trimax MOWING SYSTEMS	SPARE PARTS INSTRUCTIONS #86
Date Created: 19/05/2020	**Product:** Snake
Title: MLS service guide	

SAFETY! Before attempting to make any adjustments or carry out maintenance on the mower, review the hazard identification table (section 3a of your Operator's Manual) and take all necessary precautions.

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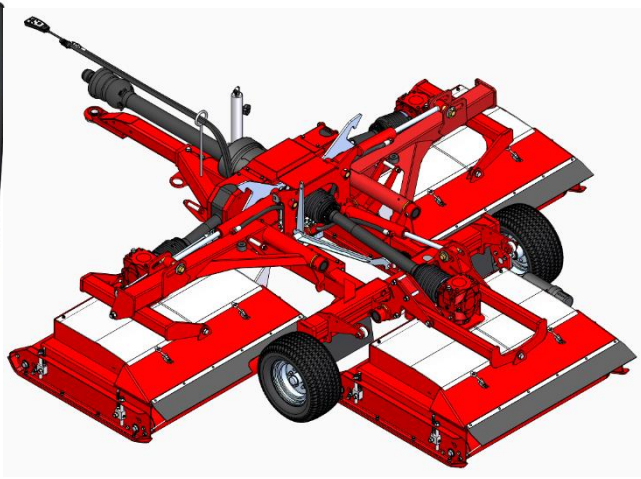
PRIOR TO WORKING ON THE MOWER



Park the Snake on a flat, level surface.

Ensure the surrounding area is clear of obstructions and people.

With the tractor running, and the lift system (MLS) in **Transport** mode, unlock the Transport Locks and gently lower the Mowing Decks down onto the ground.

Note:
For more detail on this process, please refer to your Snake Operator's Manual.

Prior to performing any work detailed in this procedure, isolate the power supply to the Snake.

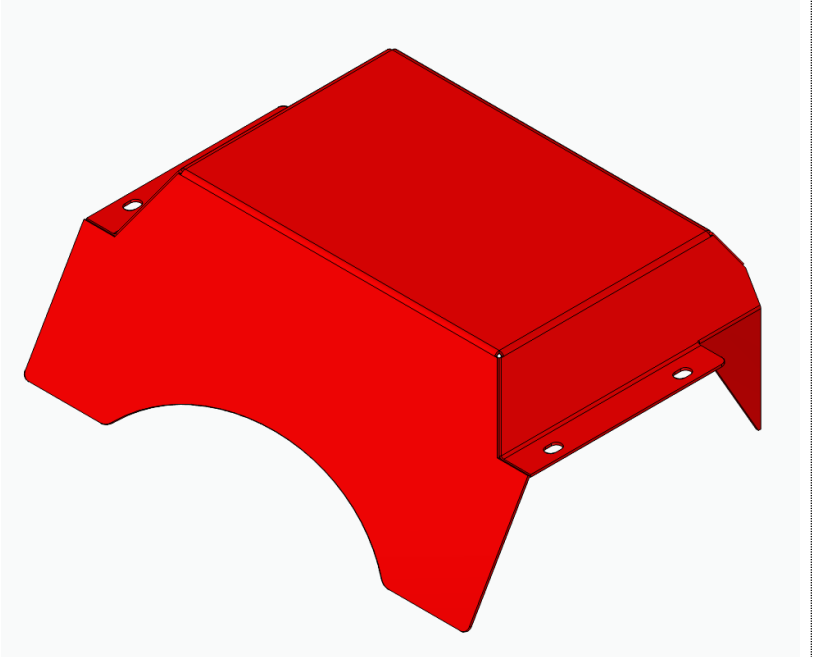
Firstly, switch the Tractor Ignition to the "**OFF"** position, then disconnect the Main Power Cable from between the Tractor and the Snake.

DO NOT work on live electrical equipment, as this is dangerous and may cause damage to electrical components and/or injury!

CAUTION:
Circuitry supplied suits **12-VOLT NEGATIVE EARTH SYSTEMS ONLY!**

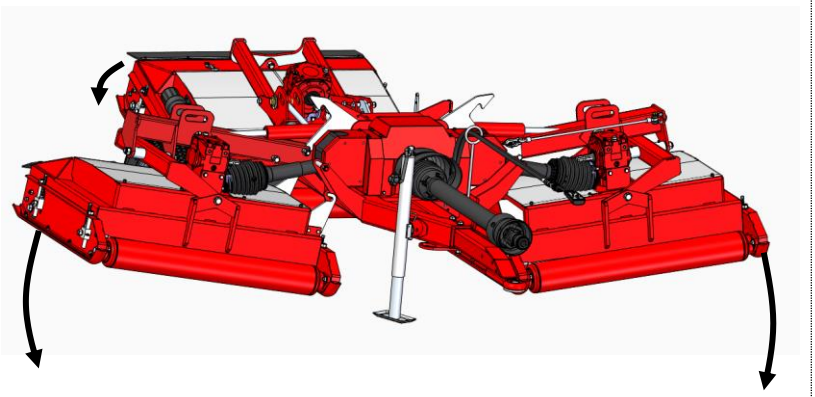
Trimax or its agents will not be held liable for any damage or warranty claims occurring as a result of failure to follow these instructions.

DRIVE PROTECT MODULE CENTRE COVER REPLACEMENT



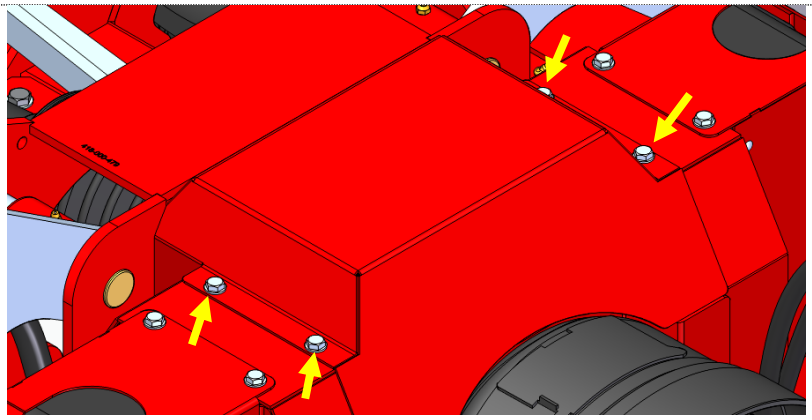
This section covers the removal and replacement of the Drive Protect command module cover – **410-000-365**.

Note:
This section will be referred to in other sections of this manual where the removal of this part is required.



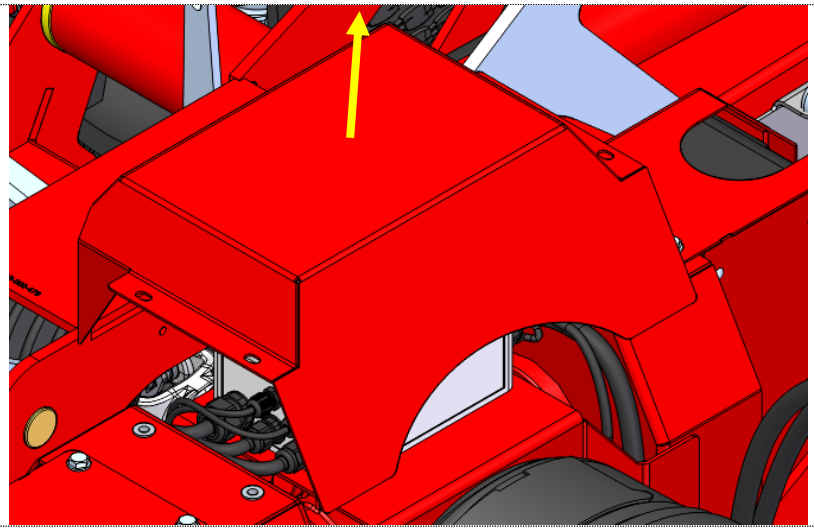
Begin by lowering the mower decks completely. This allows for easier access, but this process can be performed with decks raised. Ensure locks are engaged and safety rope is in place if decks are raised

IMPORTANT:
Do not work on the mower with the decks partially raised. This is very dangerous!



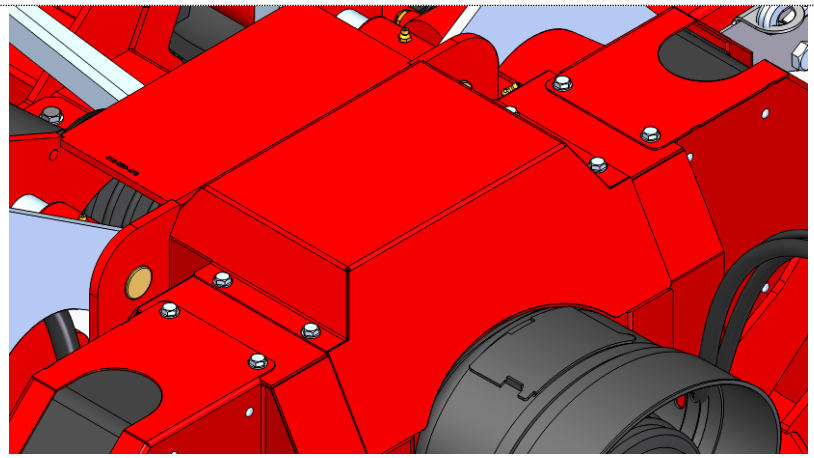
To remove the cover, begin by undoing the four M8 bolts securing the top section of the cover.

Put the fasteners to one side. These will be reused.



Remove the centre cover by lifting straight up.

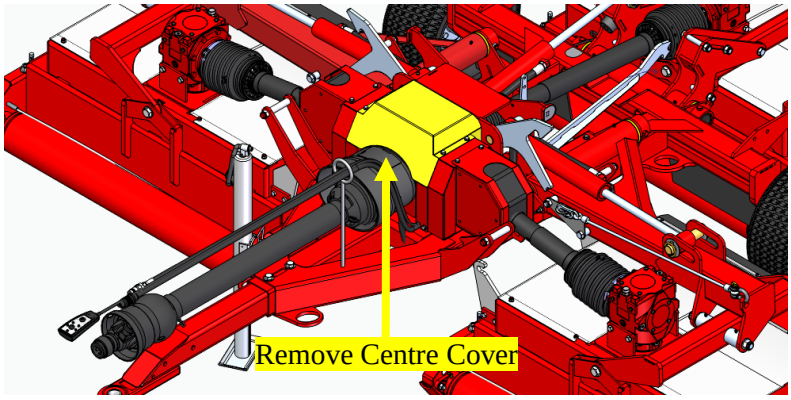
Re-fit the cover



To refit the cover or fit the replacement cover, simply reverse the above procedure.

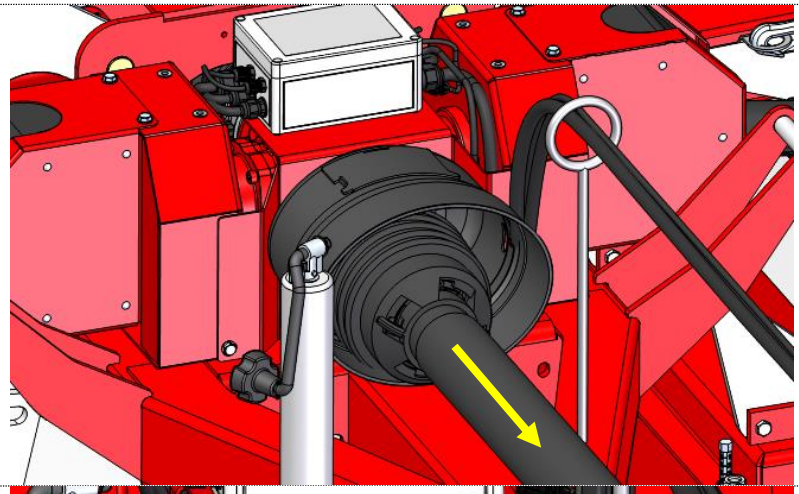
This process is now complete

HAND CONTROLLER REPLACEMENT

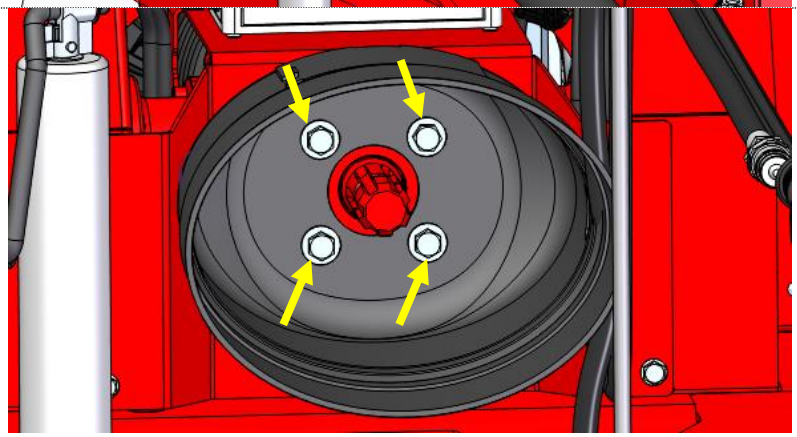


Remove the Drive Protect Module Centre Cover as highlighted **YELLOW** in the image opposite.

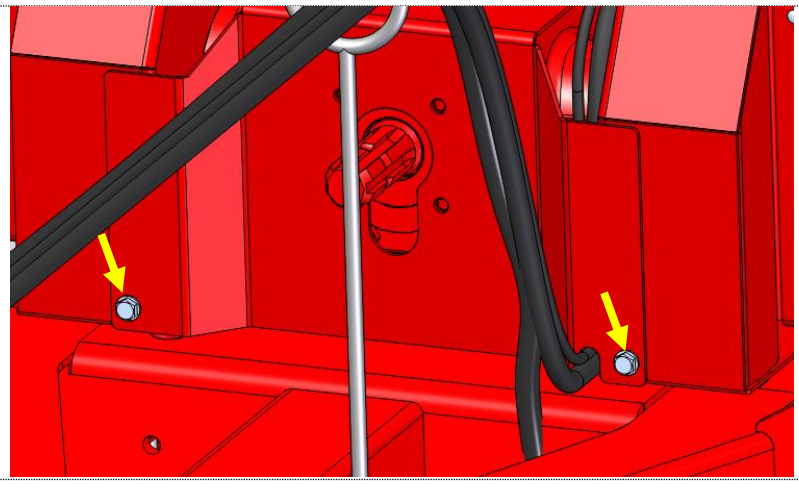
Note:
For more detail on this process, please refer to "Drive Protect module centre cover replacement" section of this Service Guide.



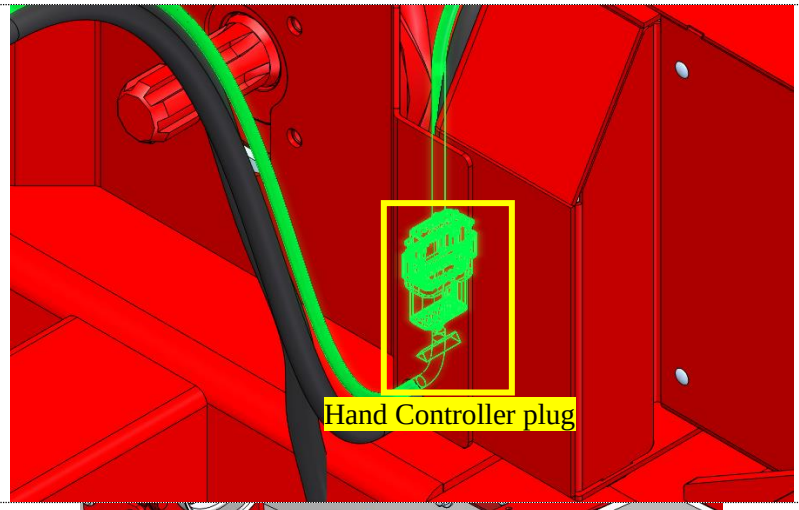
If the front PTO shaft is connected, remove it and set it aside.



Undo the four M10 bolts securing the PTO cone, remove the PTO cone and bolts and set them aside.

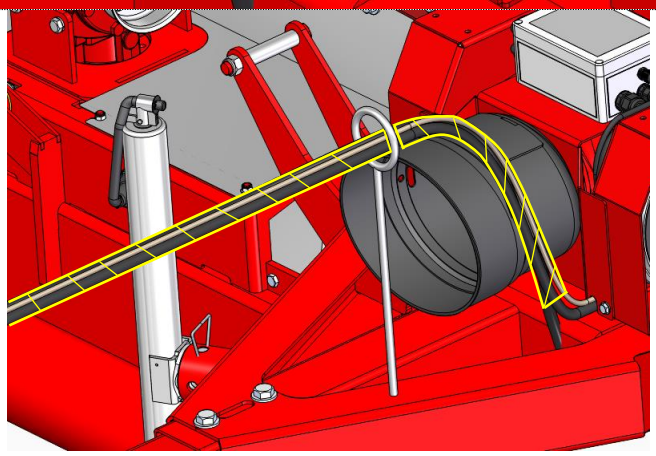


Undo the two M8 bolts securing the front cover, remove the bolts and set them aside.



