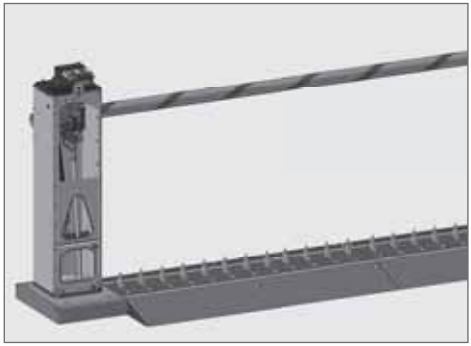
STEP 3 FIGURE 59



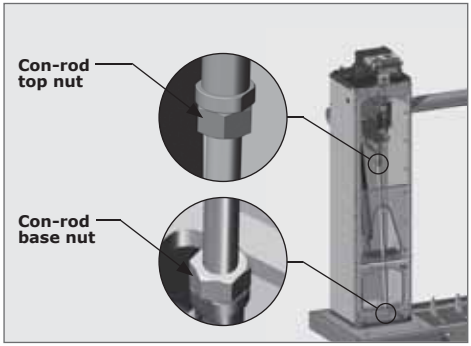
STEP 4 FIGURE 60

7.4.4. Adjusting the CLAWS spikes

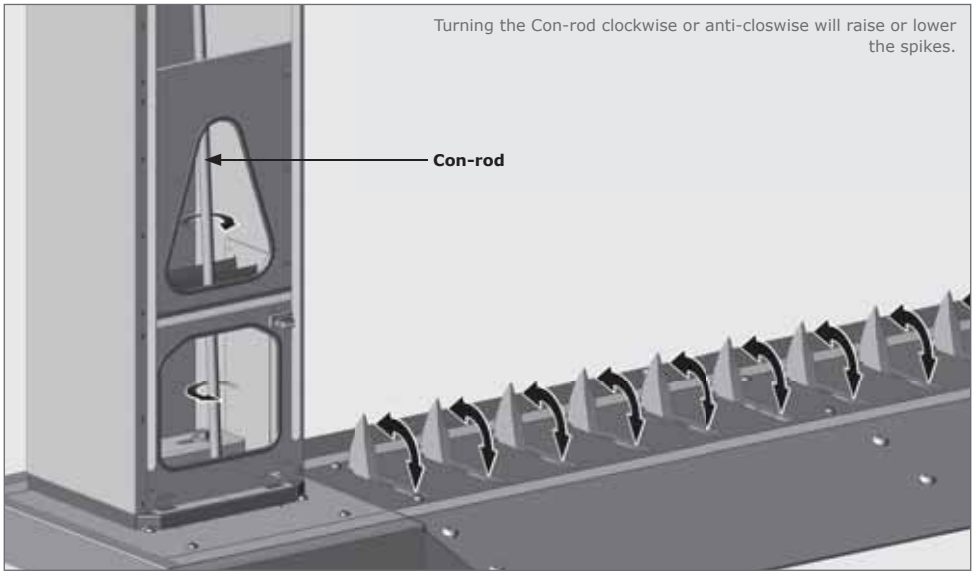
The CLAWS spikes will raise during this procedure!



STEP 1 **FIGURE 61**



STEP 2 **FIGURE 62**



STEP 3 **FIGURE 63**

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 7, Figure 64).

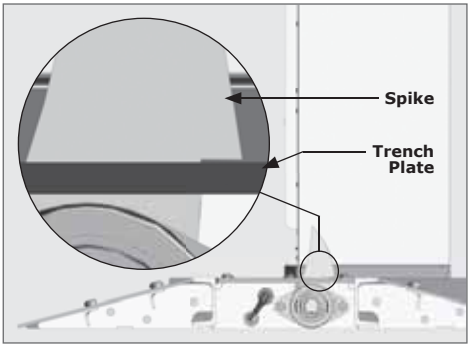
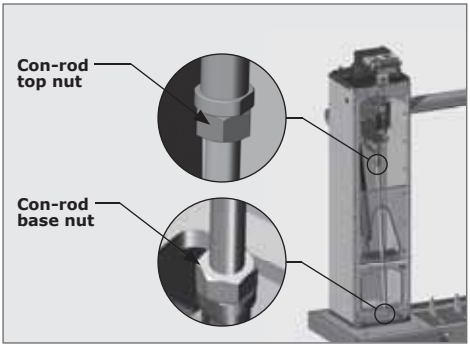


FIGURE 64



STEP 4

FIGURE 65

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 7, Figures 66 and 67).

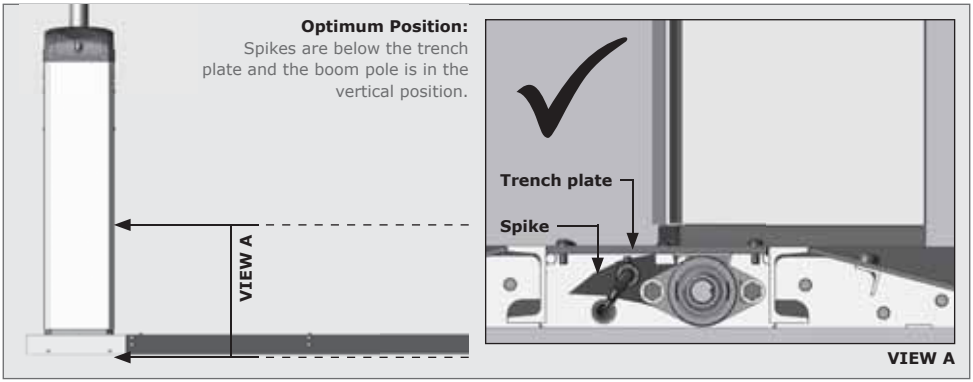


FIGURE 66

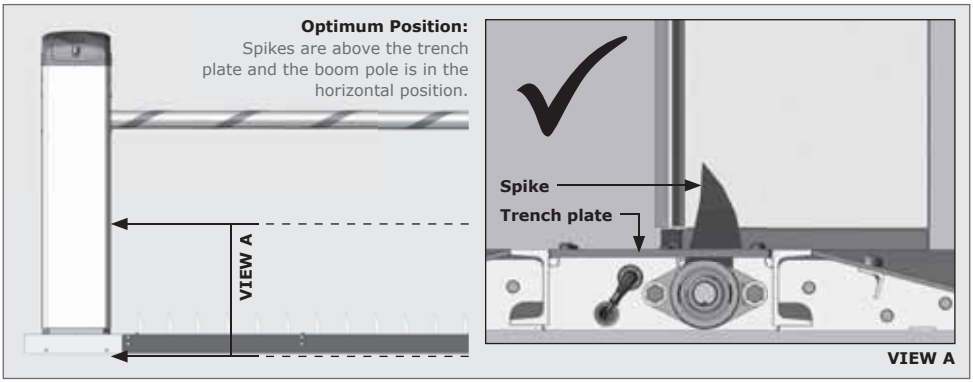
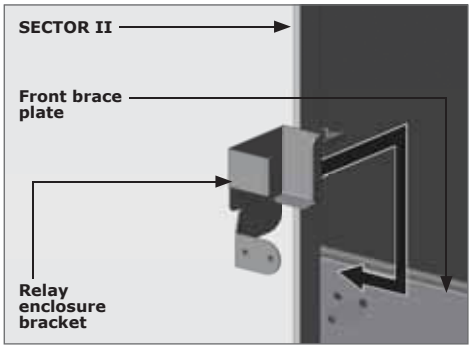


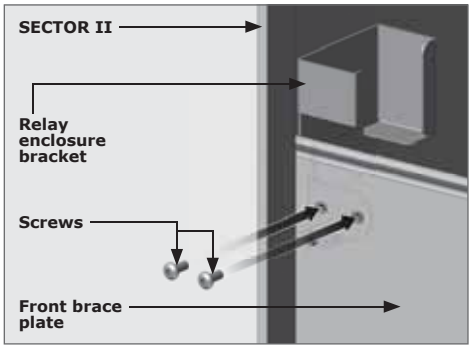
FIGURE 67

7.5. Completing the Assembly

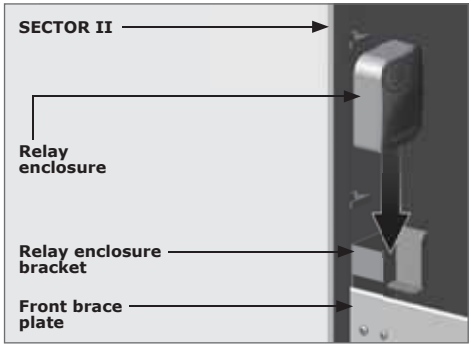
7.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 68



STEP 2 FIGURE 69



STEP 3 FIGURE 70

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

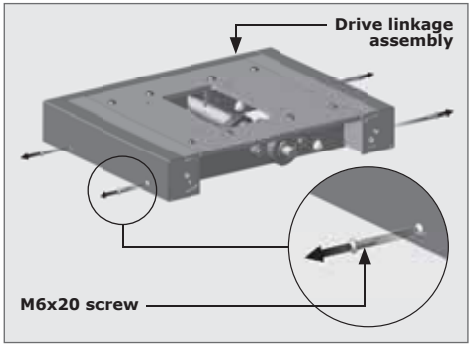
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

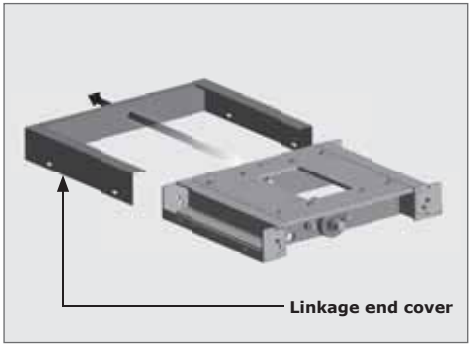
8. LHS Direct Drive Surface Mount - Opposing Direction of Travel

8.1. Configuring the Drive Linkage Assembly for Left-hand Similar

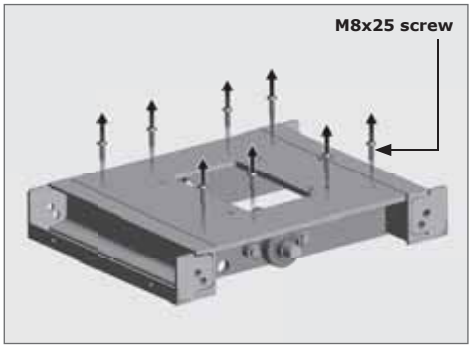
8.1.1. Stripping the drive linkage assembly



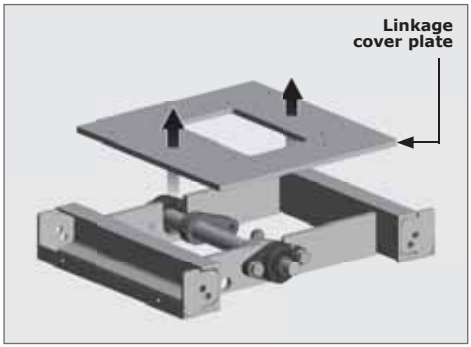
STEP 1 FIGURE 1



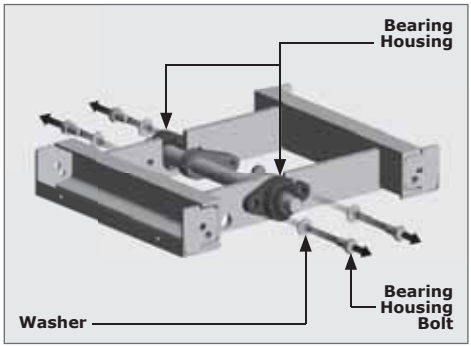
STEP 2 FIGURE 2



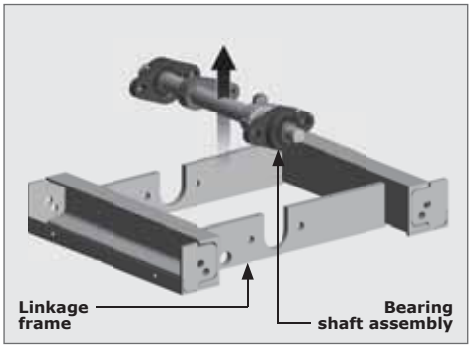
STEP 3 FIGURE 3



STEP 4 FIGURE 4



STEP 5 FIGURE 5



STEP 6 FIGURE 6

The unit is supplied with two drive arms, LHS and RHS (see Section 8, Figure 7).

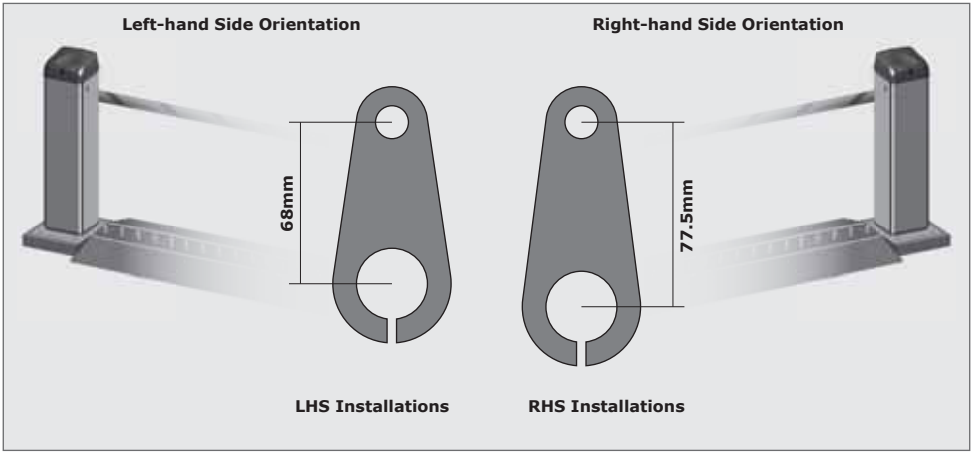
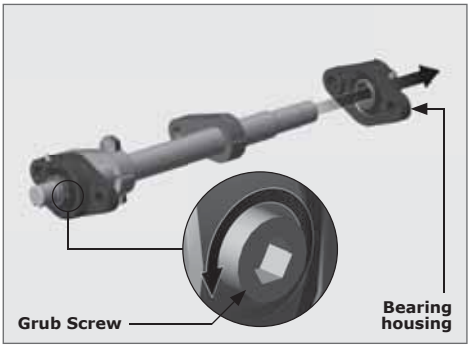
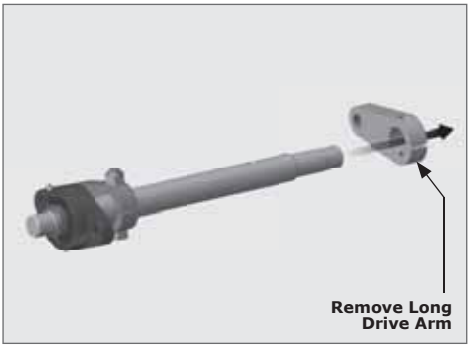


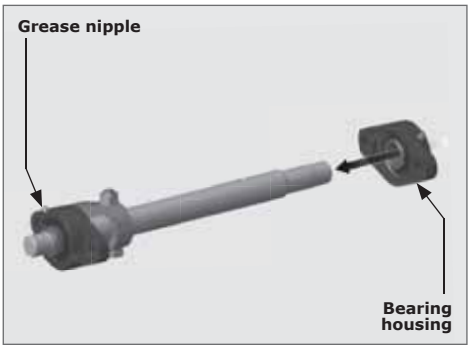
FIGURE 7



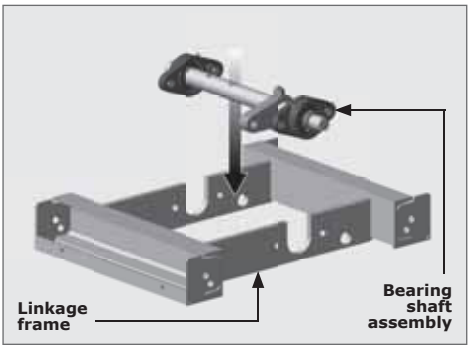
STEP 7 FIGURE 8



STEP 8 FIGURE 9



STEP 9 FIGURE 10



STEP 10 FIGURE 11

The grease nipples on the bearing housings must face up (Section 8, Figures 10 and 11). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 8, Figure 11).

Once assembled with the short drive arm, the format should look as shown in Section 8, Figure 12.

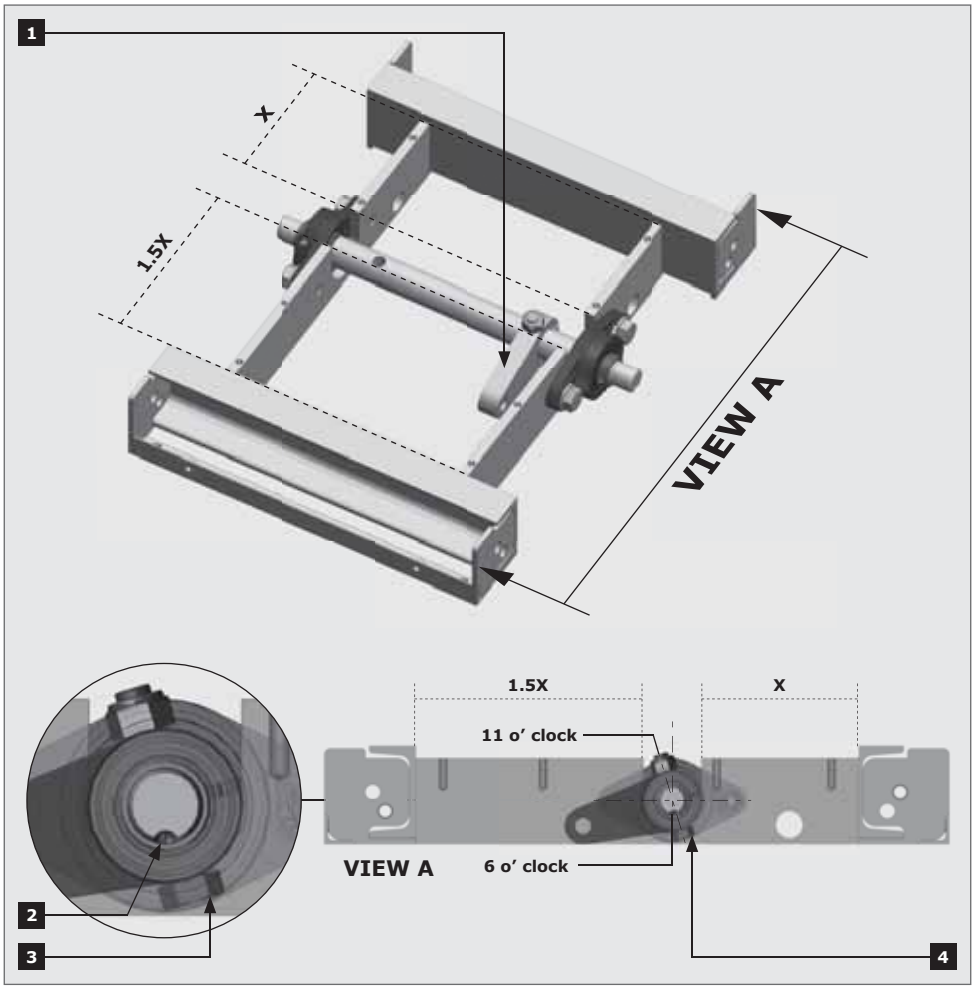


FIGURE 12

1. The drive arm must point towards the longer side of the drive linkage assembly (1.5x)
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (11'clock)

STEP 11

Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 12
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 8, Figure 13).

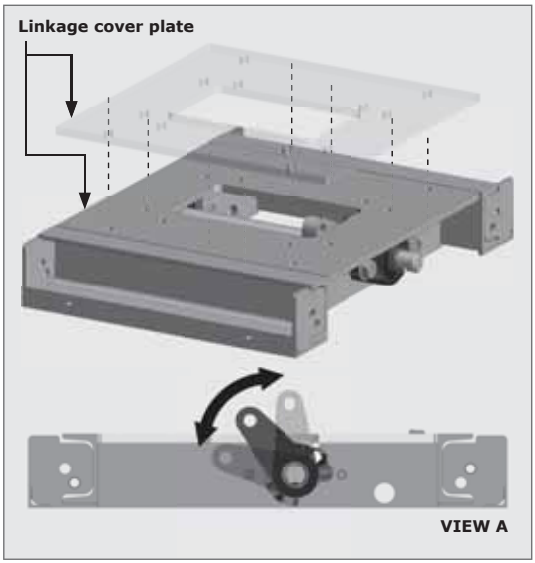
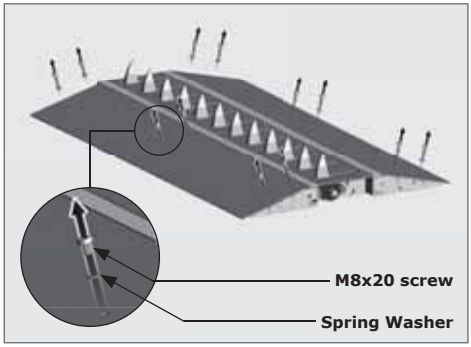


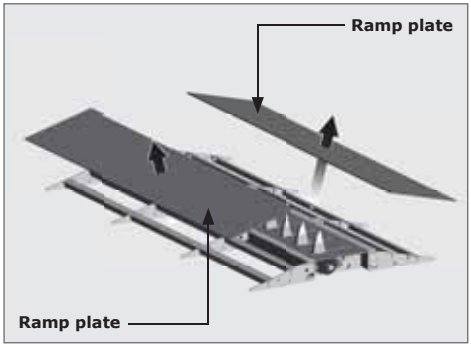
FIGURE 13

8.2. Spike Module Assembly

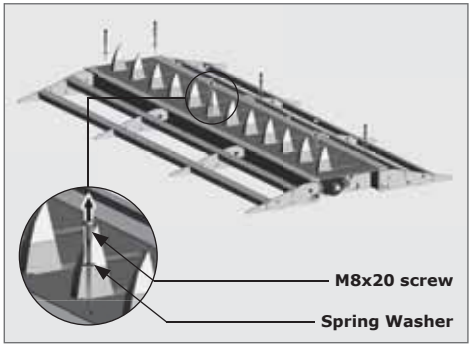
8.2.1. Preparing the Spike Module assembly(ies) for installation



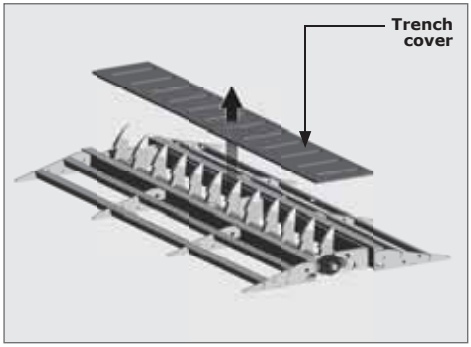
STEP 1 **FIGURE 14**



STEP 2 **FIGURE 15**

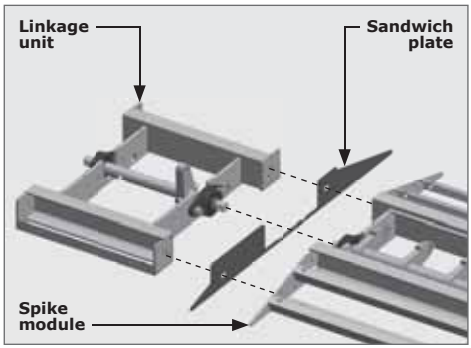


STEP 3 **FIGURE 16**

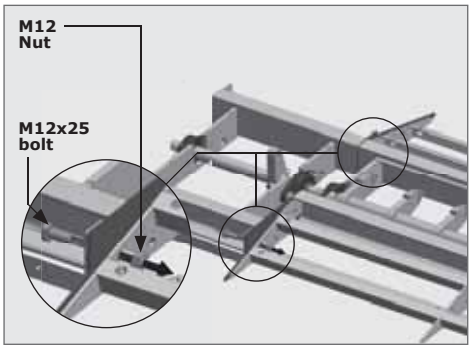


STEP 4 **FIGURE 17**

8.2.2. Attaching the drive linkage unit to the spike module



STEP 1 **FIGURE 18**



STEP 2 **FIGURE 19**

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 8, Figure 18).

STEP 3

Using six M12x25 bolts, fix one spike module to another (Section 8, Figure 20).

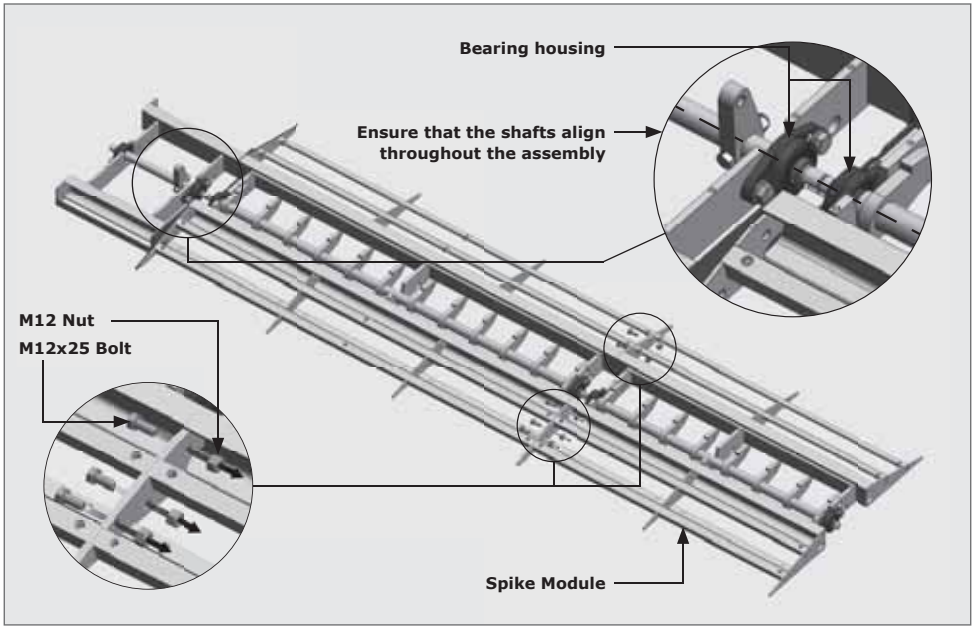


FIGURE 20

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

8.2.3. Bolting down the assembly to the ground

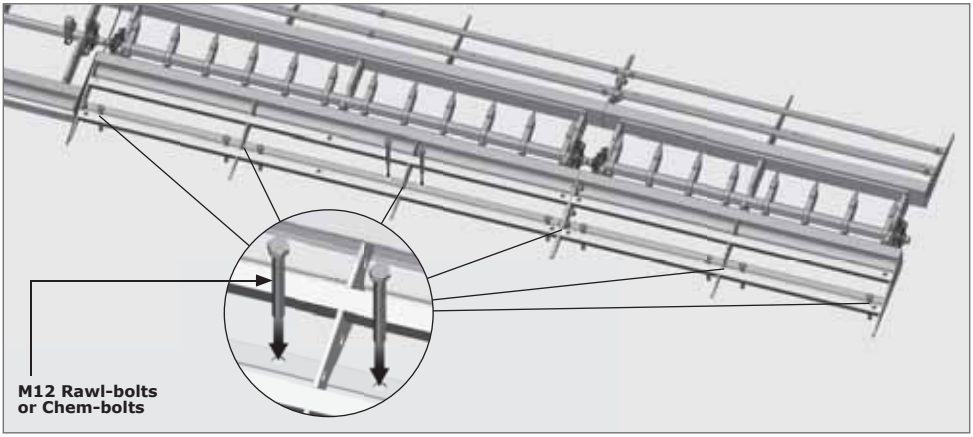


FIGURE 21

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.

8.2.4. 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.

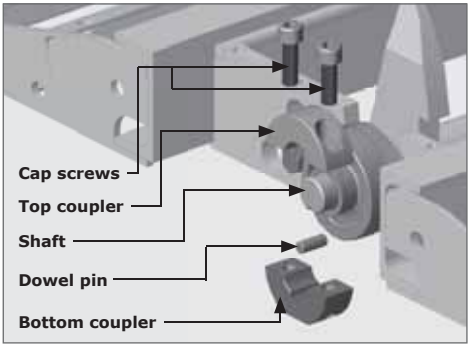


FIGURE 22. SHAFT COUPLER

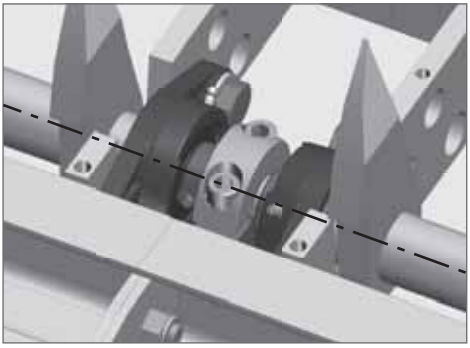
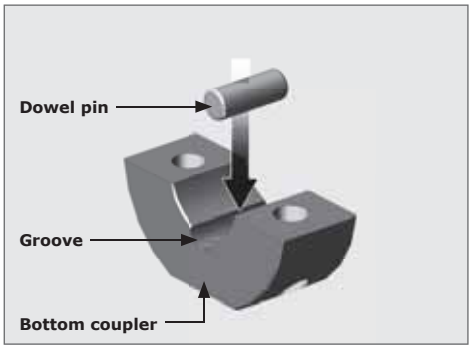
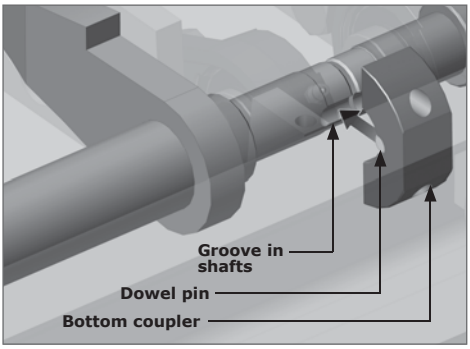


FIGURE 23

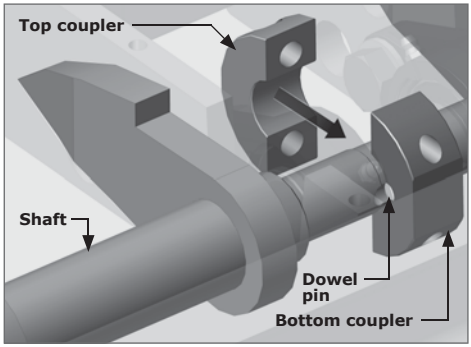
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



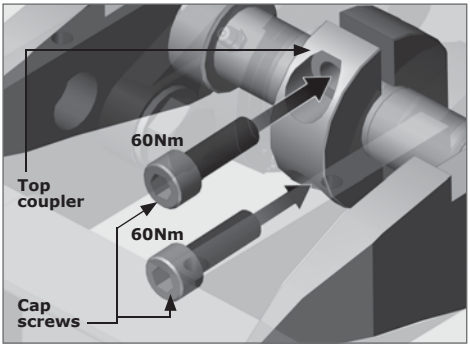
STEP 1 **FIGURE 24**



STEP 2 **FIGURE 25**



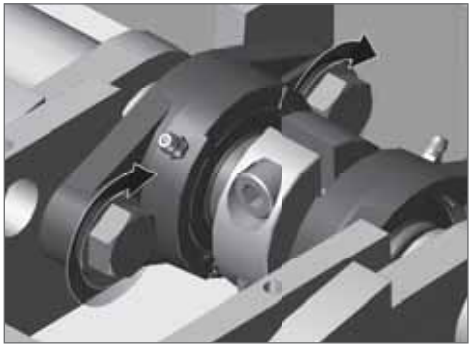
STEP 3 **FIGURE 26**



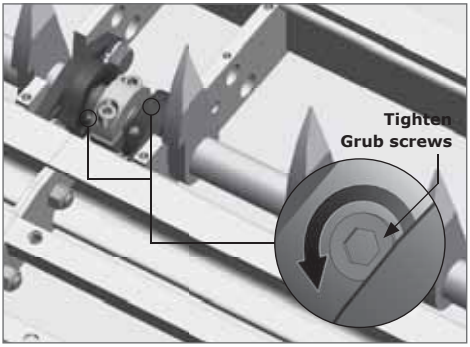
STEP 4 **FIGURE 27**

STEP 5

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



STEP 6 **FIGURE 28**



STEP 7 **FIGURE 29**

8.2.5. Proximity sensor installation

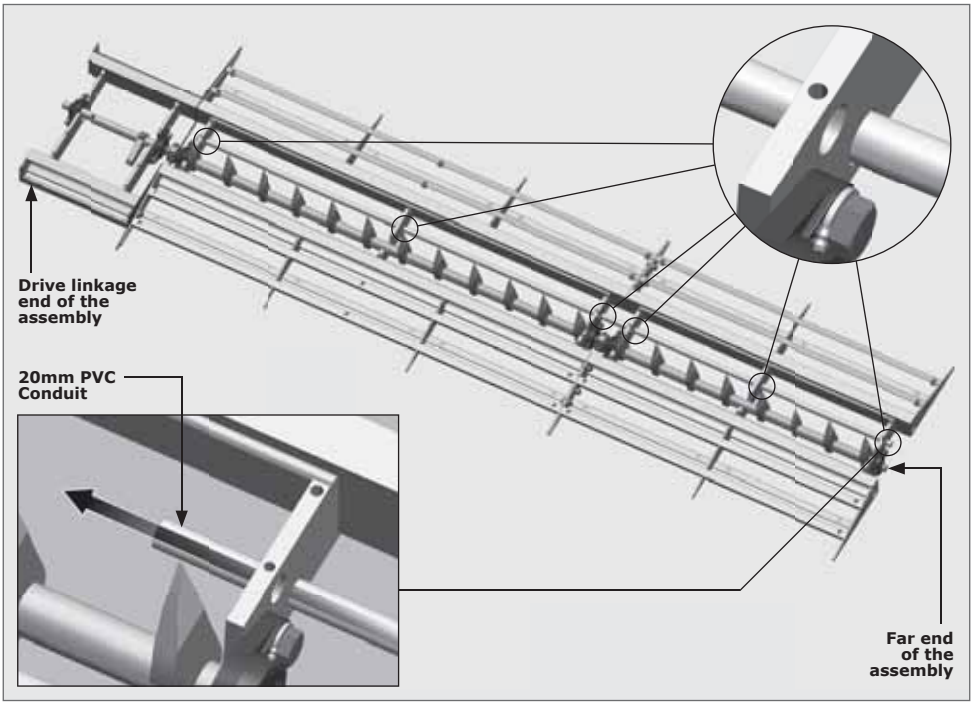


FIGURE 30

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 110mm is added to this to account for the modules and coupling (Refer to Section 8, Figure 31).