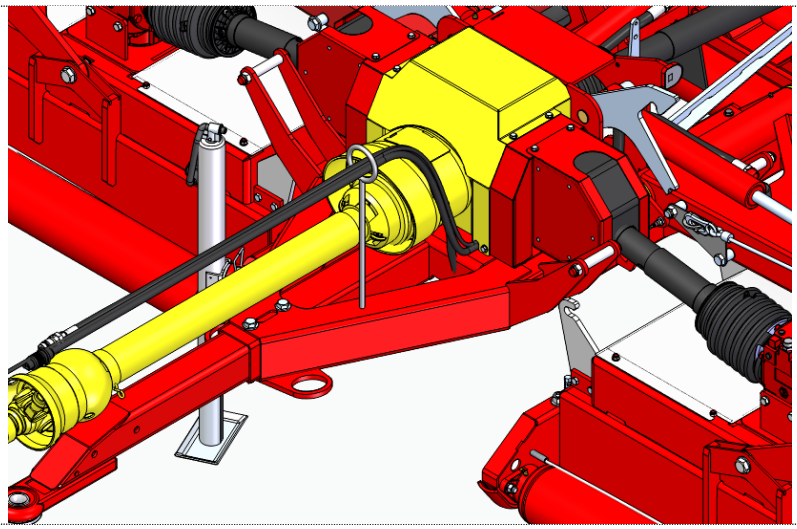
Gently lift the front cover so you can get access to the 12-pin Hand Controller plug behind it on the right-hand side, as viewed from the front. Disconnect the plug and remove from the slot in the front cover.

Note:
Do not use excessive force on the front cover as the control unit is attached to the front cover.



Remove the spiral wrap from the cables between the mower and the tractor, and remove the faulty Hand Controller.

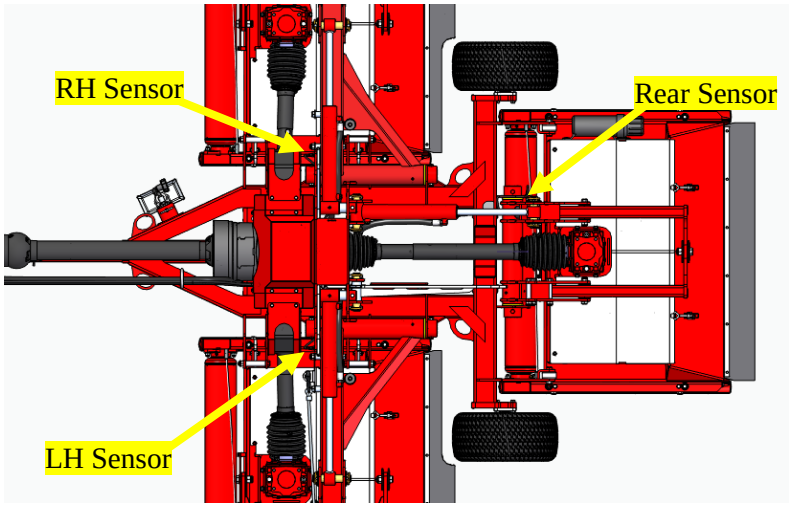
Replace the Hand Controller and re-fit the spiral wrap as it was previously.



Replace the previously removed cable ties, and re-fit the Drive Protect module front and centre covers, PTO Cone, and wide angle PTO shaft.

This process is now complete

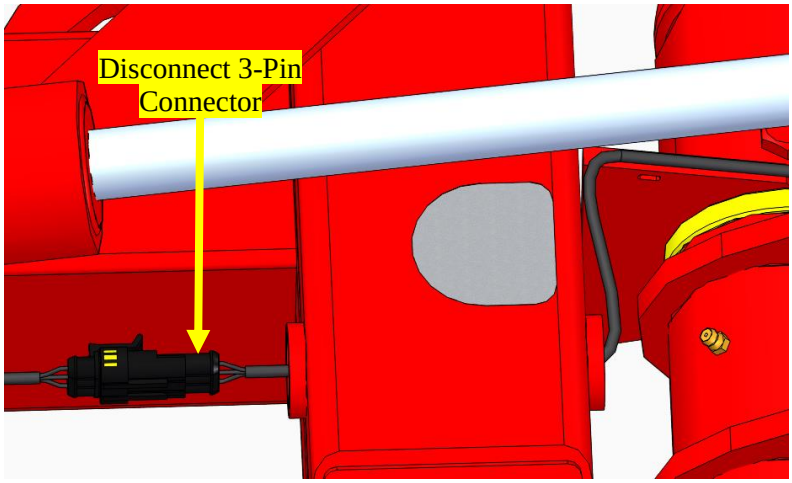
PROXIMITY SENSOR REPLACEMENT



There are three Proximity Sensors (**421-000-118**) fitted to the Snake Chassis, one is near each Outrigger Arm.

Their locations are shown in the birdseye view image shown.

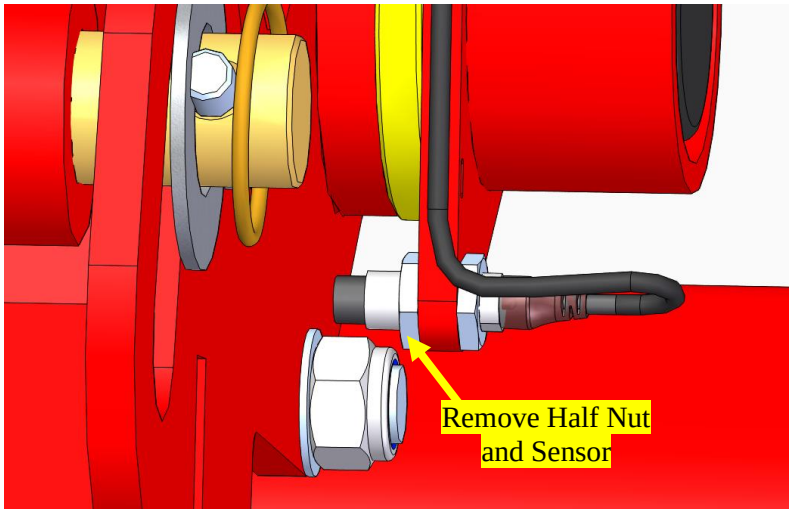
Note:
Only the Rear Proximity Sensor is shown throughout this section. The replacement process is **identical** for all three Sensors.



Once the faulty Proxitmity Sensor is identified, trace the Cable back towards the Command Module above the Chassis Gearbox until the 3-Pin Connector is found.

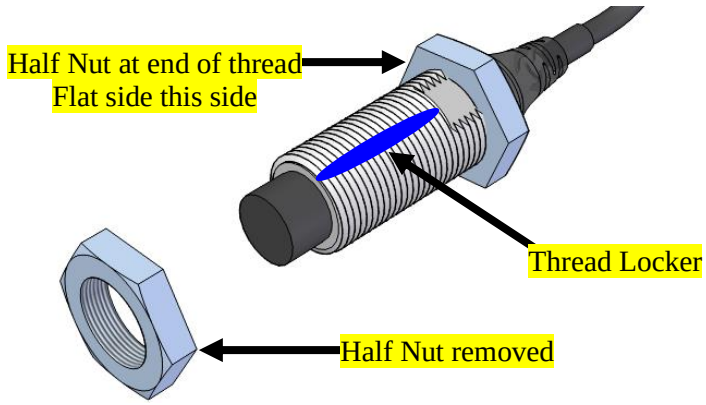
Disconnect this 3-Pin Connector.

Carefully cut any Cable Ties used to retain the Proximity Sensor Cable to the Chassis.



Remove the Half Nut shown from **BLACK** end of the faulty Proximity Sensor.

Remove the faulty Proximity Sensor from the Chassis.



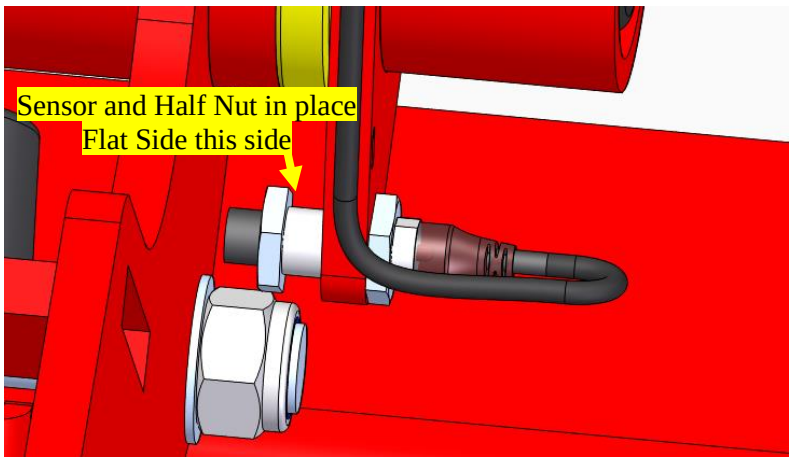
Remove both Half Nuts from the replacement Proximity Sensor.

Apply **MEDIUM STRENGTH THREAD LOCKING COMPOUND** along thread on the Proximity Sensor.

Refit one Half Nut with the flat side facing the end of the sensor and wind to cable end.

The image opposite shows a Sensor prepared for fitment.

IMPORTANT:
Ensure the **FLAT** side of the Nut is facing the **BLACK** end of the Sensor.

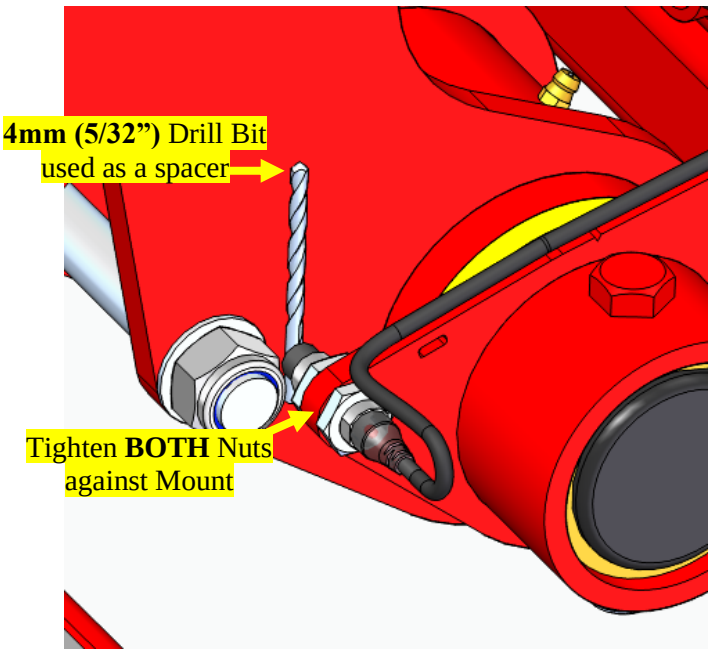


Pass the **BLACK** end of the Sensor through the Proximity Sensor Mount on the Chassis as shown.

Refit the other Nut to the Proximity Sensor.

DO NOT tighten at this stage!

IMPORTANT:
Ensure the **FLAT** side of the Nut is facing **AWAY** from the **BLACK** end of the Sensor.



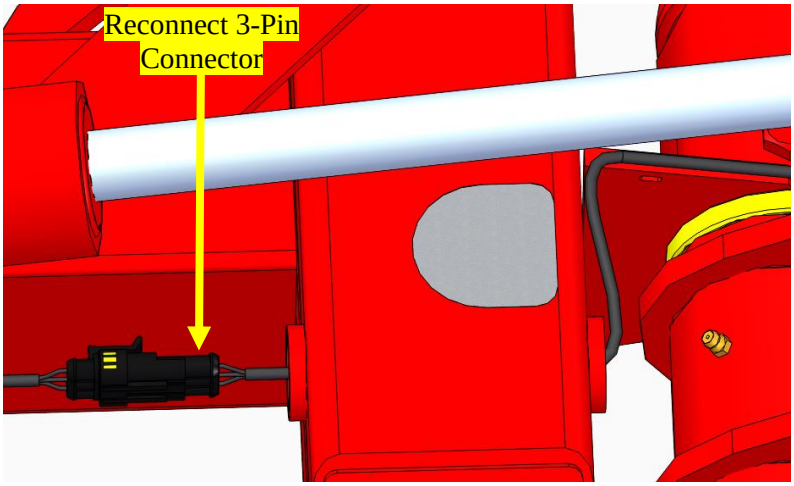
Set the **BLACK** end of Proximity Sensor **4mm (5/32")** away from the Outrigger Arm.

A **4mm (5/32")** Drill Bit or Allen Key is ideal for setting this spacing.

Once set, tighten **BOTH** Nuts against the Mount.

DO NOT overtighten or the Sensor may be damaged!

IMPORTANT:
It is **CRITICAL** that the Sensor is set to the correct distance from the Outrigger! The system can malfunction if set incorrectly!



Reconnect the 3-Pin Connector.

Resecure the Cable using Cable Ties in the original locations.

Trim the “tails” off of the Cable Ties.

Reconnect the Main Power Cable to the Tractor.

Ensure that the Tractor PTO output is **DISENGAGED**.

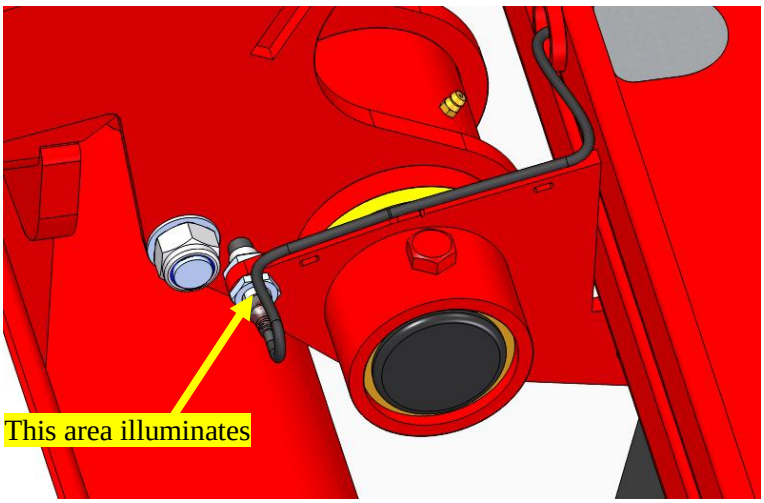
Start the Tractor Engine.

Observe the Hand Controller.

When first powering on, all lights will flash.

Press the **“Mode”** button once to enter “**Transport** mode”

The transport mode indicator light will stay on and all others will turn off.



With the Mowing Decks in the **LOWERED** position, check all three Proximity Sensors.

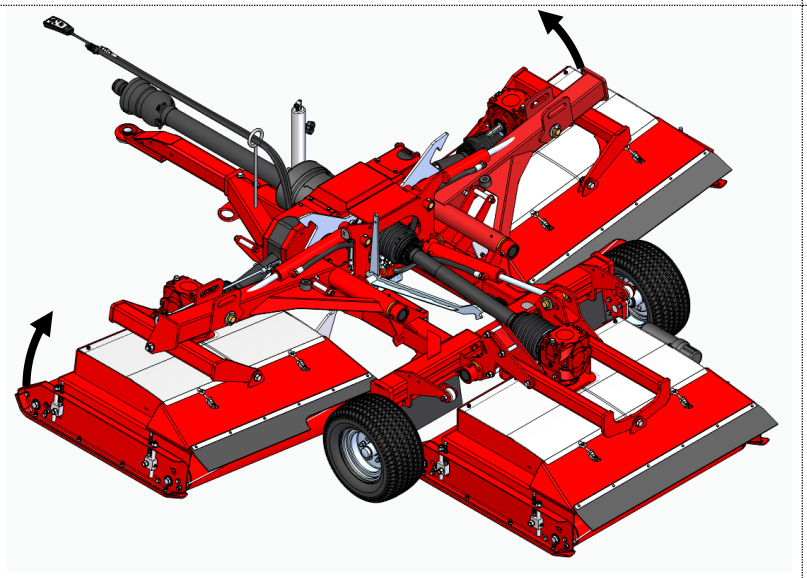
One shown.

IMPORTANT:
The white part of each Sensor should be illuminated **ORANGE**. This indicates that the Sensors are being triggered by the Outrigger Arms as the Mowing Decks are in the lowered position.

Press the **"Mode"** button on the Hand Controller to enter **BiLift** mode.