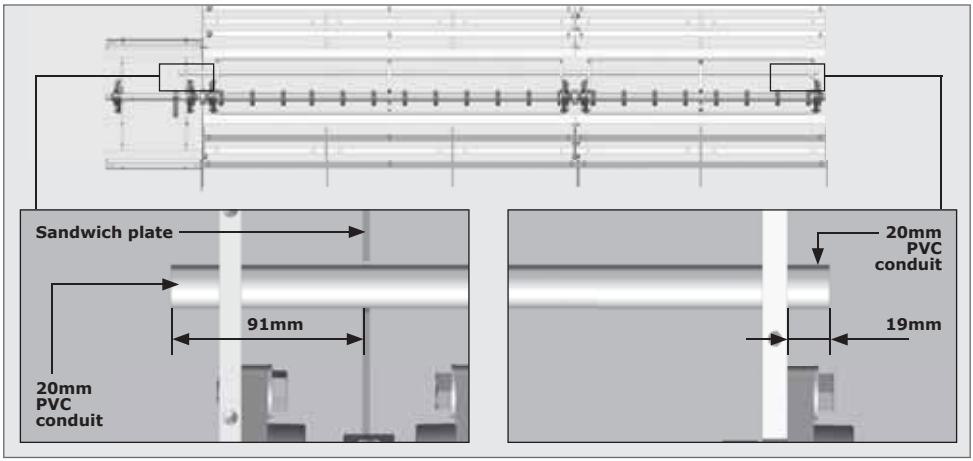
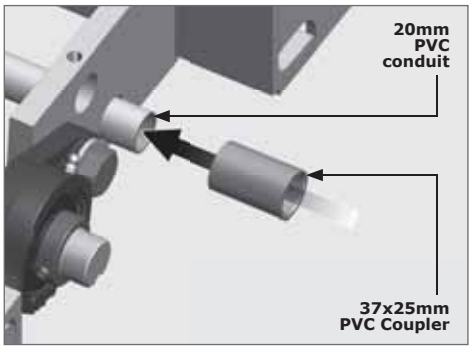
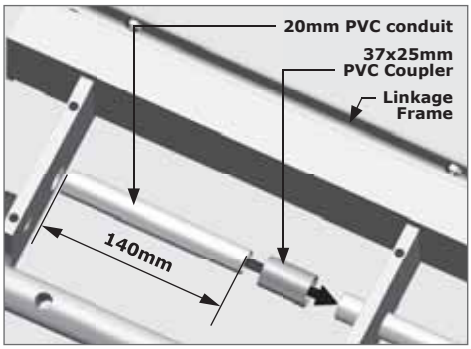


FIGURE 31

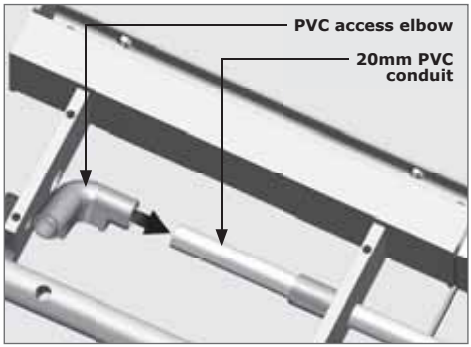
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



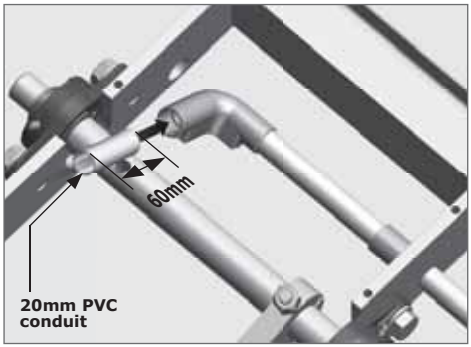
STEP 2 FIGURE 32



STEP 3 FIGURE 33



STEP 4 FIGURE 34



STEP 5 FIGURE 35

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

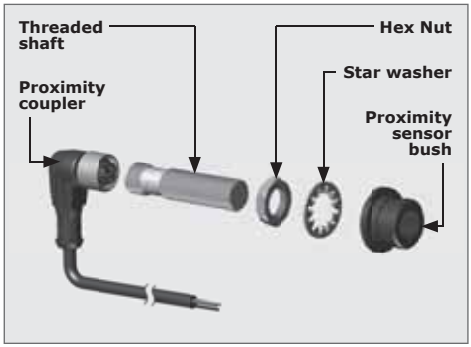


FIGURE 36. PROXIMITY SENSOR

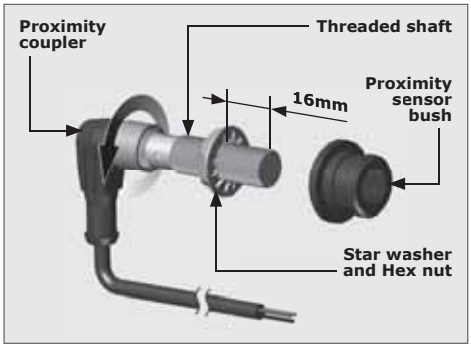


FIGURE 37. PROXIMITY SENSOR

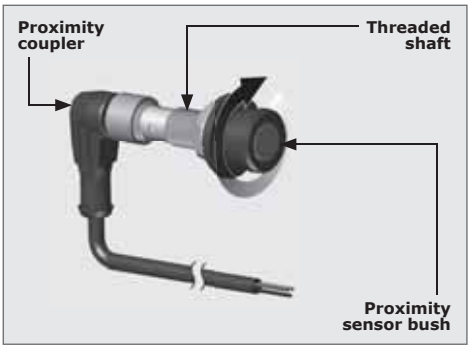
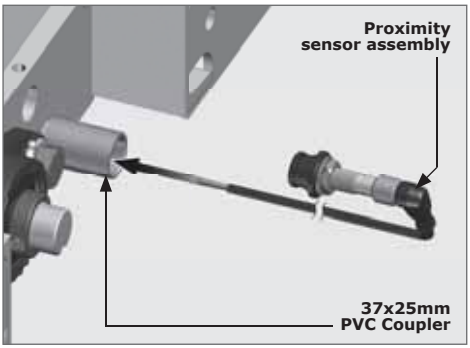


FIGURE 38. PROXIMITY SENSOR



STEP 6 FIGURE 39

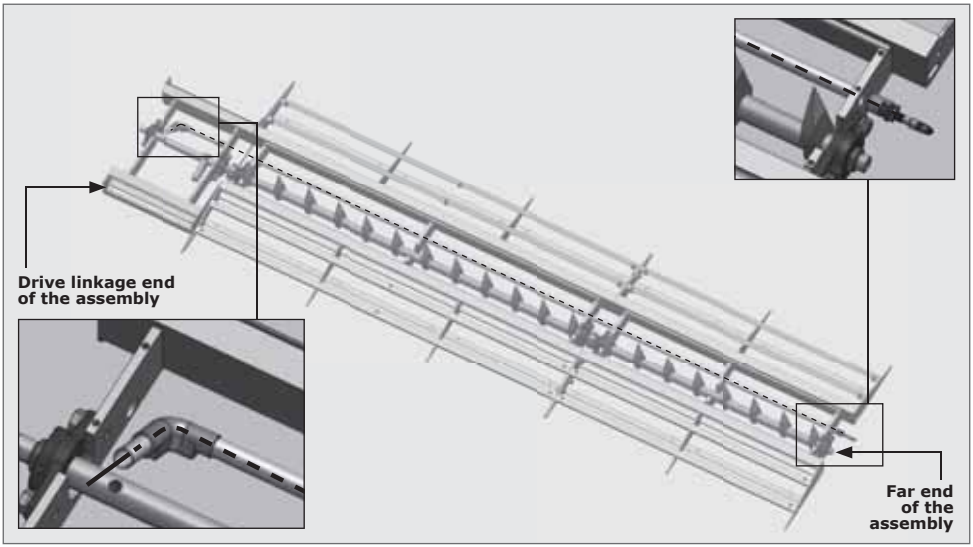
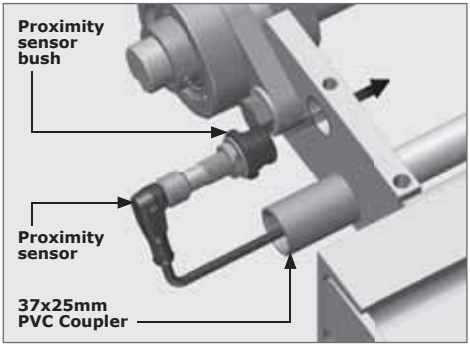
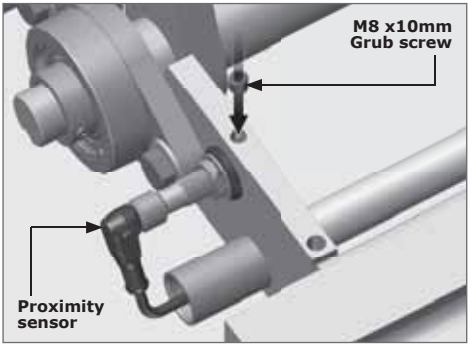


FIGURE 40

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.

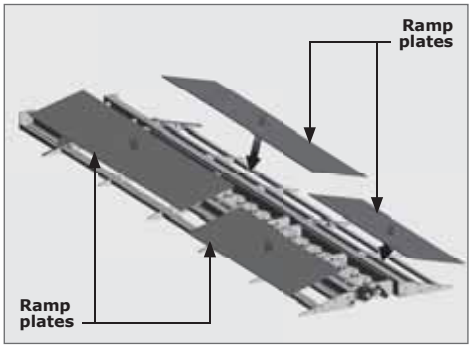


STEP 7 FIGURE 41

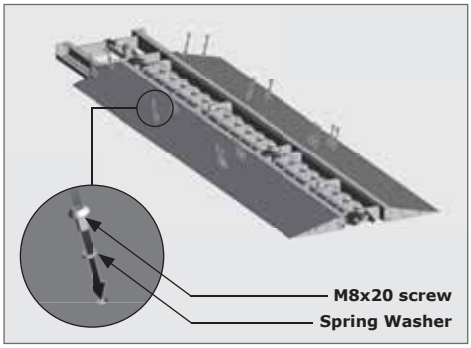


STEP 8 FIGURE 42

8.3. Re-assembling the ramp plates and linkage cover

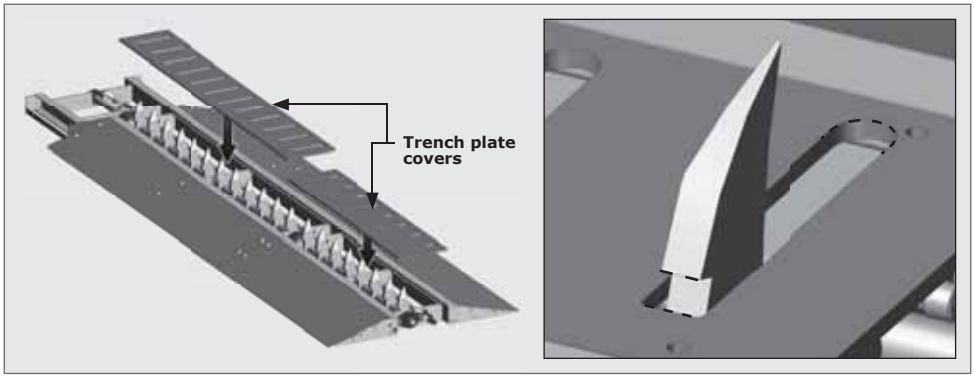


STEP 1 FIGURE 43



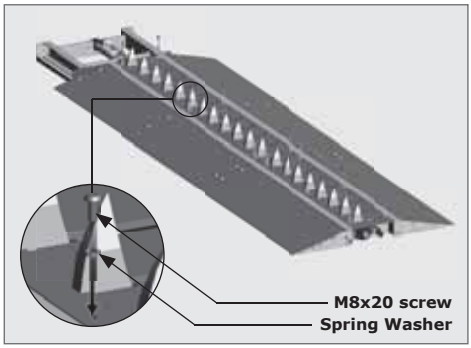
STEP 2 FIGURE 44

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.

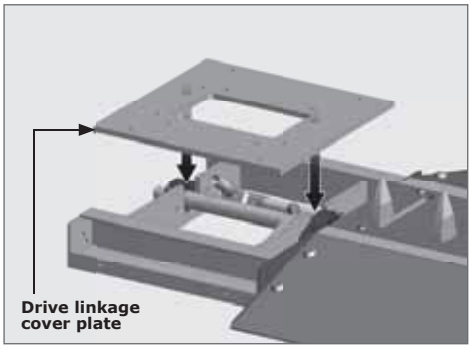


STEP 3 FIGURE 45

Take notice 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.

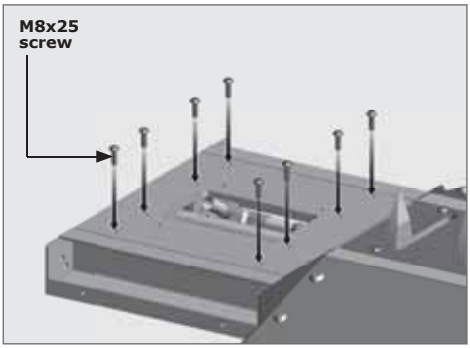


STEP 4 FIGURE 46

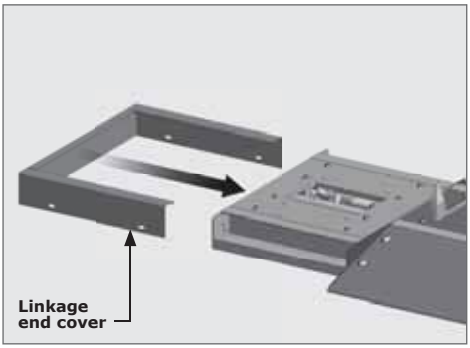


STEP 5 FIGURE 47

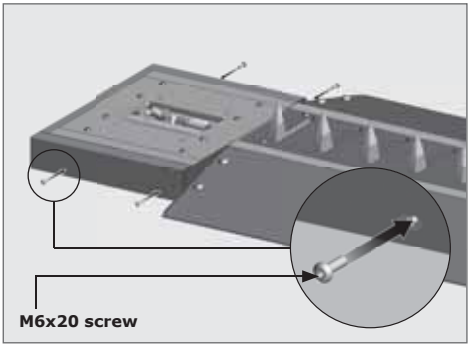
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back top Section 8, Figure 13).



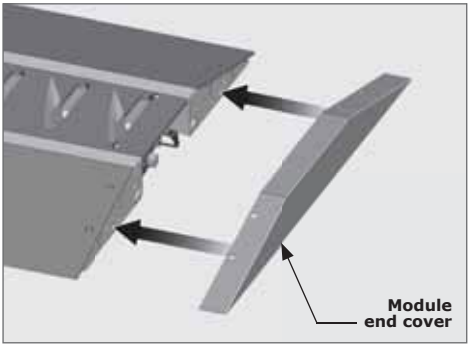
STEP 6 FIGURE 48



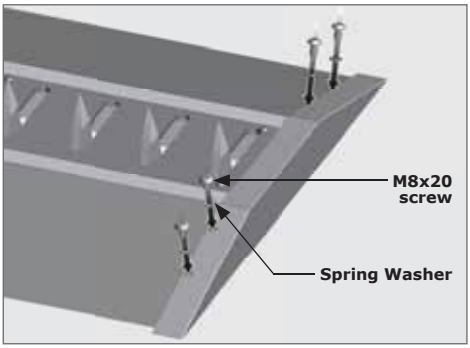
STEP 7 FIGURE 49



STEP 8 FIGURE 50



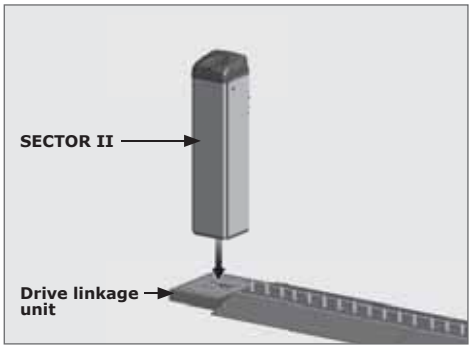
STEP 9 FIGURE 51



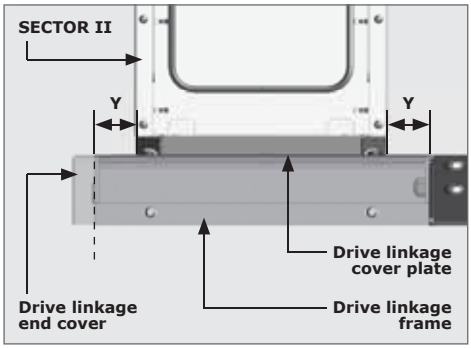
STEP 10 FIGURE 52

8.4. Integrating the SECTOR II with the CLAWS

8.4.1. Placing the SECTOR II into position

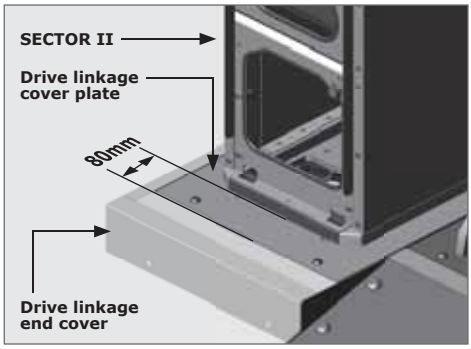


STEP 1 FIGURE 53

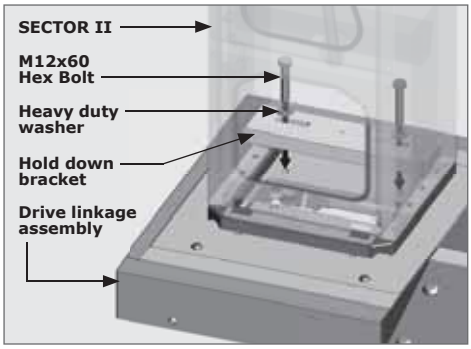


STEP 2 FIGURE 54

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 80mm from the front edge of the Linkage Cover Plate. (Section 8, Figure 55).



STEP 3 FIGURE 55



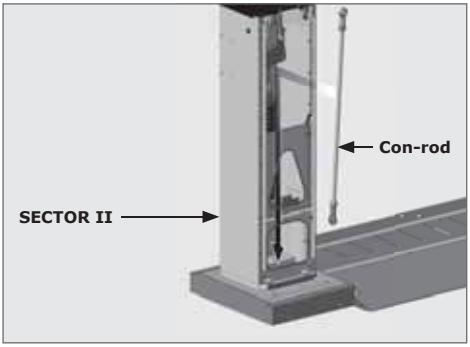
STEP 4 FIGURE 56

8.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

8.4.3. Inserting the Con-rod

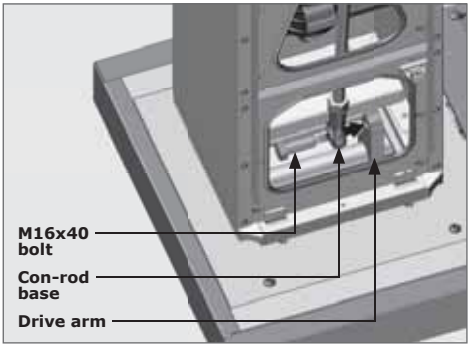
STEP 1 FIGURE 57



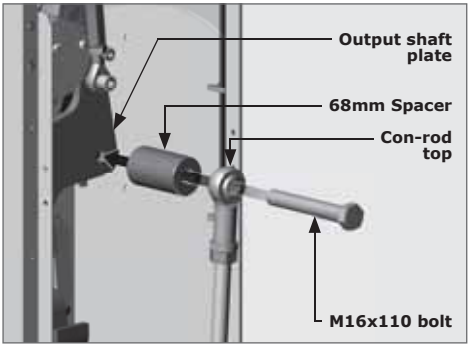
STEP 2 FIGURE 58

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



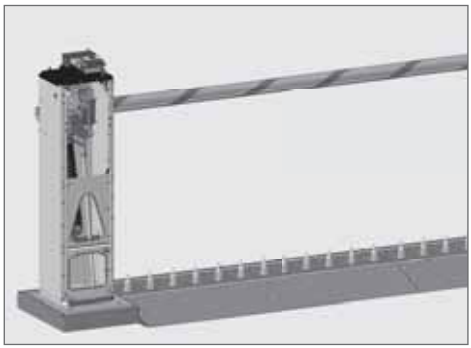
STEP 3 FIGURE 59



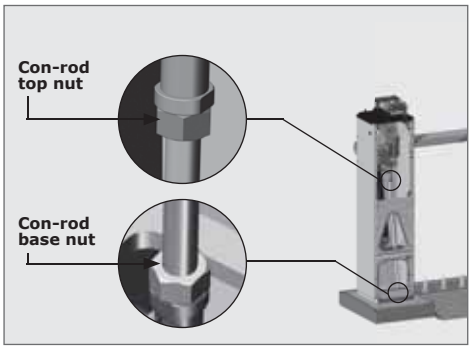
STEP 4 FIGURE 60

8.4.4. Adjusting the CLAWS spikes

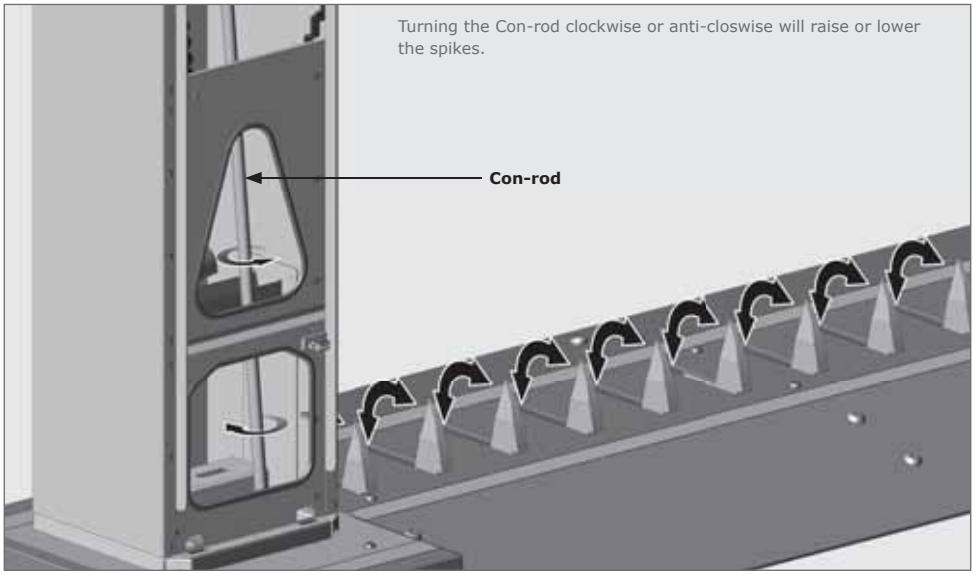
The CLAWS spikes will raise during this procedure!



STEP 1 **FIGURE 61**



STEP 2 **FIGURE 62**



STEP 3 **FIGURE 63**

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 8, Figure 71).

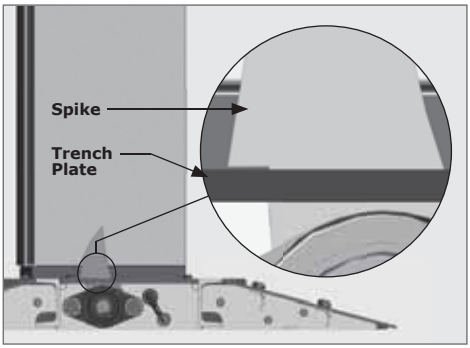
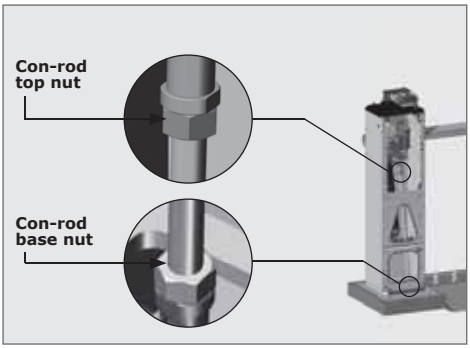


FIGURE 64



STEP 4

FIGURE 65

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 8, Figures 66 and 67).

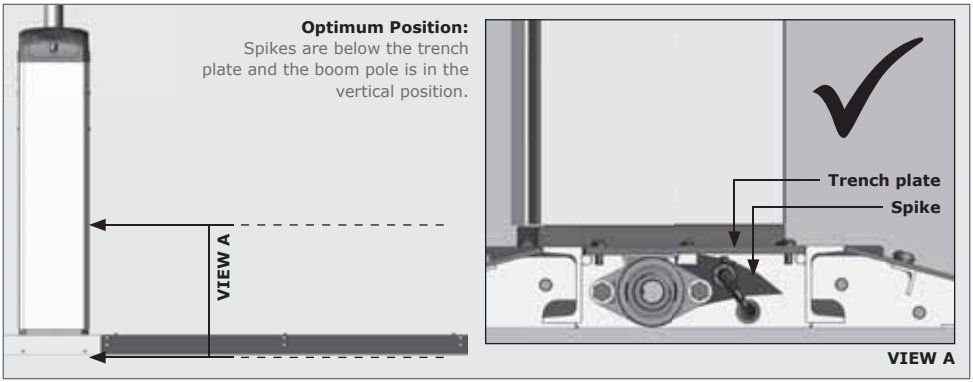


FIGURE 66

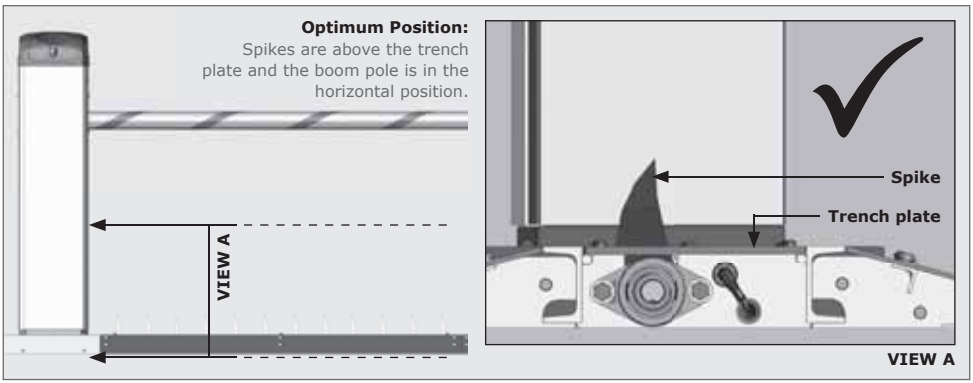
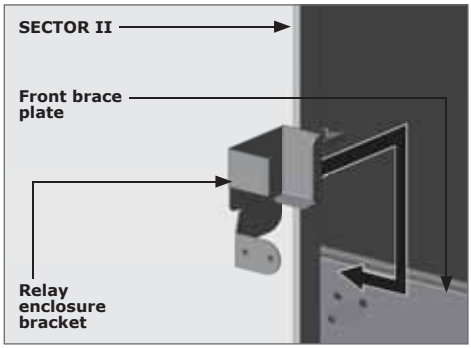


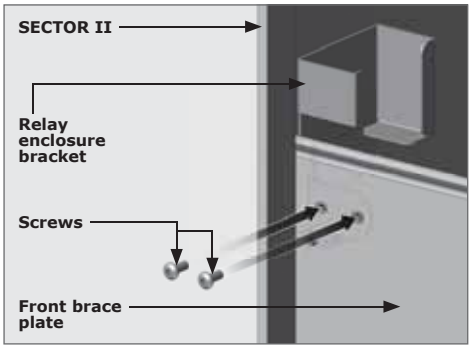
FIGURE 67

8.5. Completing the Assembly

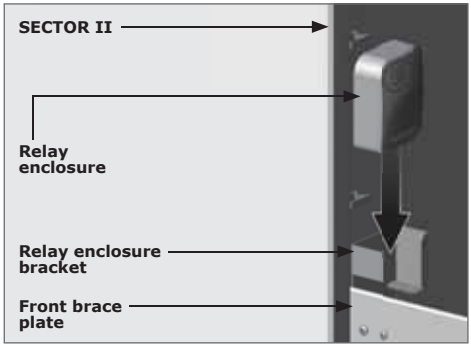
8.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 68



STEP 2 FIGURE 69



STEP 3 FIGURE 70

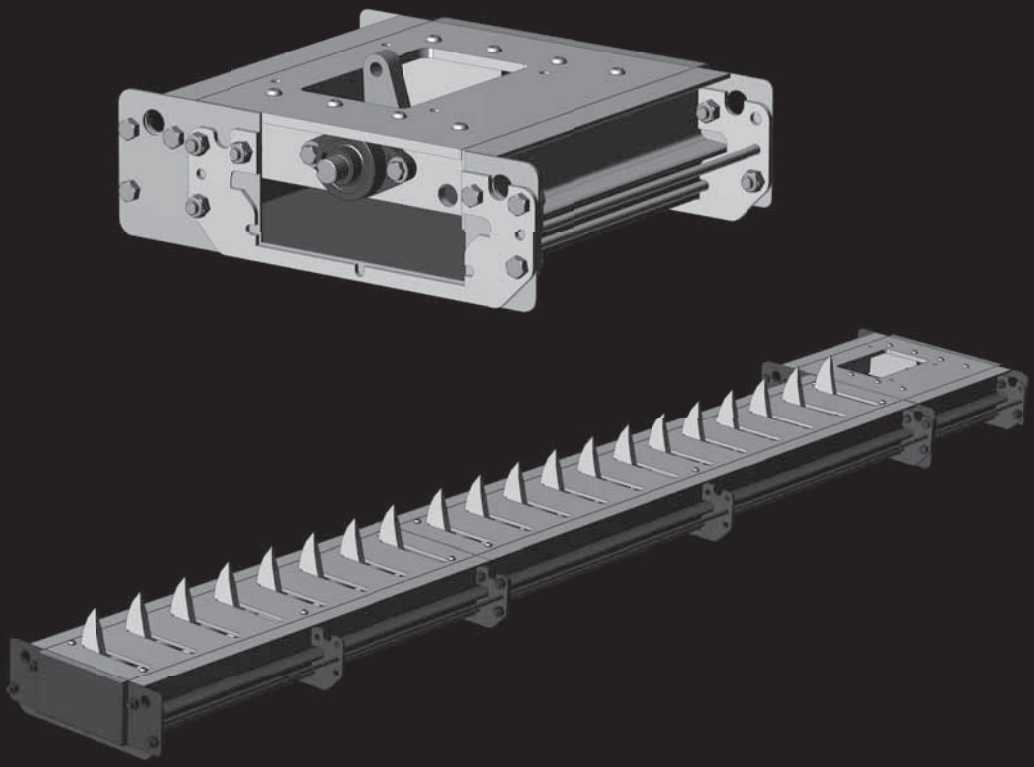
Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

Direct Drive
Flush Mount Installations

claws



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9. Product Identification

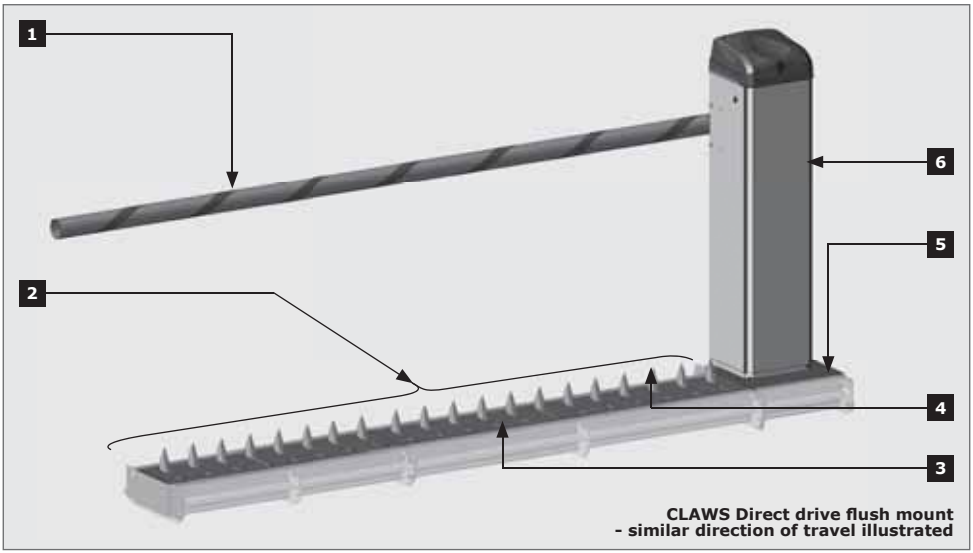
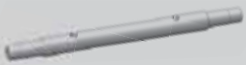
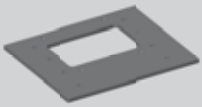


FIGURE 1. PRODUCT IDENTIFICATION

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

	Module Frame
	Linkage Frame
	Sandwich Plate
	Top Coupler
	Bottom Coupler
	8x20 Dowel Pin

	Short Drive Arm
	Long Drive Arm
	Linkage Drive Shaft
	Bearing Housing
	Hold Down Bracket
	Con-rod Assembly
	Linkage Cover Plate
	Linkage End Cover
	Module End Cover

10. Tools Required

- 13mm,17mm, 19mm and 24mm Spanners
- Ratchet
- 19mm, and 24mm Sockets
- Allen Key Set
- Mallet
- Tape Measure
- Spirit Level
- Torque Wrench
- Permanent marker
- Spade
- Pick
- Trough
- Fish line
- 50mm hole saw
- Electric Drill

11. 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.

11.1. 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

11.1.1. 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

11.1.2. 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.

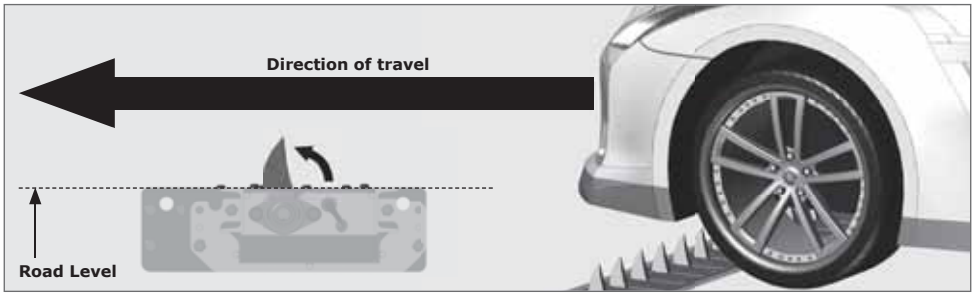


FIGURE 4. SPIKE IMPACT DIRECTION - SIMILAR

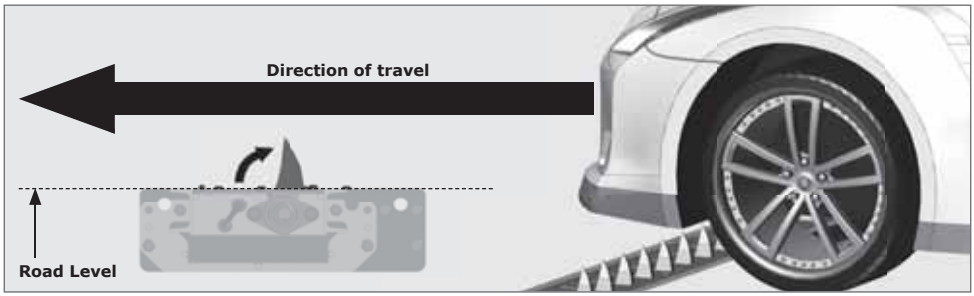


FIGURE 5. SPIKE IMPACT DIRECTION - OPPOSING

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

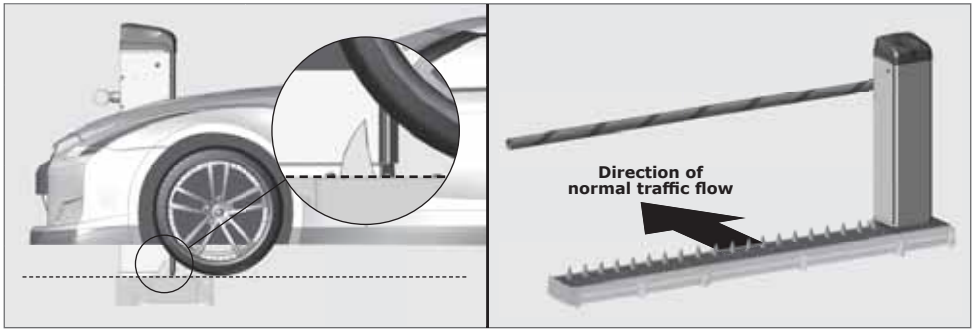


FIGURE 6. RHS SIMILAR DIRECTION OF TRAVEL

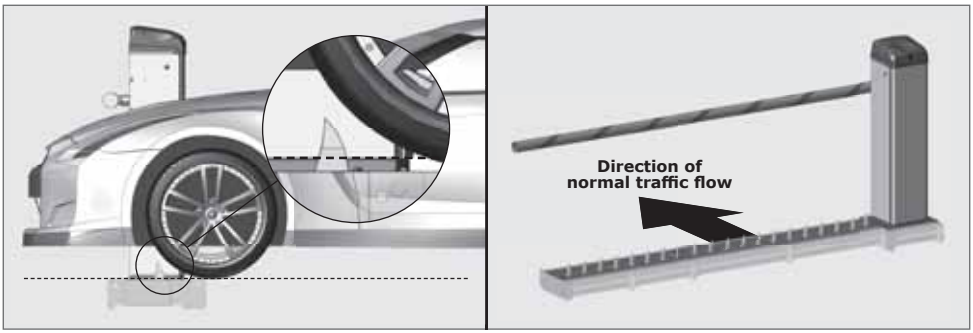


FIGURE 7. RHS OPPOSED DIRECTION OF TRAVEL

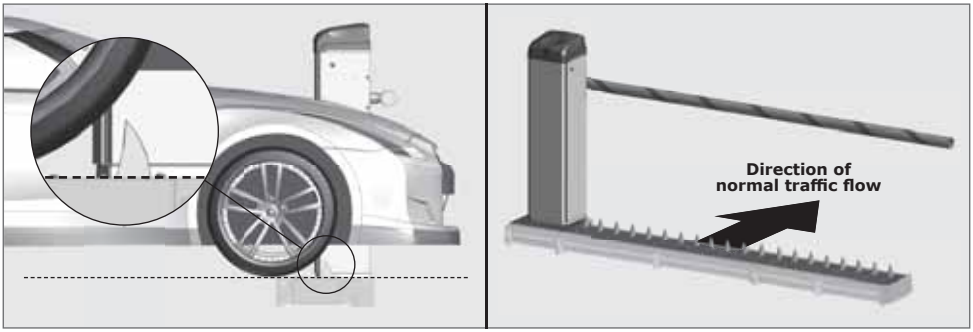


FIGURE 8. LHS SIMILAR DIRECTION OF TRAVEL

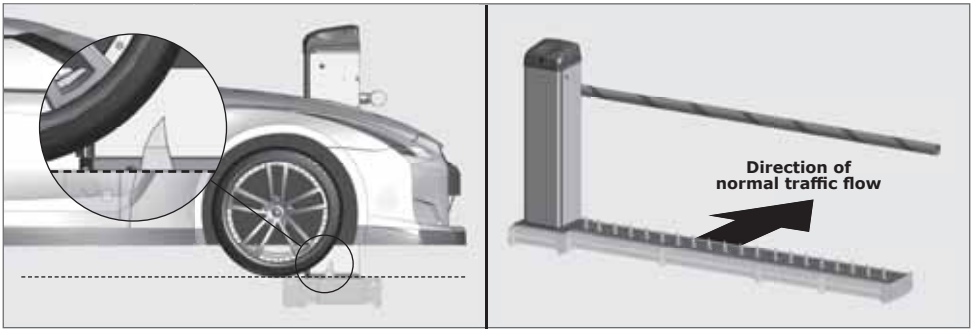
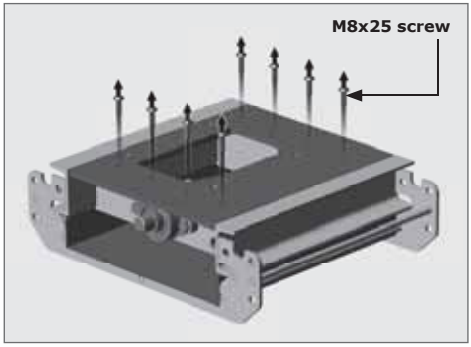


FIGURE 9. LHS OPPOSED DIRECTION OF TRAVEL

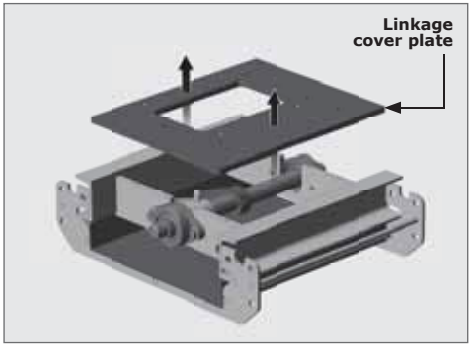
12. RHS Direct Drive Flush Mount - Similar Direction of Travel

12.1. Configuring the Drive Linkage Assembly for Right-hand Similar

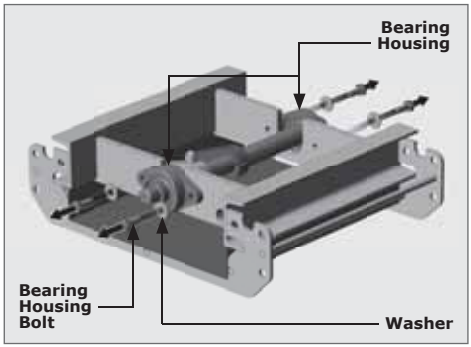
12.1.1. Stripping the drive linkage assembly



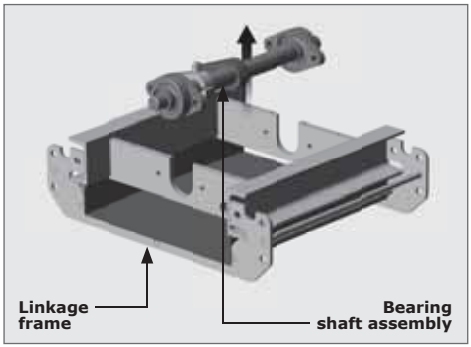
STEP 1 FIGURE 10



STEP 2 FIGURE 11



STEP 3 FIGURE 12



STEP 4 FIGURE 13

The unit is supplied with two drive arms, RHS and LHS (see Section 12, Figure 14).

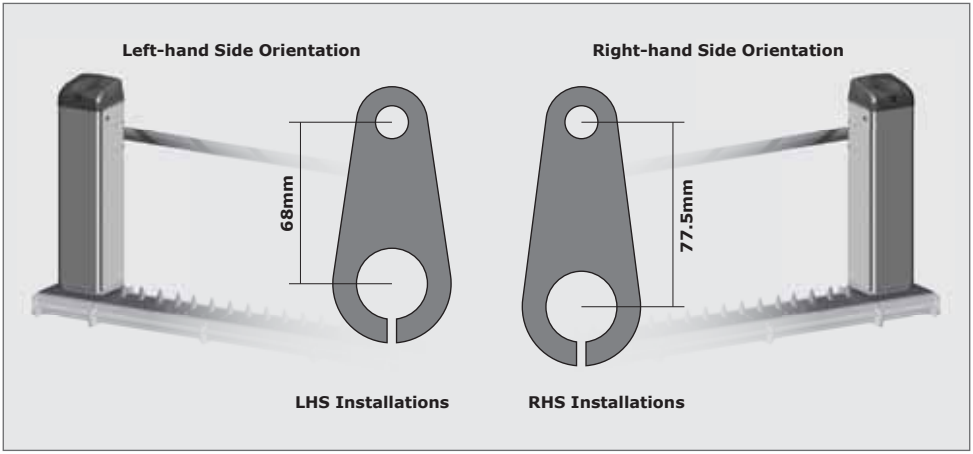
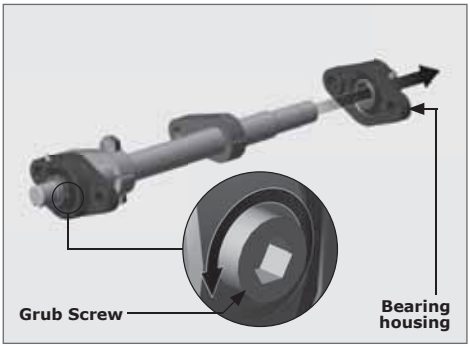
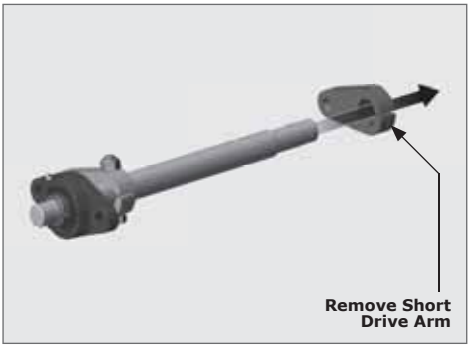


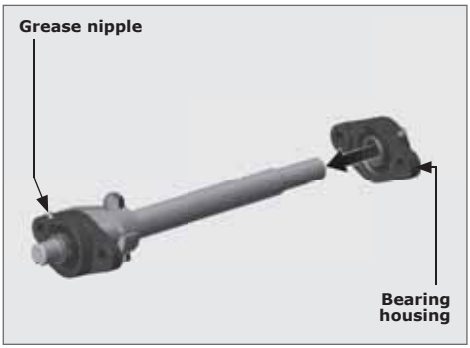
FIGURE 14



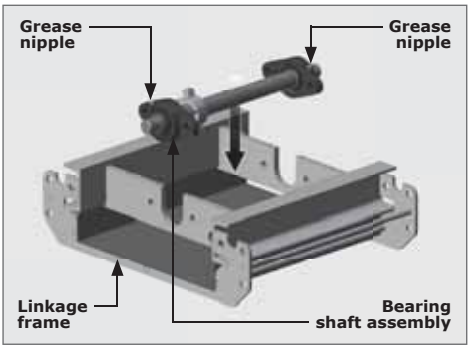
STEP 5 FIGURE 15



STEP 6 FIGURE 16



STEP 7 FIGURE 17



STEP 8 FIGURE 18

The grease nipples on the bearing housings must face up (Section 12, Figures 17 and 18). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 12, Figure 18).

Once assembled with the long drive arm, the format should look as shown in Section 12, Figure 19.

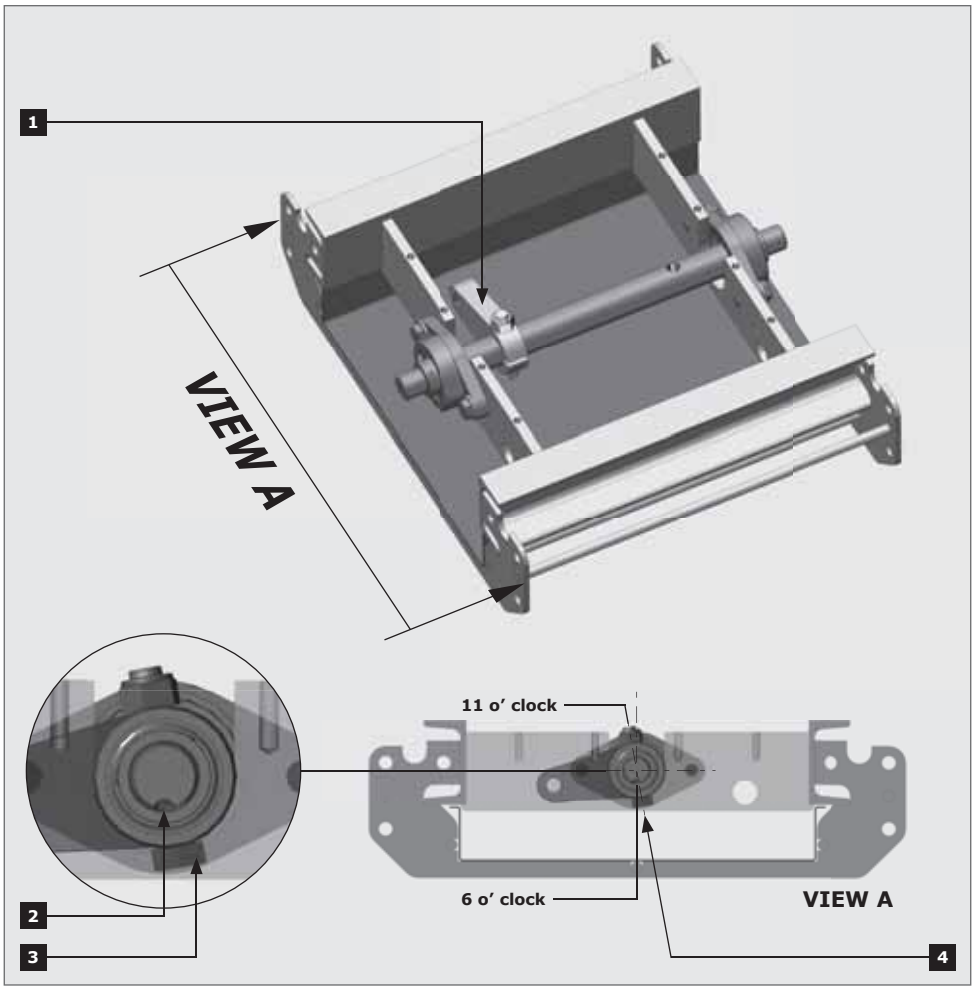


FIGURE 19

1. The drive arm must point as is shown in Section 12, Figure 19
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (11 o'clock)

STEP 9
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 10
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 12, Figure 20).

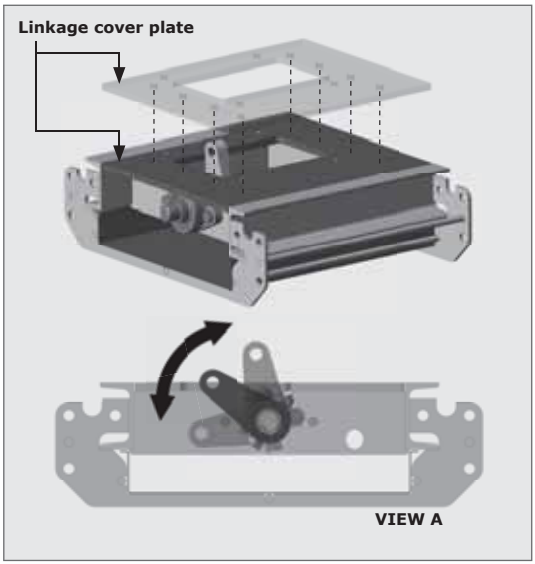
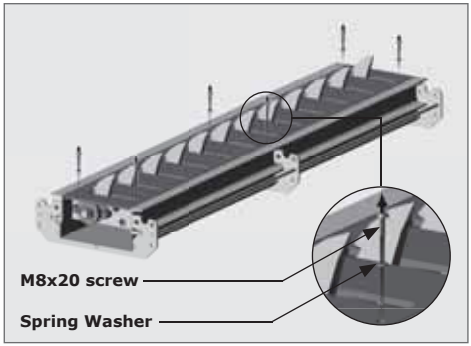


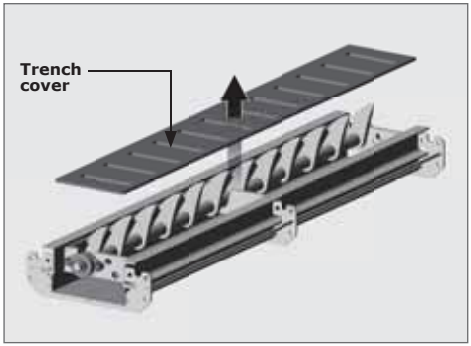
FIGURE 20

12.2. Spike Module Assembly

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

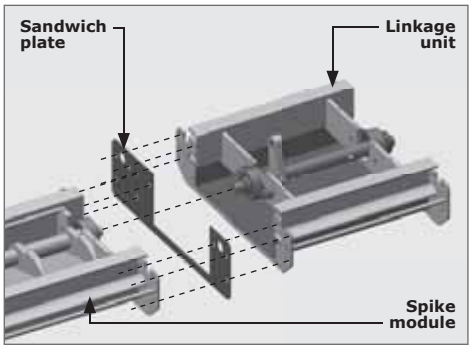


STEP 1 **FIGURE 21**

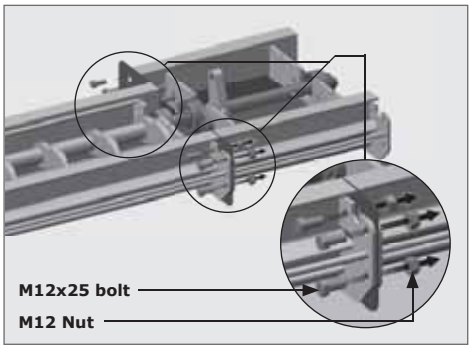


STEP 2 **FIGURE 22**

12.2.2. Attaching the drive linkage unit to the spike module



STEP 1 **FIGURE 23**



STEP 2 **FIGURE 24**

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 12, Figure 23).

STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 12, Figure 25).

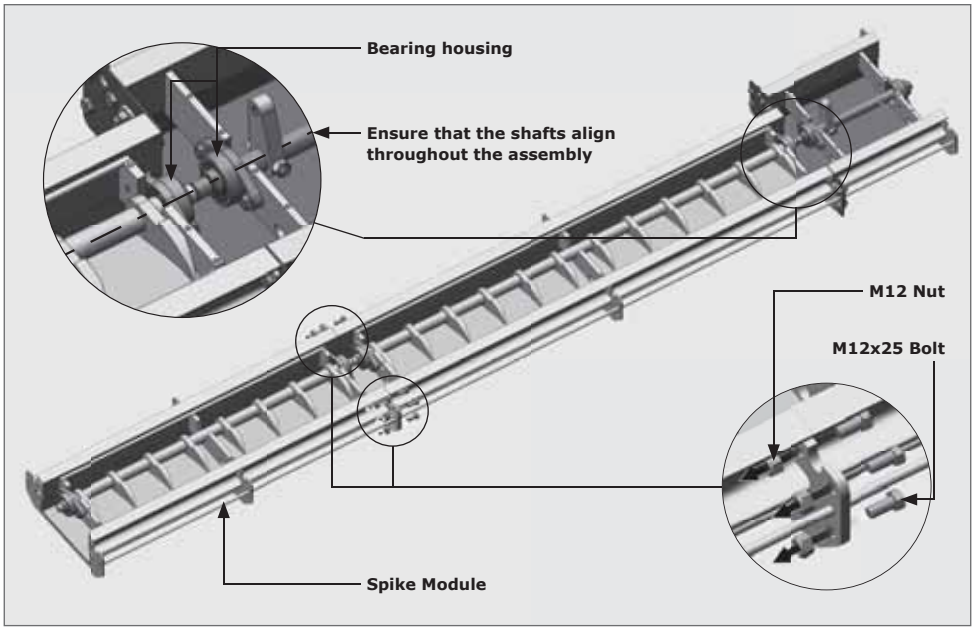


FIGURE 25

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

12.2.3. 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.

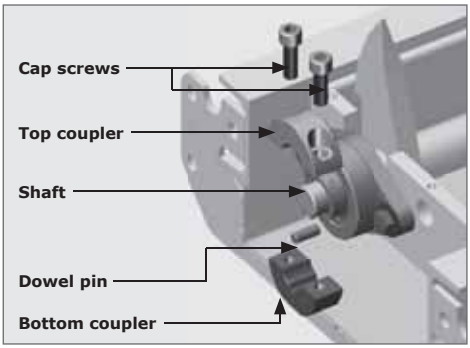


FIGURE 26. SHAFT COUPLER

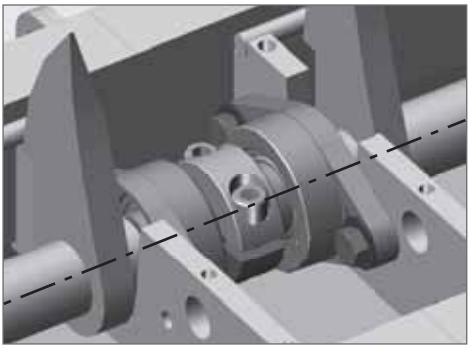
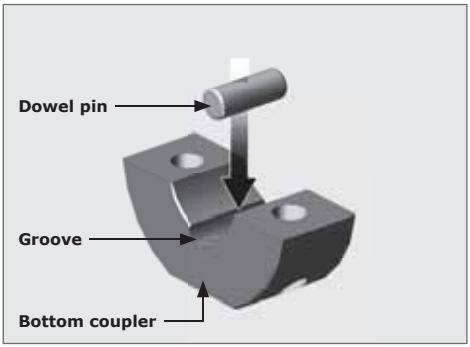
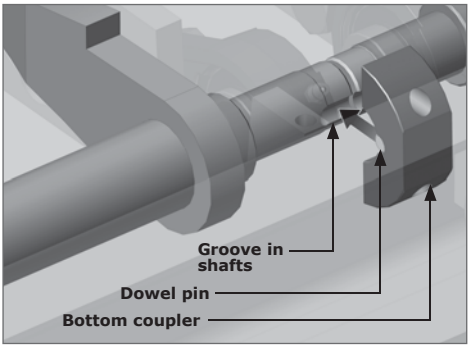


FIGURE 27

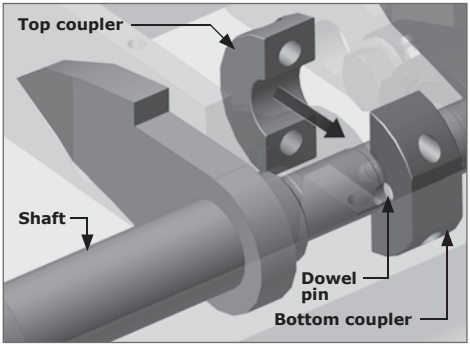
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



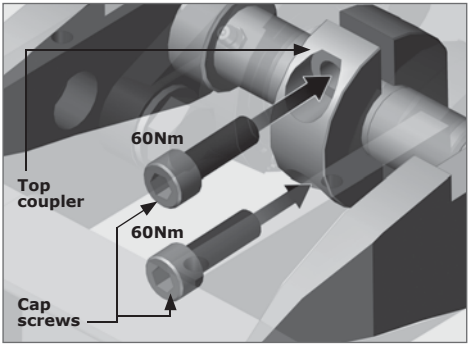
STEP 1 FIGURE 28



STEP 2 FIGURE 29

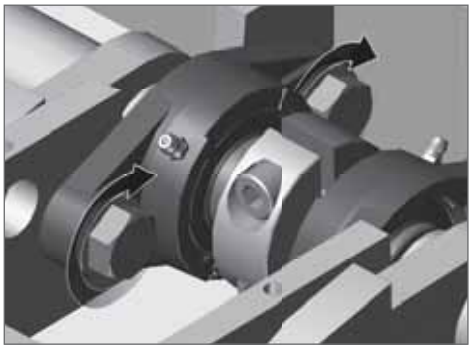


STEP 3 FIGURE 30

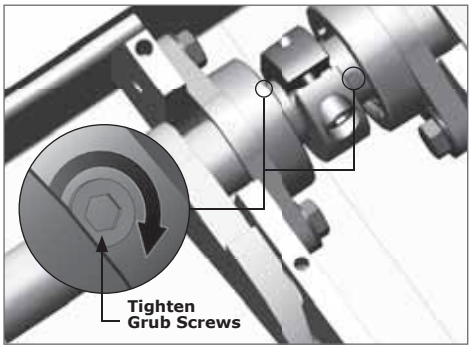


STEP 4 FIGURE 31

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

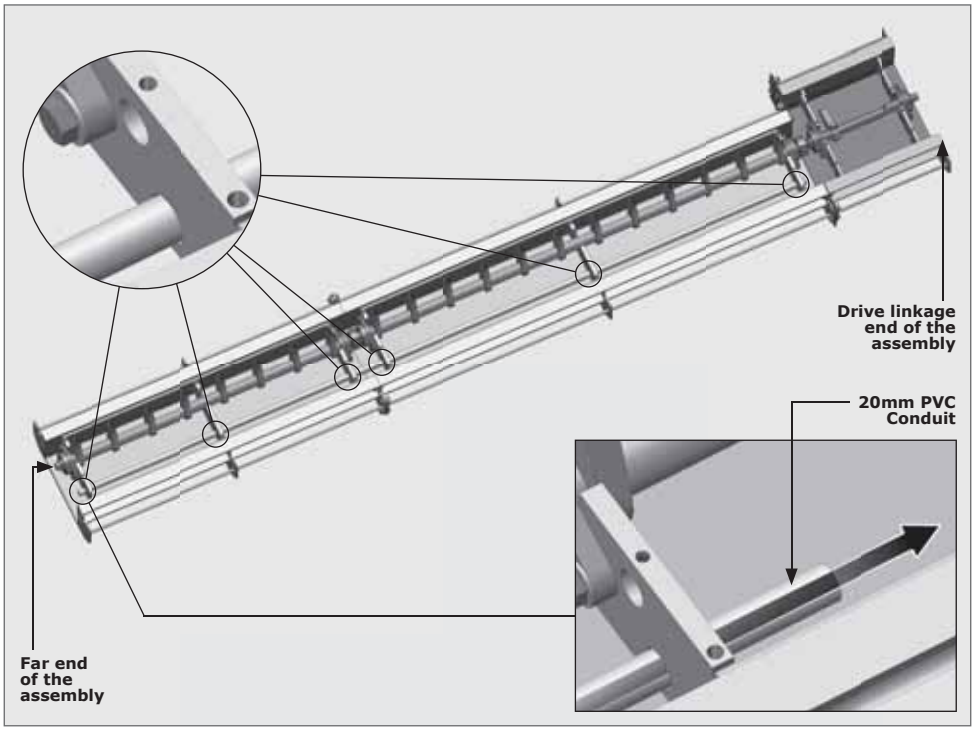


STEP 6 **FIGURE 32**



STEP 7 **FIGURE 33**

12.2.4. Proximity sensor installation



STEP 1 **FIGURE 34**

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 12, Figure 35).

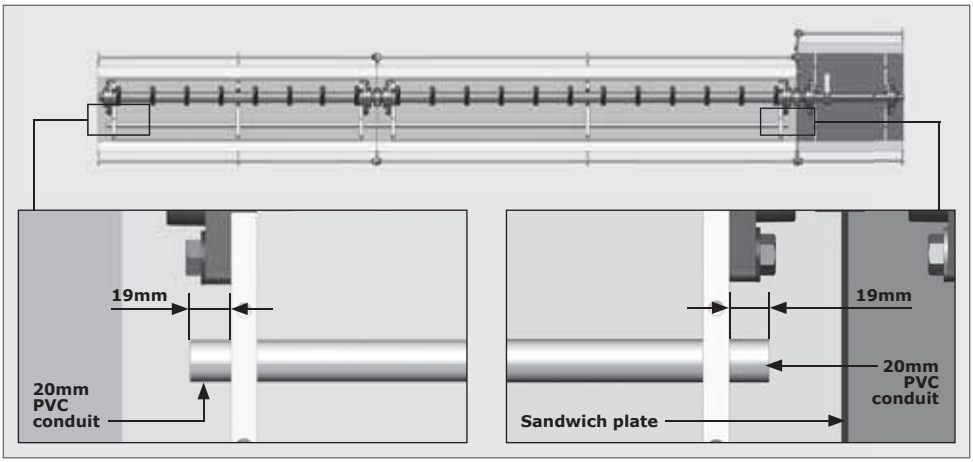
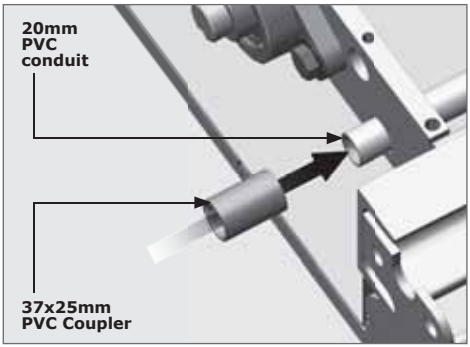
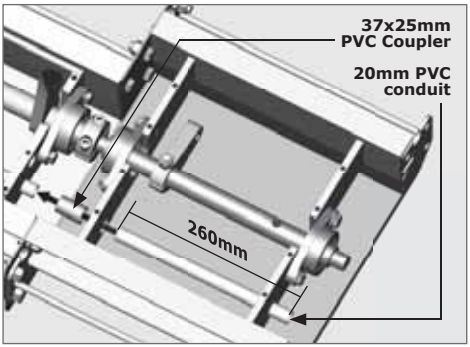


FIGURE 35

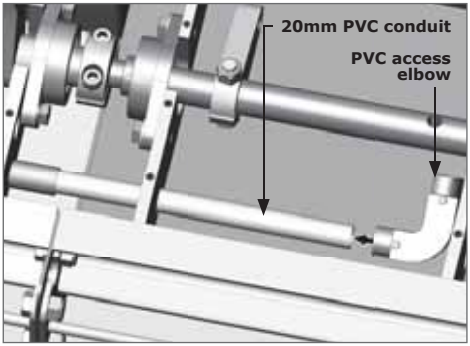
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



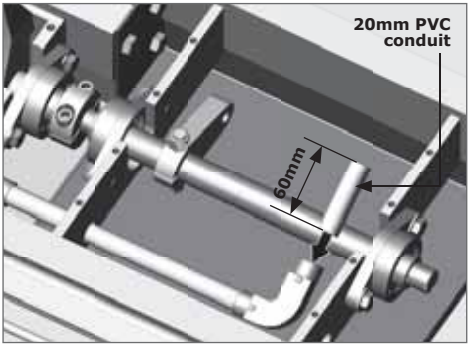
STEP 2 FIGURE 36



STEP 3 FIGURE 37



STEP 4 FIGURE 38



STEP 5 FIGURE 39

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

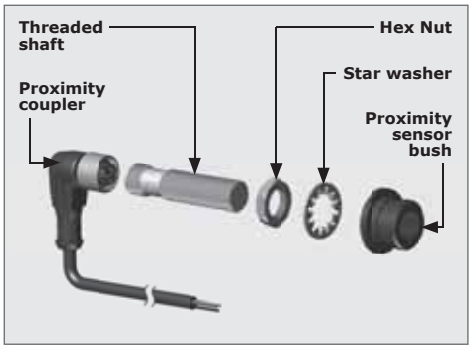


FIGURE 40. PROXIMITY SENSOR

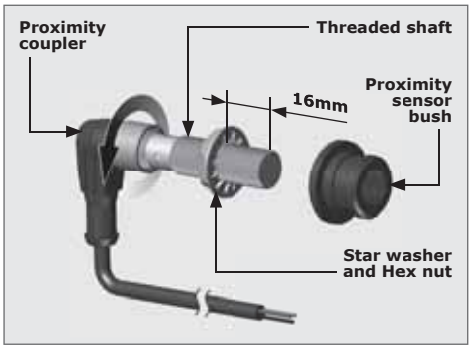


FIGURE 41. PROXIMITY SENSOR

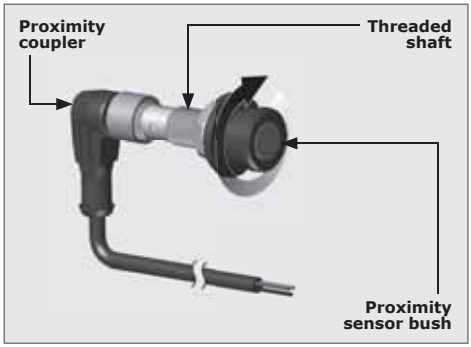
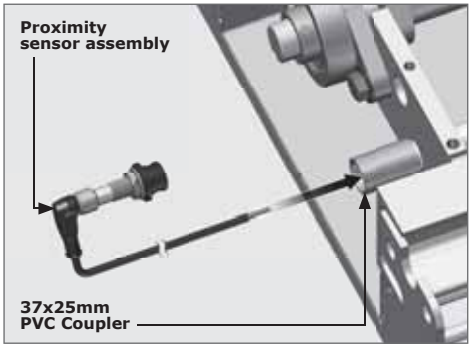


FIGURE 42. PROXIMITY SENSOR



STEP 6

FIGURE 43

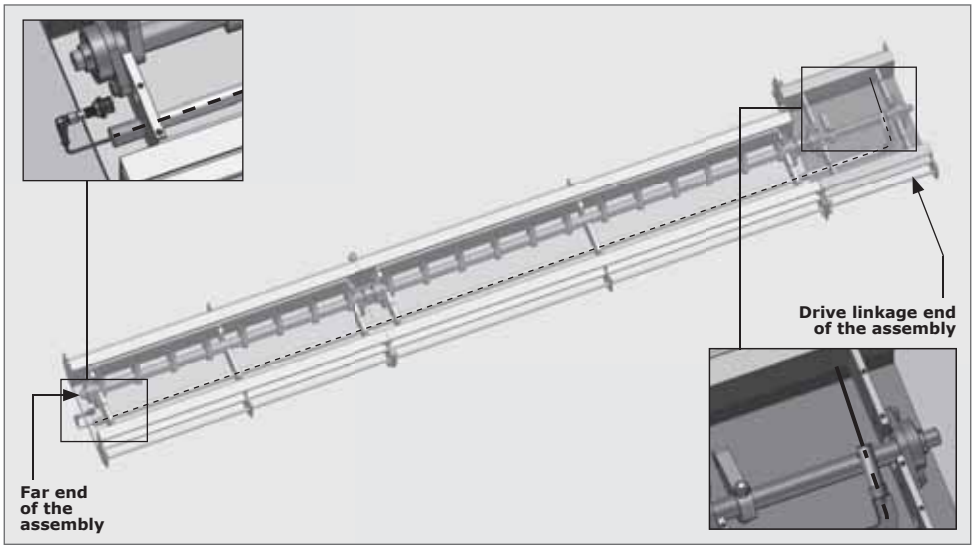
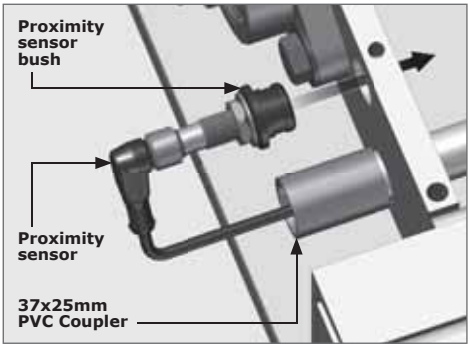
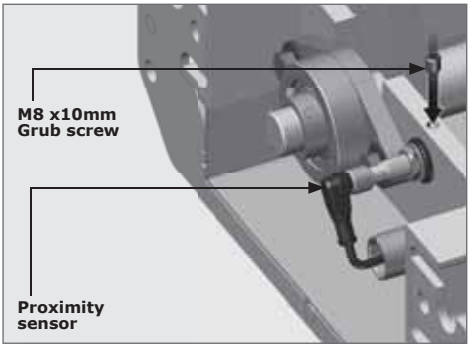


FIGURE 44

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.



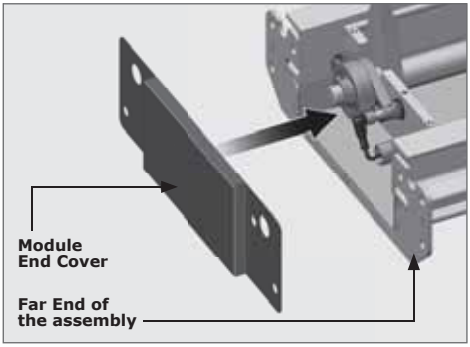
STEP 7 FIGURE 45



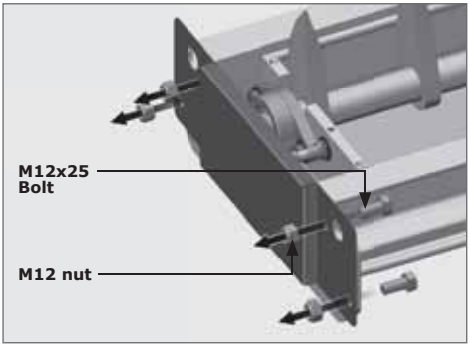
STEP 8 FIGURE 46

12.2.5. Attaching the End Covers to the Assembly

12.2.5.1. Attaching the Module End cover

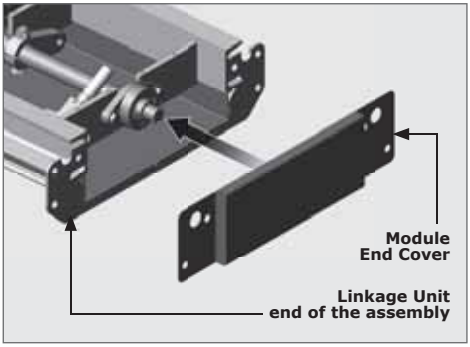


STEP 1 FIGURE 47

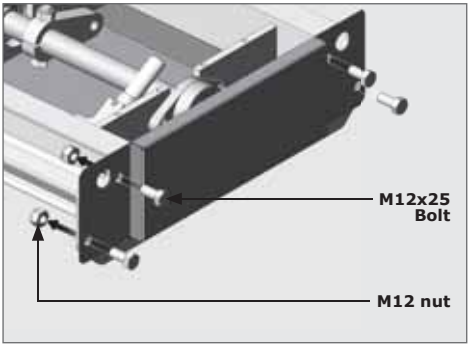


STEP 2 FIGURE 48

12.2.5.2. Attaching the Linkage Unit End cover



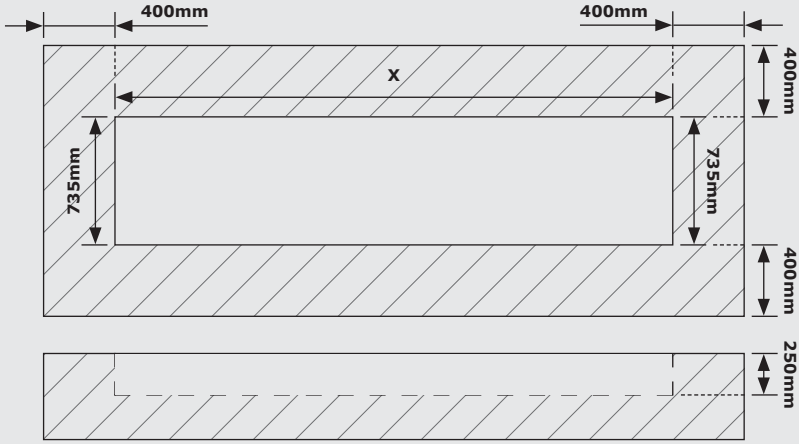
STEP 1 FIGURE 49



STEP 2 FIGURE 50

12.3. Preparing the trench and drainage system

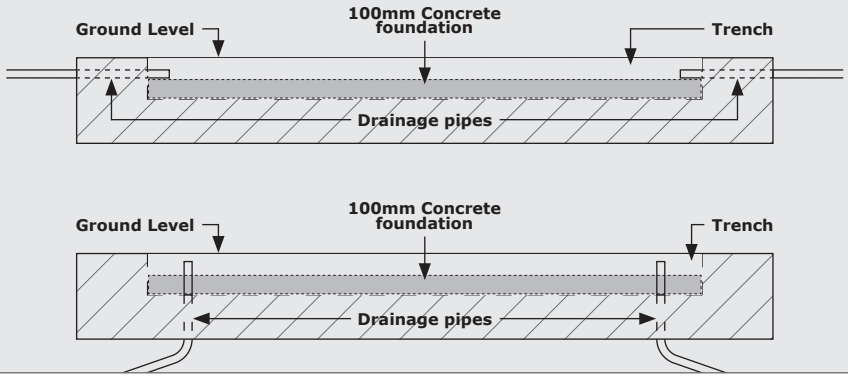
Dig a hole following the dimensions below. Dimension 'X' is relative to the total length of the linkage unit and spike models combined.