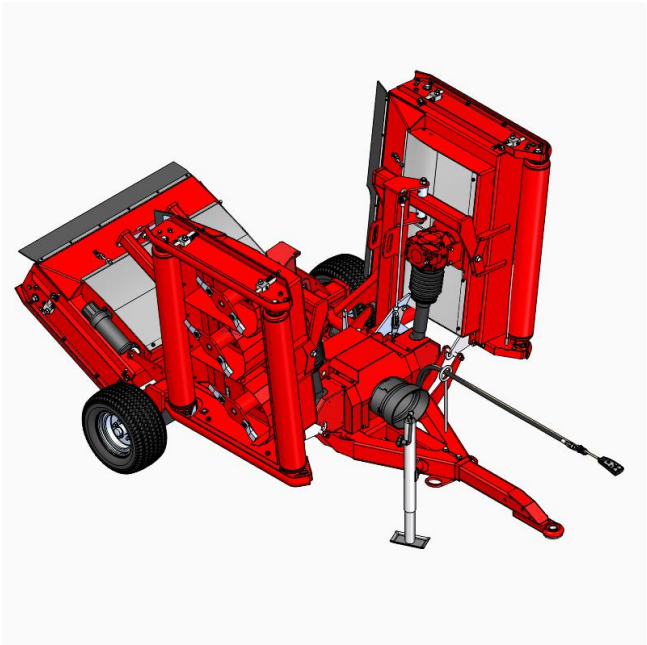
The BiLift light will illuminate, all other lights will be off.

Operate the Tractor hydraulics and raise the Mowing Decks.



The Side Mowing Decks should pause with the **OUTERMOST** Blades at no more than **400mm (15 3/4")** above the ground.

IMPORTANT:
If this does not occur, the Sensor may not be set up correctly. Ensure that the Sensor is set as described earlier in this procedure.



Once the above tests have occurred, press the "Mode" Button until the system is in "Transport Mode"

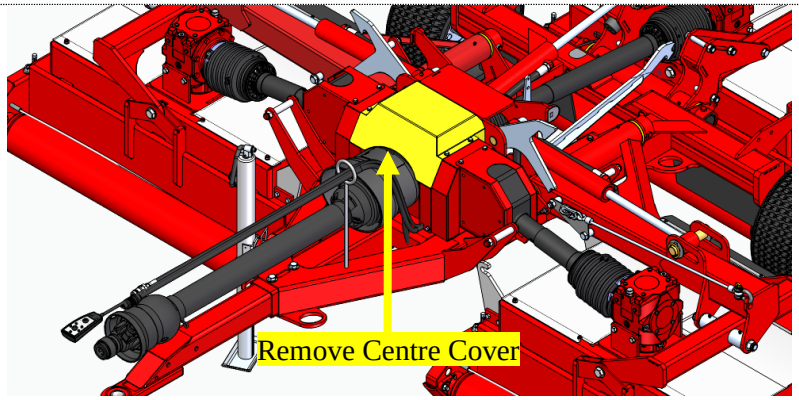
Raise the Mowing Decks to their raised position and engage the Transport Locks.

Check all three Proximity Sensors.

IMPORTANT:
The white part of each Sensor should **NOT** be illuminated. This indicates that the Sensors are **NOT** being triggered by the Outrigger Arms as the Mowing Decks are in the raised position.

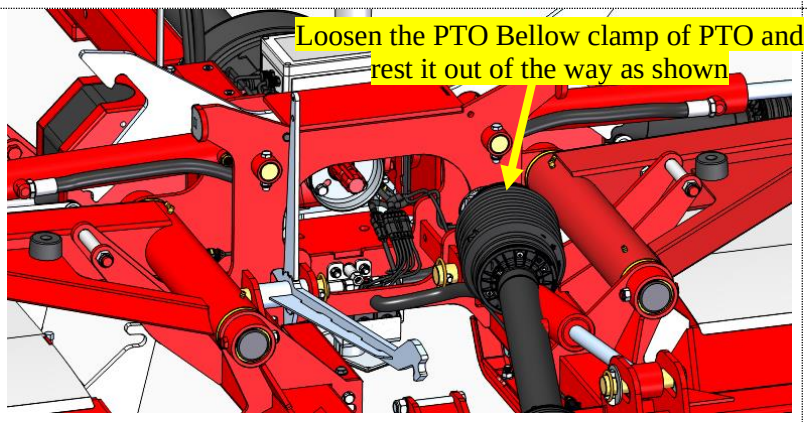
	**IMPORTANT:** If there are still issues with the Proximity Sensors, please refer to your Operator's Manual for additional troubleshooting information or contact your Authorized Service Agent/Trimax Mowing Systems Representative.
This process is now complete	

PTO SENSOR REPLACEMENT



Remove the Drive Protect Module Centre Cover as highlighted **YELLOW** in the image opposite.

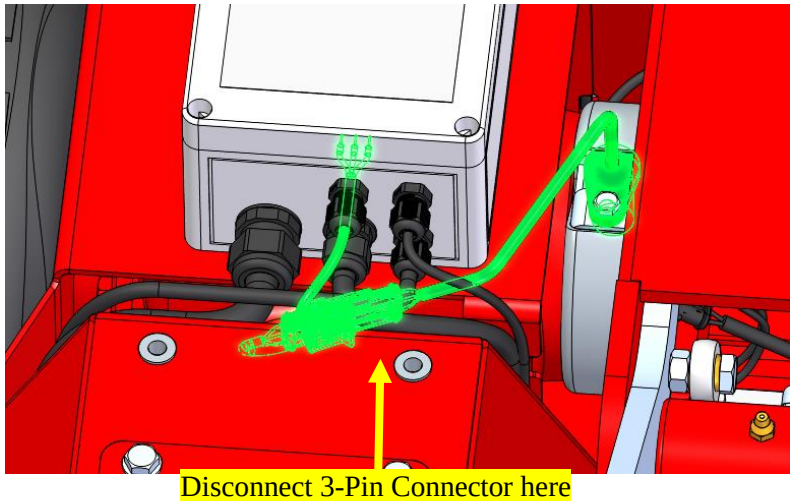
Note:
For more detail on this process, please refer to “Drive Protect module centre cover replacement” section of this Service Guide.



Loosen the PTO Bellow clamp and slide back the bellow fitted to the **REAR** of the Chassis Gearbox.

Depress the Push Pin and slide the PTO Shaft off the Chassis Gearbox.

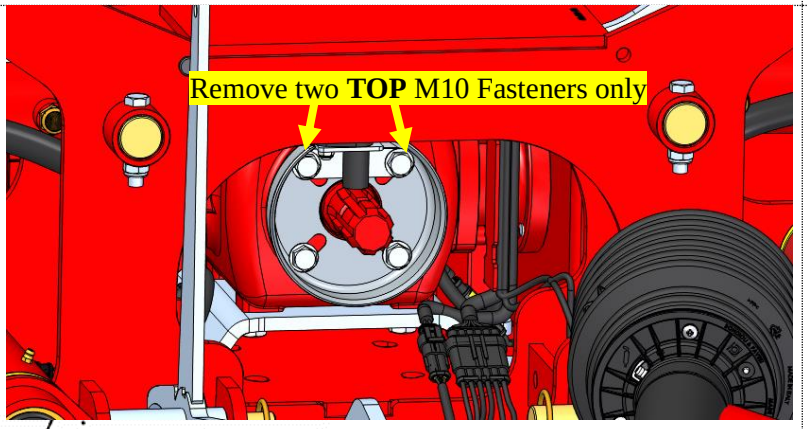
Rest this end of the PTO Shaft on the Rear Hydraulic Cylinder as shown.



Disconnect the PTO Speed Sensor from the Command Module by unplugging the 3-Pin Connector. This is located on the **LEFT** side of the Command Module.

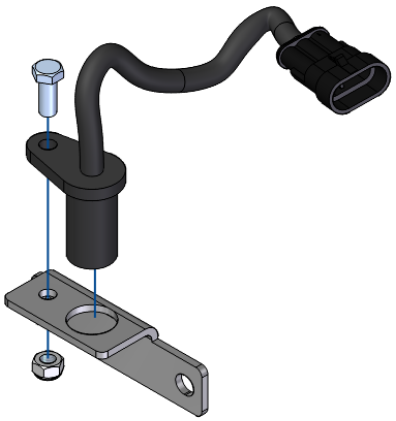
The Cable and Connector are highlighted **GREEN** in the image opposite.

Note:
All other Cables are hidden throughout this procedure for clarity.



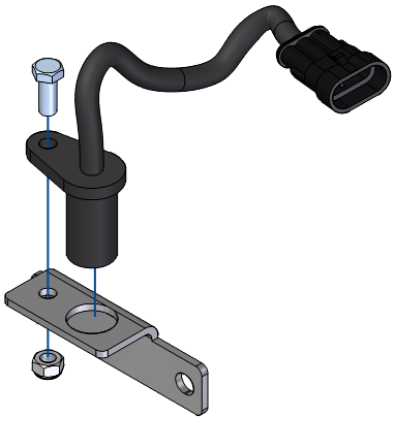
Remove the two **TOP** M10 x 16 Bolts and Flat Washers used to secure the PTO Cone to the **REAR** of the Chassis Gearbox.

Remove the faulty PTO Speed Sensor Assembly, leaving the PTO Cone mounted to the gearbox.



Remove the M6 x 16 Bolt and M6 Nyloc Nut shown to separate the PTO Speed Sensor from the Mounting Bracket.

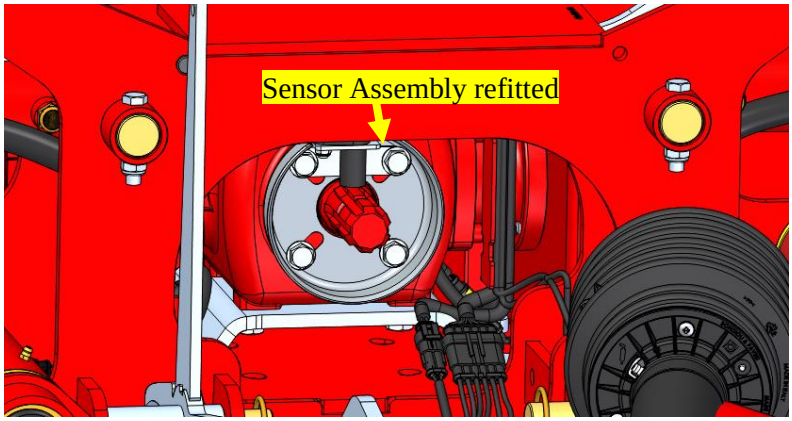
Retain the Molunting Bracket and Fasteners.



Collect the replacement PTO Speed Sensor (**418-000-117**).

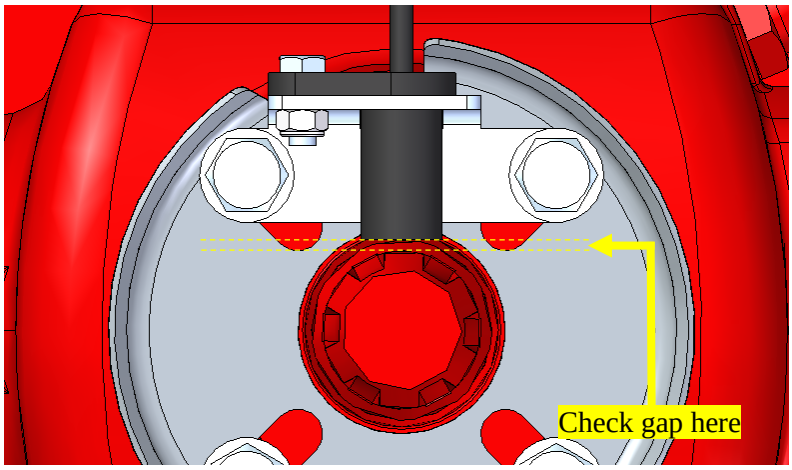
Attach to the Mounting Bracket using the M6 x 16 Bolt and M6 Nyloc Nut.

Tighten to secure.



Offer PTO Speed Sensor Assembly up to the PTO Cone on the Chassis Gearbox.

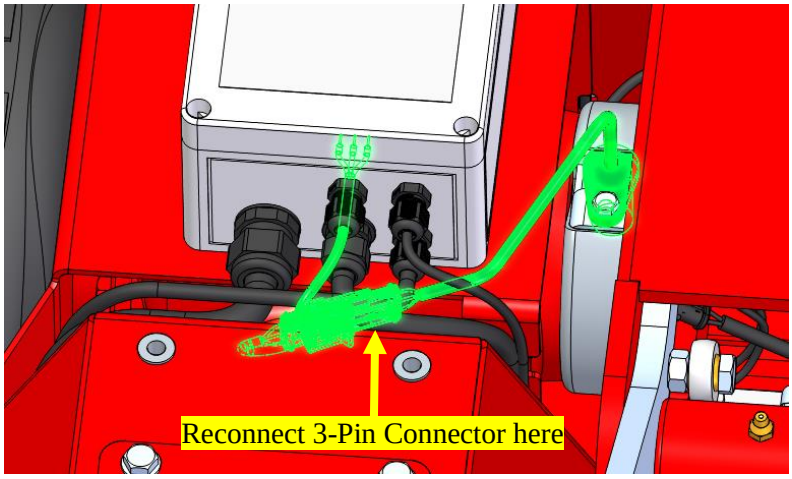
Secure using M10 x 16 Bolts and M10 Flat Washers.



IMPORTANT:
The gap between the PTO Speed Sensor and splined shaft should be **2mm-3.5mm (3/32”-1/8”)** for the sensor to function correctly.

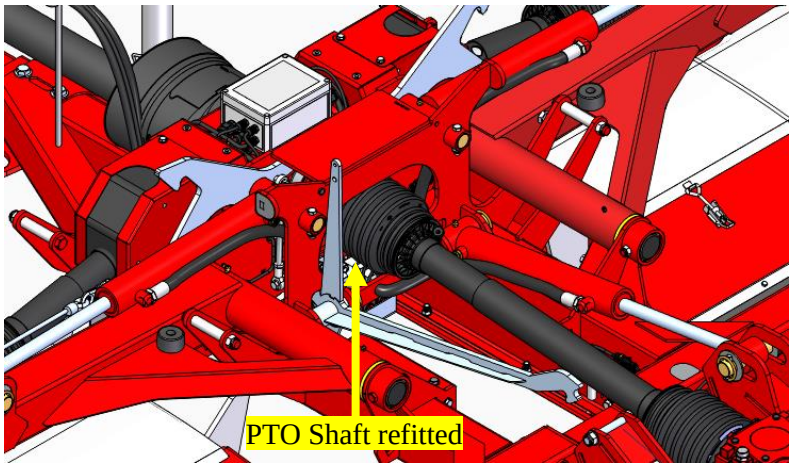
If this gap is too large or small, ensure all parts are fitted as detailed above.

If this specification is still not achievable, contact your Authorized Service Agent or Trimax Mowing Systems Representative.



Reconnect the PTO Speed Sensor to the Command Module by plugging in the 3-Pin Connector.

The Cable and Connector are highlighted **GREEN** in the image opposite.

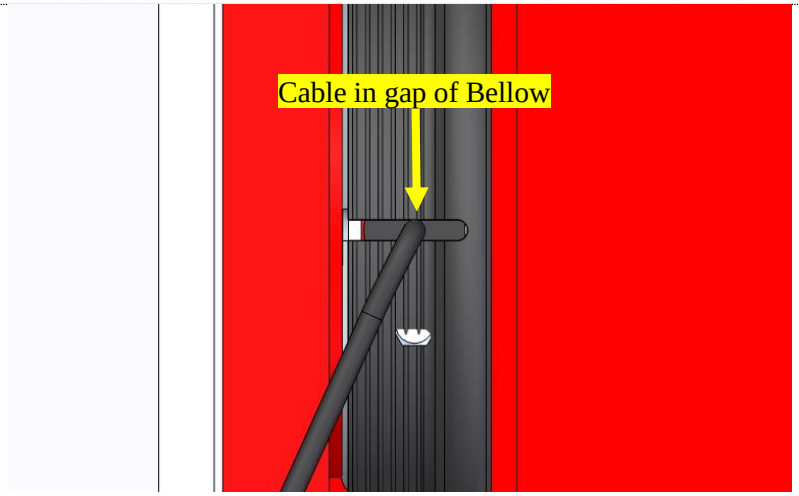


Refit the Rear PTO Shaft to the Chassis Gearbox.

Depress the Push Pin, align the internal splines in the PTO Shaft with the external spines on the Gearbox Shaft.

Push the PTO Shaft onto the Gearbox Shaft.
Release the Push Pin.

IMPORTANT:
Use caution during this step to avoid damaging the replacement Sensor.



Fit the PTO Bellow over the gearbox cone. Take care to align the gap in the Bellow with the Sensor cable.

Refit the PTO Bellow Clamp and tighten to secure the PTO Bellow.

Note:
Take care when tightening clamp not to crush the sensor cable.

Reconnect the Main Power Cable to the Tractor.

Ensure that the Tractor PTO output is **DISENGAGED**.

Switch the Tractor ignition to the **"ON"** position and start the engine.

IMPORTANT:
Check the Operation of the replacement PTO Speed Sensor.

With the Mowing Decks in the **LOWERED** position, press the "MODE" button once to enter Transport Mode.

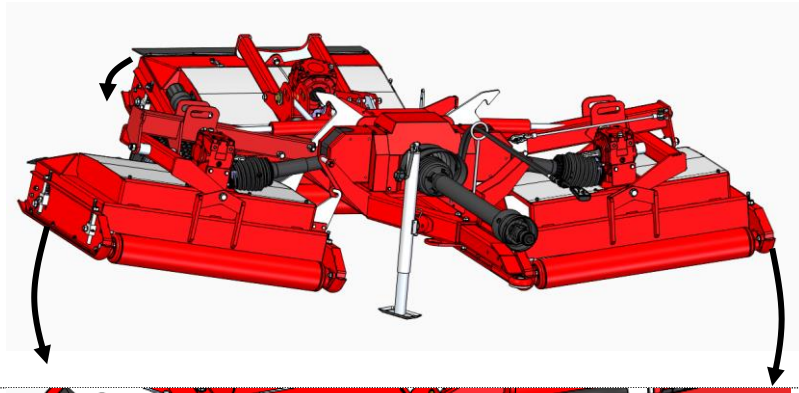
Engage the Tractor PTO Output. Observe the transport light on the Hand Controller.

If the transport light on the Hand Controller blinks while the PTO is running, the Sensor is functioning correctly.

Note:
If the transport light does not blink during this process, please refer to your Operator's Manual for additional troubleshooting information or contact your Authorized Service Agent/Trimax Mowing Systems Representative.

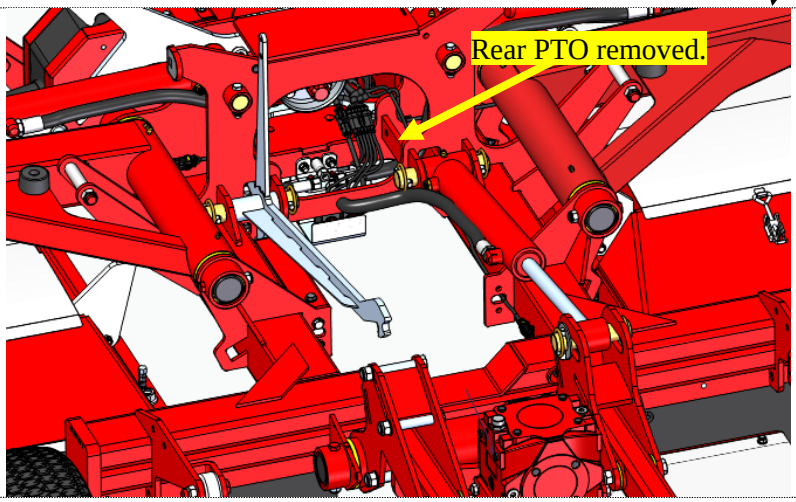
This process is now complete

UNLOCK ACTUATOR REPLACEMENT



Begin by lowering the mower decks completely.

IMPORTANT:
Do not work on the mower with the decks partially raised. This is very dangerous!

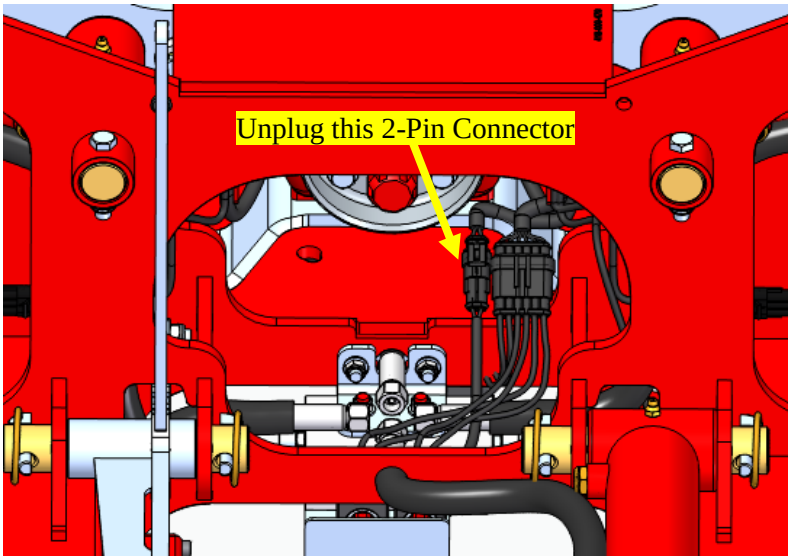


Loosen the PTO Bellow clamps at both ends of the **REAR** PTO and slide back the bellow fitted to the **REAR** of the Chassis Gearbox.

Depress the Push Pin and slide the PTO Shaft off the Chassis Gearbox.

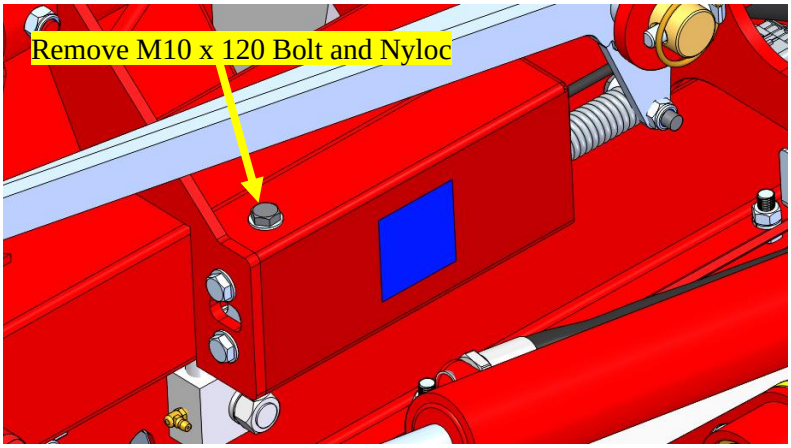
Repeat at the opposite end of the rear PTO to remove the rear PTO from the mower.

Set aside. The PTO will be refitted later.



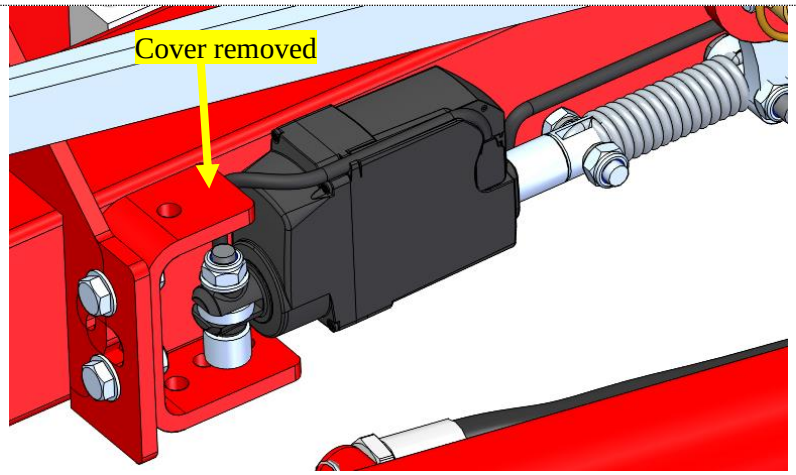
Disconnect the Unlock Actuator from the Command Module by unplugging the 2-Pin Connector shown behind the Chassis Gearbox.

Pull the Cable back through the holes in the Lift Frame.



Remove the M10 x 120 Bolt and Nyloc from the Actuator cover

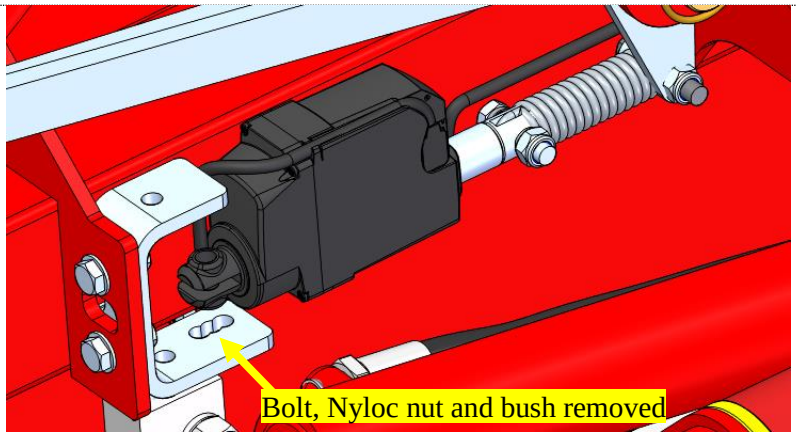
Set aside. These will be refitted later.



Remove the Actuator cover by sliding out from Chassis.
Set aside. Cover will be refitted later.

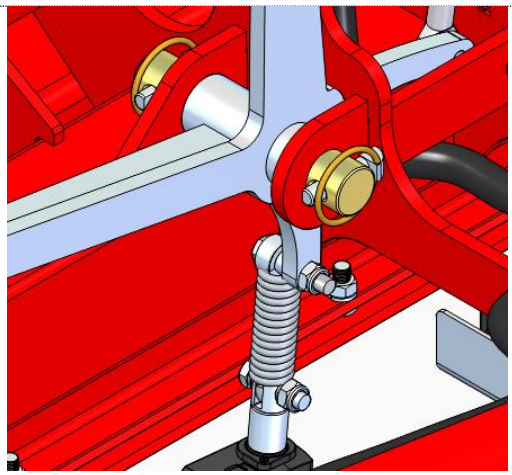
IMPORTANT:
Take note of which hole position the Unlock Actuator is mounted to in the Mounting Bracket.

The new Unlock Actuator will need to be mounted to the same position.

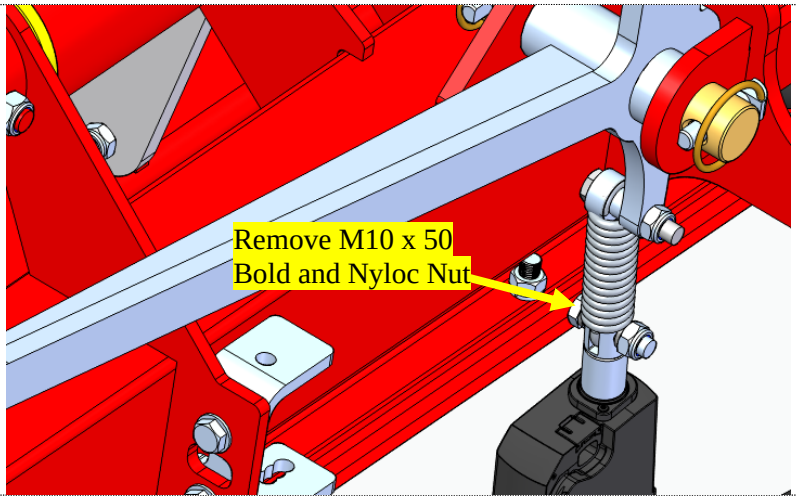


Remove the M10 x 65 Bolt and M10 Nyloc Nut used to secure the Unlock Actuator to the Mounting Bracket.

IMPORTANT:
Be careful not to lose the Boss (**402-000-106**) and Bush (402-000-107) used to mount the Actuator as this will be reused.

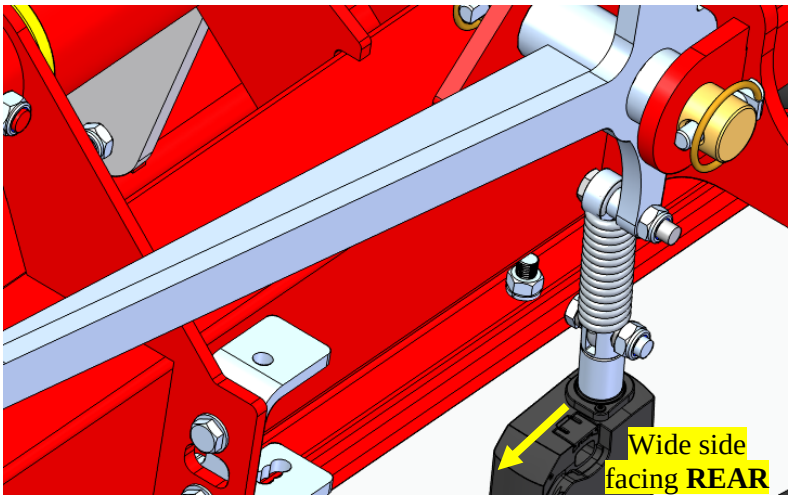


Rotate the actuator so it is hanging vertically. This will give room to remove the last bolt.



Remove the M10 x 50 Bolt and M10 Nyloc Nut used to connect the Unlock Actuator to the Unlock Spring.

Remove the faulty Unlock Actuator.

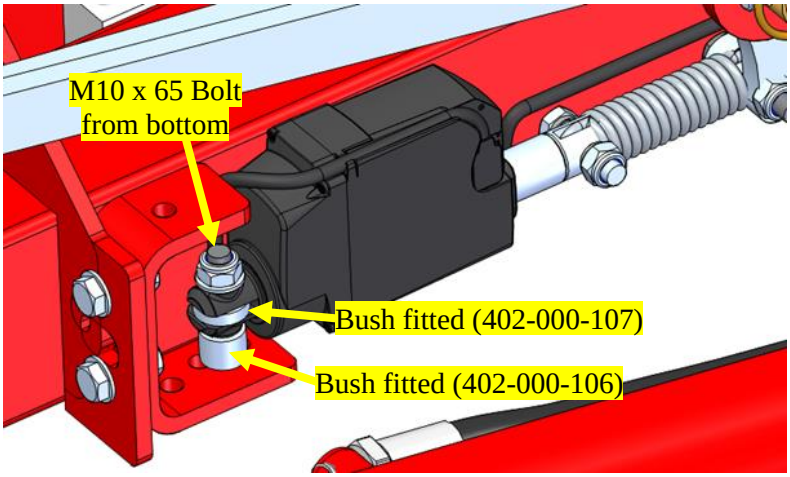


Collect the replacement Unlock Actuator.

Mount the actuator ram to the spring with the M10 x 50 Bolt and Nyloc removed in previous step.

Ensure the wide side of the actuator is facing the rear of the chassis.

Note:
It does not matter if the Actuator is extended or retracted at this stage.

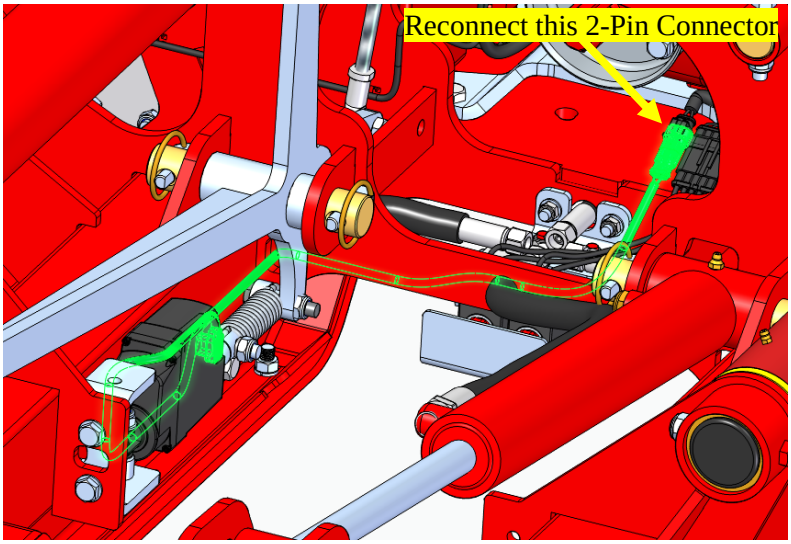


Secure the Unlock Actuator to the Mounting Bracket using an M10 x 65 Bolt and M10 Flat Washer from the bottom and M10 Flat Washer with M10 Nyloc Nut from the top.

Ensure that the Boss and Bush removed earlier are fitted as shown.

Tighten to secure.

IMPORTANT:
Use the same mounting position as the original Unlock Actuator.



Run the Cable through hole in rear of Lift Frame as shown in GREEN.

Reconnect the 2-Pin Connector.

Reconnect the Main Power Cable to the Tractor.

Switch the Tractor ignition to the **"ON"** position.

DO NOT start the engine at this point.

Ensure that the Tractor PTO output is **DISENGAGED**.

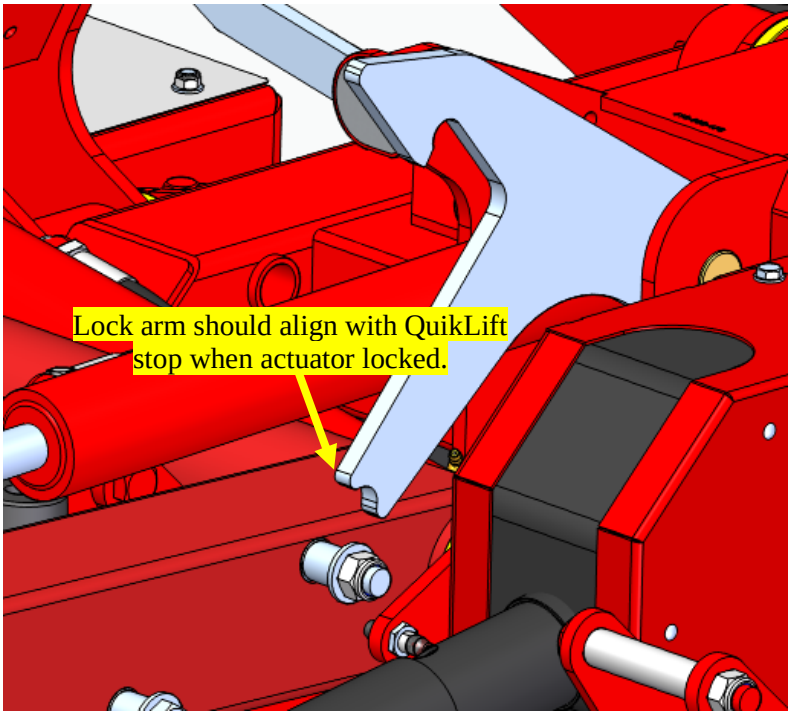
IMPORTANT:
When first powering on the system, observe the Hand Controller.