STEP 1 **FIGURE 51**

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 12, Figure 52 shows two recommended drainage configurations. Once complete, hold them in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and **CLAWS** are to be seperated, 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 12.5.2.).



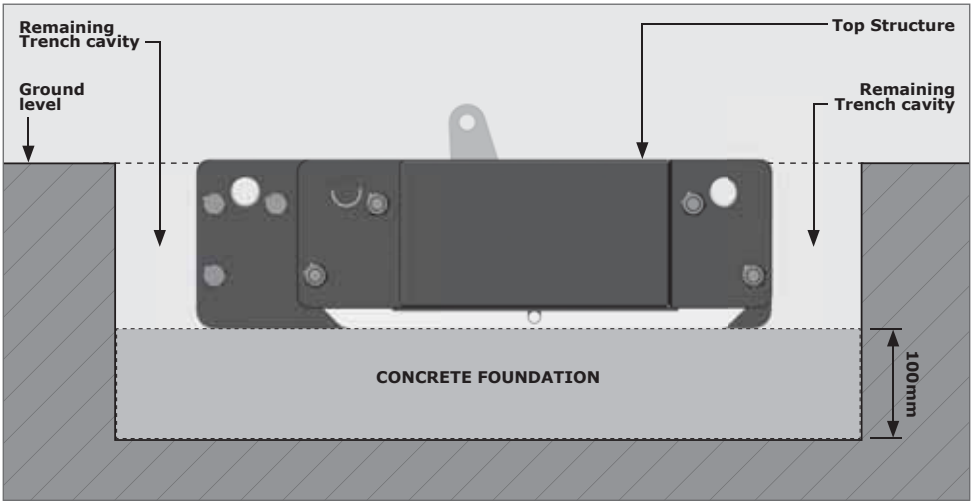
STEP 2 **FIGURE 52**

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

12.3.1. Concreting the assembly into the trench.

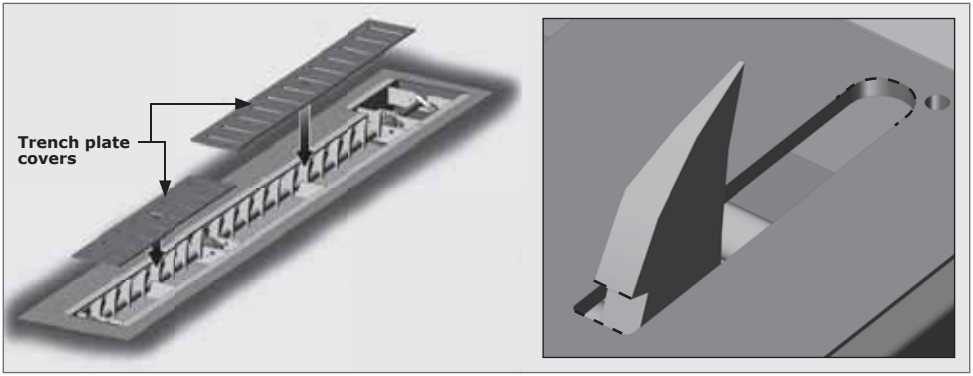
Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

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



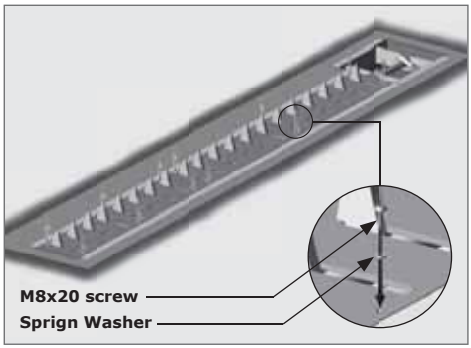
STEP 3 **FIGURE 53**

12.4. Re-assembling the trench plate and linkage covers

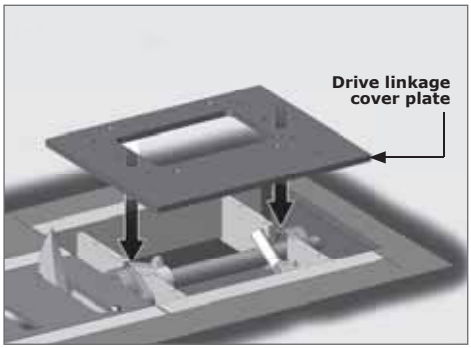


STEP 1 **FIGURE 54**

Take notice 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.

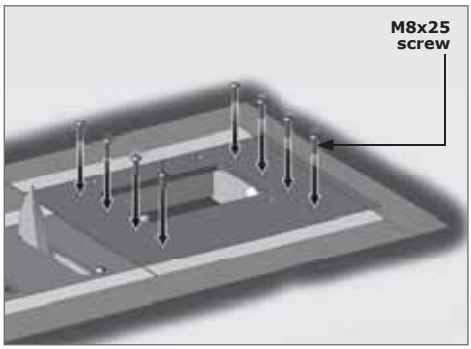


STEP 2 FIGURE 55



STEP 3 FIGURE 56

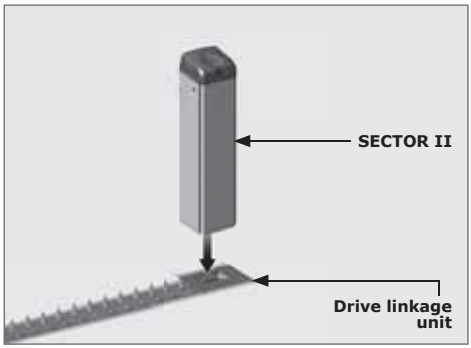
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 12, Figure 20).



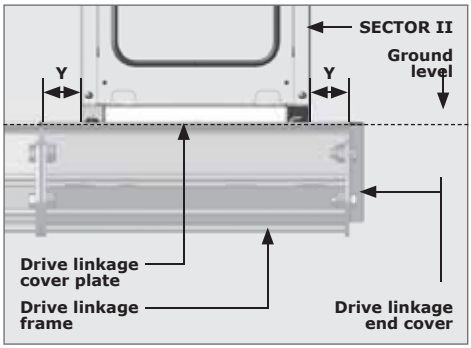
STEP 3 FIGURE 57

12.4. Integrating the SECTOR II with the CLAWS

12.4.1. Placing the SECTOR II into position

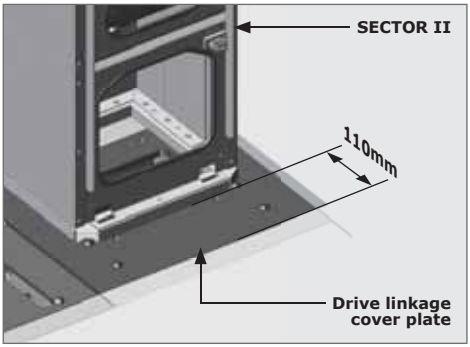


STEP 1 FIGURE 58

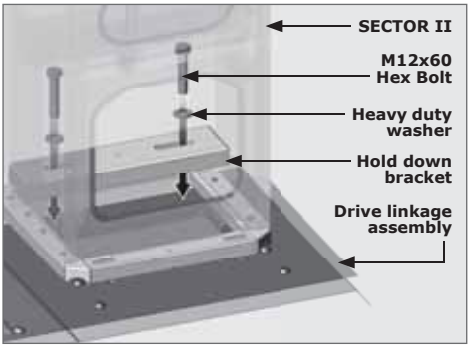


STEP 2 FIGURE 59

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 110mm from the front edge of the Linkage Cover Plate. (Section 12, Figure 60).



STEP 3 FIGURE 60

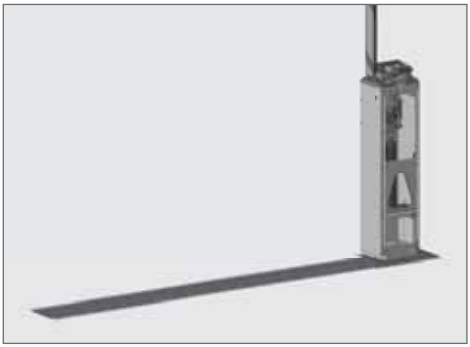


STEP 4 FIGURE 61

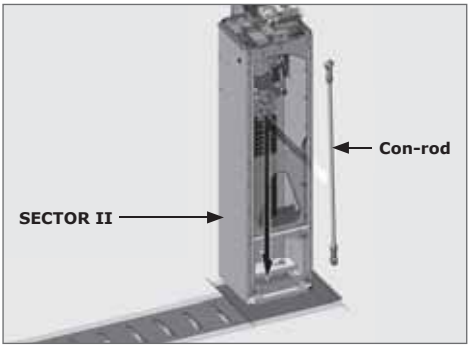
12.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

12.4.3. Inserting the Con-rod



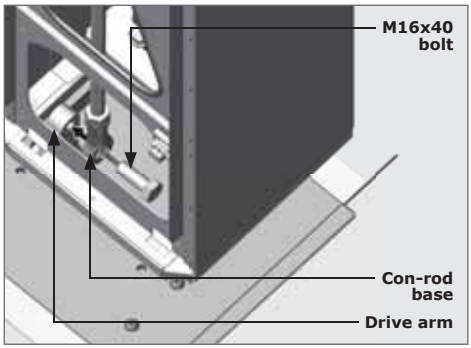
STEP 1 FIGURE 62



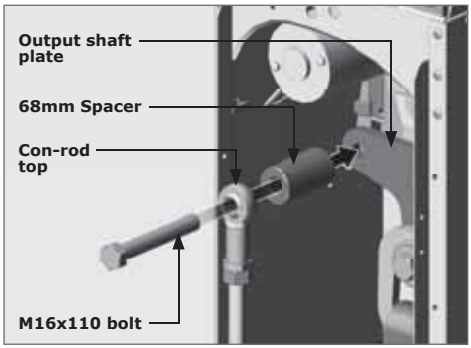
STEP 2 FIGURE 63

Apply Lock-tite 243 to all the internal threads and torque the both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



STEP 3 FIGURE 64

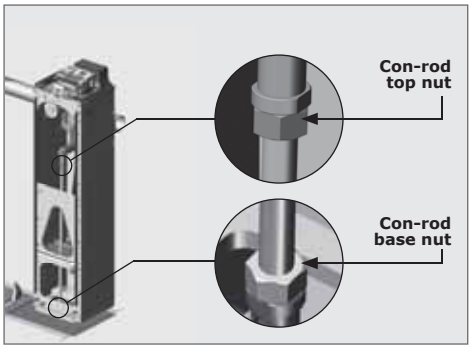


STEP 4 FIGURE 65

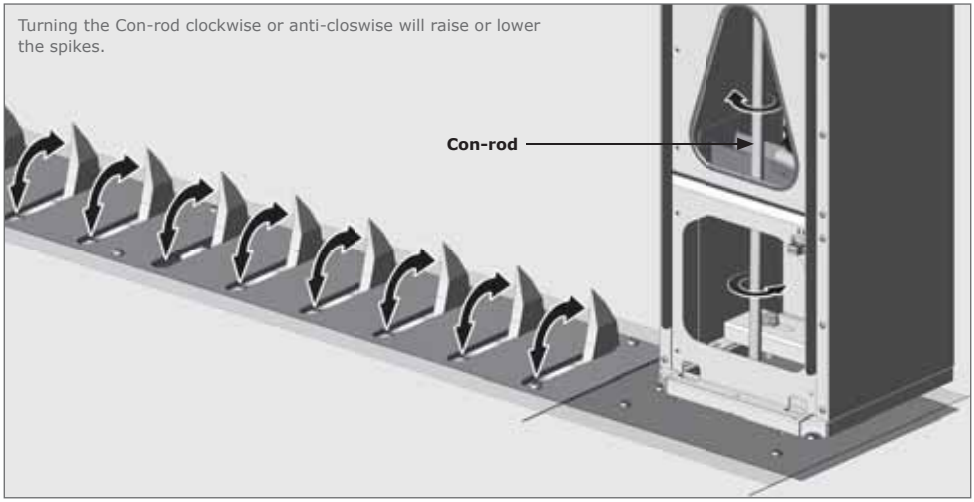
12.4.4. Adjusting the CLAWS spikes

The CLAWS spikes will raise during this procedure!

STEP 1 FIGURE 66



STEP 2 FIGURE 67



STEP 3 FIGURE 68

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 12, Figure 69).

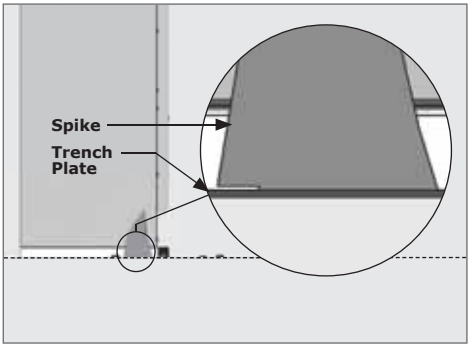
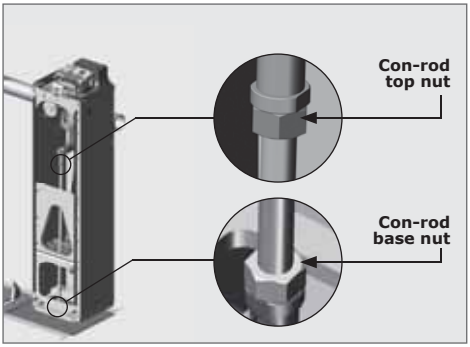


FIGURE 69



STEP 4

FIGURE 70

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 12, Figures 71 and 72).

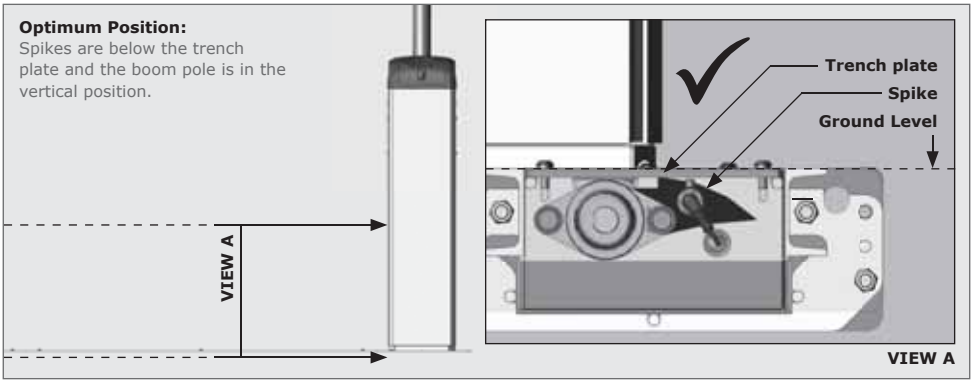


FIGURE 71

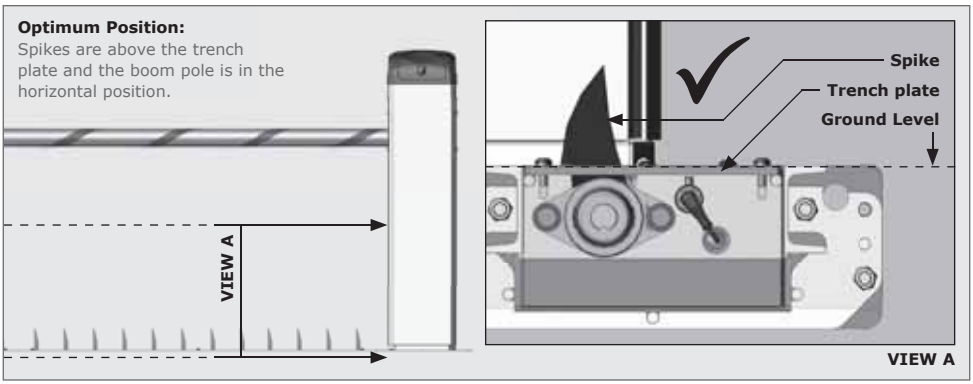
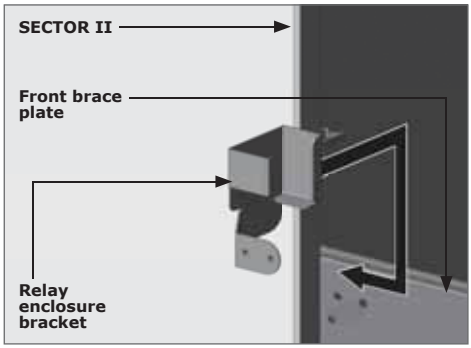


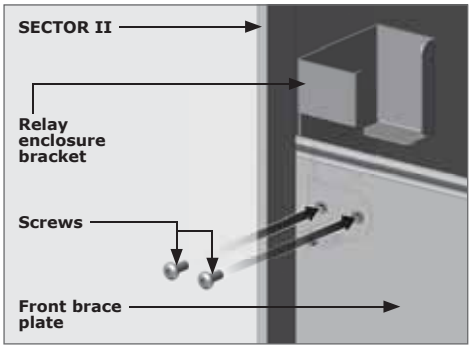
FIGURE 72

12.5. Completing the Assembly

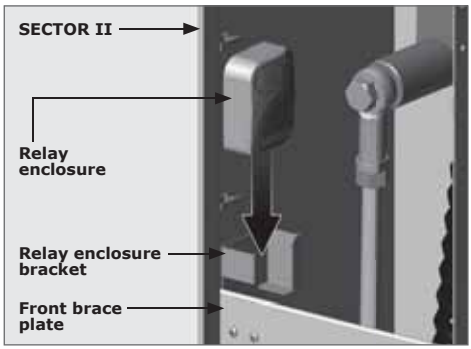
12.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 73



STEP 2 FIGURE 74



STEP 3 FIGURE 75

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

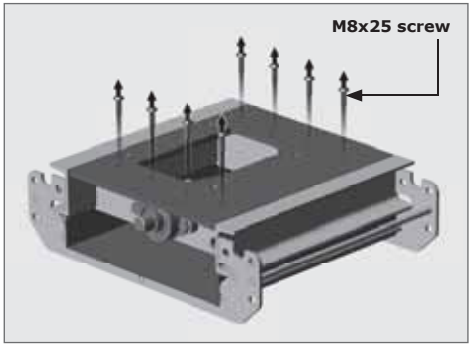
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

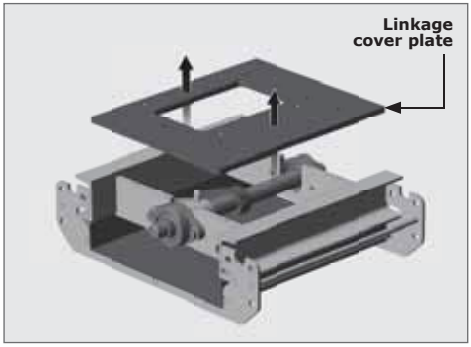
13. RHS Direct Drive Flush Mount - Opposing Direction of Travel

13.1. Configuring the Drive Linkage Assembly for Right-hand Opposing

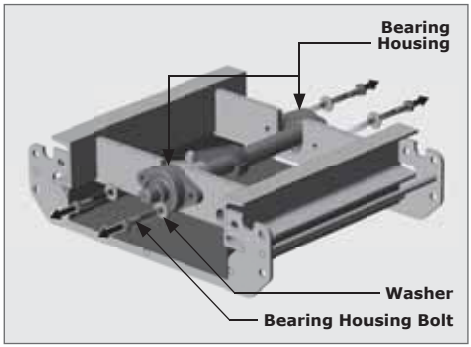
13.1.1. Stripping the drive linkage assembly



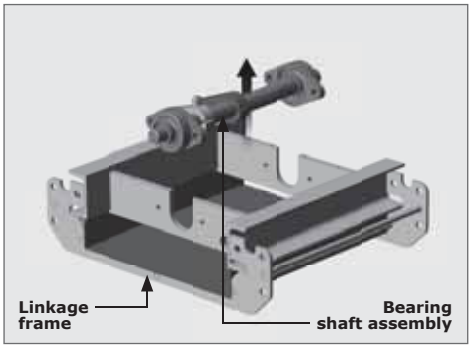
STEP 1 FIGURE 1



STEP 2 FIGURE 2



STEP 3 FIGURE 3



STEP 4 FIGURE 4

The unit is supplied with two drive arms, LHS and RHS (see Section 13, Figure 5).

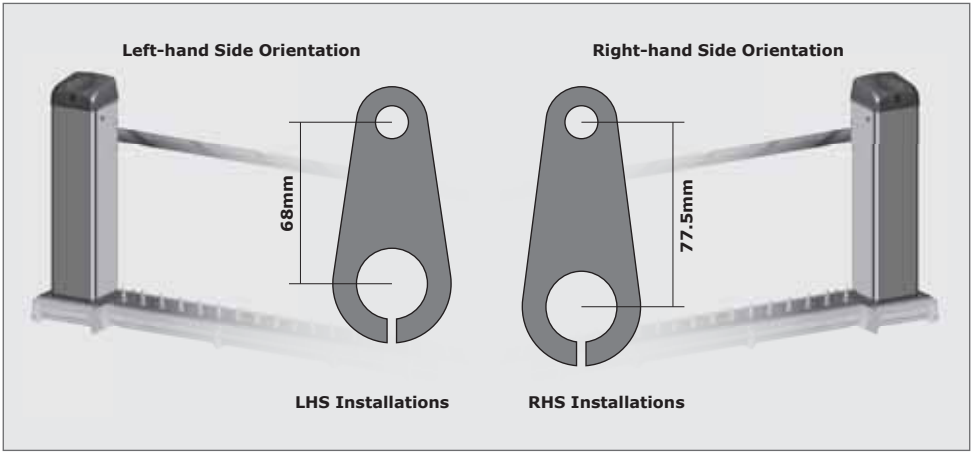
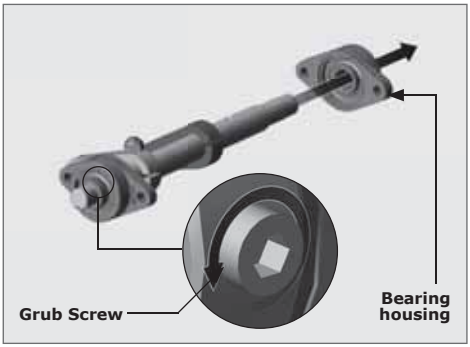
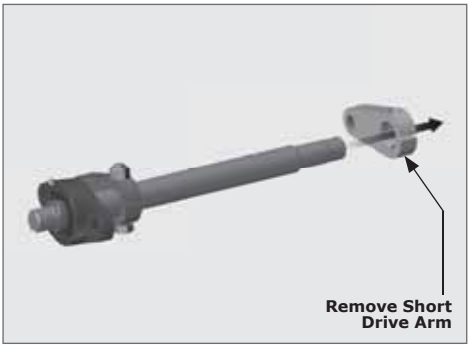


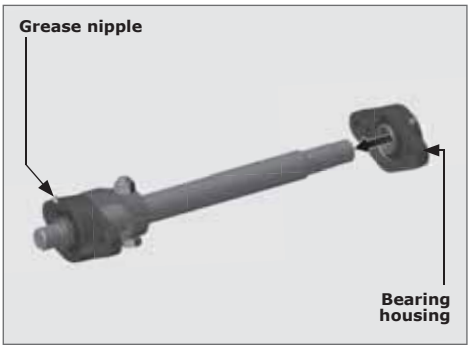
FIGURE 5



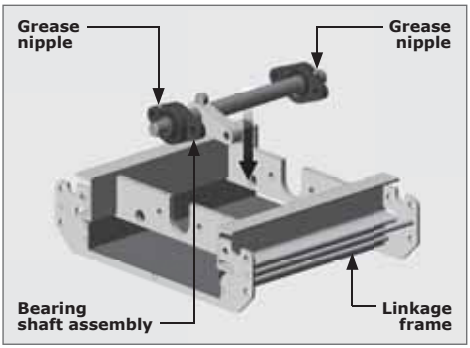
STEP 5 FIGURE 6



STEP 6 FIGURE 7



STEP 7 FIGURE 8



STEP 8 FIGURE 9

The grease nipples on the bearing housings must face up (Section 13, Figures 8 and 9). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 13, Figure 9).

Once assembled with the long drive arm, the format should look as shown in Section 13, Figure 10.

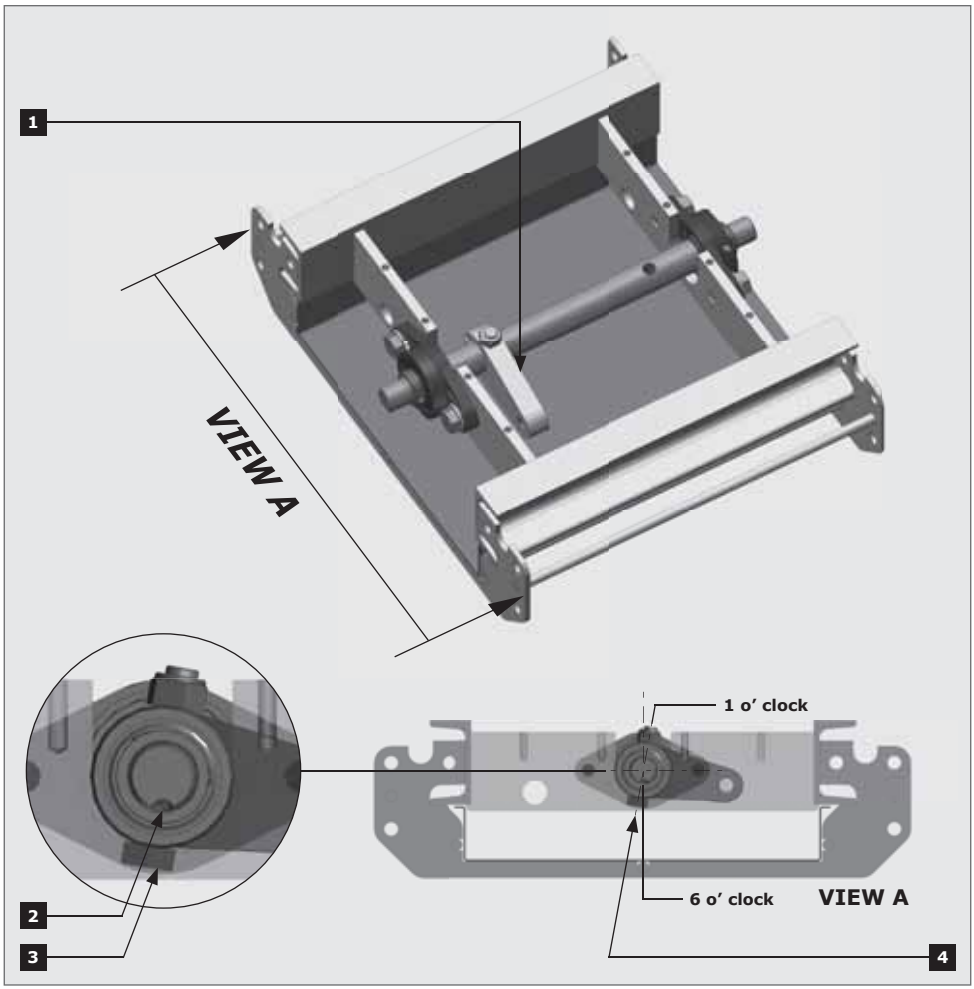


FIGURE 10

1. The drive arm must point as is shown in Section 13, Figure 10
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (1 o'clock)

STEP 9
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 10
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 13, Figure 11).

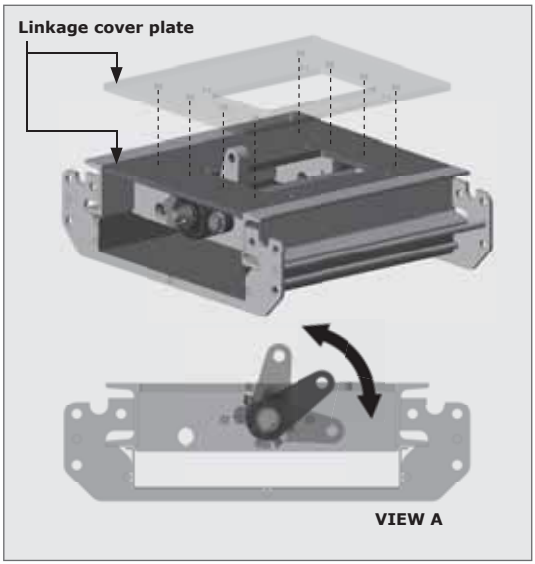
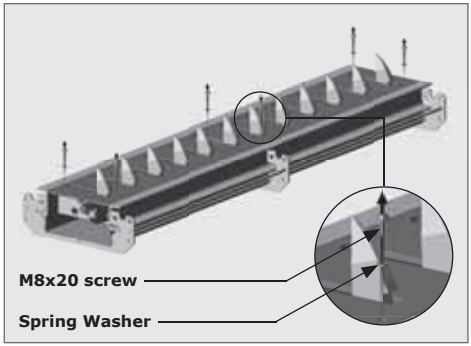


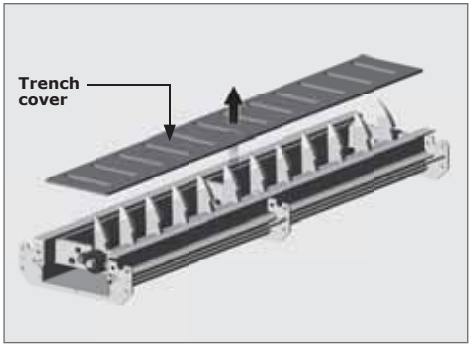
FIGURE 11

13.2. Spike Module Assembly

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

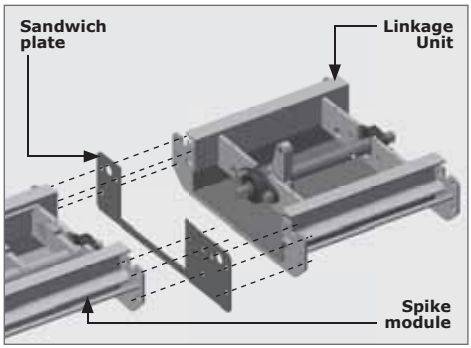


STEP 1 **FIGURE 12**

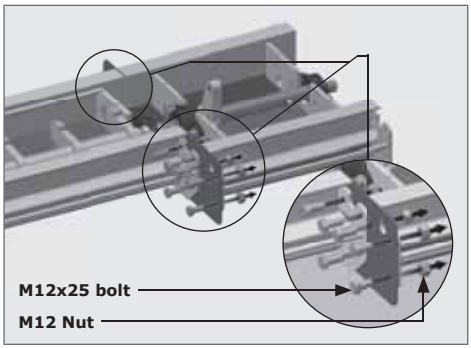


STEP 2 **FIGURE 13**

13.2.2. Attaching the drive linkage unit to the spike module



STEP 1 FIGURE 14



STEP 2 FIGURE 15

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 13, Figure 14).

STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 13, Figure 16).

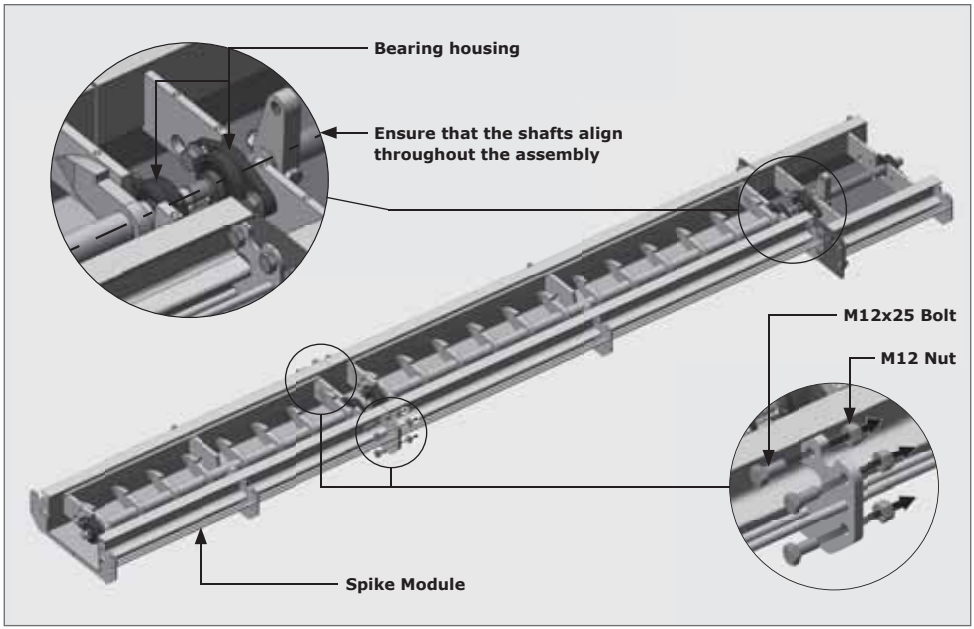


FIGURE 16

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.

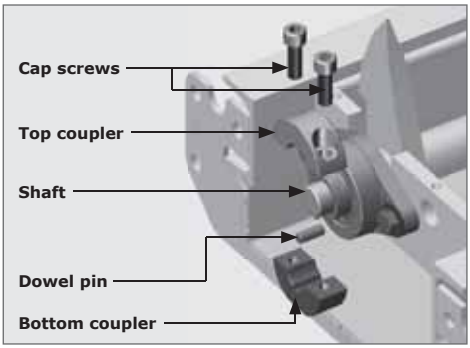


FIGURE 17. SHAFT COUPLER

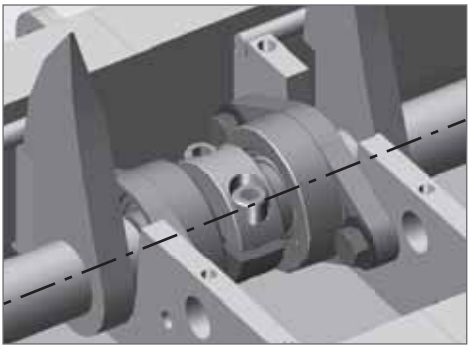
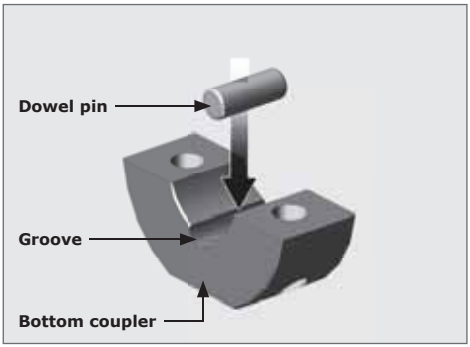
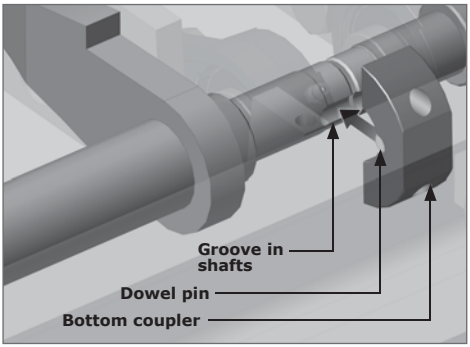


FIGURE 18

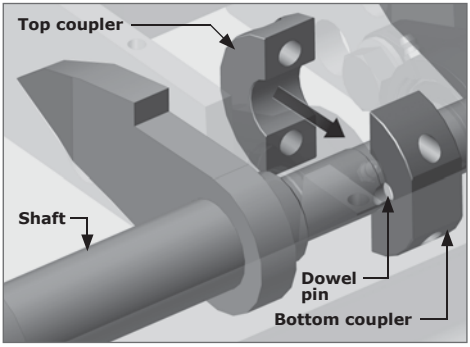
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



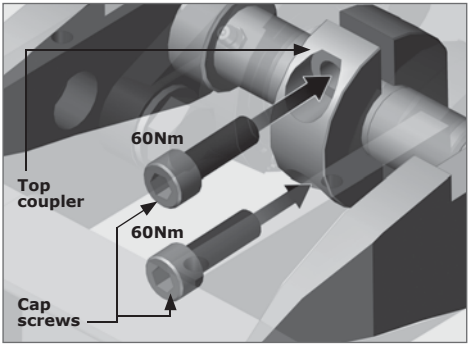
STEP 1 FIGURE 19



STEP 2 FIGURE 20

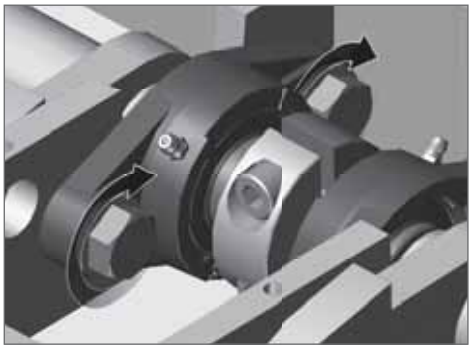


STEP 3 FIGURE 21

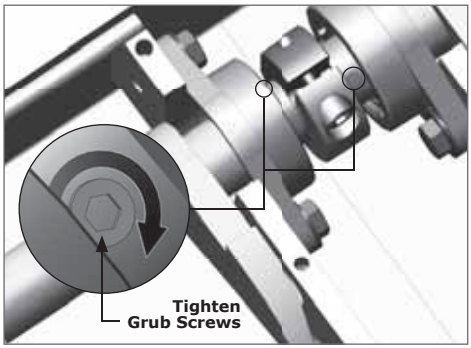


STEP 4 FIGURE 22

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

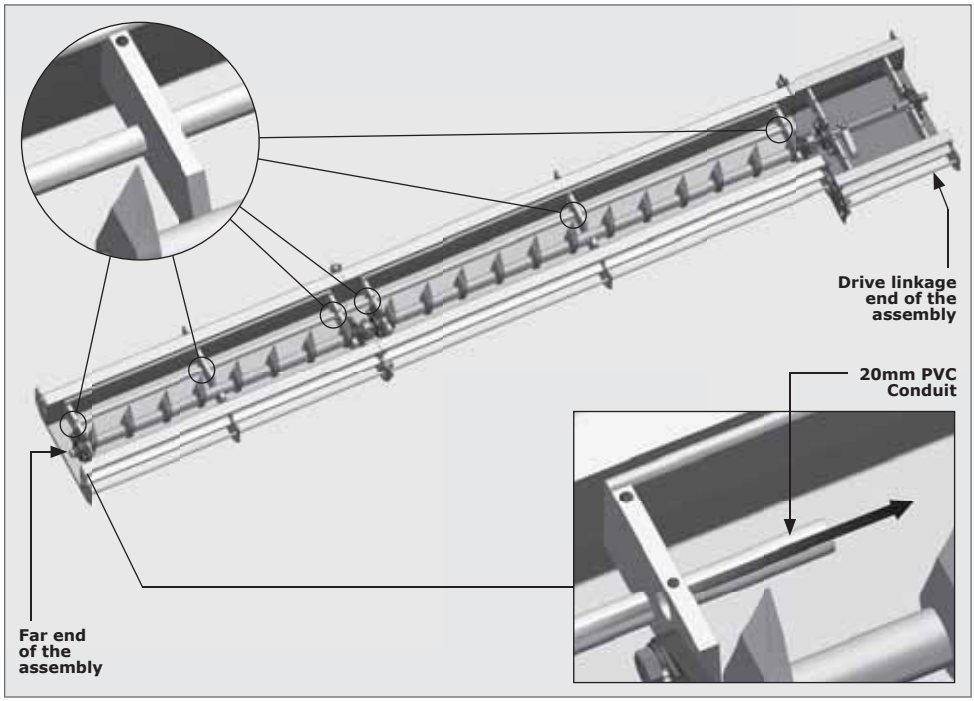


STEP 6 **FIGURE 23**



STEP 7 **FIGURE 24**

13.2.4. Proximity sensor installation



STEP 1 **FIGURE 25**

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 26).