All mode lights will flash.

Press the "Mode" button once to enter transport mode.

The transport light will stay on and all others will turn off.

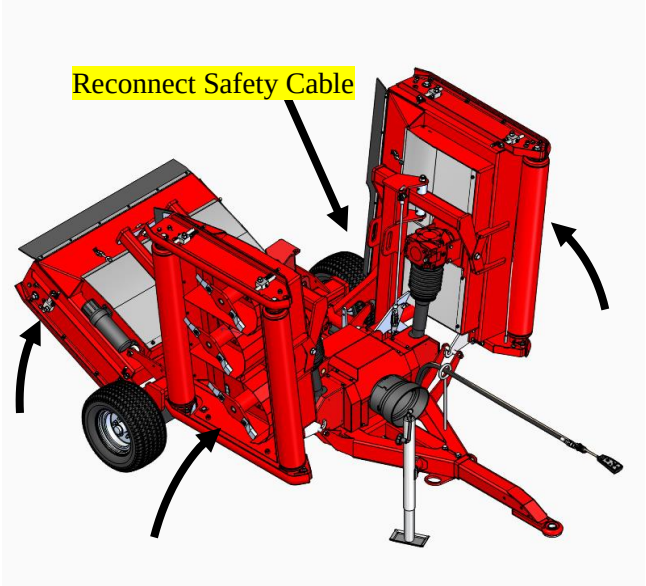
The Unlock Actuator will extend, then the unlock light will turn off.



With the Actuator extended, **ALL** three Transport Lock Arms should be lowered, and lower stops should align with the QuikLift stops.

Note:
If the Unlock Spring is under excessive tension, move the bolt forwards one-hole position.

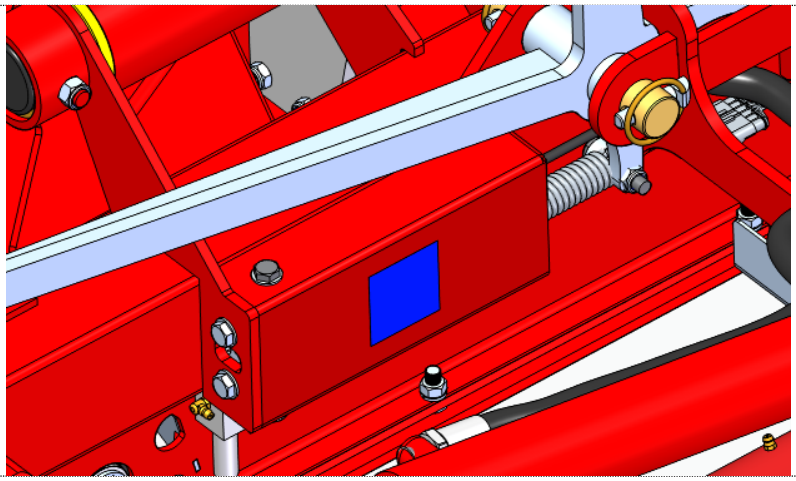
If the Unlock Spring is too slack, move it back one-hole position.



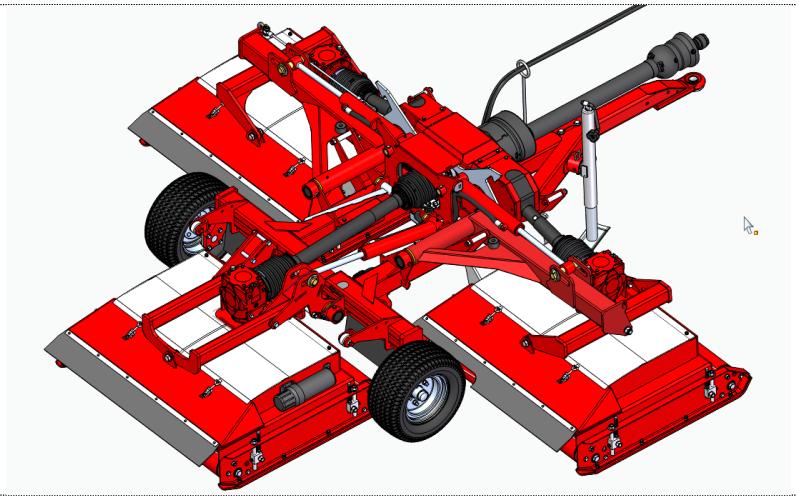
Use the Tractor hydraulics to raise **ALL** Mowing Decks to their **MAXIMUM.**

IMPORTANT:
Check that all three Transport Lock Arms are engaged correctly on their respective hooks.

Reconnect the Safety Rope between the Outrigger Arms.



Refit the Actuator Cover with an M10 x 120 Bolt, two M10 Flat Washers and Nyloc Nut.

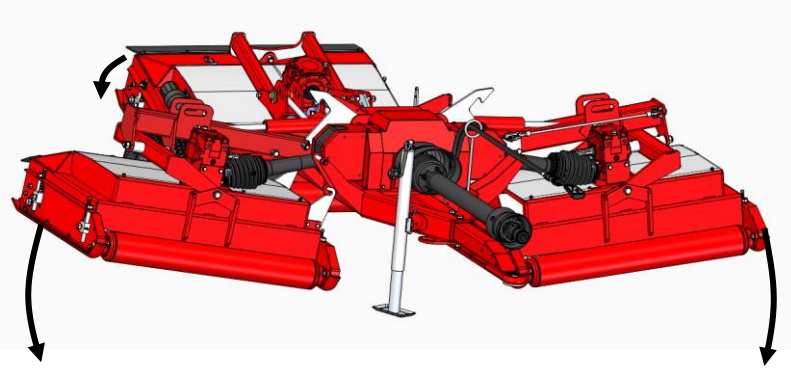


Refit the Rear PTO and tighten Bellow clamps.

Note:
Take care when tightening clamp not to crush the PTO sensor cable.

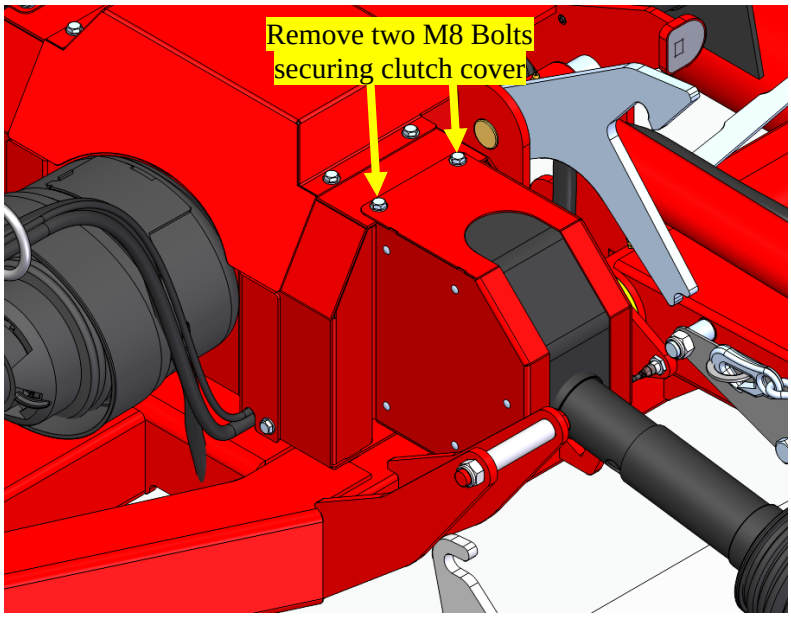
This process is now complete

CLUTCH REPLACEMENT



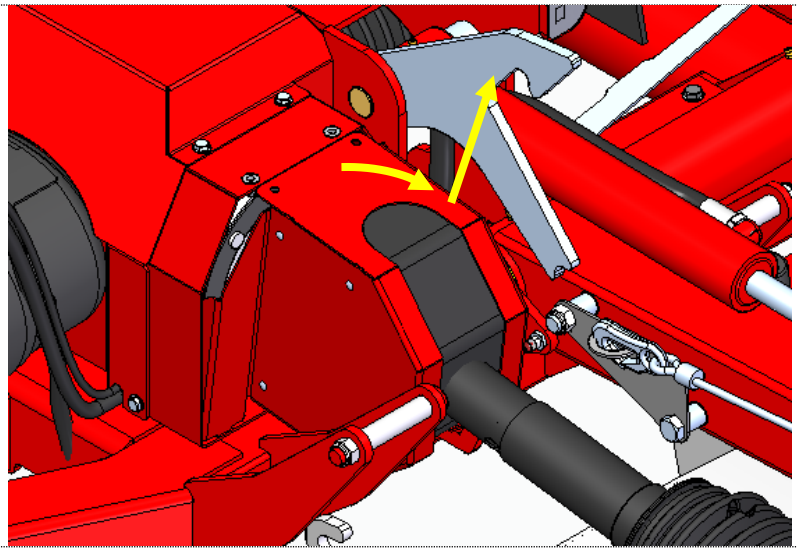
Begin by lowering the mower decks completely.

IMPORTANT:
Do not work on the mower with the decks partially raised. This is very dangerous!



On the side of the Snake that has a faulty Clutch, remove two M8 Bolts securing clutch cover.

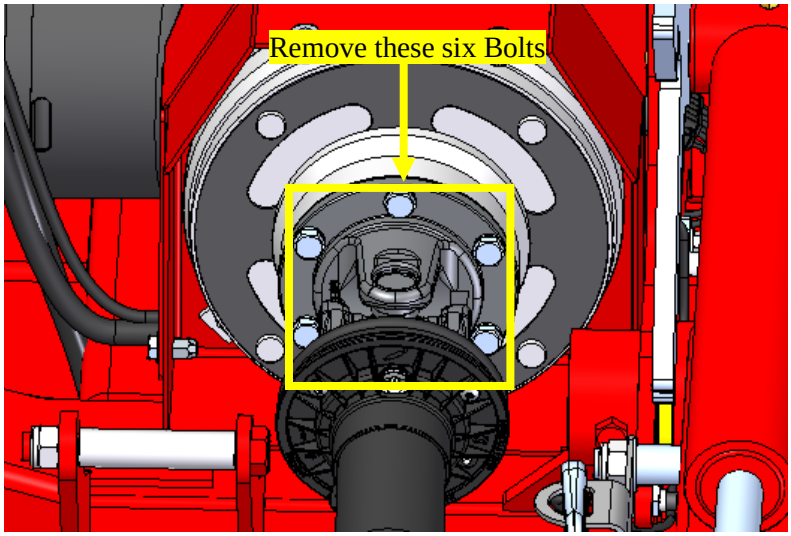
Note:
This process can apply to either the LH or RH Clutch. The LH Clutch is shown throughout this procedure.



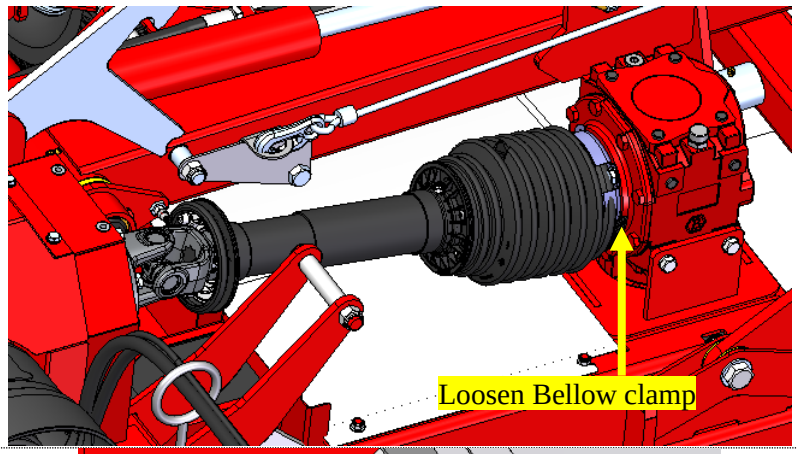
Tilt the top of the cover away from the back section before lifting up at an angle.

There will be some resistance from the bristles around the PTO but will lift off the mower.

Set cover aside as it will be refitted later.



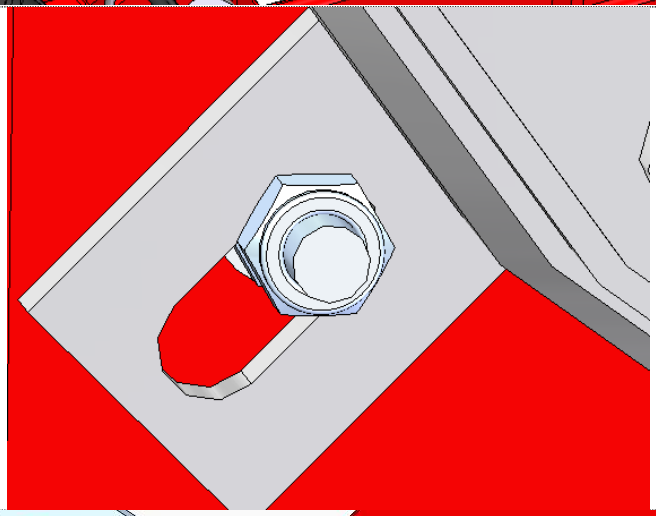
Remove the six M10 x 30 Bolts and M10 Spring Washers from the PTO Mounting Flange. Rest this end of the PTO Shaft somehere where it will not fall.



At the Mowing Deck end of the PTO Shaft, loosen the bellow clamp and pull the bellow back.

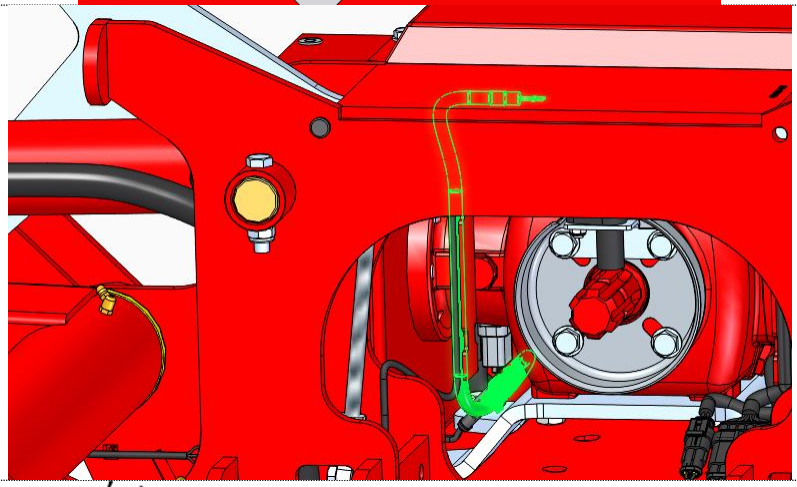
Depress the Push Pin and slide the PTO Shaft off the Mowing Deck Gearbox.

Remove the PTO Shaft from the mower.



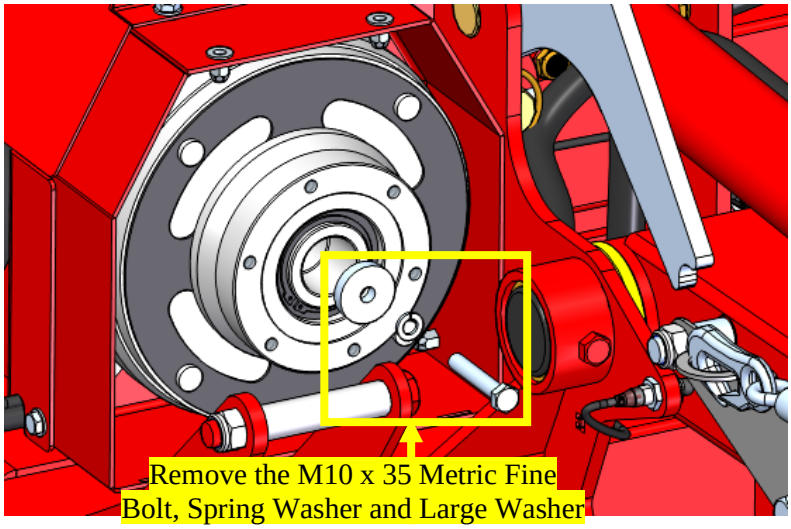
Remove M6 Nyloc Nut holding clutch tag.

Set aside as this will be reused later.



Disconnect the Clutch from the Command Module by unplugging the 2-Pin Connector behind the rear clutch cover as shown in GREEN.

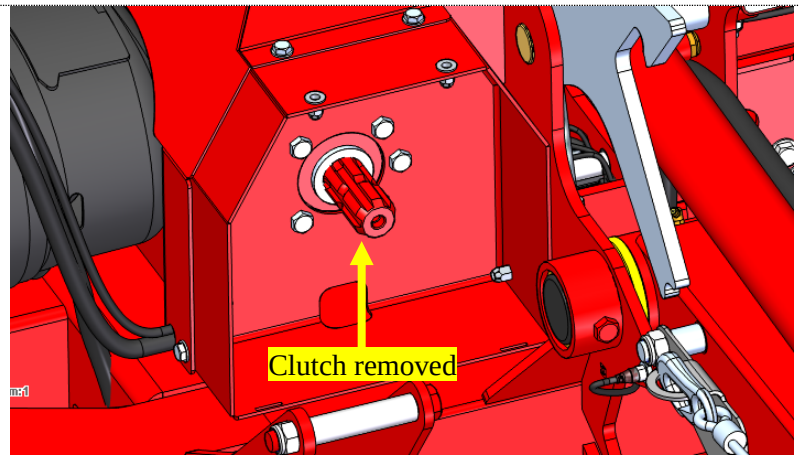
This is most easily accessed from behind the gearbox. The rear PTO and Drive Protect centre cover can be removed to improve access if required.



Remove the M10 x 45 **Metric Fine Bolt** and M10 Spring Washer from the centre of the Clutch.

Remove the large Retaining Washer from the centre of the Clutch.

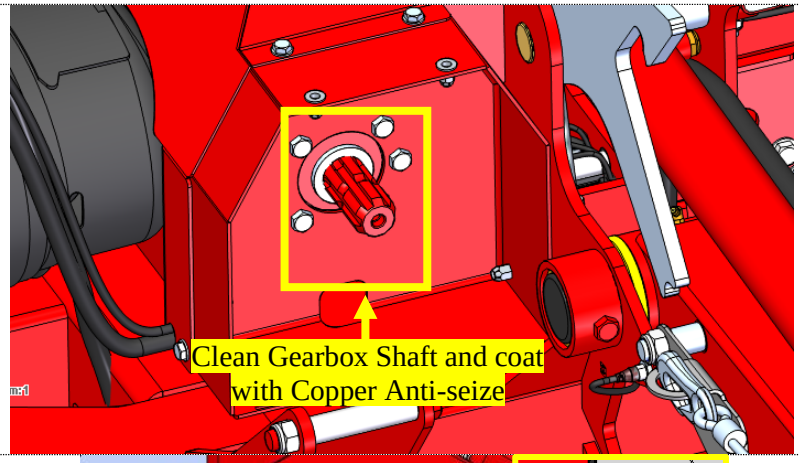
IMPORTANT:
Keep these parts separate from all other fasteners to prevent confusion later in this procedure.



Remove the Clutch from the Snake Gearbox.

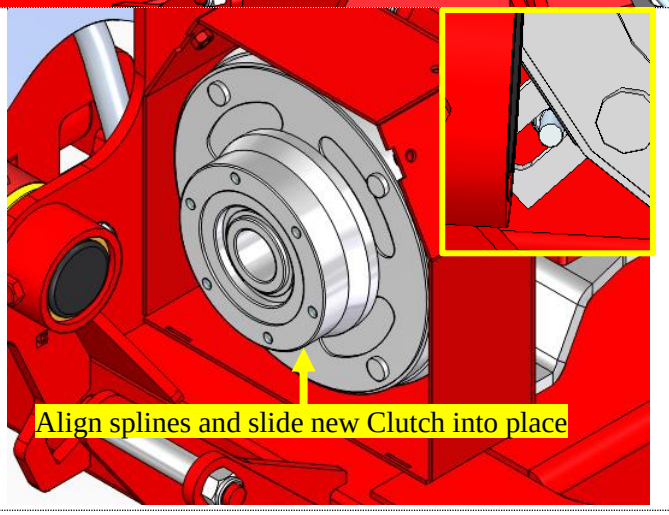
DO NOT remove the Washers behind the Clutch.

Note:
Take care with that the power cable does not get caught in the covers when removing.



Clean the Splined Gearbox Shaft.

Apply a fresh coating of Copper Anti-seize to this shaft.

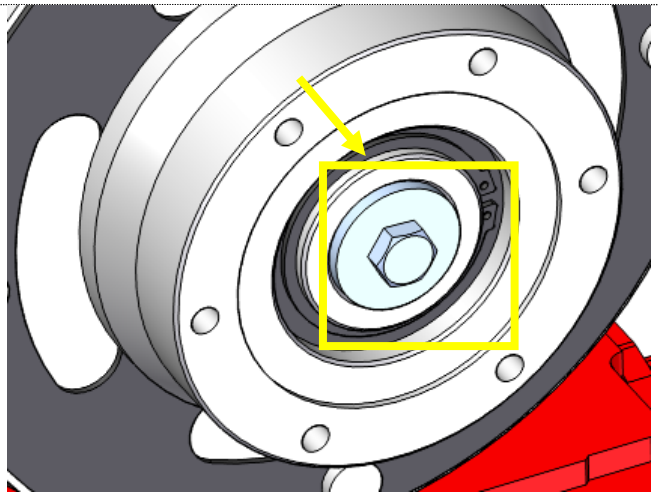


Collect the replacement Clutch and offer up to the Gearbox. Pass the plug and cable through hole in clutch cover before fully fitting clutch. Retaining tag should align with bolt protruding from back cover.

Align the internal splines with the gearbox shaft. Slide the Clutch as far onto the Gearbox Shaft as possible by hand.

Ensure that the cable is protruding out the hole of the clutch cover.

Refit the M10 x 35 Metric Fine Bolt, and Large Washer through the Clutch into the Gearbox

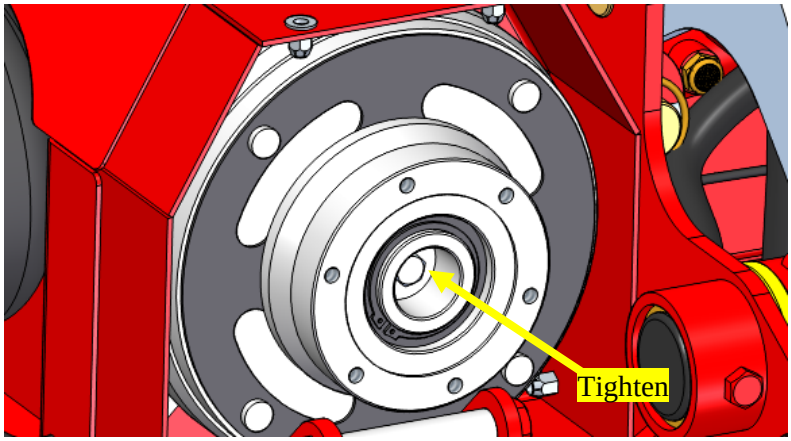


Refit the large Retaining Washer to the Centre of the Clutch.

Refit the M10 x 45 Fine Thread Bolt through the Retaining Washer and into the Gearbox Shaft.

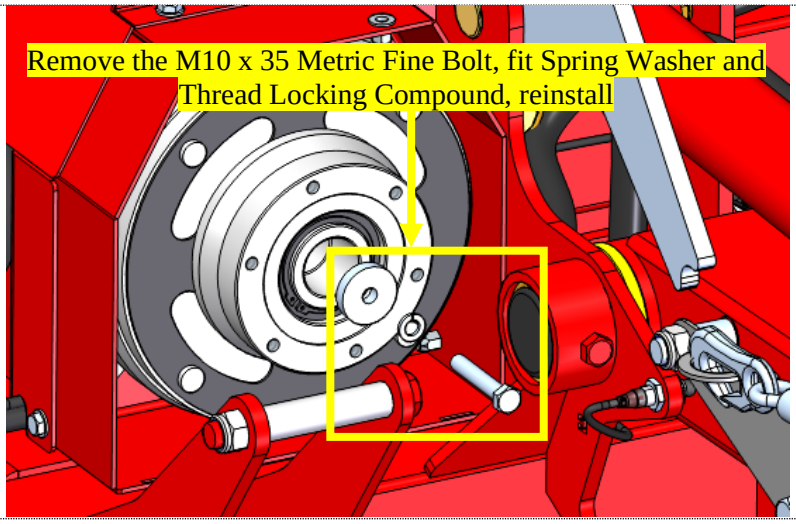
DO NOT fit the M10 Spring Washer at this stage as the Clutch still needs to be fully seated on the Gearbox Shaft!

IMPORTANT:
DO NOT use a Metric Coarse Bolt here, this will damage the internal threads in the Gearbox Shaft! This Bolt **MUST** be a Metric Fine M10 x 45 Bolt!



Gradually tighten the M10 x 45 Fine Thread Bolt.

Once the Clutch does not move **INWARDS** any further, it is correctly seated on the Gearbox Shaft.



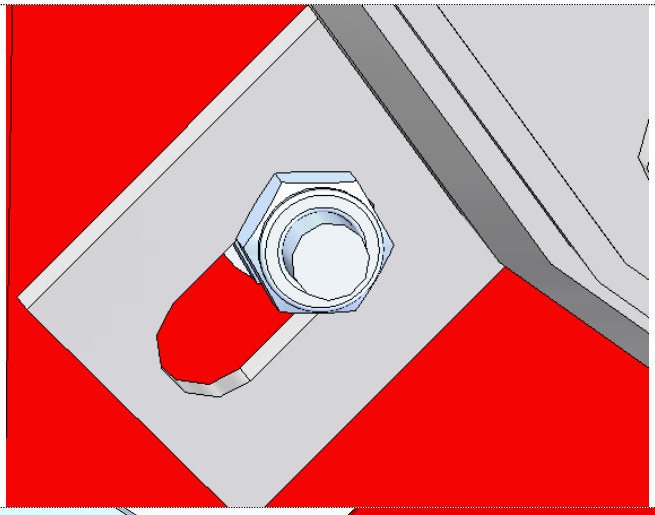
Remove the M10 x 45 Fine Thread Bolt.

Fit the M10 Spring Washer over the Bolt.

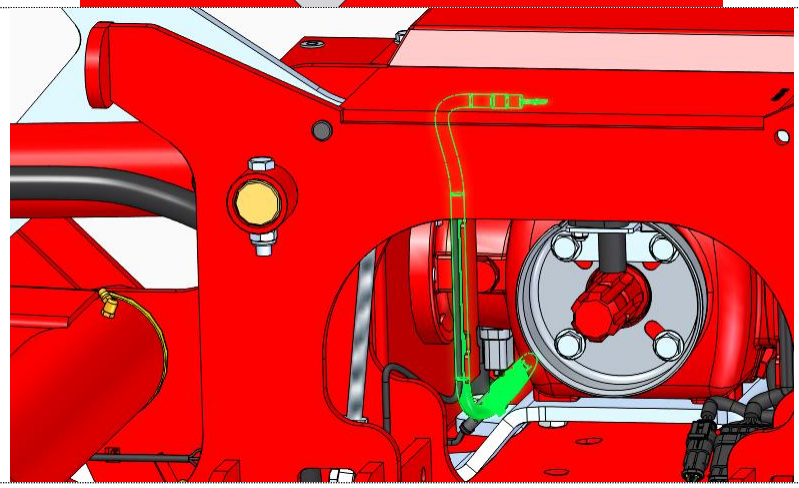
Apply **MEDIUM STRENGTH THREAD LOCKING COMPOUND** to the thread of the Bolt.

Refit this Bolt and Washer through the Retaining Washer into the Gearbox Shaft.

Fully Tighten.



Refit the M6 Nyloc Nut over the clutch tag. Tighten.



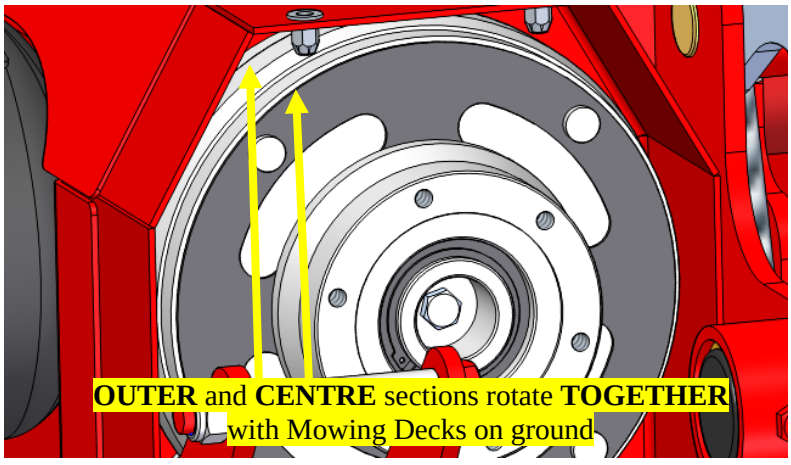
Reconnect the Clutch cable to the Command Module by connecting the 2-Pin Connector behind the rear clutch cover as shown in GREEN.

This is most easily accessed from behind the gearbox. The rear PTO and Drive Protect centre cover can be removed to improve access if required.

Reconnect the Main Power Cable to the Tractor and switch the Tractor ignition to the **"ON"** position.

Ensure that the Tractor PTO output is **DISENGAGED**.

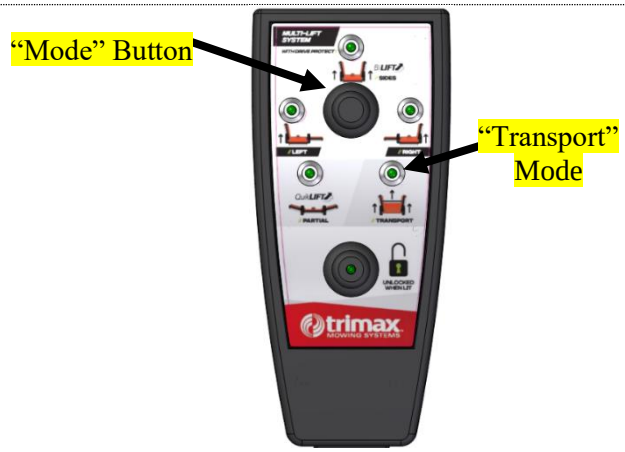
IMPORTANT:
Ensure that the system is switched into one of its mowing modes, please consult your Operator's Manual for further detail.



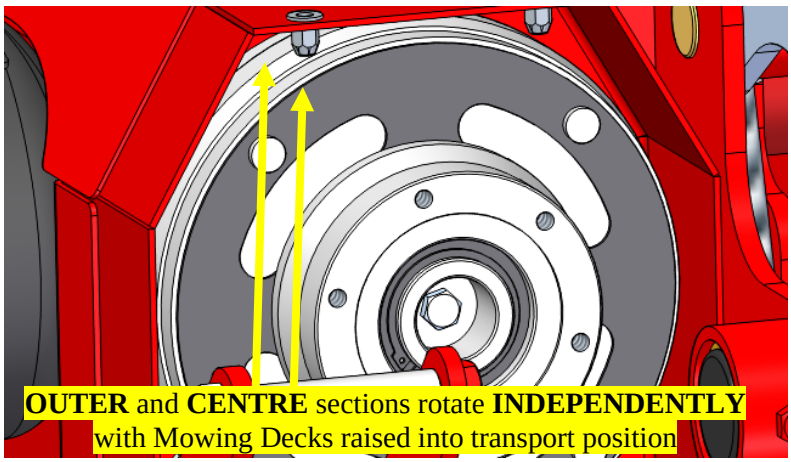
IMPORTANT:
Check the operation of the Clutch. As the Mowing Decks are in the **LOWERED** position the Clutch should be engaged due to the Proximity Sensor being triggered.

Rotate the **OUTER** section of the Clutch by hand.

The **OUTER** section and the **CENTRE** section of the Clutch will rotate together and will also rotate the other shafts in the 4-Way Gearbox.



Press the **MODE** button until in Transport mode.



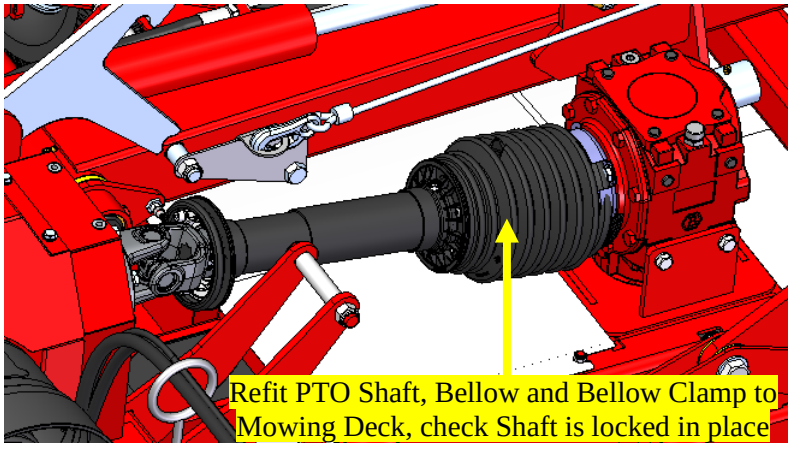
IMPORTANT:
Check the operation of the Clutch. As the mower is in Transport mode, the Clutch should be disengaged.