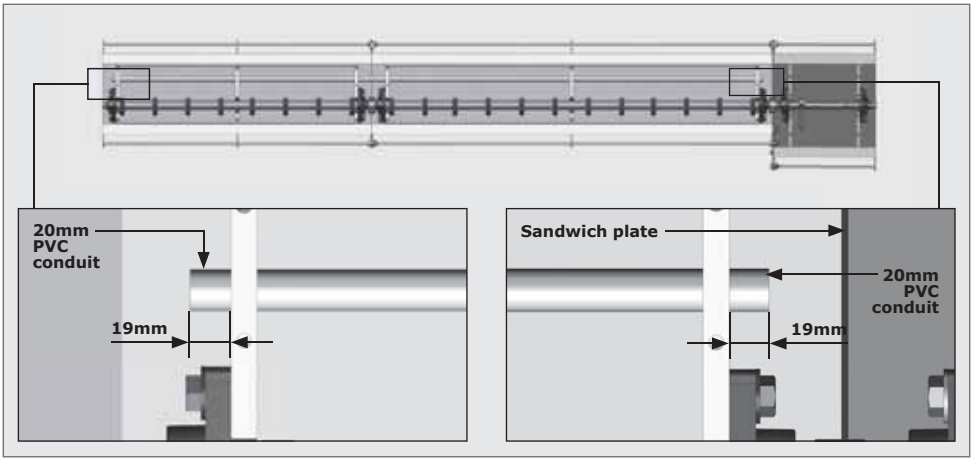
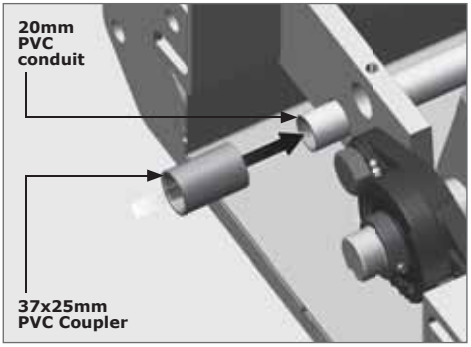
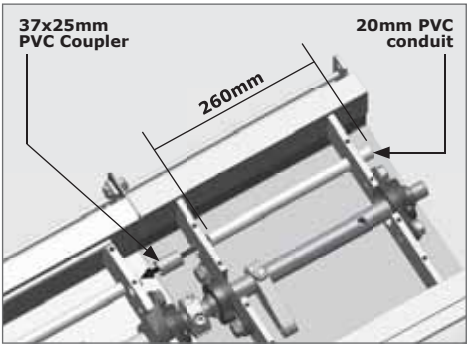


FIGURE 26

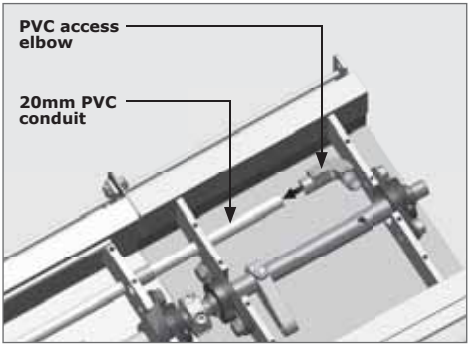
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



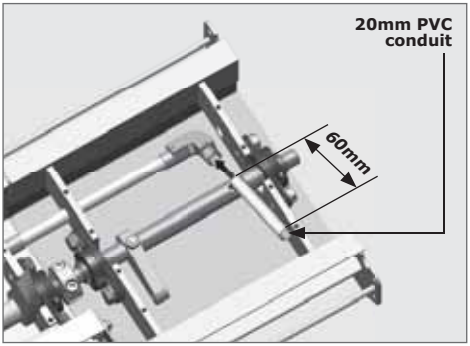
STEP 2 FIGURE 27



STEP 3 FIGURE 28



STEP 4 FIGURE 29



STEP 5 FIGURE 30

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

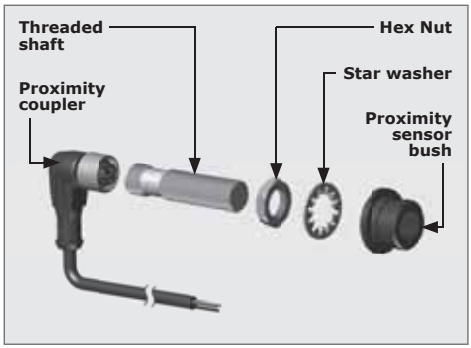


FIGURE 31. PROXIMITY SENSOR

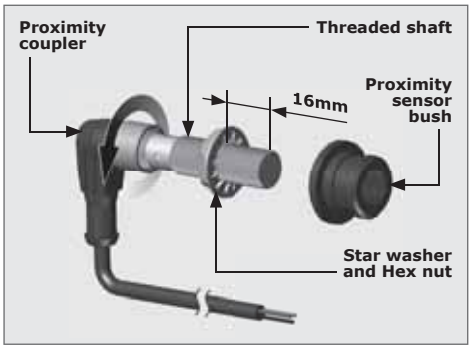


FIGURE 32. PROXIMITY SENSOR

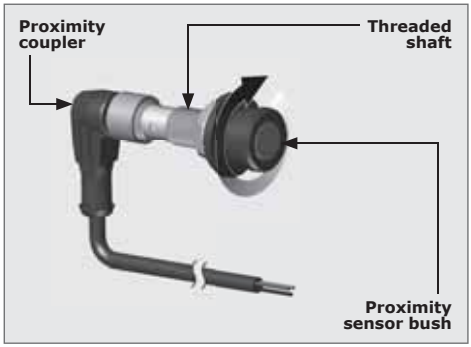
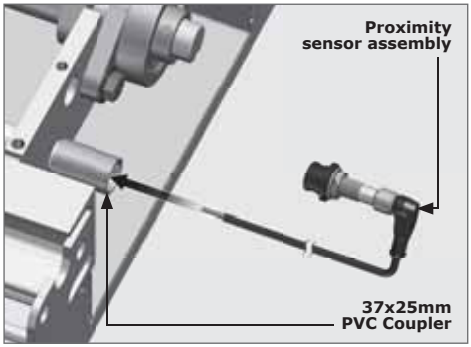


FIGURE 33. PROXIMITY SENSOR



STEP 6

FIGURE 34

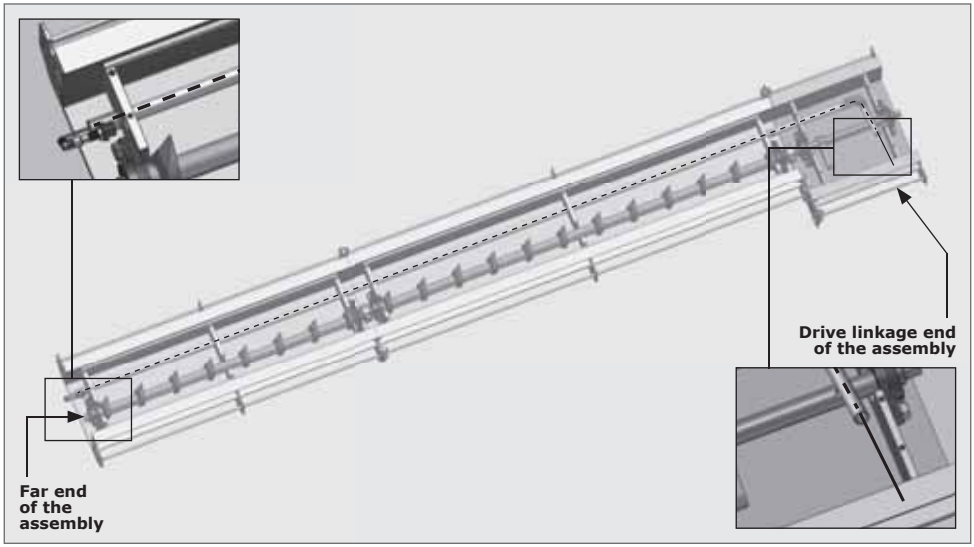
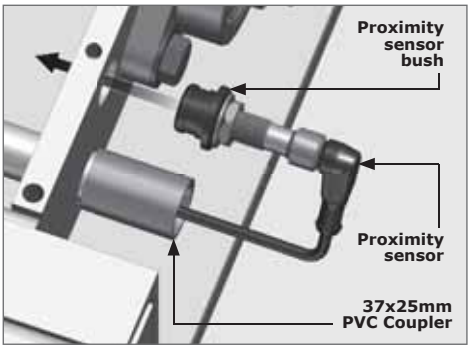
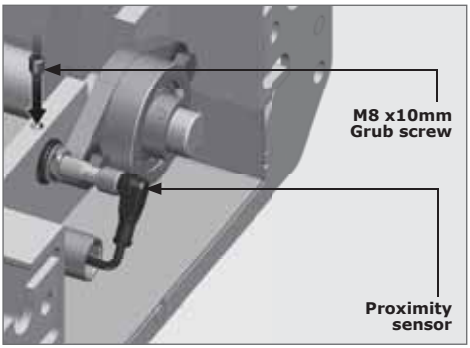


FIGURE 35

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.



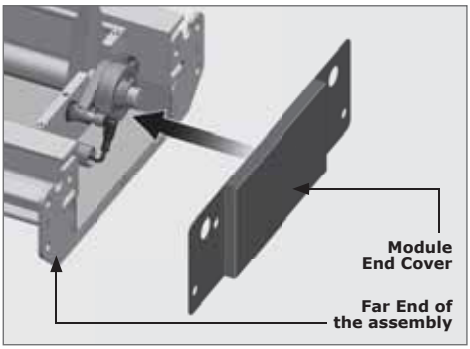
STEP 7 FIGURE 36



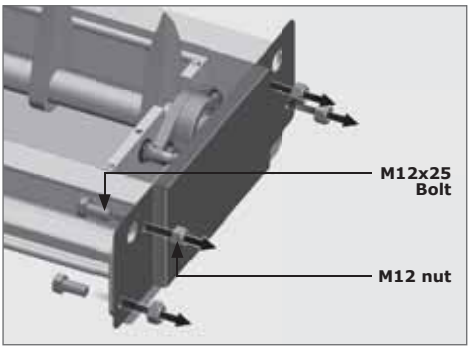
STEP 8 FIGURE 37

13.2.5. Attaching the End Covers to the Assembly

13.2.5.1. Attaching the Module End cover

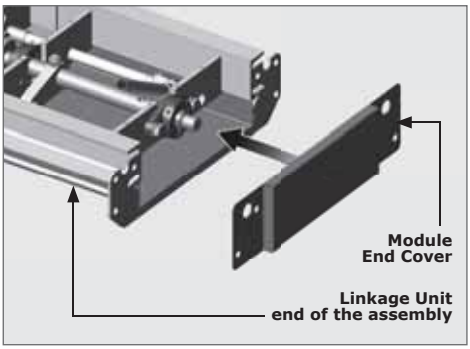


STEP 1 FIGURE 38

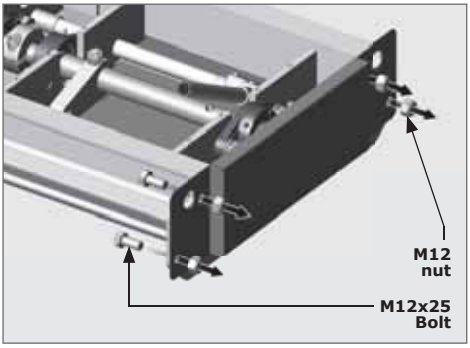


STEP 2 FIGURE 39

13.2.5.2. Attaching the Linkage Unit End cover



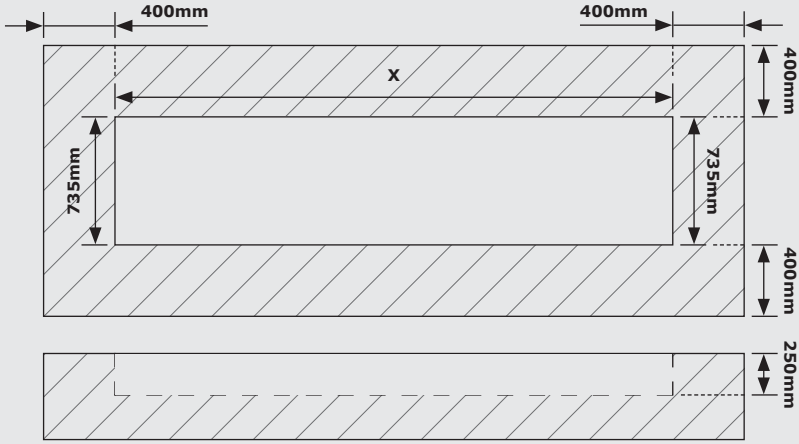
STEP 1 FIGURE 40



STEP 2 FIGURE 41

13.3. Preparing the trench and drainage system

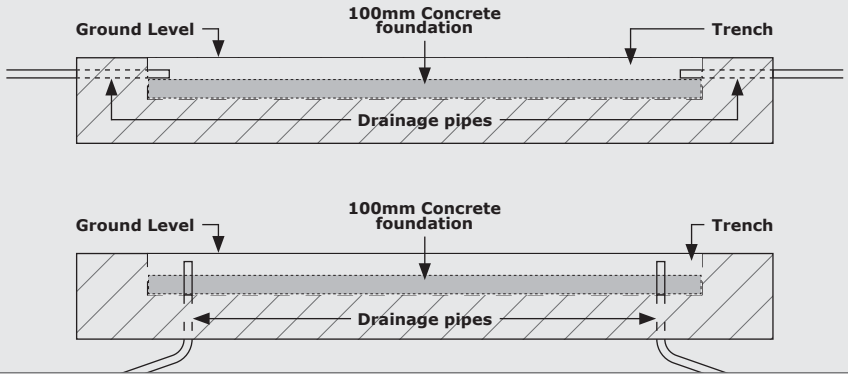
Dig a hole following the dimensions below. Dimension 'X' is relative to the total length of the linkage unit and spike models combined.



STEP 1 **FIGURE 42**

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 43 shows two recommended drainage configurations. Once complete, hold them in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and **CLAWS** are to be seperated, 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.).



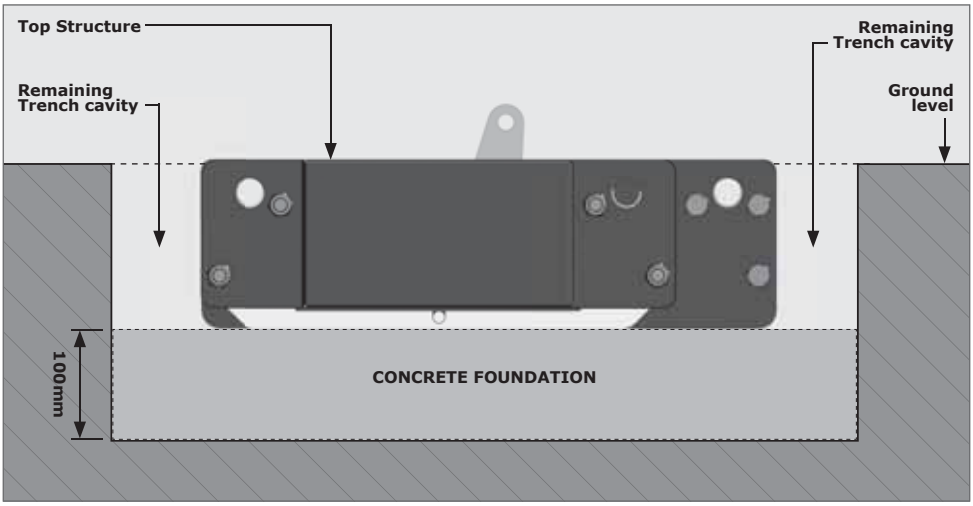
STEP 2 **FIGURE 43**

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

13.3.1. Concreting the assembly into the trench.

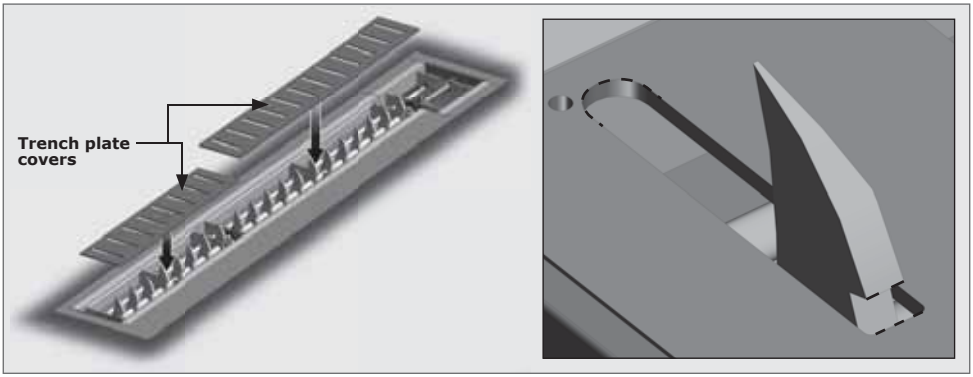
Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

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



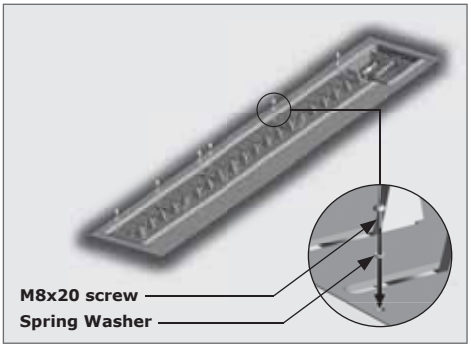
STEP 3 **FIGURE 44**

13.4. Re-assembling the trench plate and linkage covers

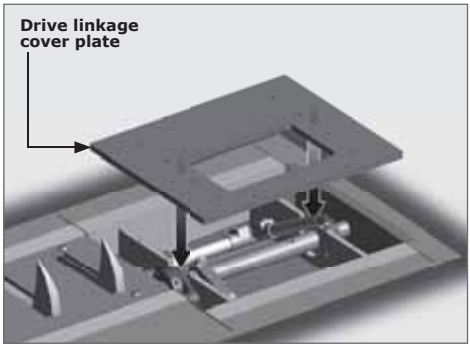


STEP 1 **FIGURE 45**

Take notice 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.

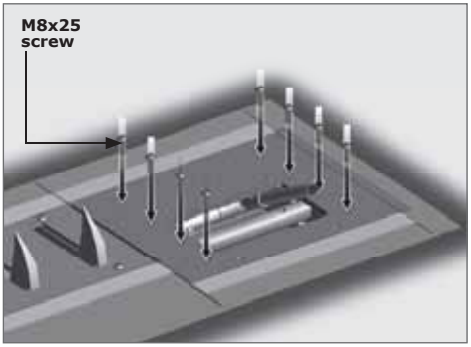


STEP 2 FIGURE 46



STEP 3 FIGURE 47

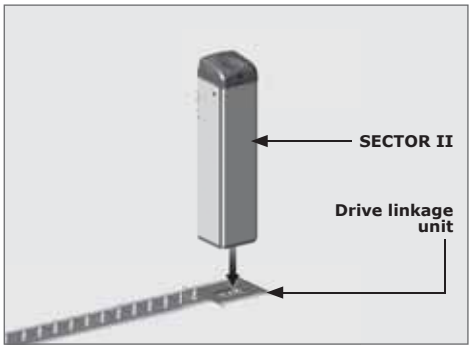
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 13, Figure 11).



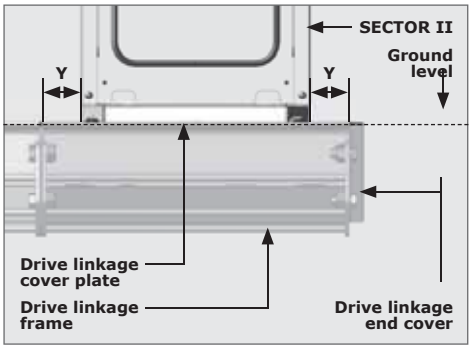
STEP 3 FIGURE 48

13.4. Integrating the SECTOR II with the CLAWS

13.4.1. Placing the SECTOR II into position

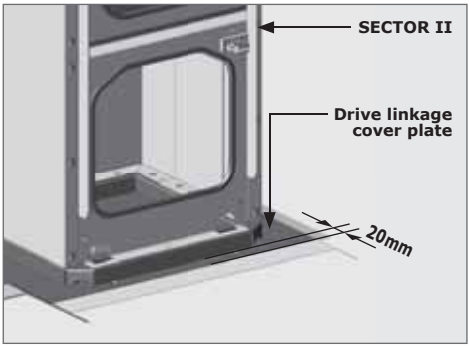


STEP 1 FIGURE 49

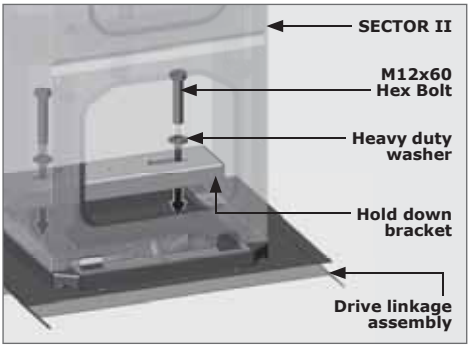


STEP 2 FIGURE 50

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 20mm from the front edge of the Linkage Cover Plate. (Section 13, Figure 51).



STEP 3 FIGURE 51

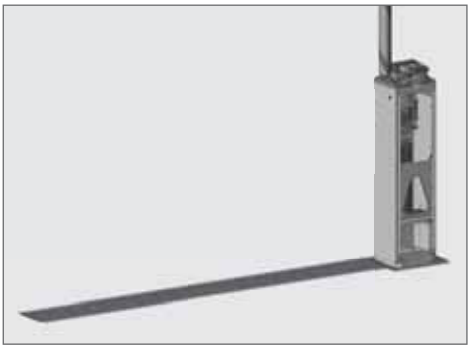


STEP 4 FIGURE 52

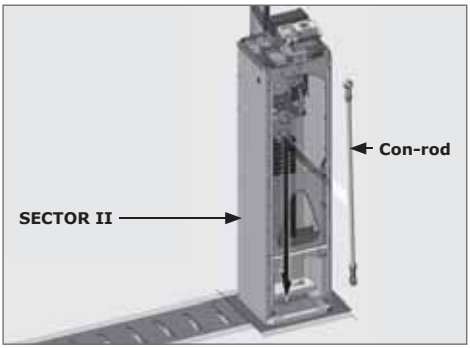
13.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

13.4.3. Inserting the Con-rod



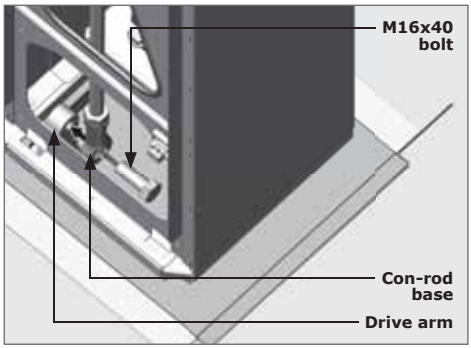
STEP 1 FIGURE 53



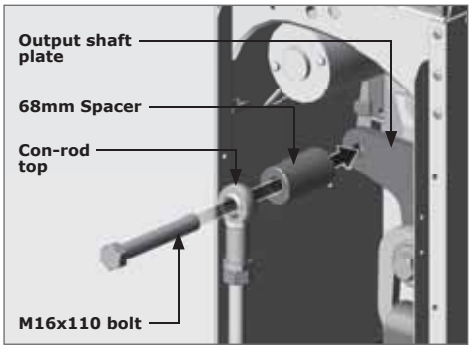
STEP 2 FIGURE 54

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



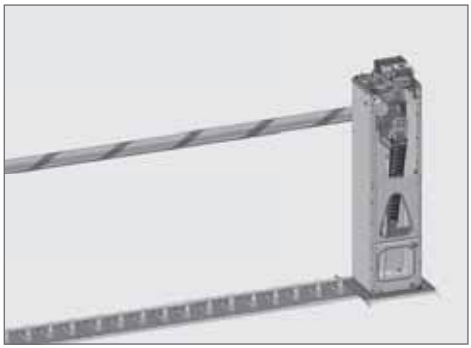
STEP 3 FIGURE 55



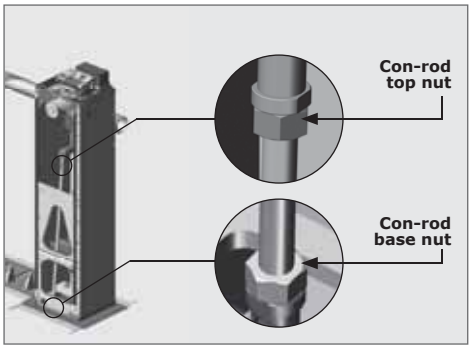
STEP 4 FIGURE 56

13.4.4. Adjusting the CLAWS spikes

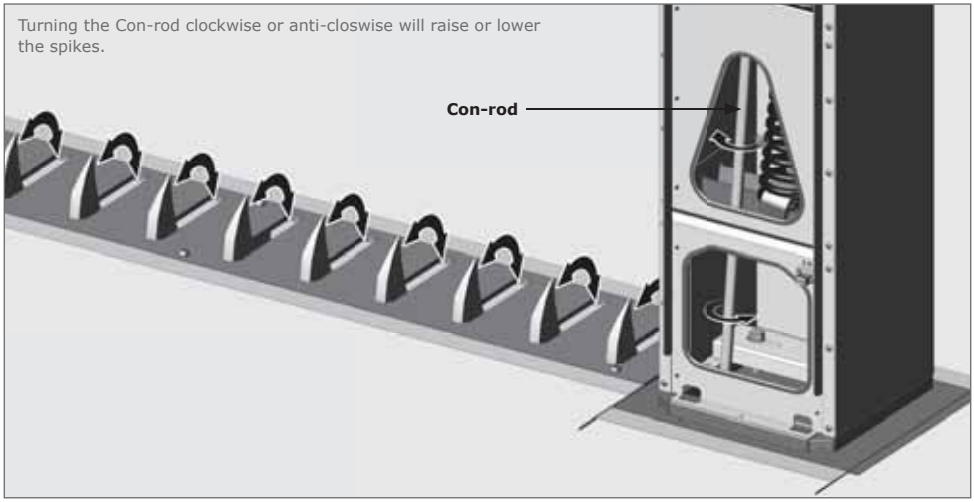
The CLAWS spikes will raise during this procedure!



STEP 1 FIGURE 57



STEP 2 FIGURE 58



STEP 3 FIGURE 59

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 13, Figure 60).

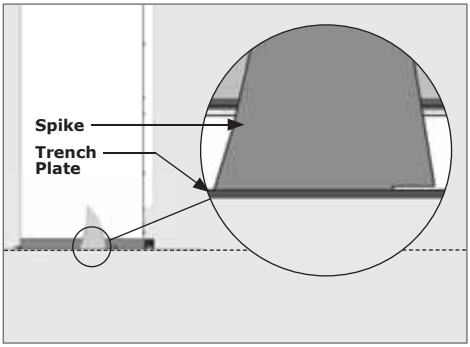
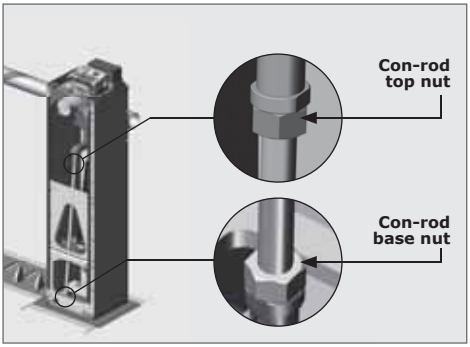


FIGURE 60



STEP 4

FIGURE 61

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 13, Figures 62 and 63).

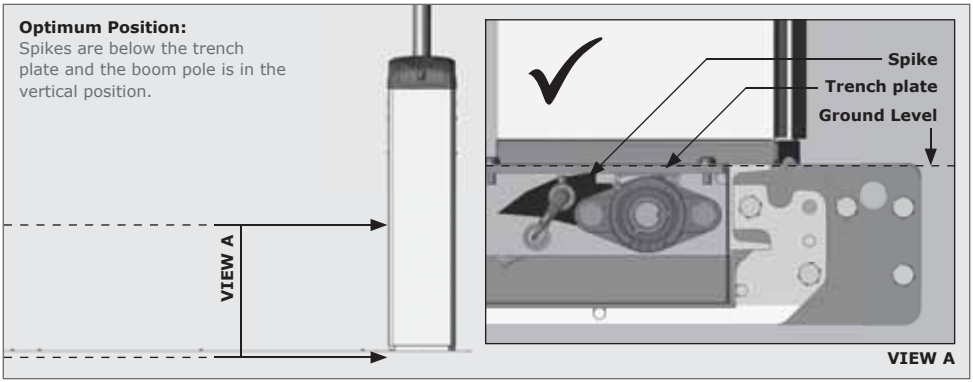


FIGURE 62

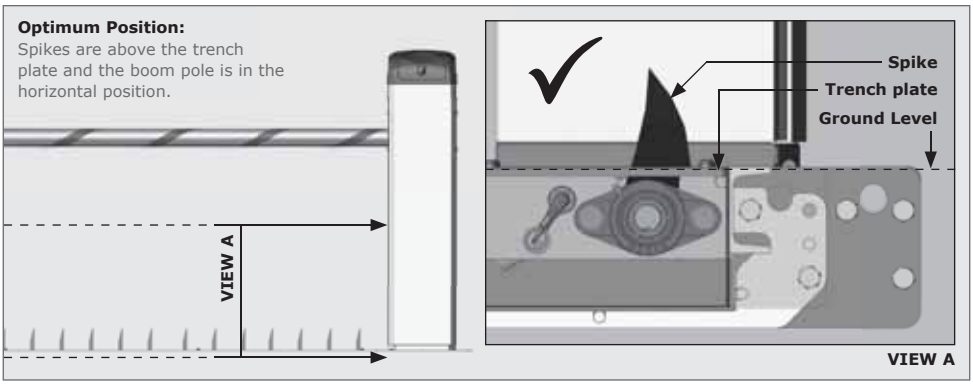
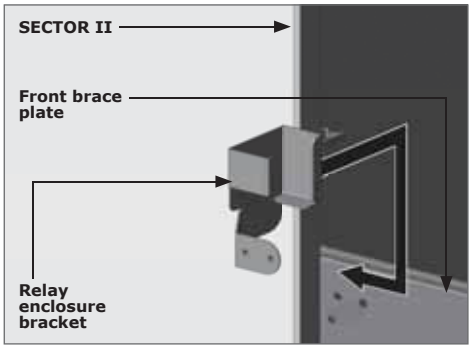


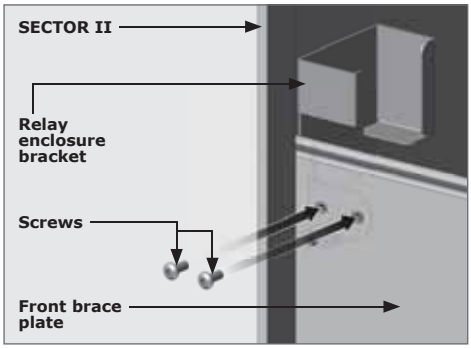
FIGURE 63

13.5. Completing the Assembly

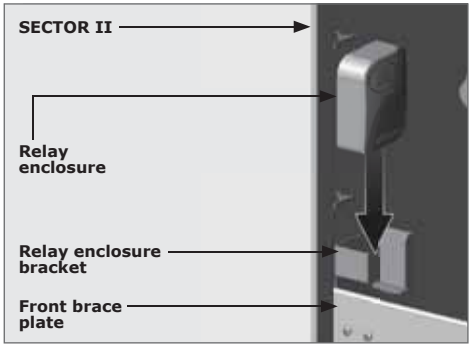
13.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 64



STEP 2 FIGURE 65



STEP 3 FIGURE 66

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

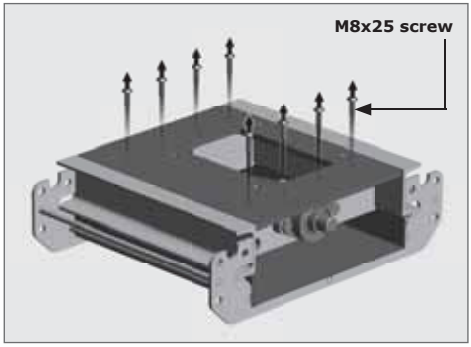
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

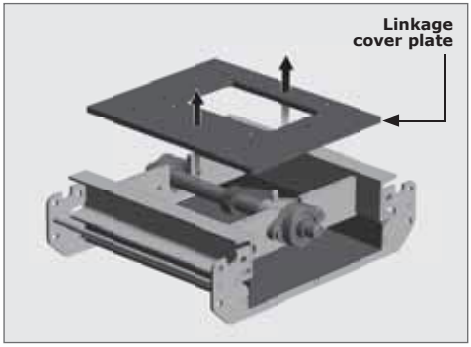
14. LHS Direct Drive Flush Mount - Similar Direction of Travel

14.1. Configuring the Drive Linkage Assembly for Left-hand Similar

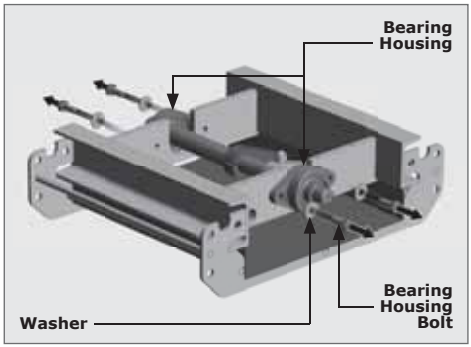
14.1.1. Stripping the drive linkage assembly



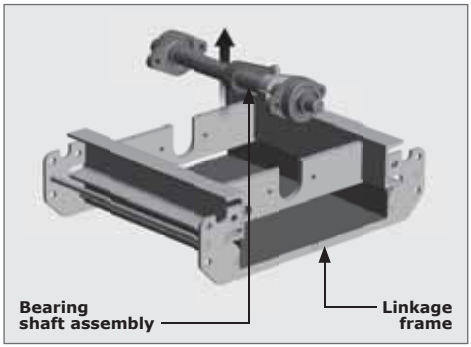
STEP 1 FIGURE 1



STEP 2 FIGURE 2



STEP 3 FIGURE 3



STEP 4 FIGURE 4

The unit is supplied with two drive arms, LHS and RHS (see Section 14, Figure 5).