Rotate the **OUTER** section of the Clutch by hand.

The **OUTER** section and the **CENTRE** section of each Clutch will rotate independently of each other and will **NOT** rotate the other shafts in the 4-Way Gearbox.

Following the operational checks, switch the Tractor ignition to the **"OFF"** position.

Ensure that the Tractor PTO output is **DISENGAGED**.

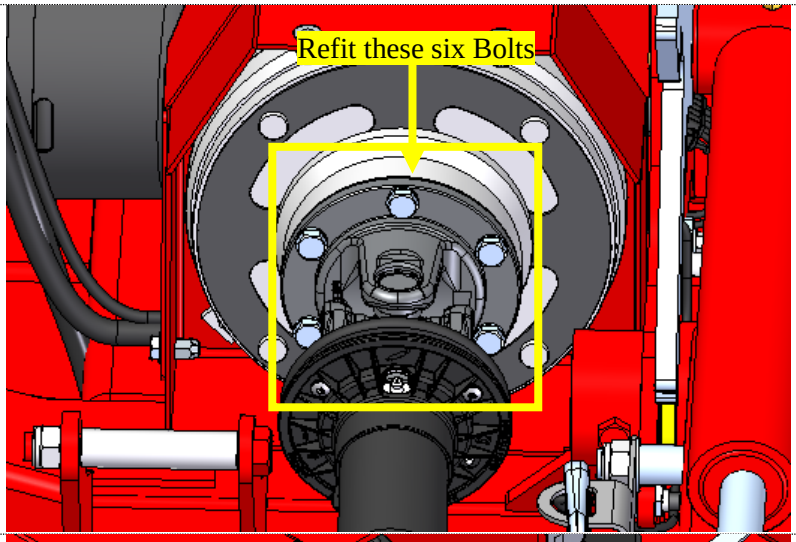


Refit the PTO Shaft to the Mowing Deck.

Depress the Push Pin, align the internal splines in the PTO Shaft with the external spines on the Gearbox Shaft.

Push the PTO Shaft fully onto the Gearbox Shaft. Release the Push Pin. Fit bellow to gearbox cone and tighten bellow clamp.

IMPORTANT:
Once fitted, try to pull the PTO Shaft **AWAY** from the Gearbox to check that the PTO Shaft is locked in place correctly.

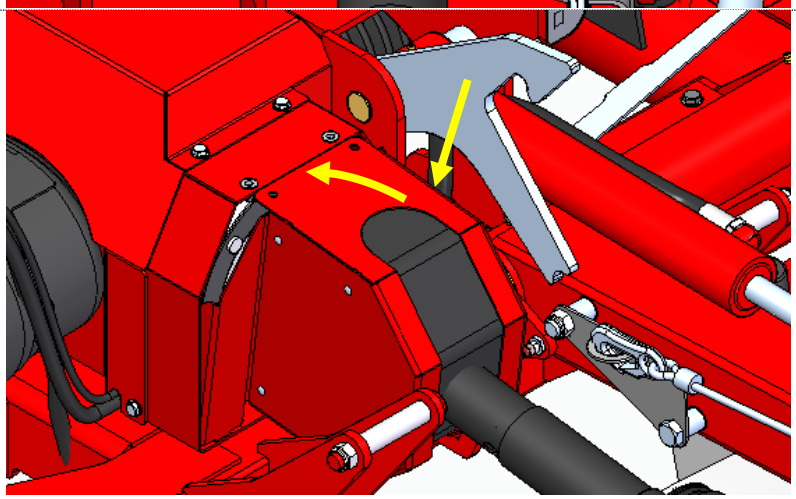


Refit the PTO Shaft to the Clutch using M10 x 30 Bolts and M10 Spring Washers.

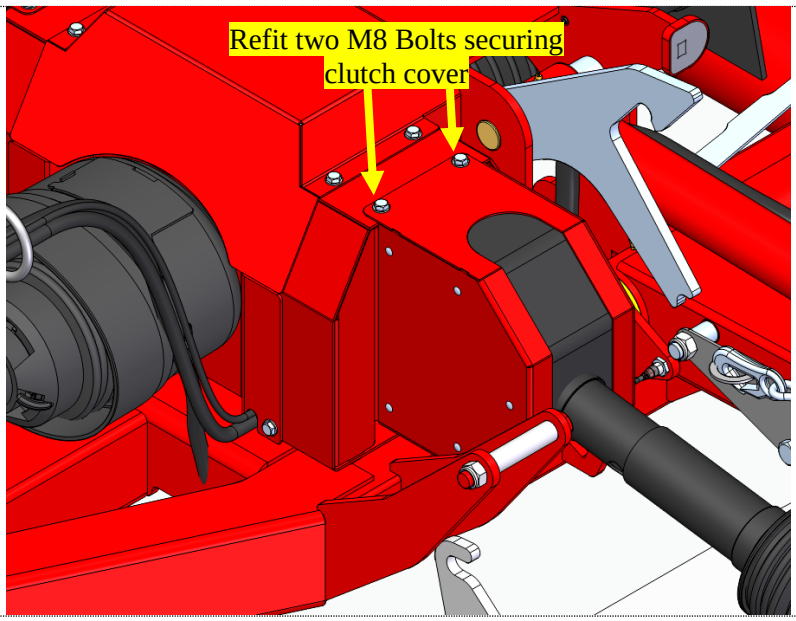
MEDIUM STRENGTH TREAD LOCKING COMPOUND is used on the threads of the Bolts.

Fully tighten **ALL** six M10 x 30 Bolts.

Note:
With the Clutch disengaged, it is possible to rotate this shaft to access all Bolt positions.



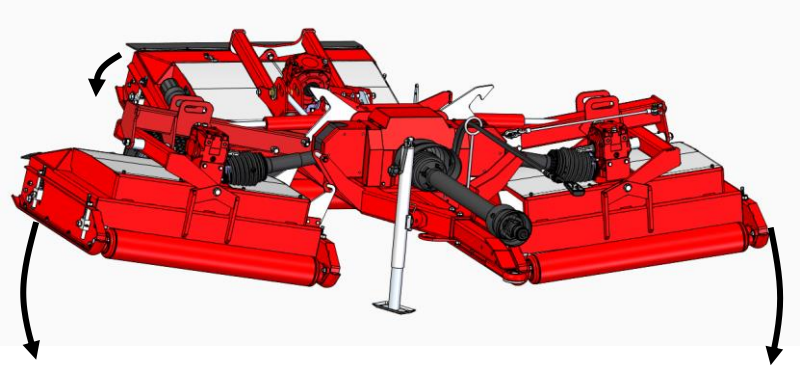
Refit the Clutch Cover, by inserting over PTO at an angle, aligning bottom tabs with back cover and pushing top in.



Refit two M8 Bolts and Flat Washers to secure cover.

This process is now complete

HYDRAULIC VALVE BANK REPLACEMENT

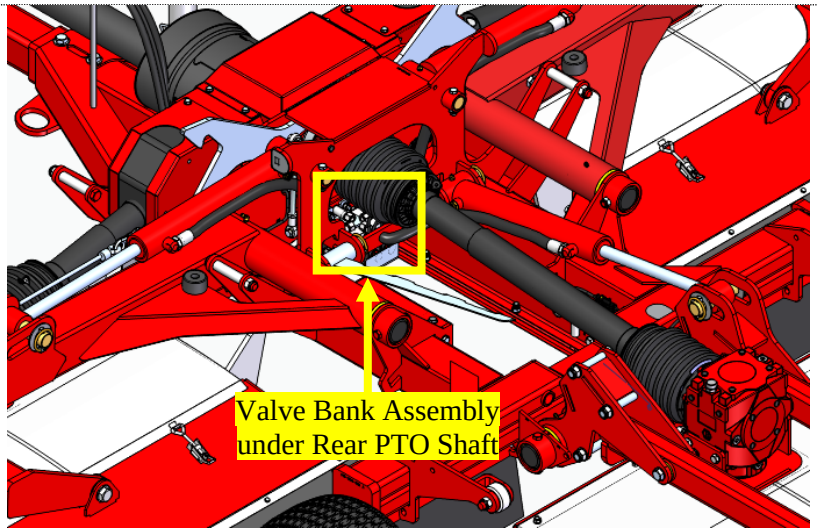


Begin by lowering the mower decks completely.

IMPORTANT:
Do not work on the mower with the decks partially raised. This is very dangerous!

Switch the Tractor ignition to the "**OFF**" position and operate the Hydraulic Control Lever for the Snake up and down a few times to relieve any residual hydraulic pressure in the system.

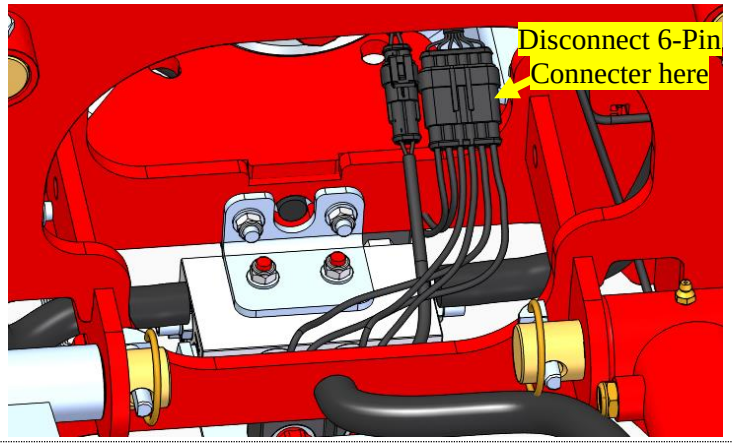
IMPORTANT:
High pressure hydraulic fluid is **EXTREMELY** dangerous and can cause serious injury or death!



Clean the area around the Valve Bank Assembly (underneath the Rear PTO Shaft) thoroughly to remove dirt and debris.

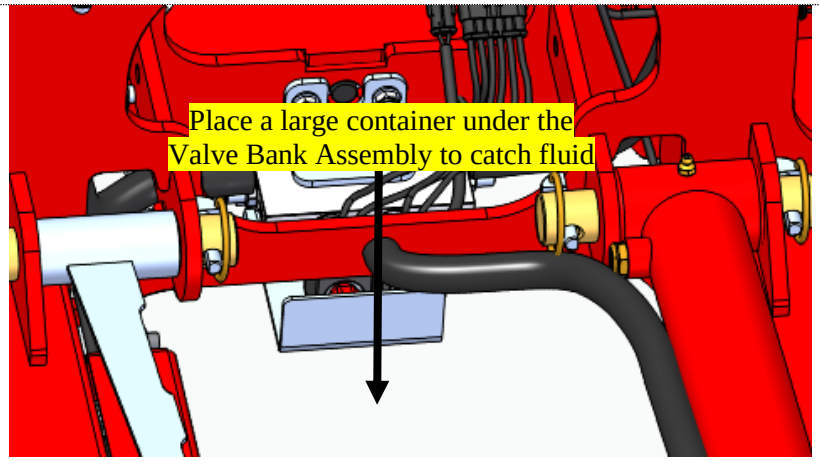
The location of the Valve Bank Assembly on the Snake is highlighted in the image opposite for clarity.

IMPORTANT:
A clean working environment is important when servicing hydraulic componentry. A small piece of debris can easily enter the system and damage seals, causing oil leaks and premature component failure.



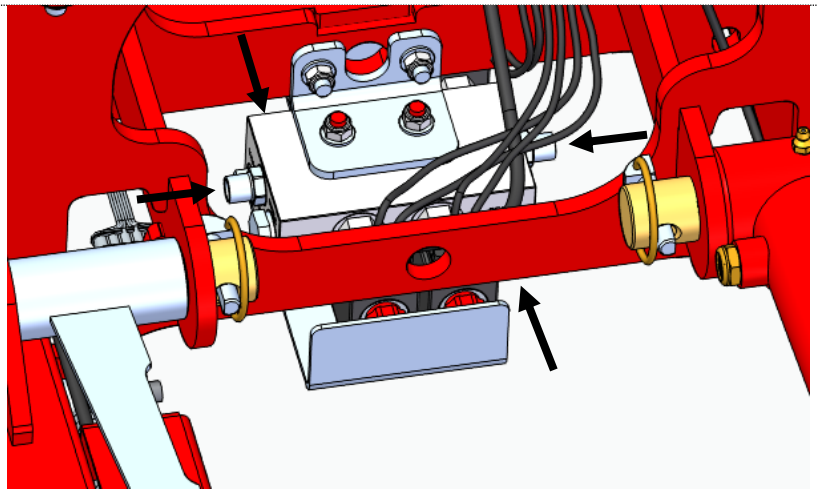
Disconnect the faulty Valve Bank Assembly from the Control Module by unplugging the 6-Pin Connector shown.

Note:
The Rear PTO Shaft is hidden in this image and following images for clarity.



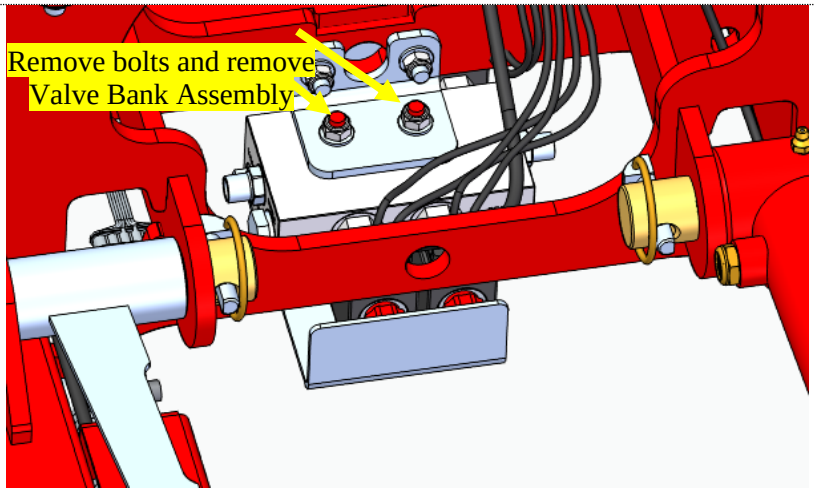
Place a suitable container directly underneath the Valve Bank Assembly.

This is to catch the hydraulic fluid when disconnecting the Hydraulic Lines.



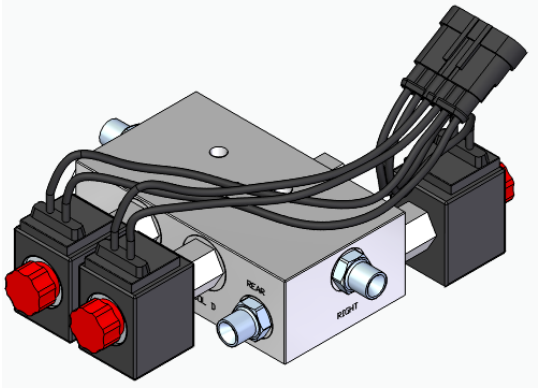
Using a 19mm Spanner, disconnect the four Hydraulic Lines that run into the Valve Bank Assembly, as shown by the arrows.

CAUTION:
Residual hydraulic fluid may leak from hydraulic componentry during disassembly, this can create a slip hazard. Clean up as required.



Using two 13mm Spanners, remove the M8 x 65 Bolts, M8 Flat Washers and M8 Nyloc Nuts used to secure the Valve Bank Assembly to the Mounting Bracket.

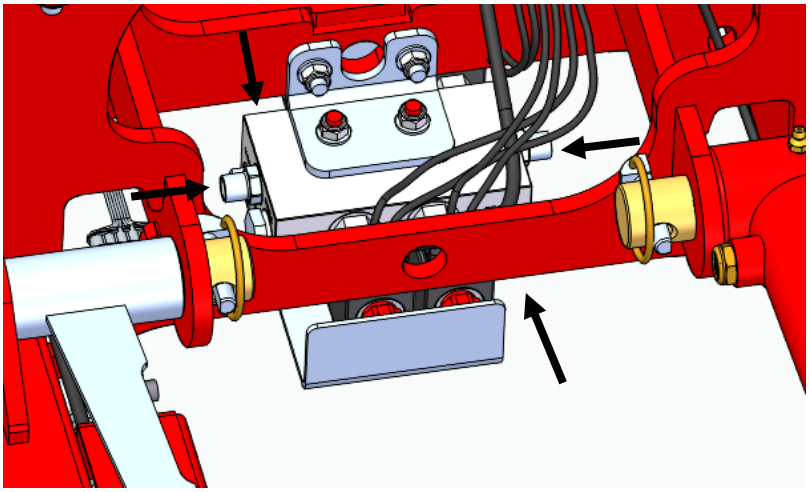
Remove the Valve Bank Assembly from the Snake Chassis.