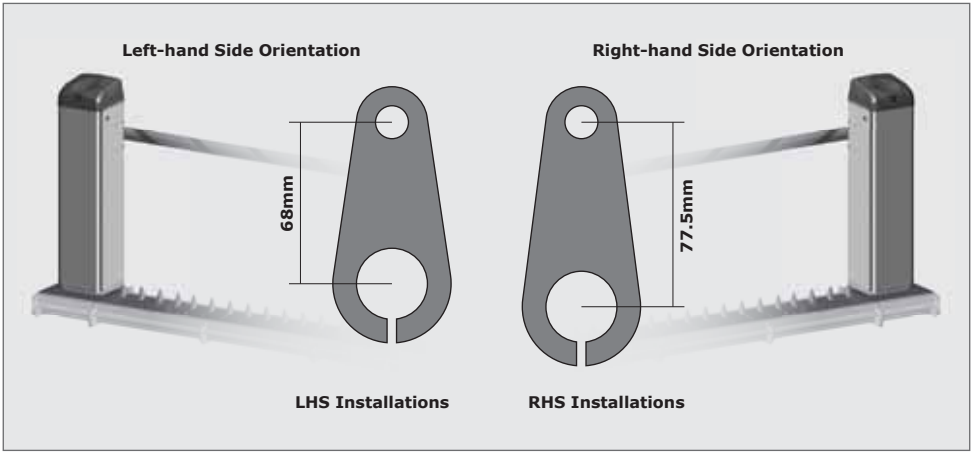
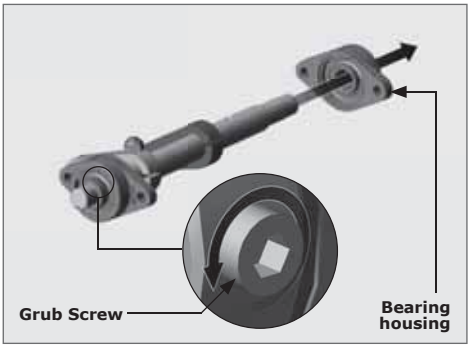
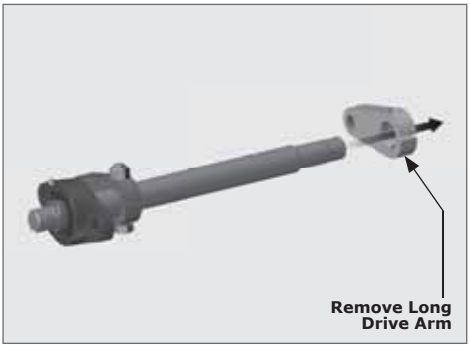


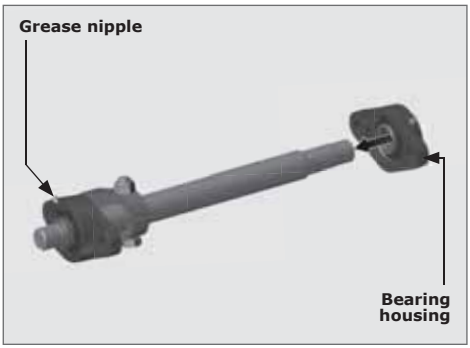
FIGURE 5



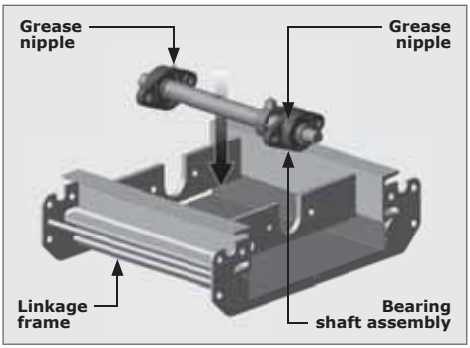
STEP 5 FIGURE 6



STEP 6 FIGURE 7



STEP 7 FIGURE 8



STEP 8 FIGURE 9

The grease nipples on the bearing housings must face up (Section 14, Figures 8 and 9). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 14, Figure 9).

Once assembled with the short drive arm, the format should look as shown in Section 14, Figure 10.

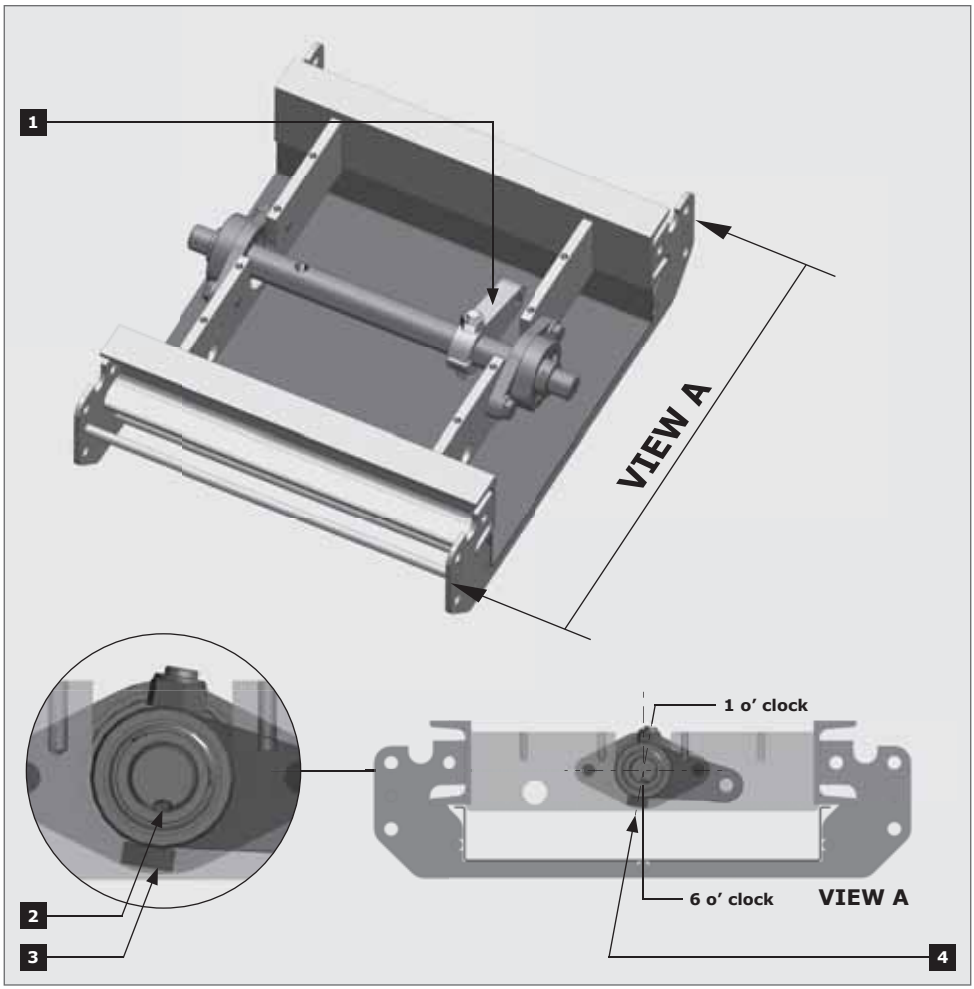


FIGURE 10

1. The drive arm must point as is shown in Section 14, Figure 10
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (1 o'clock)

STEP 9
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 10
Place the linkage plate back onto the drive linkage assembly without fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 14, Figure 11).

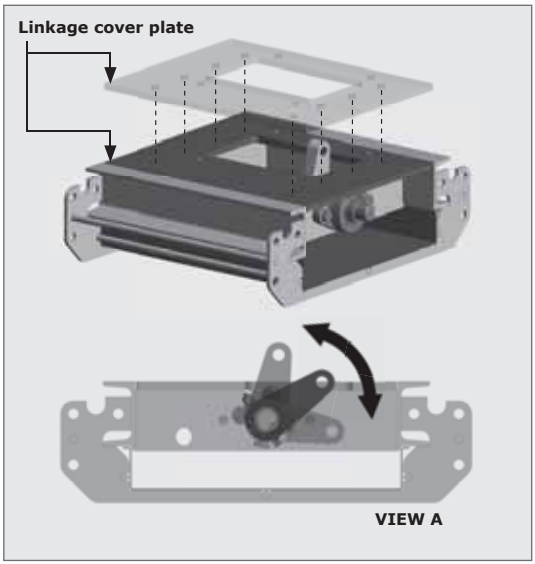
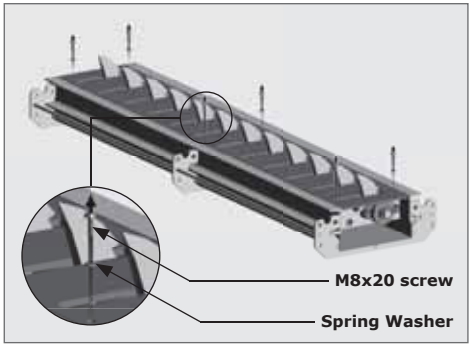


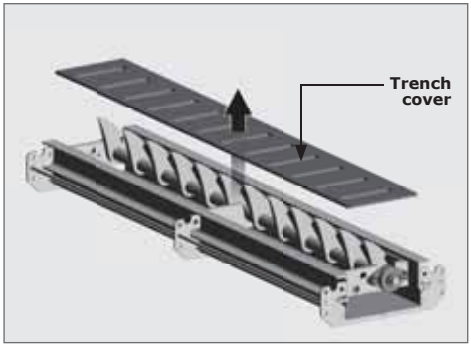
FIGURE 11

14.2. Spike Module Assembly

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

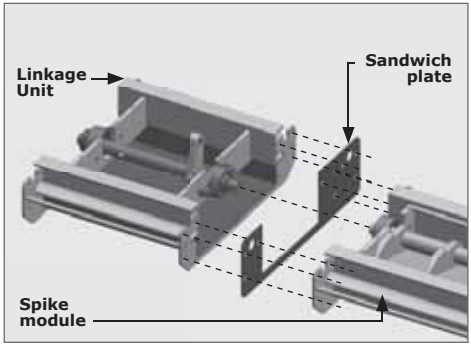


STEP 1 **FIGURE 12**

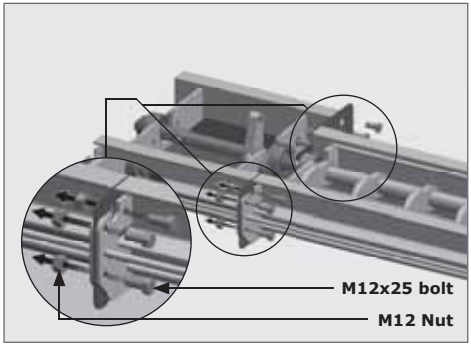


STEP 2 **FIGURE 13**

14.2.2. Attaching the drive linkage unit to the spike module



STEP 1 **FIGURE 14**



STEP 2 **FIGURE 15**

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 14, Figure 14).

STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 14, Figure 16).

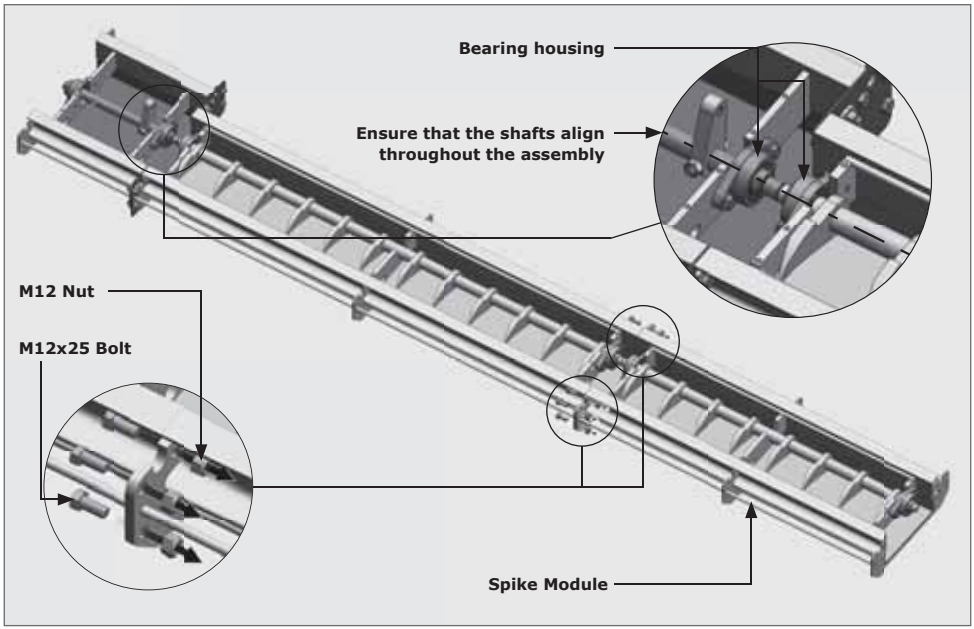


FIGURE 16

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.

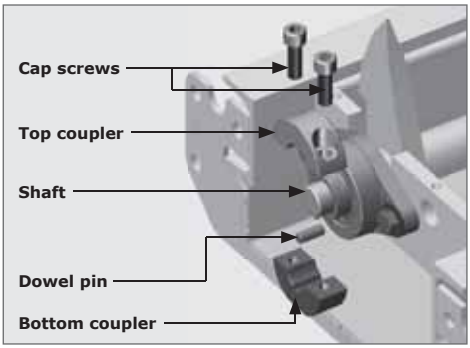


FIGURE 17. SHAFT COUPLER

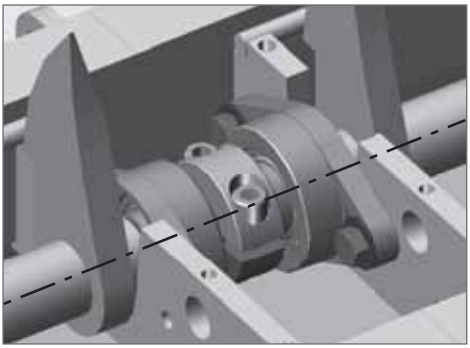
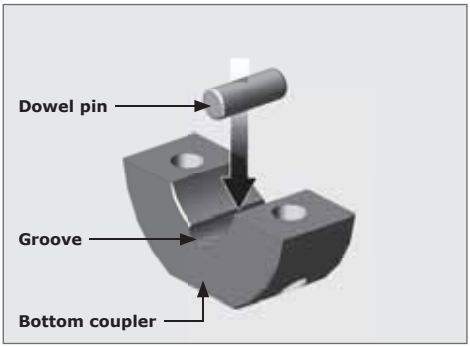
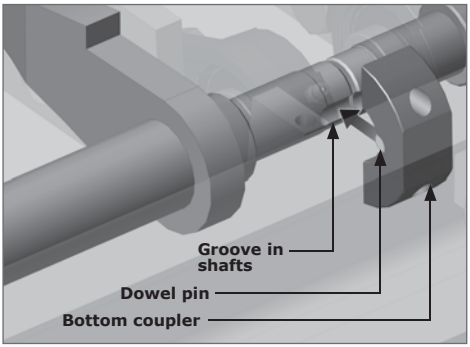


FIGURE 18

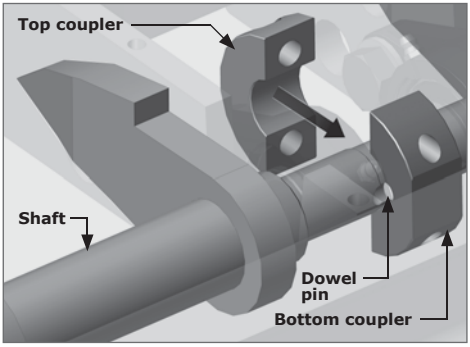
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



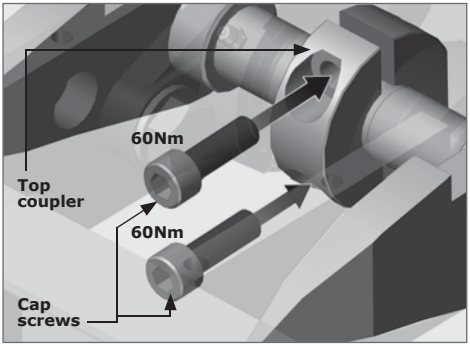
STEP 1 FIGURE 19



STEP 2 FIGURE 20

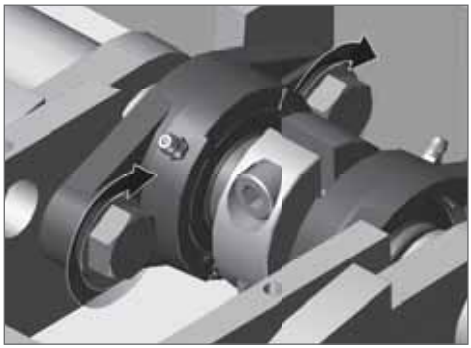


STEP 3 FIGURE 21

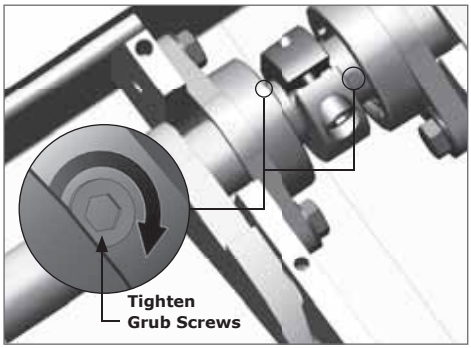


STEP 4 FIGURE 22

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

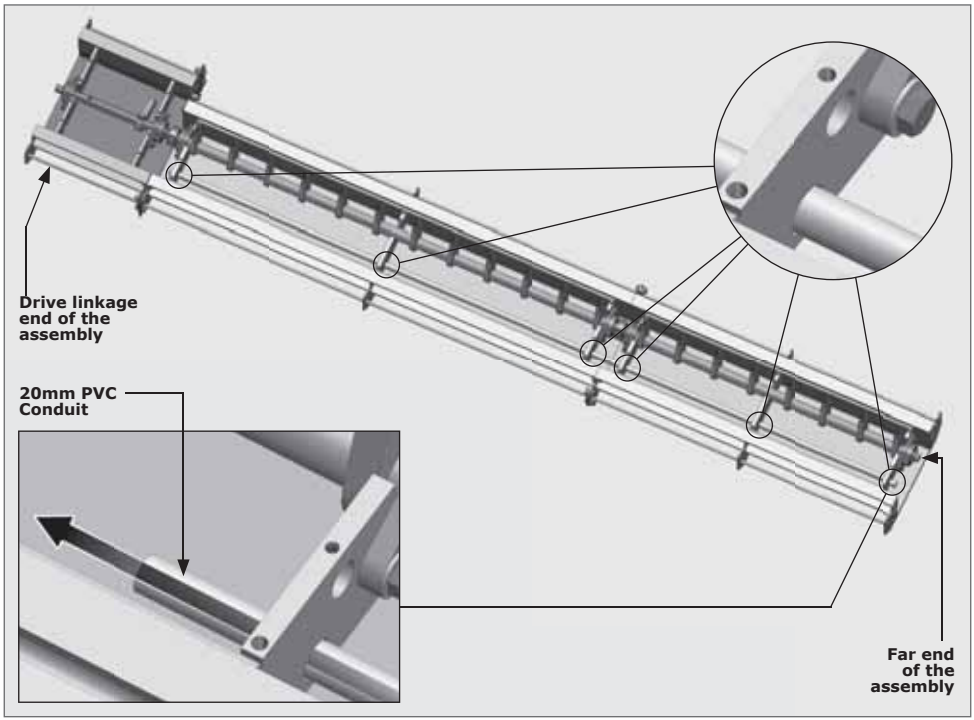


STEP 6 **FIGURE 23**



STEP 7 **FIGURE 24**

14.2.4. Proximity sensor installation



STEP 1 **FIGURE 25**

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 26).

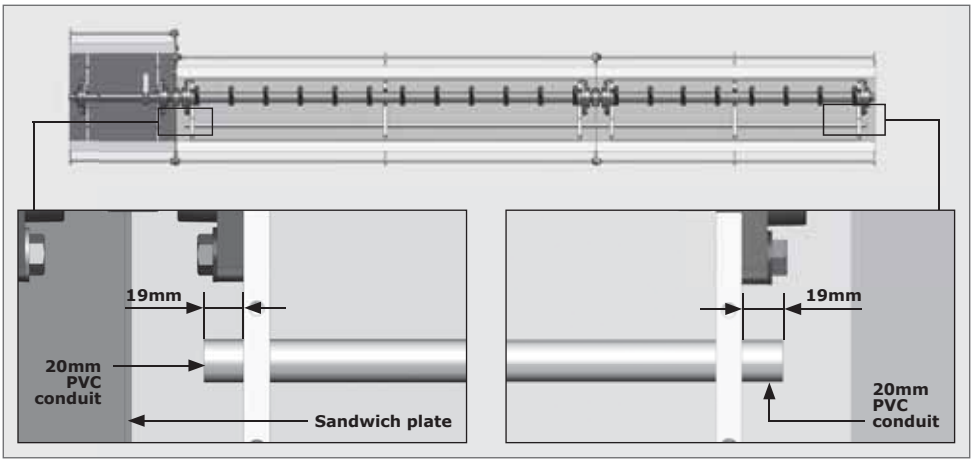
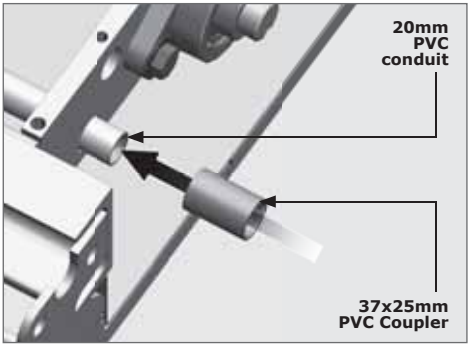
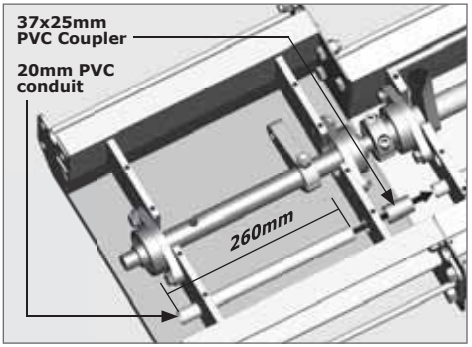


FIGURE 26

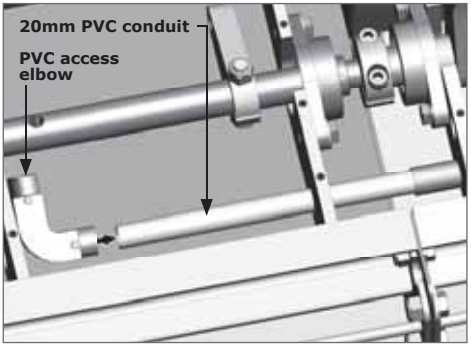
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



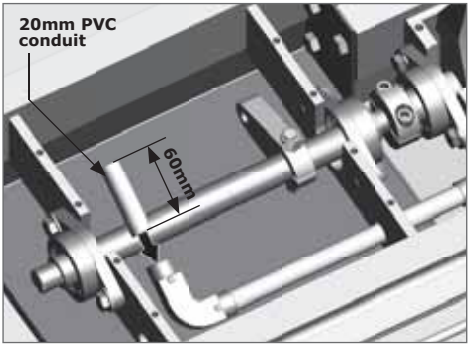
STEP 2 FIGURE 27



STEP 3 FIGURE 28



STEP 4 FIGURE 29



STEP 5 FIGURE 30

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

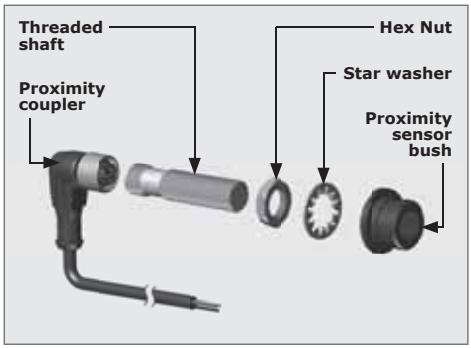


FIGURE 31. PROXIMITY SENSOR

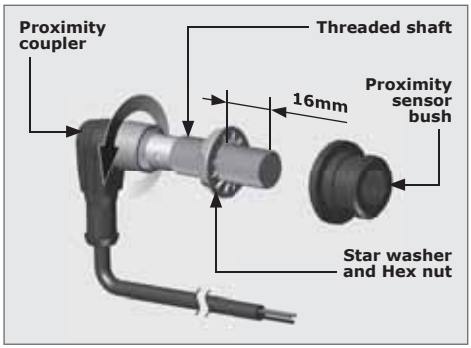


FIGURE 32. PROXIMITY SENSOR

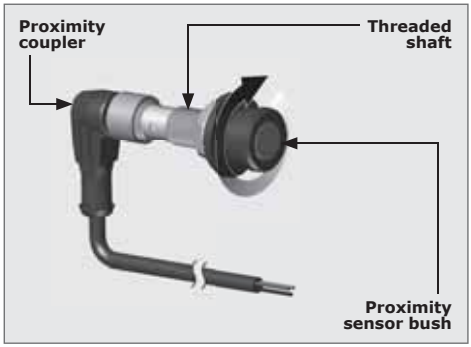
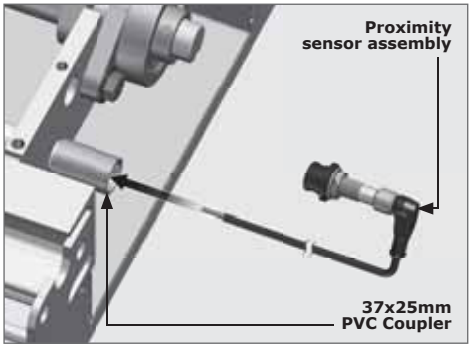


FIGURE 33. PROXIMITY SENSOR



STEP 6

FIGURE 34

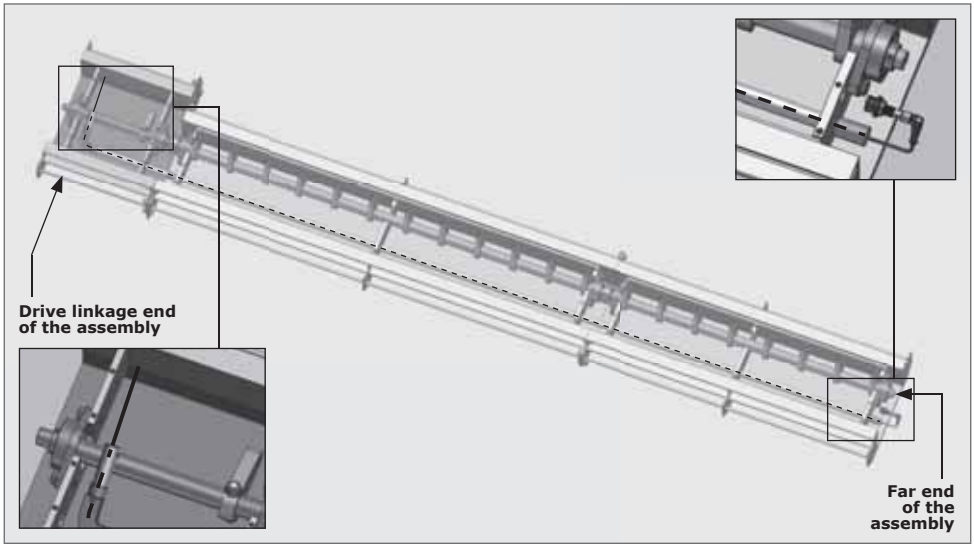
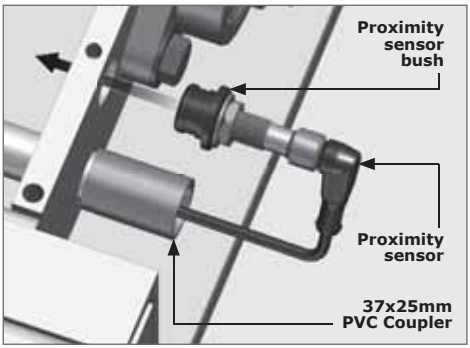
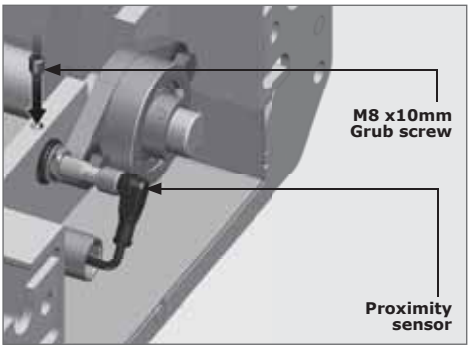


FIGURE 35

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.



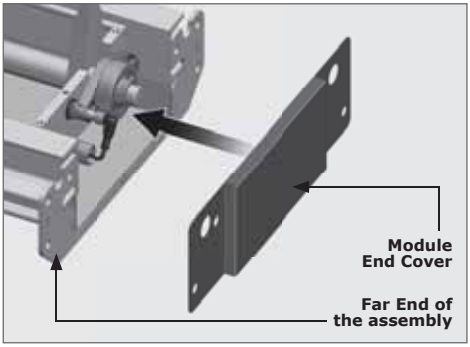
STEP 7 FIGURE 36



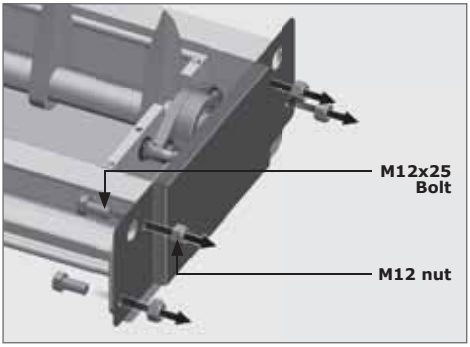
STEP 8 FIGURE 37

14.2.5. Attaching the End Covers to the Assembly

14.2.5.1. Attaching the Module End cover

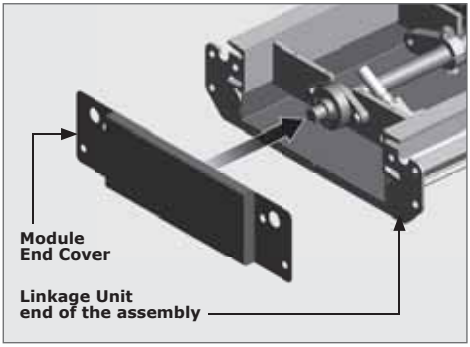


STEP 1 FIGURE 38

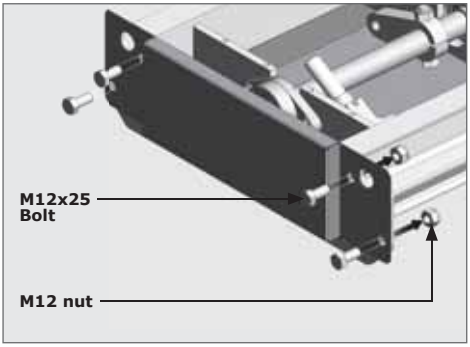


STEP 2 FIGURE 39

14.2.5.2. Attaching the Linkage Unit End cover



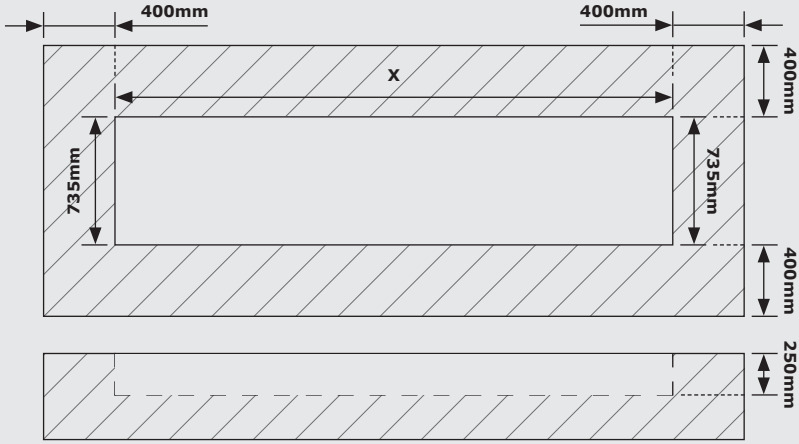
STEP 1 FIGURE 40



STEP 2 FIGURE 41

12.3. Preparing the trench and drainage system

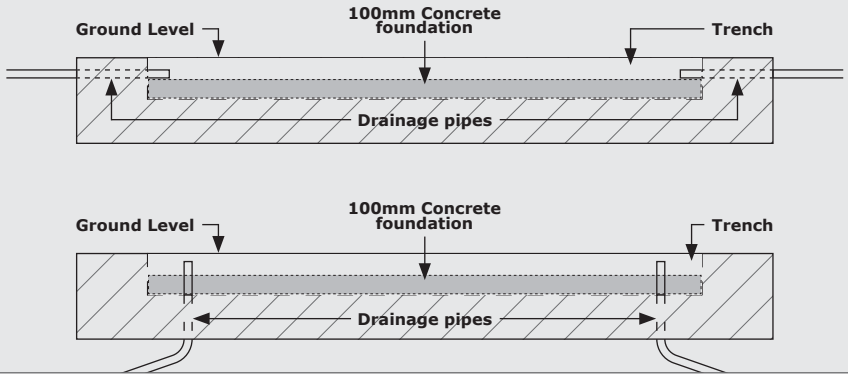
Dig a hole following the dimensions below. Dimension 'X' is relative to the total length of the linkage unit and spike models combined.



STEP 1 **FIGURE 42**

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 52 shows two recommended drainage configurations. Once complete, hold them 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.).



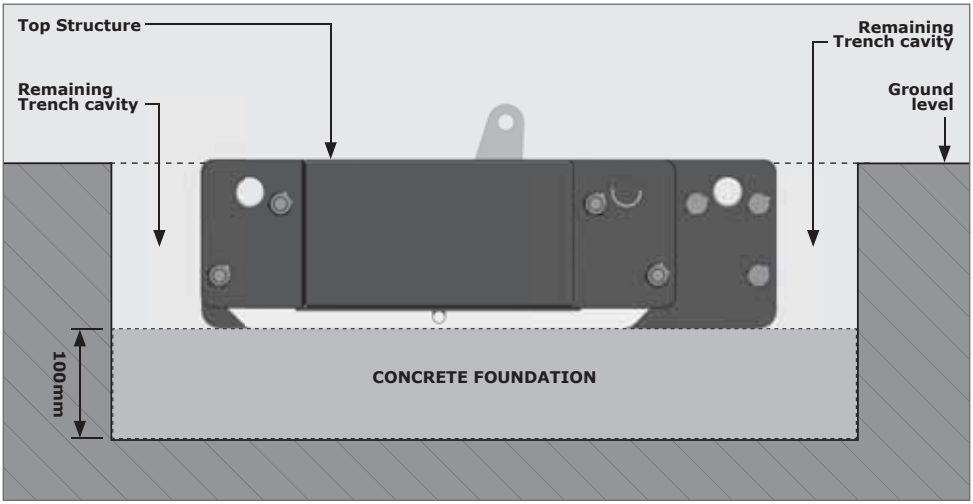
STEP 2 **FIGURE 43**

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

14.3.1. Concreting the assembly into the trench.

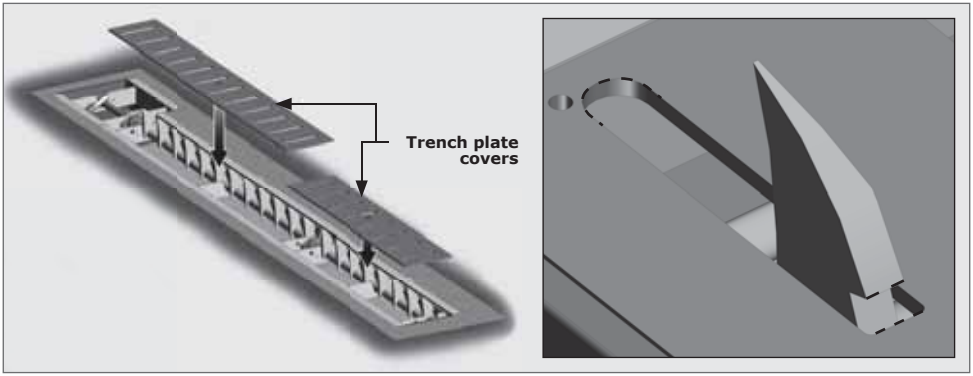
Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

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



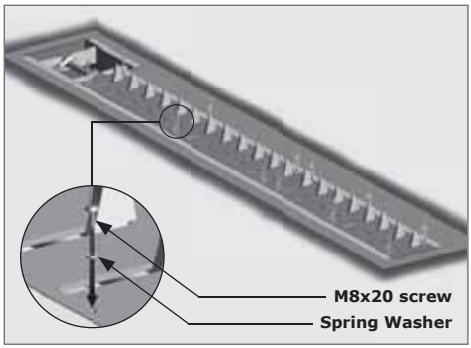
STEP 3 FIGURE 44

14.4. Re-assembling the trench plate and linkage covers

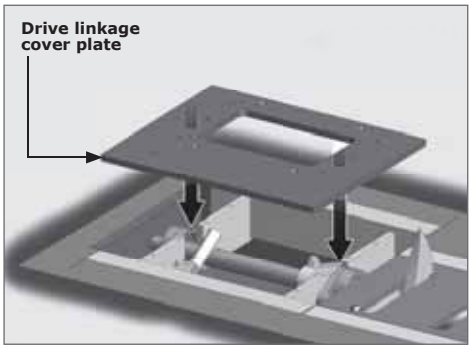


STEP 1 FIGURE 45

Take notice 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.

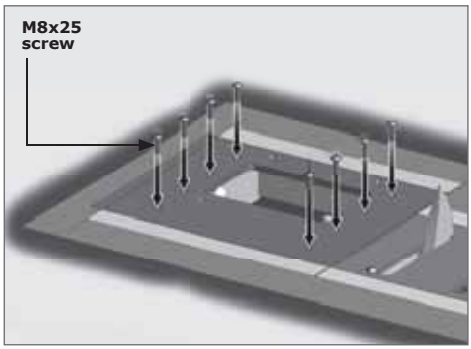


STEP 2 FIGURE 46



STEP 3 FIGURE 47

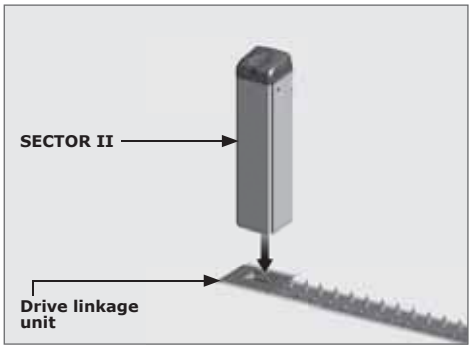
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 14, Figure 11).



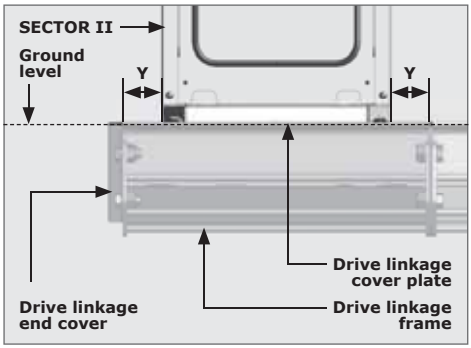
STEP 3 FIGURE 48

14.4. Integrating the SECTOR II with the CLAWS

14.4.1. Placing the SECTOR II into position

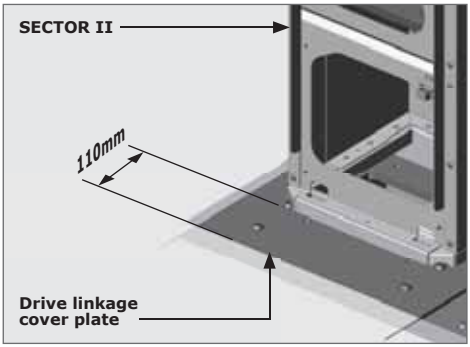


STEP 1 FIGURE 49

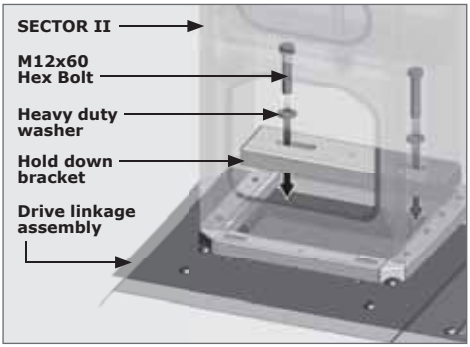


STEP 2 FIGURE 50

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 110mm from the front edge of the Linkage Cover Plate. (Section 14, Figure 51).



STEP 3 FIGURE 51

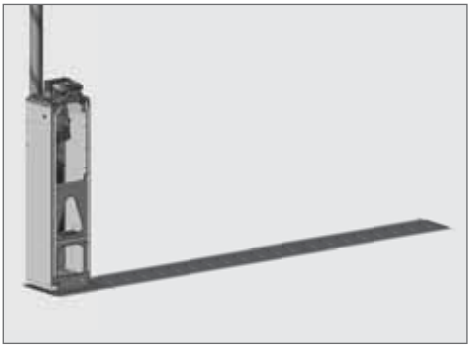


STEP 4 FIGURE 52

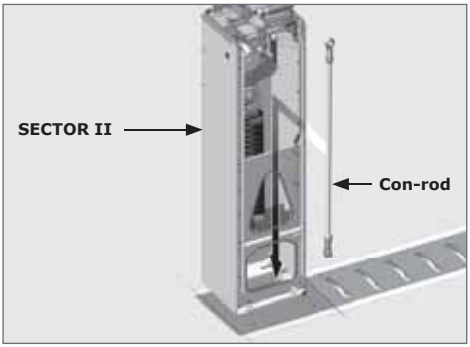
14.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

14.4.3. Inserting the Con-rod



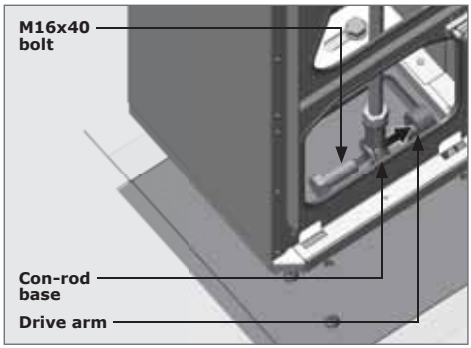
STEP 1 FIGURE 53



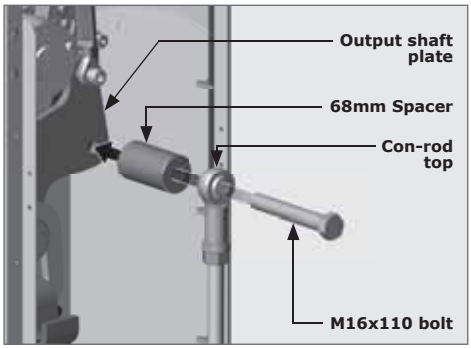
STEP 2 FIGURE 54

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



STEP 3 FIGURE 55

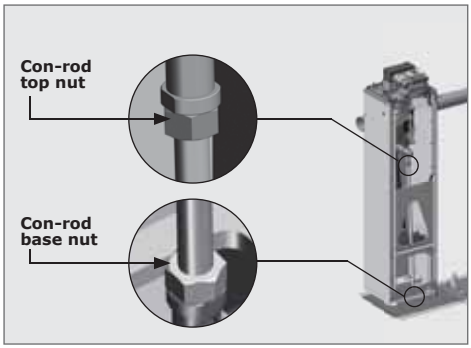


STEP 4 FIGURE 56

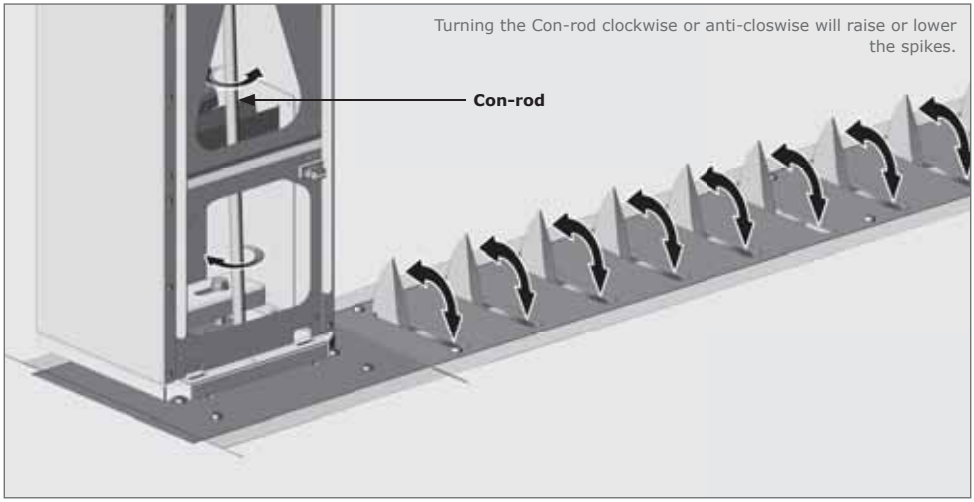
14.4.4. Adjusting the CLAWS spikes

The CLAWS spikes will raise during this procedure!

STEP 1 FIGURE 57



STEP 2 FIGURE 58



STEP 3 FIGURE 59

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the trench plate (Section 14, Figure 60).

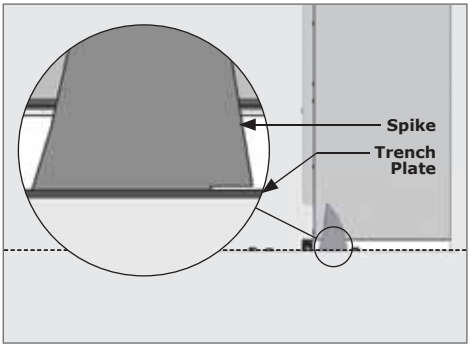
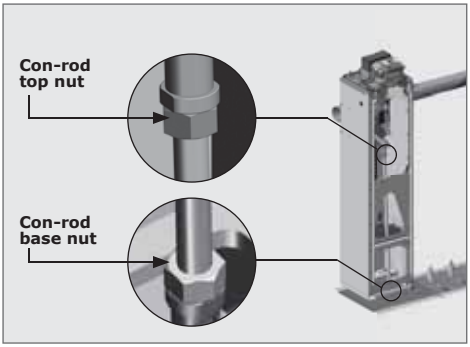


FIGURE 60



STEP 4

FIGURE 61

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 14, Figures 62 and 63).

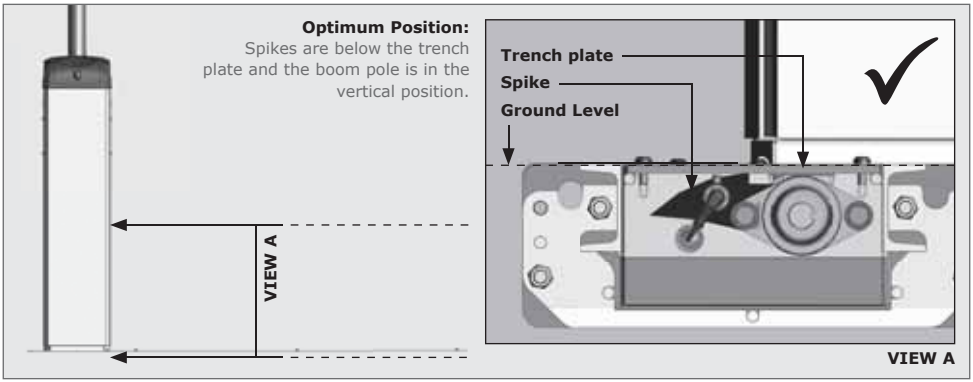


FIGURE 62

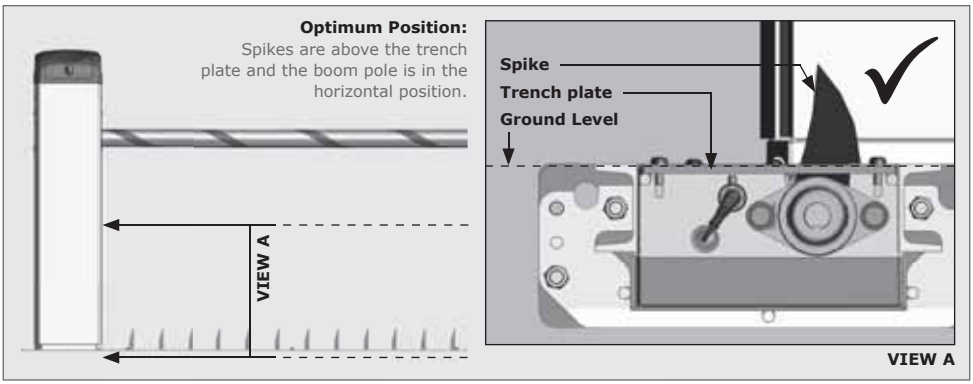
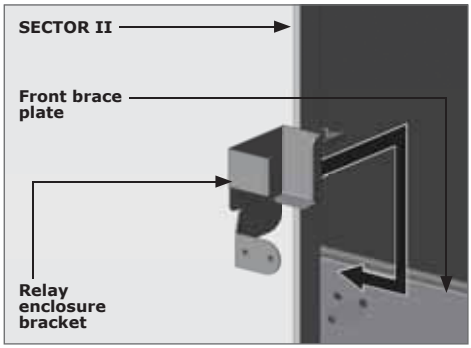


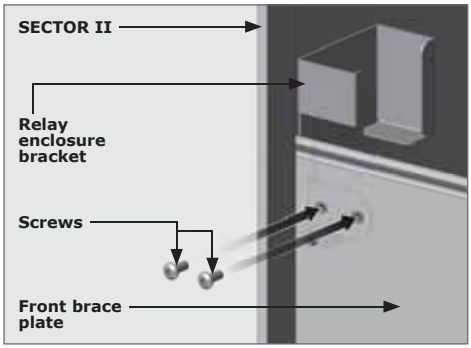
FIGURE 63

14.5. Completing the Assembly

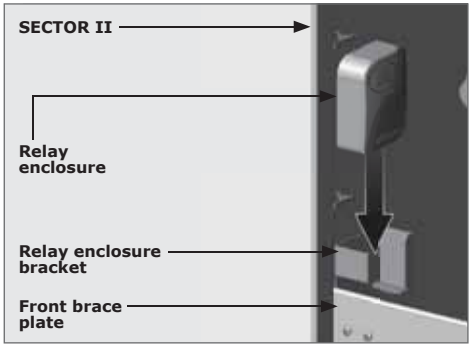
14.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 64



STEP 2 FIGURE 65



STEP 3 FIGURE 66

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

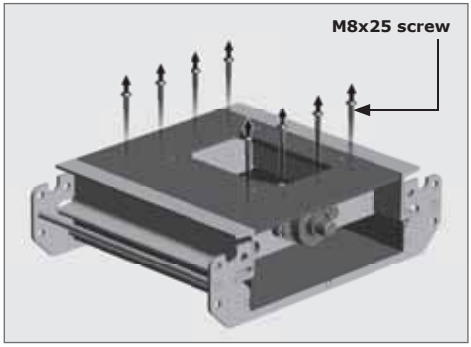
Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

Notes

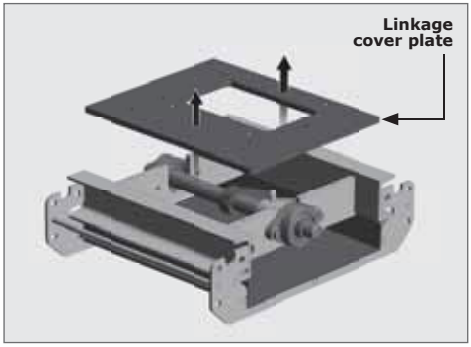
15. LHS Direct Drive Flush Mount - Opposing Direction of Travel

15.1. Configuring the Drive Linkage Assembly for Right-hand Opposing

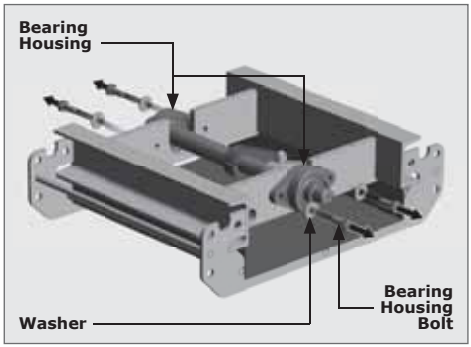
15.1.1. Stripping the drive linkage assembly



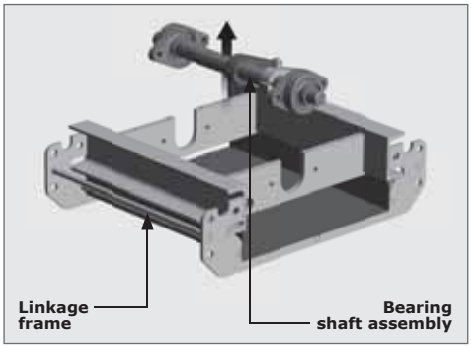
STEP 1 FIGURE 1



STEP 2 FIGURE 2



STEP 3 FIGURE 3



STEP 4 FIGURE 4

The unit is supplied with two drive arms, LHS and RHS (see Section 15, Figure 5).

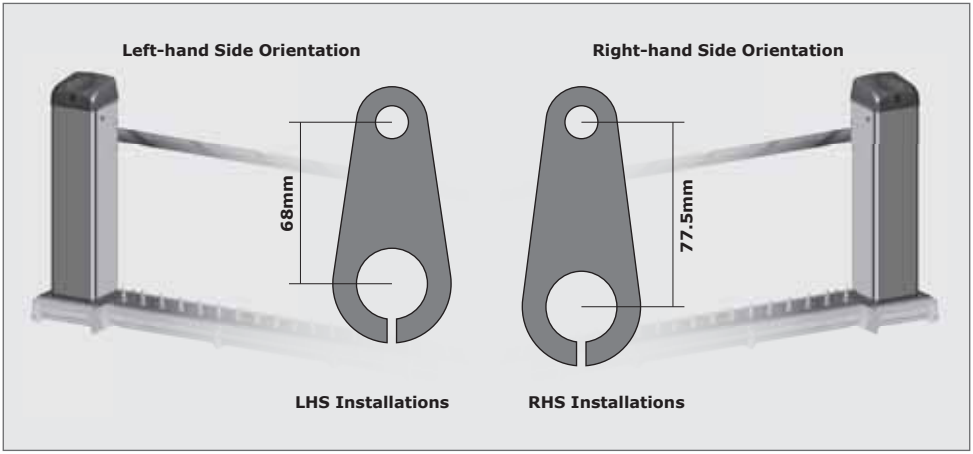
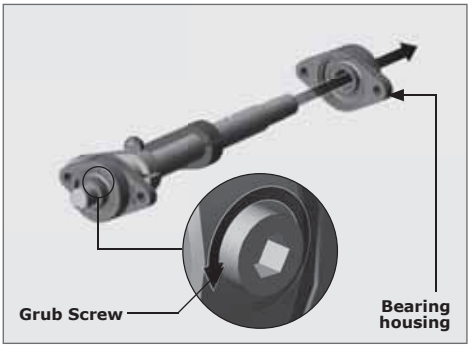
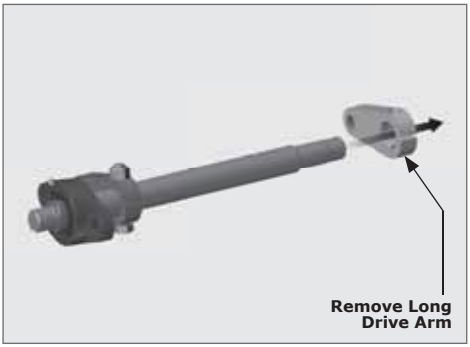


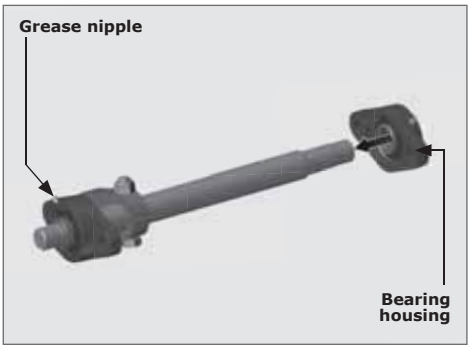
FIGURE 5



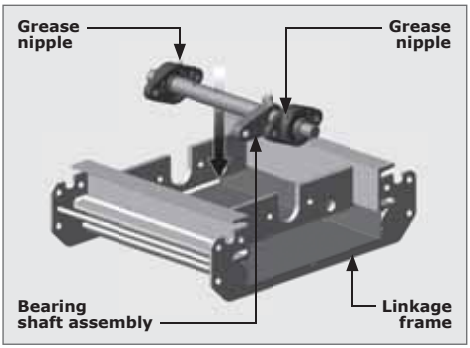
STEP 5 FIGURE 6



STEP 6 FIGURE 7



STEP 7 FIGURE 8



STEP 8 FIGURE 9

The grease nipples on the bearing housings must face up (Section 15, Figures 8 and 9). Take note of the orientation of the Linkage frame, the Bearing Shaft Assembly, and the Drive linkage arm (Section 15, Figure 9).

Once assembled with the short drive arm, the format should look as shown in Section 15, Figure 10.

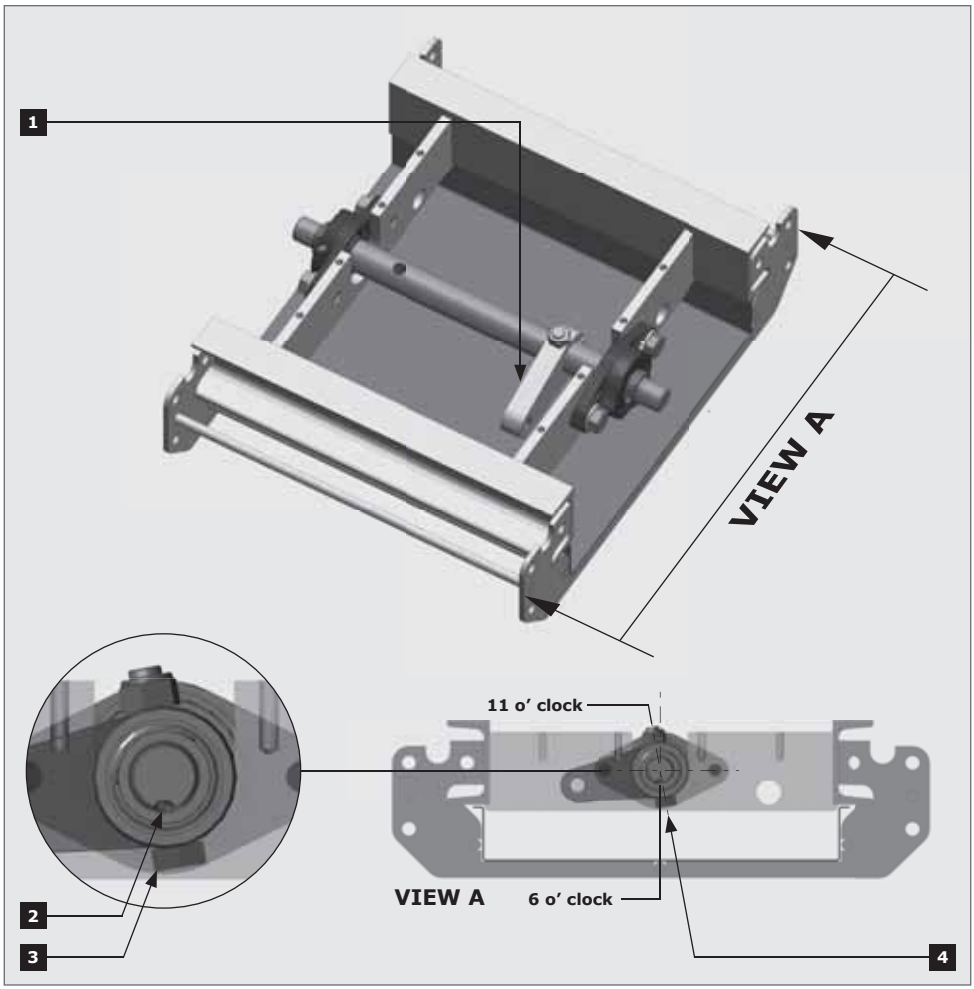


FIGURE 10

1. The drive arm must point as is shown in Section 15, Figure 10
2. The notch must be at the bottom of the shaft (6 o'clock)
3. The bolt head must face the bottom and the nut on top
4. The angle of the bolt and nut must be as shown (11 o'clock)

STEP 9
Replace the bearing housing bolts once everything is in the correct orientation. Hand-tighten for the time being.

STEP 10
Place the linkage plate back onto the drive linkage assembly withouth fastening the bolts.

Check that the linkage cover plate is in the correct position and that there is ample clearance for the drive arm (Section 15, Figure 11).

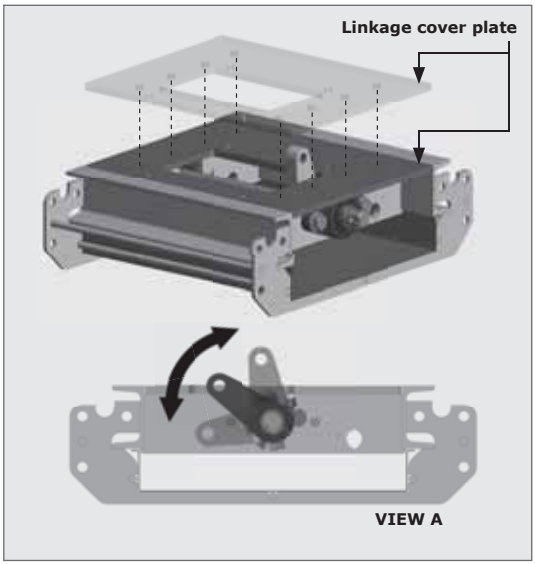
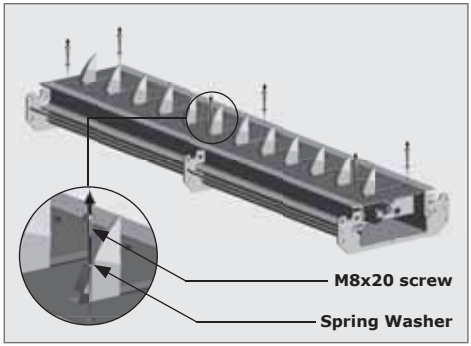


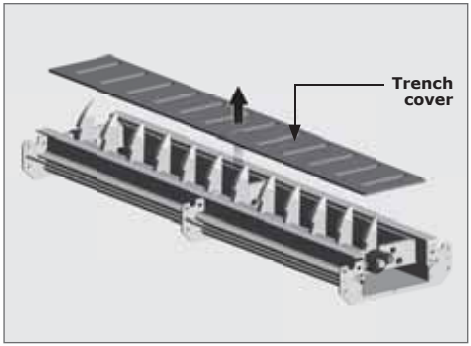
FIGURE 11

15.2. Spike Module Assembly

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

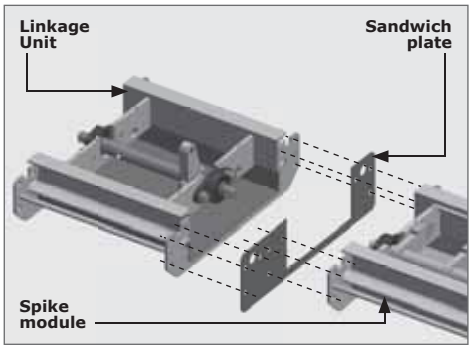


STEP 1 **FIGURE 12**

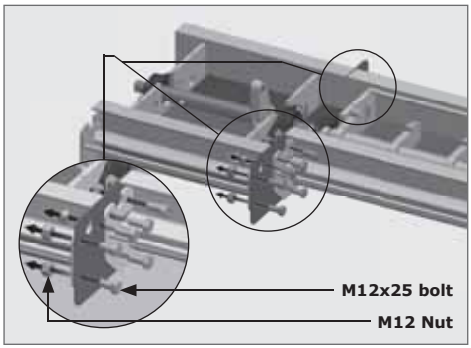


STEP 2 **FIGURE 13**

15.2.2. Attaching the drive linkage unit to the spike module



STEP 1 **FIGURE 14**



STEP 2 **FIGURE 15**

Take note of the orientation of the sandwich plate to the linkage unit before fixing them to the spike module assembly (Section 15, Figure 14).

STEP 3
Using six M12x25 bolts, fix one spike module to another (Section 15, Figure 16).

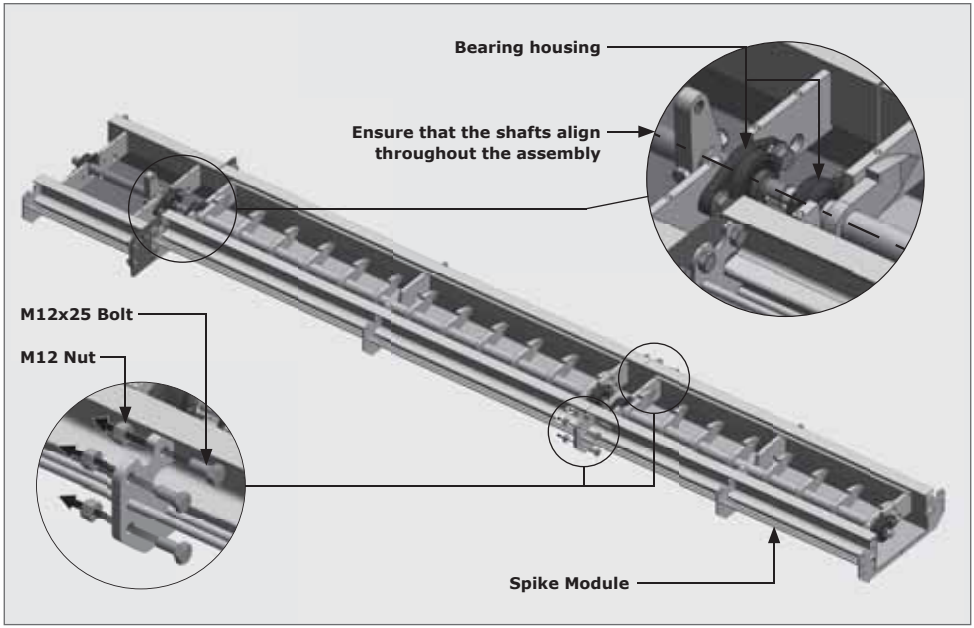


FIGURE 16

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.

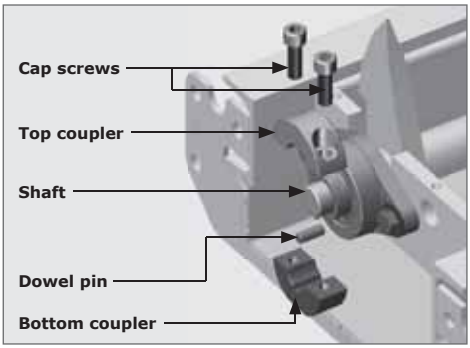


FIGURE 17. SHAFT COUPLER

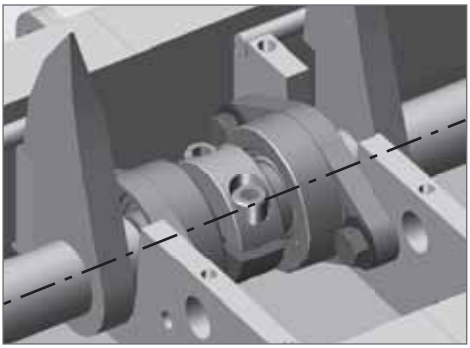
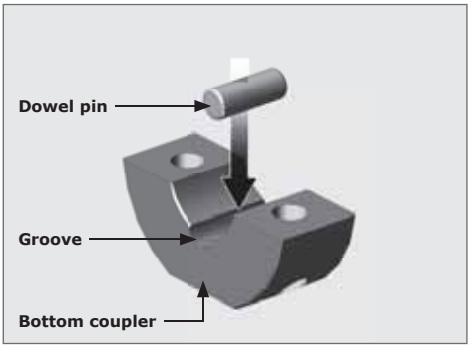
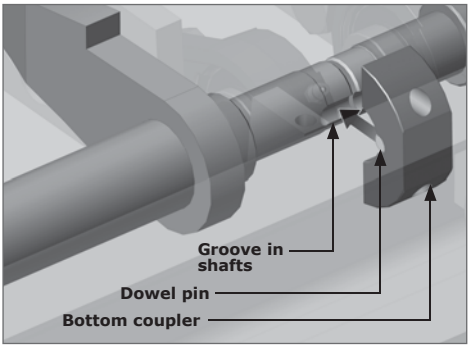


FIGURE 18

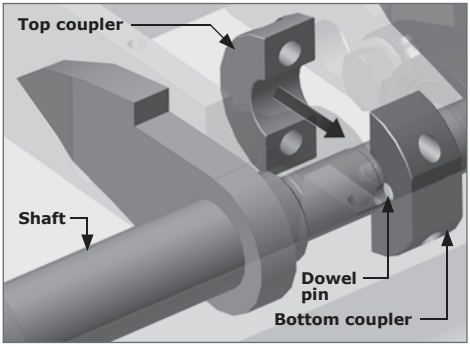
Place the spikes into the down position (and the drive arm pointing upwards) to aid in the fitment of all the shaft couplings.



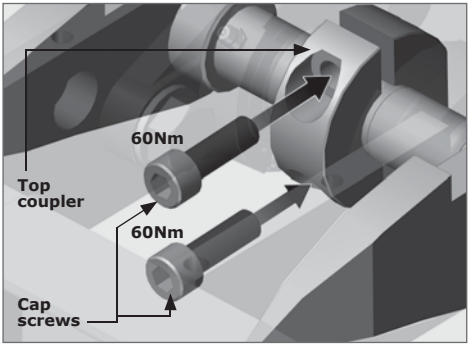
STEP 1 FIGURE 19



STEP 2 FIGURE 20

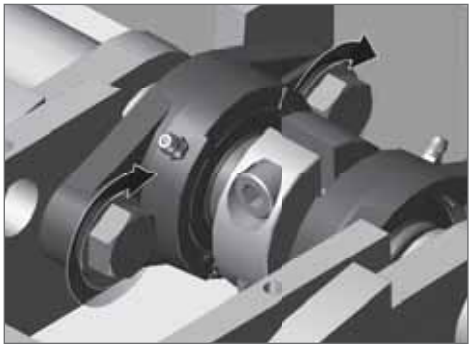


STEP 3 FIGURE 21

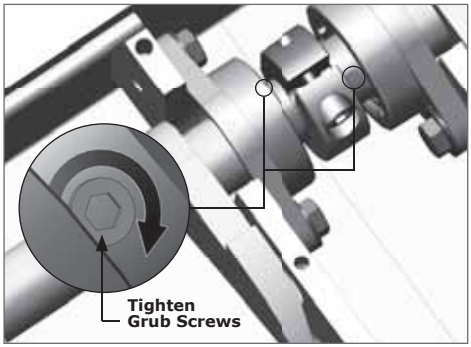


STEP 4 FIGURE 22

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

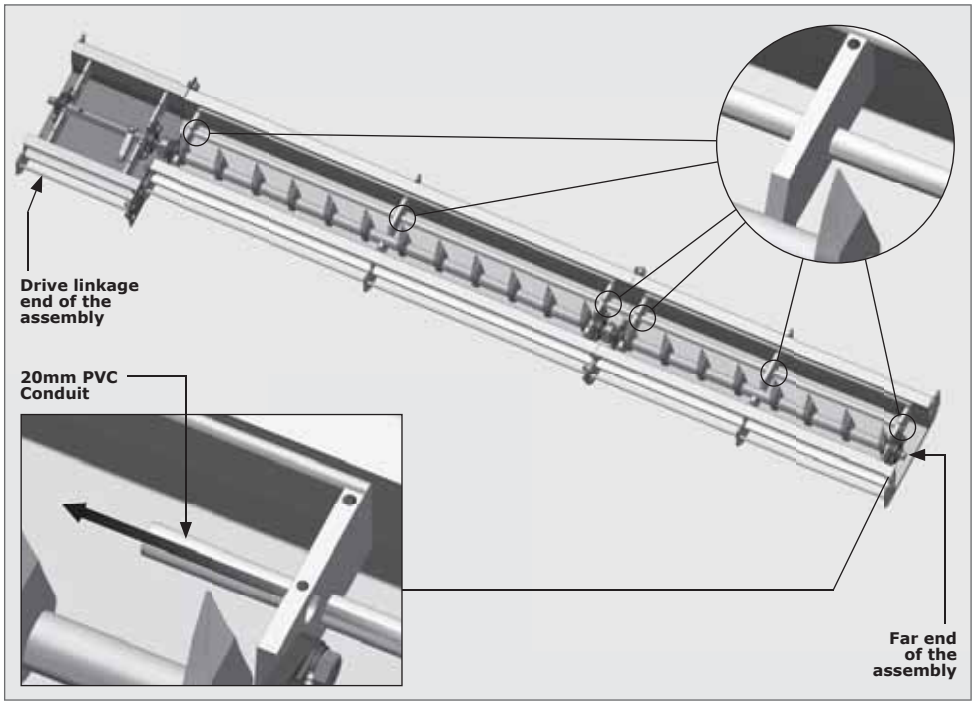


STEP 6 **FIGURE 23**



STEP 7 **FIGURE 24**

15.2.4. Proximity sensor installation



STEP 1 **FIGURE 25**

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 26).

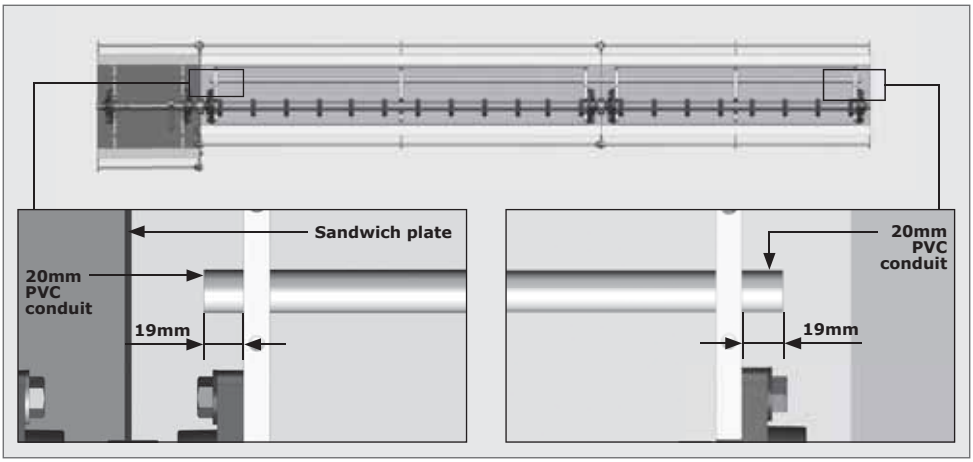
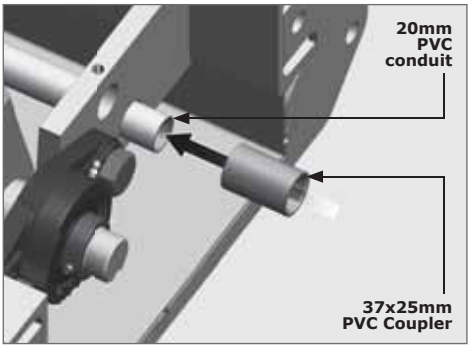
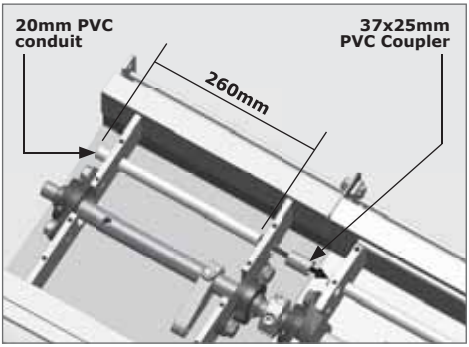


FIGURE 26

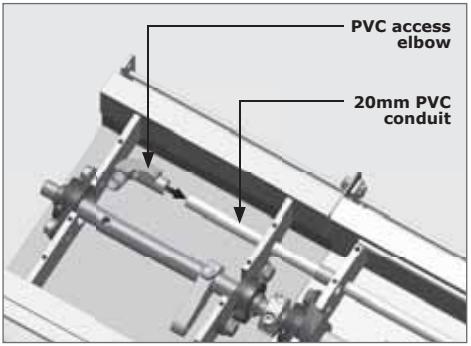
Use an appropriate PVC adhesive to bond all conduit lengths, access elbows and couplers to one another.



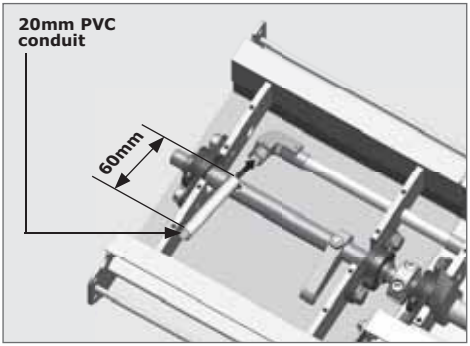
STEP 2 FIGURE 27



STEP 3 FIGURE 28



STEP 4 FIGURE 29



STEP 5 FIGURE 30

Please ensure that the moving mechanical parts do not rub against the conduit or cables.

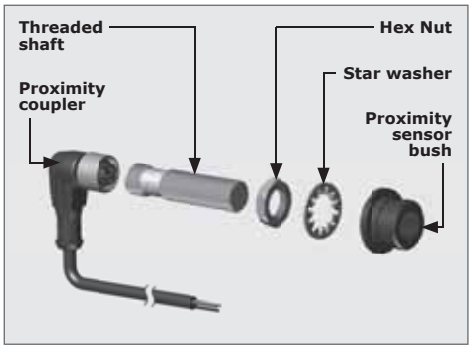


FIGURE 31. PROXIMITY SENSOR

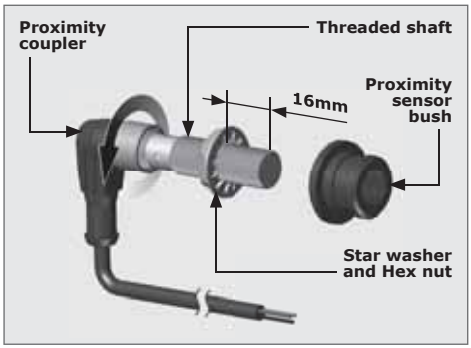


FIGURE 32. PROXIMITY SENSOR

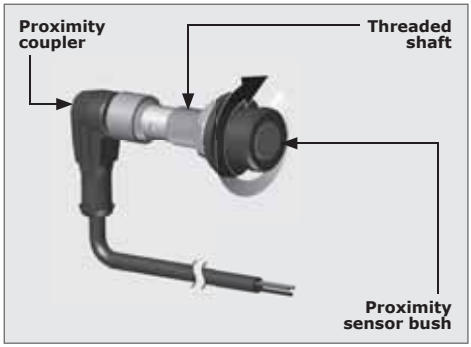
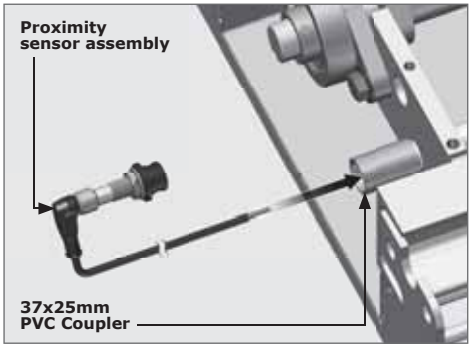


FIGURE 33. PROXIMITY SENSOR



STEP 6

FIGURE 34

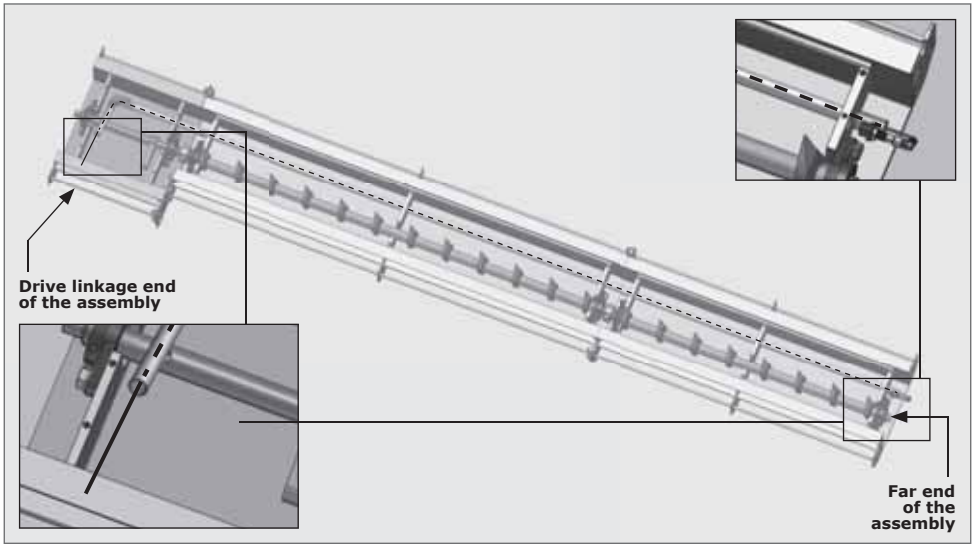
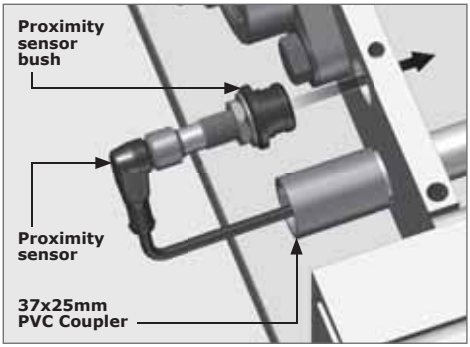
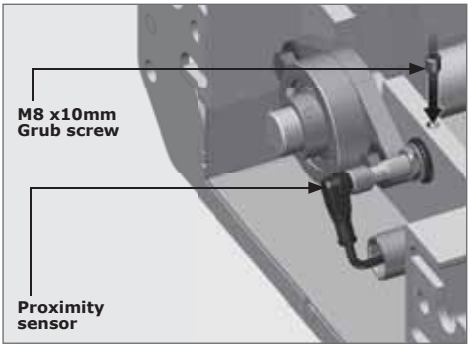


FIGURE 35

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.



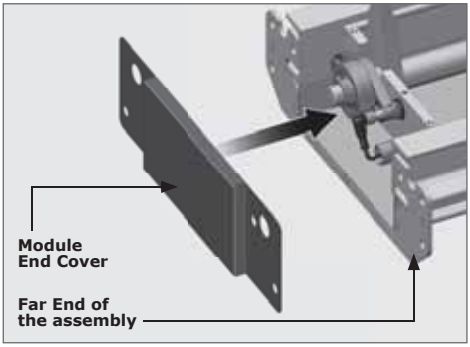
STEP 7 FIGURE 36



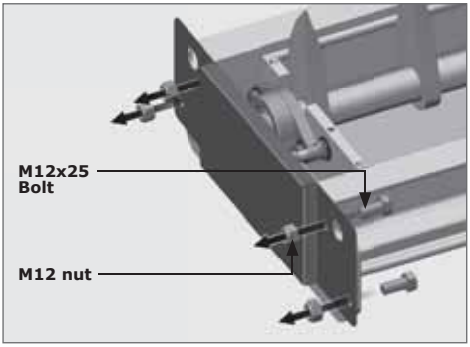
STEP 8 FIGURE 37

15.2.5. Attaching the End Covers to the Assembly

15.2.5.1. Attaching the Module End cover

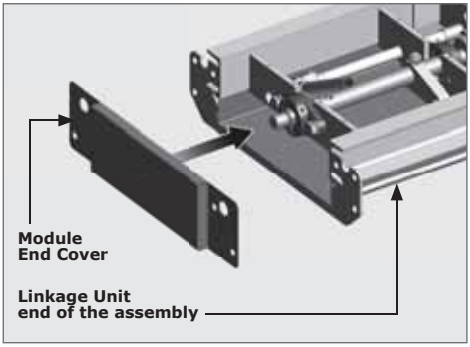


STEP 1 FIGURE 38

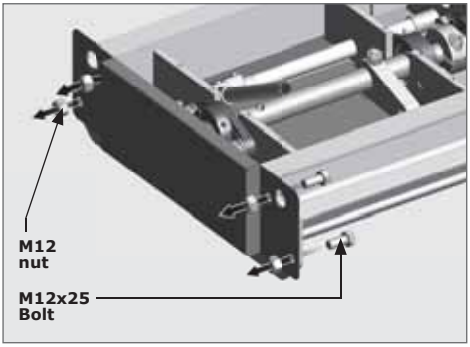


STEP 2 FIGURE 39

15.2.5.2. Attaching the Linkage Unit End cover



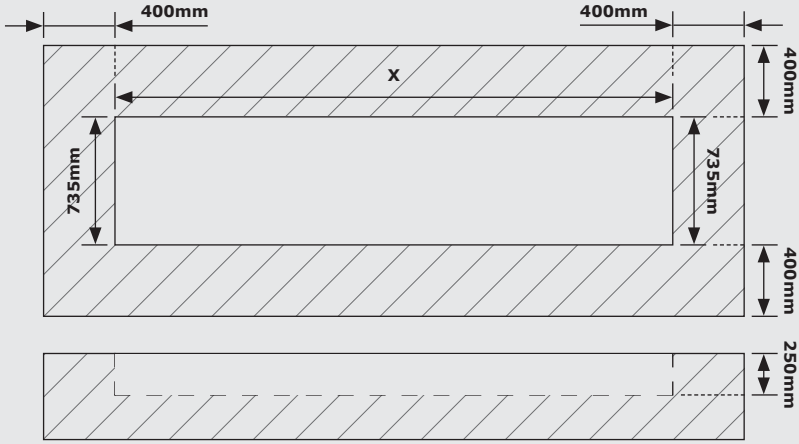
STEP 1 FIGURE 40



STEP 2 FIGURE 41

15.3. Preparing the trench and drainage system

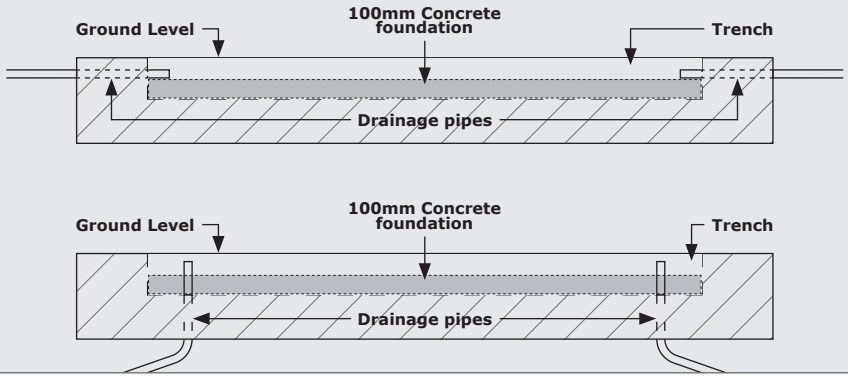
Dig a hole following the dimensions below. Dimension 'X' is relative to the total length of the linkage unit and spike models combined.



STEP 1 **FIGURE 42**

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 43 shows two recommended drainage configurations. Once complete, hold them in place by pouring a 100mm concrete foundation and level off.

If the SECTOR II and **CLAWS** are to be seperated, 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.).



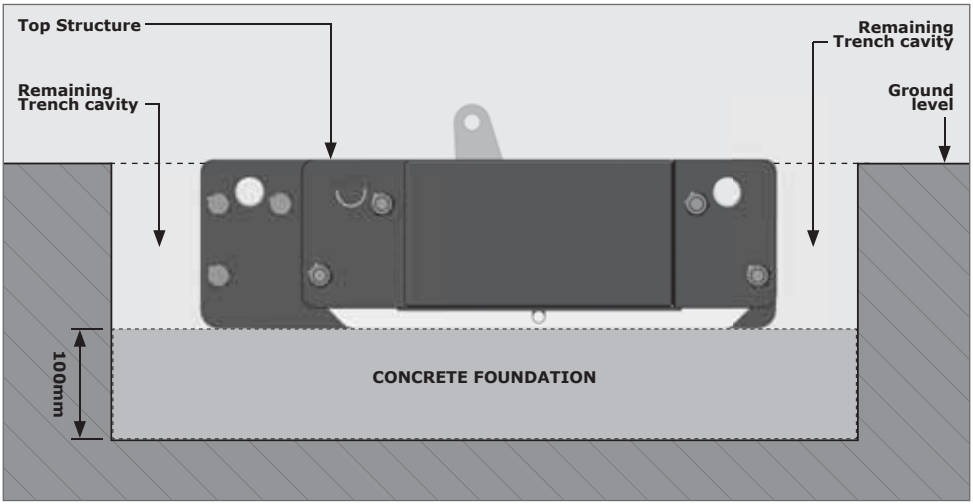
STEP 2 **FIGURE 43**

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

15.3.1. Concreting the assembly into the trench.

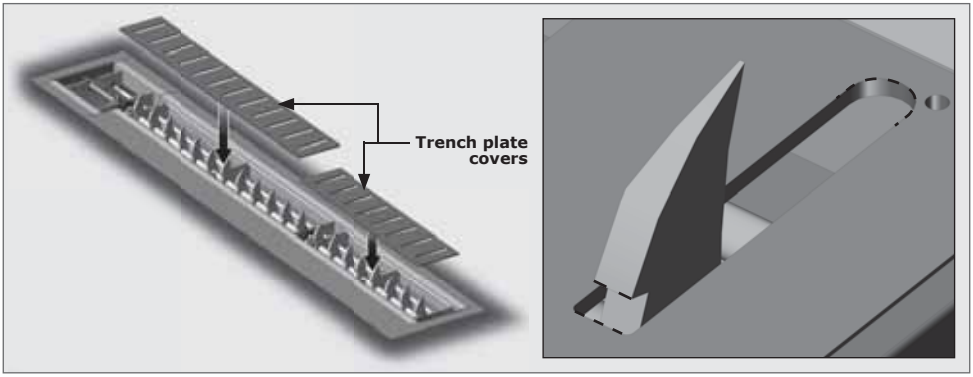
Place the assembly in the trench and level the assembly using any type of propping or jacking method. Make sure that the top of the assembly is either in line with or a little higher than the ground level and pour concrete (minimum 45MPa after 28 days) into the cavity that remains.

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



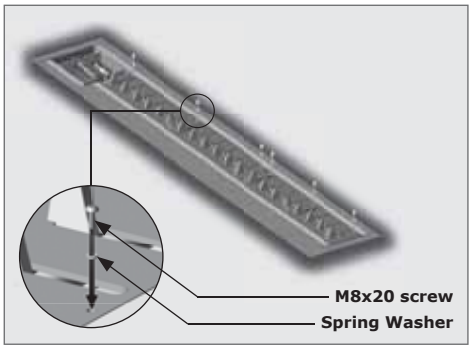
STEP 3 **FIGURE 44**

15.4. Re-assembling the trench plate and linkage covers

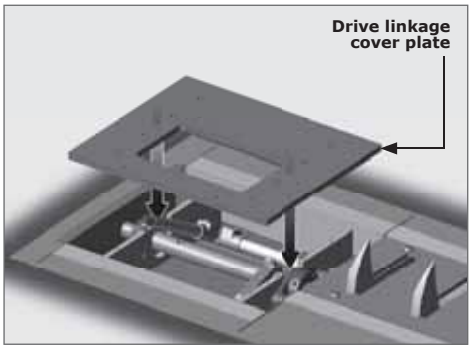


STEP 1 **FIGURE 45**

Take notice 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.

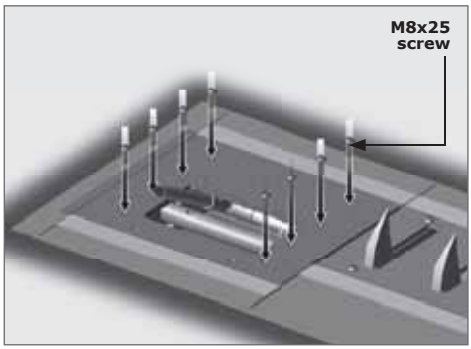


STEP 2 FIGURE 46



STEP 3 FIGURE 47

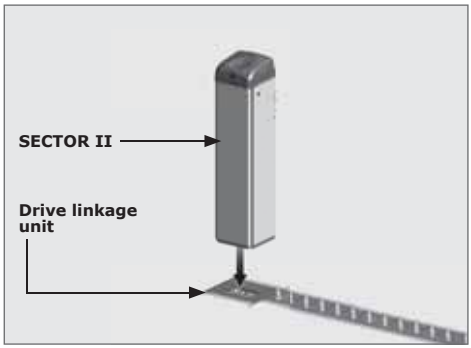
It is imperative that the drive linkage cover plate is placed correctly. Make sure that there is clearance for the drive arm to swing through. If this plate is assembled back-to-front the drive arm won't swing through and you will need to turn the plate around (Refer back to Section 15, Figure 11).



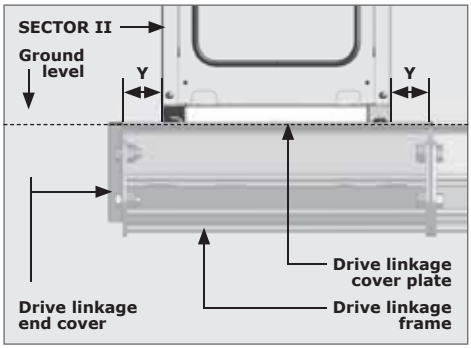
STEP 3 FIGURE 48

15.4. Integrating the SECTOR II with the CLAWS

15.4.1. Placing the SECTOR II into position

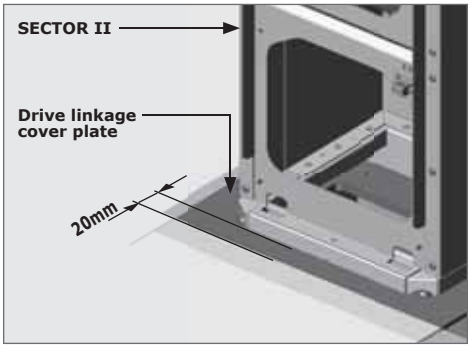


STEP 1 FIGURE 49

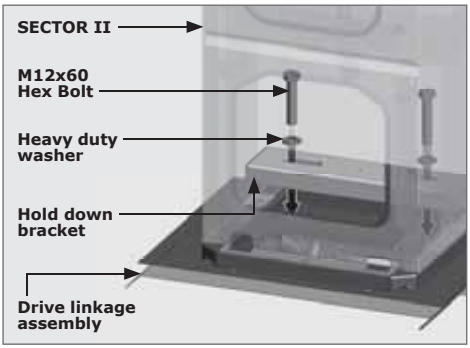


STEP 2 FIGURE 50

Lift the spikes by hand to get them just under the level of the trench plate, which pushes the linkage arm back, allowing you to move the unit into its correct position; 20mm from the front edge of the Linkage Cover Plate. (Section 15, Figure 51).



STEP 3 FIGURE 51

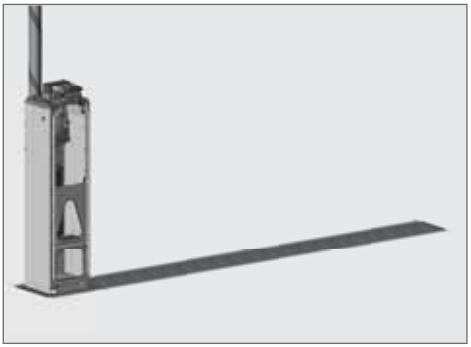


STEP 4 FIGURE 52

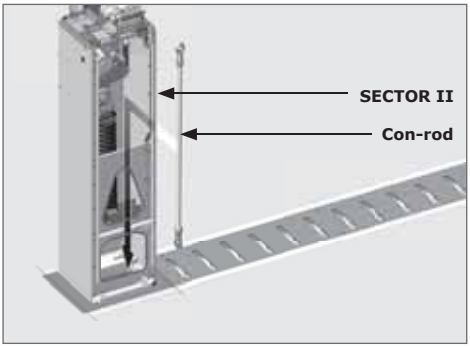
15.4.2. Fitting and leveling the SECTOR II boom pole

Refer to Section 3.3 of the SECTOR II Installation manual for instructions on fitting and leveling to boom pole.

15.4.3. Inserting the Con-rod



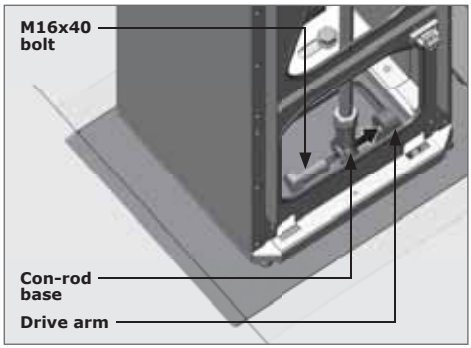
STEP 1 FIGURE 53



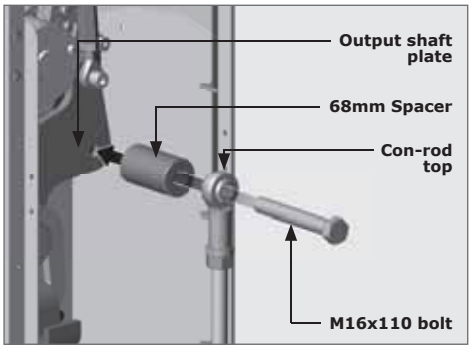
STEP 2 FIGURE 54

Apply Lock-tite 243 to all the internal threads and torque both the M16x40 and M16x110 bolts to 40Nm (Steps 3 and 4)

Do not place any body parts near the spikes as serious injury could occur; use the drive arm to move the spikes up and down.



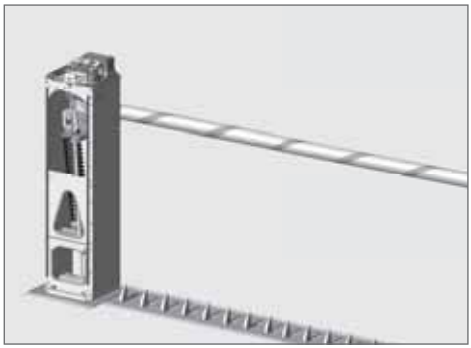
STEP 3 FIGURE 55



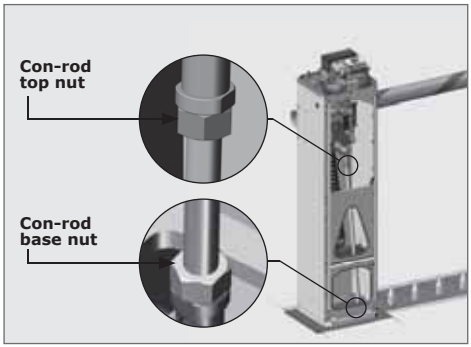
STEP 4 FIGURE 56

15.4.4. Adjusting the CLAWS spikes

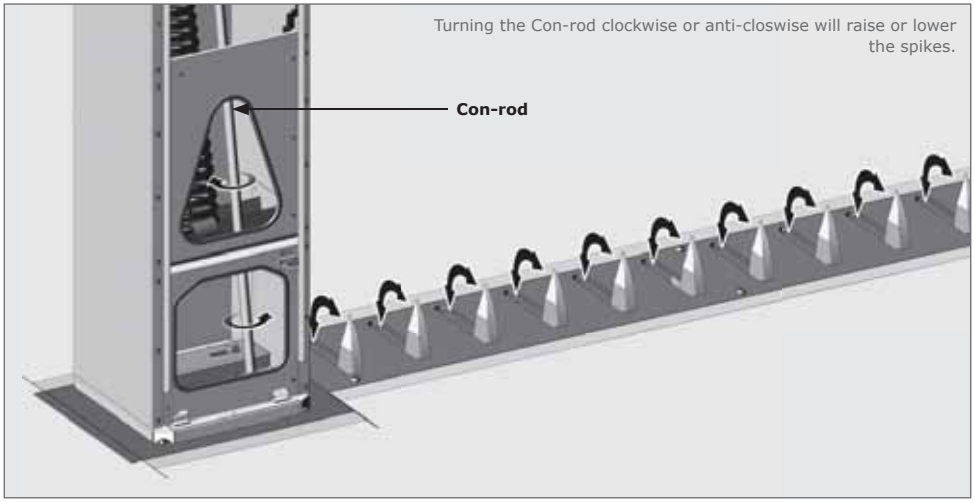
The CLAWS spikes will raise during this procedure!



STEP 1 FIGURE 57



STEP 2 FIGURE 58



STEP 3 FIGURE 59

With one person holding the barrier pole in the lowered position, adjust the spikes so that the spikes just touch the top plate (Section 15, Figure 60).

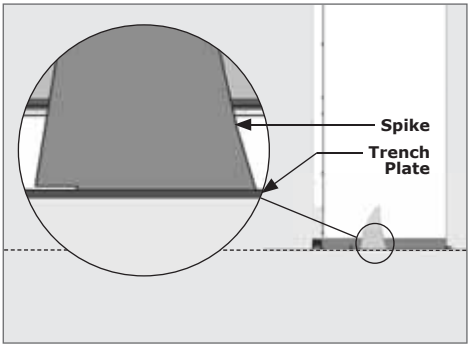
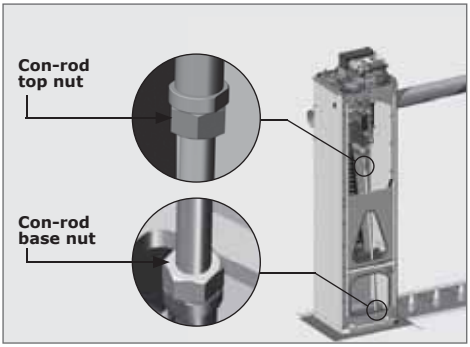


FIGURE 60



STEP 4

FIGURE 61

To ensure correct adjustment, raise the barrier pole and check that the spikes are below the top plate (Section 15, Figures 62 and 63).

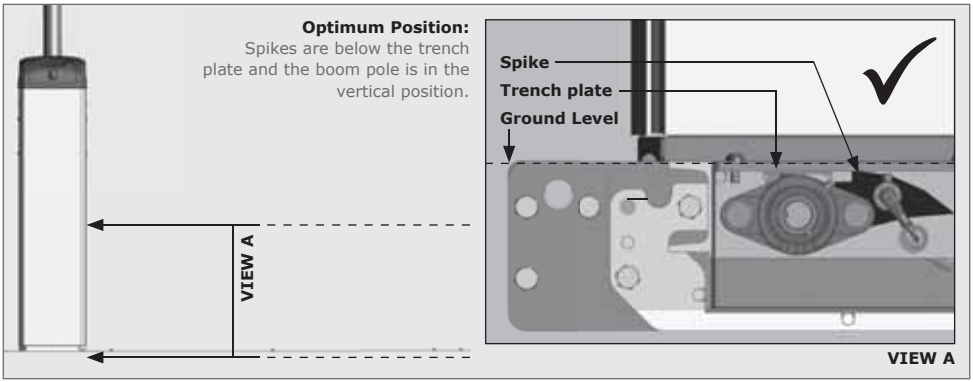


FIGURE 62

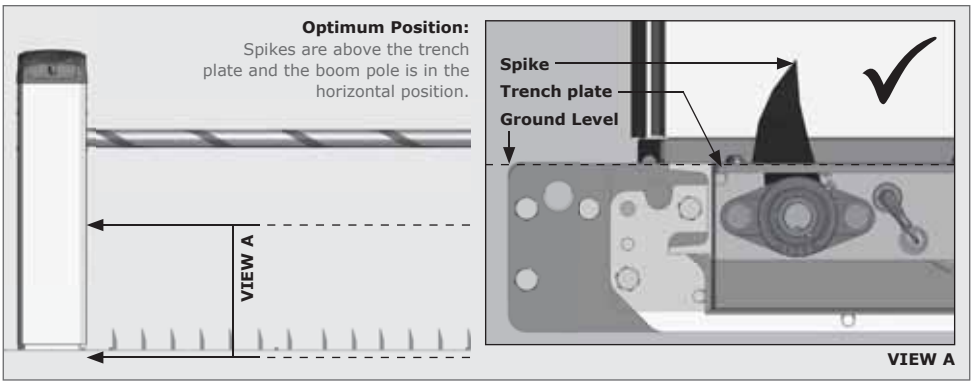
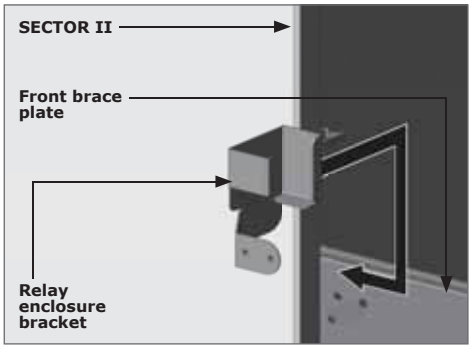


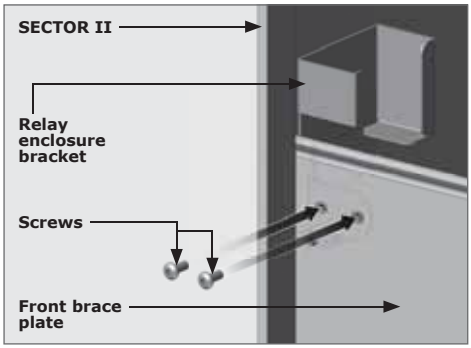
FIGURE 63

15.5. Completing the Assembly

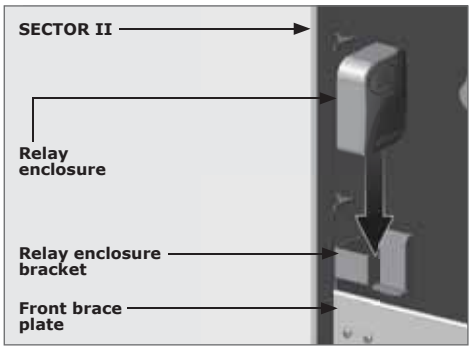
15.5.1. Fitting the relay enclosure and its bracket



STEP 1 FIGURE 64



STEP 2 FIGURE 65



STEP 3 FIGURE 66

Route the excess wire from the proximity sensor, and wire it to the relay by referring to the wiring diagram (Section 16).

Complete the installation of the SECTOR II as per its full installation manual, and proceed to 'Section 17 - Installation Handover'

16. Wiring Diagram

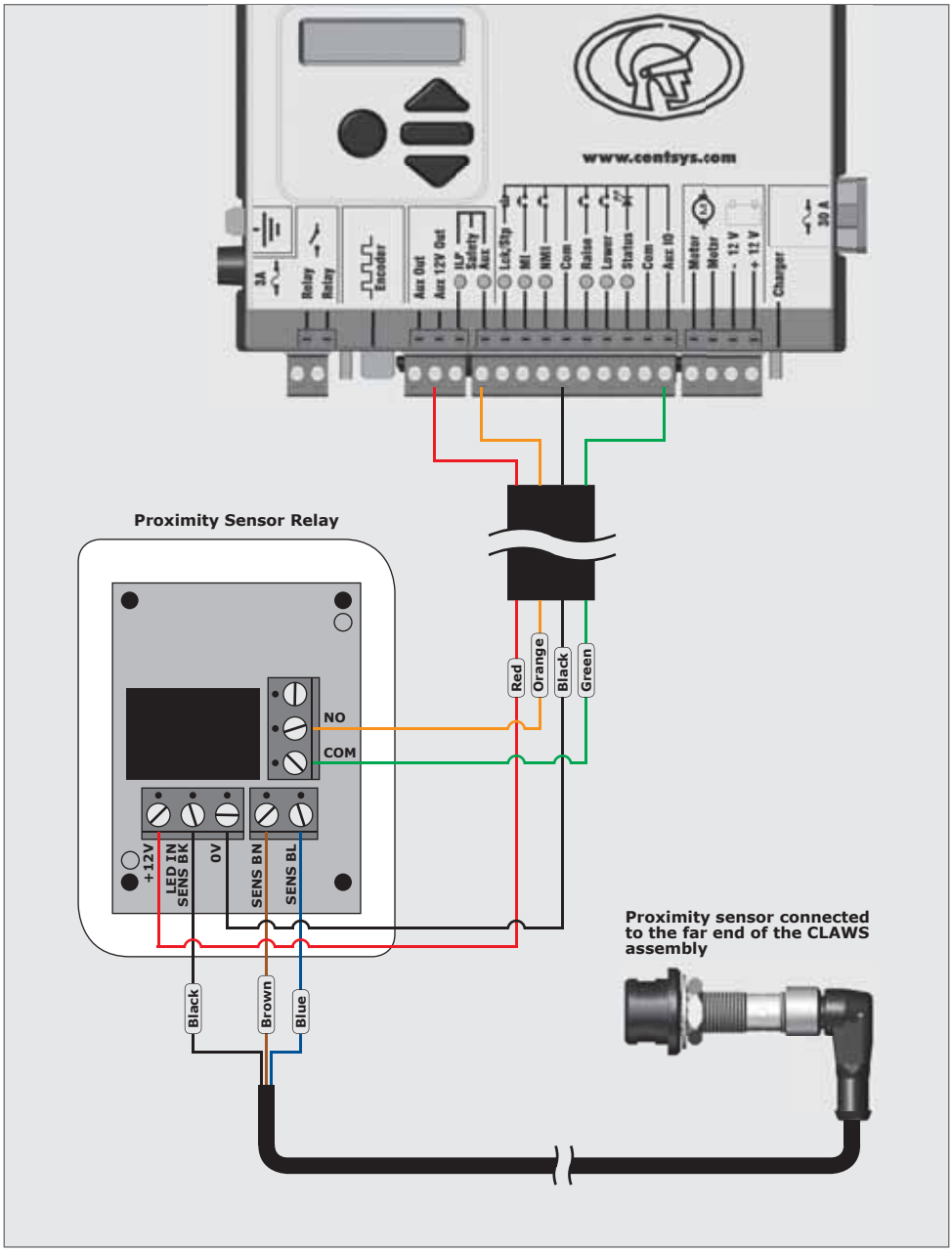


FIGURE 67

17. 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 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.

Notes

Notes

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