Collect the replacement Valve Bank **(421-000-168)**

Fit the Valve Bank and Mounting Bracket to the Chassis using the same fasteners as the previous step.

Gently tighten both fasteners.

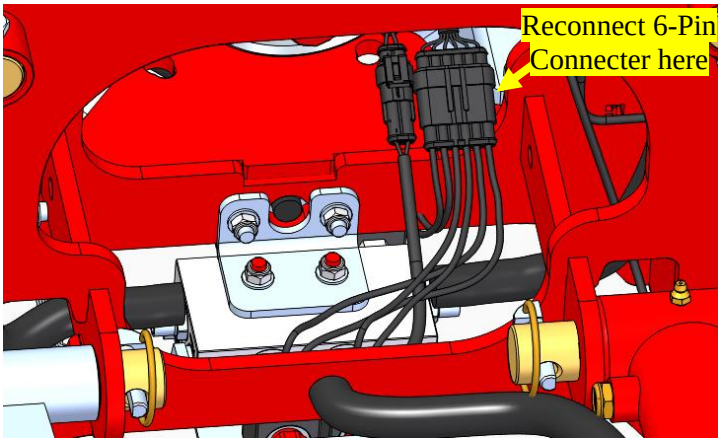


Refit the Hydraulic Lines to the Valve Bank Assembly as shown by the arrows.

Fully tighten using a 19mm Spanner.

A 14mm Spanner should be used to prevent the Hydraulic Lines form twisting while tightening.

IMPORTANT:
Ensure that these are tight to prevent leaks!



Connect the Valve Bank Assembly to the Control Module using the 6-Pin Connector.

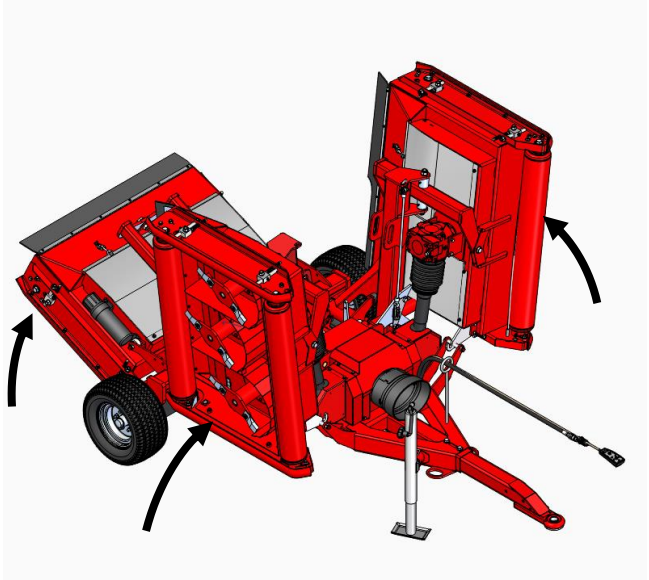
Remove the container from under the Valve Bank Assembly.

IMPORTANT:
Dispose of the hydraulic fluid in the container according to local environmental regulations.

Reconnect the Main Power Cable from the Snake Chassis to the Tractor.

Ensure that the Tractor PTO output is **DISENGAGED**.

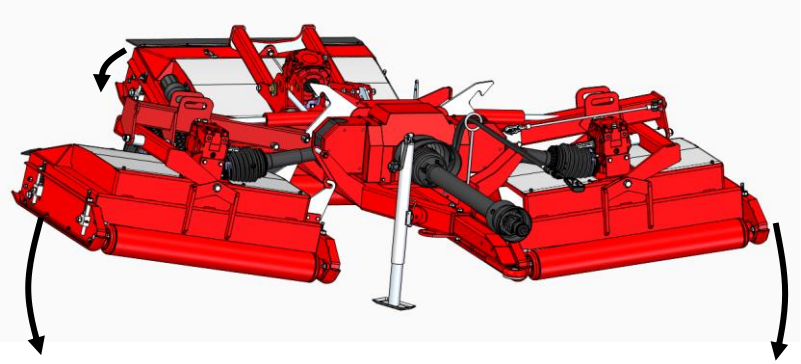
Start the Tractor.



Operate the Hydraulic Control Lever for the Snake to raise the decks to the transport position.

Visually check the hydraulic system for leaks. **DO NOT** use your hands to check for leaks.

IMPORTANT:
High pressure hydraulic fluid is **EXTREMELY** dangerous and can cause serious injury or death!



Operate the Transport Locks and gently lower the Mowing Decks down onto the ground.

Repeat this step 2-3 times to purge any air from the hydraulic system.

Test that the Individual Lift and QuikLIFT functions work correctly.

Note:
For more detail on this process, please refer to your Snake Operator's Manual.

Following the Tractor Manufacturers procedure, check the hydraulic fluid level in the Tractor and top up with the appropriate fluid if required.

Note:
For more detail on this process, please refer to your Tractors Operator's Manual.

This process is now complete

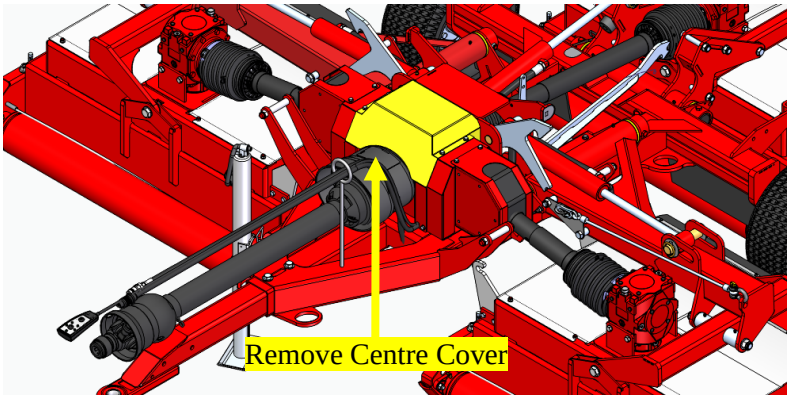
DRIVE PROTECT MODULE REPLACEMENT

This section covers the removal and replacement of the main control unit – the Drive Protect module.

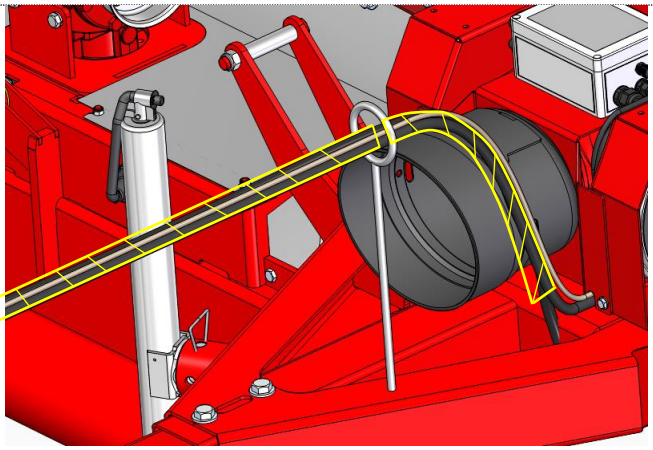
Replacement part numbers are shown below:

- Snake MLS – **421-000-167**

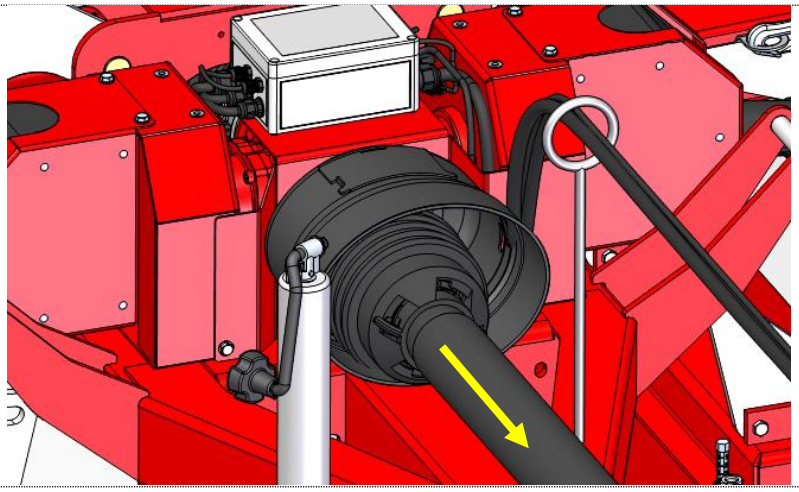
Note: Actual cable lengths vary from image shown.



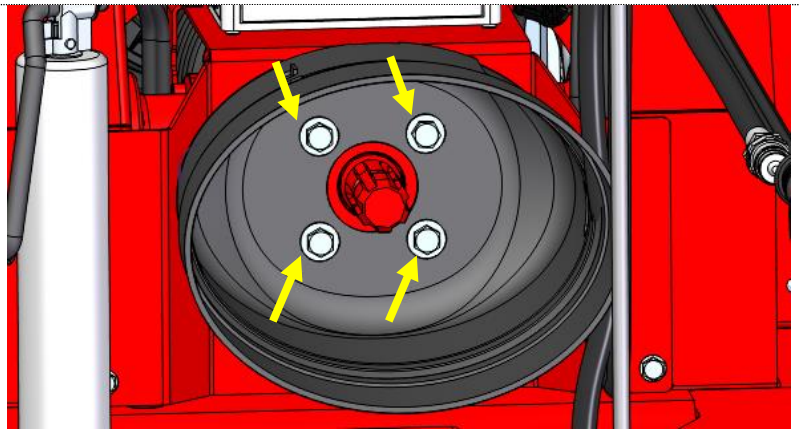
Remove the Drive Protect module centre cover shown in YELLOW. The process for this is detailed earlier in this service guide.



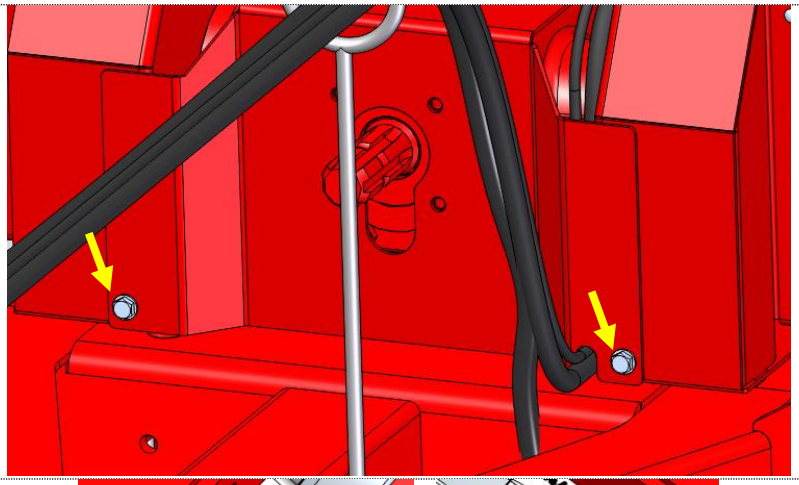
Remove the spiral wrap from the cables between the mower and the tractor.



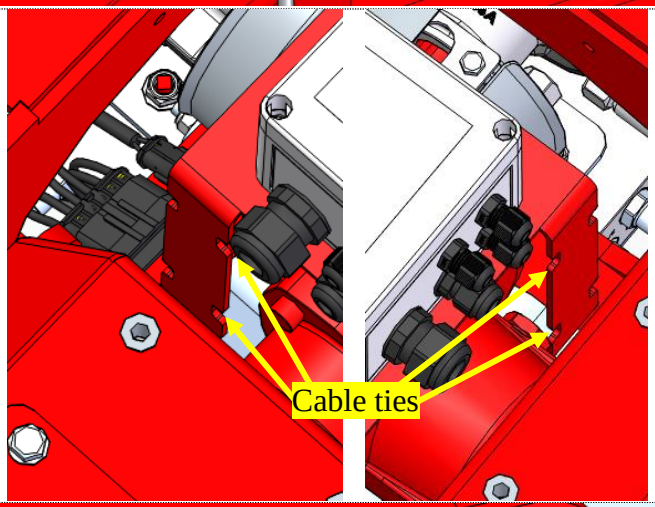
If the front PTO shaft is connected, remove it and set it aside.



Undo the four M10 bolts securing the PTO cone, remove the PTO cone and bolts and set them aside.



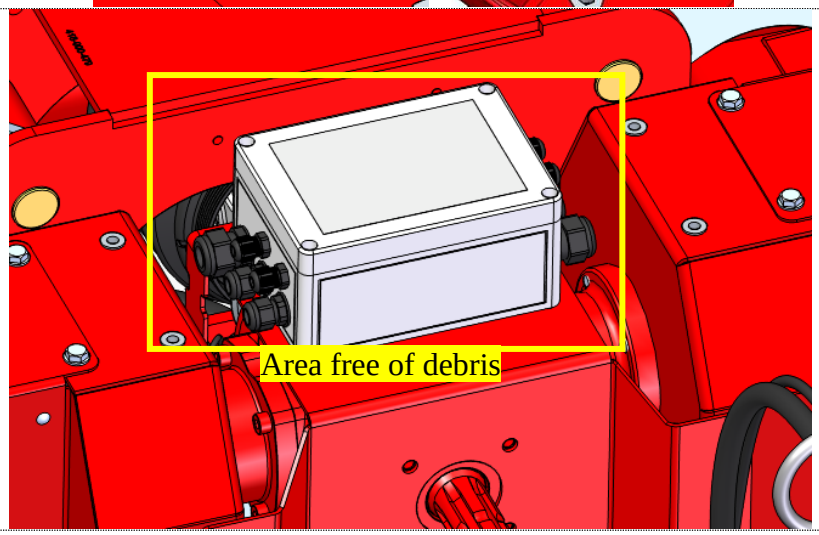
Undo the two M8 bolts securing the front cover, remove the bolts and set them aside.



With the top cover removed, there should be clear access to the Drive Protect unit.

Remove the cable ties securing the cables to the cable retention tabs on the enclosure mount.

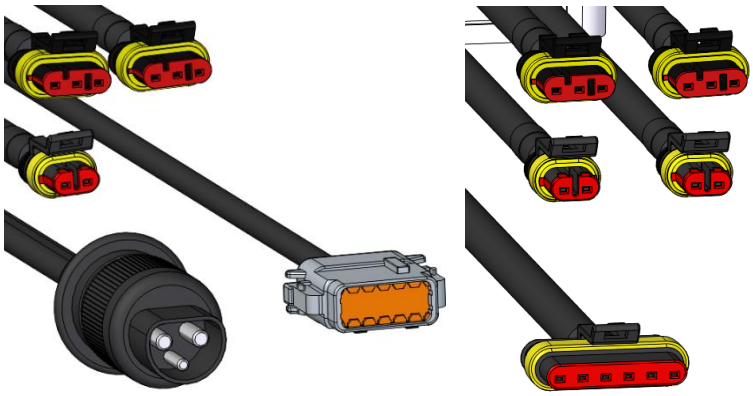
Note:
Cables not shown.



Clear any grass or debris away from the Drive Protect enclosure.

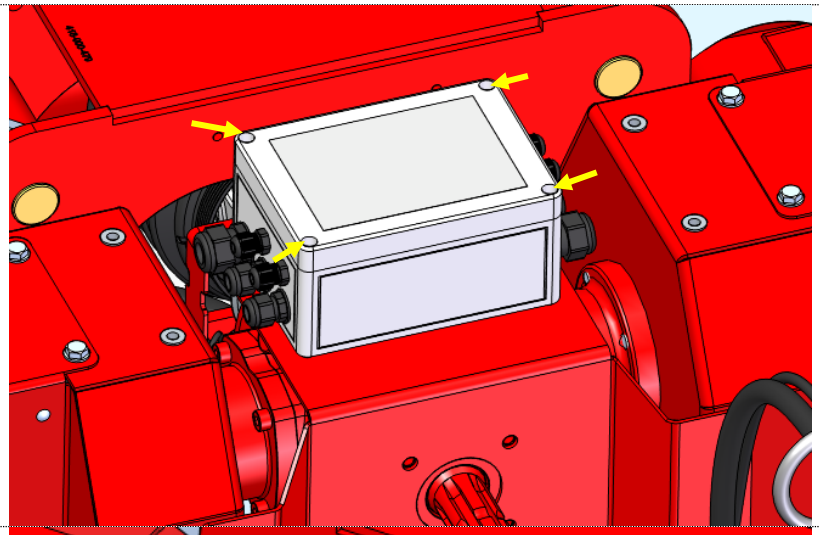
The enclosure lid will be opened and needs to be kept free of dirt, grass and moisture.

DO NOT use a pressure washer on the Drive Protect unit, particularly if the unit is going to be repaired.



Disconnect all the plugs connecting the Drive Protect unit. There are a total of 10 cables to be disconnected.

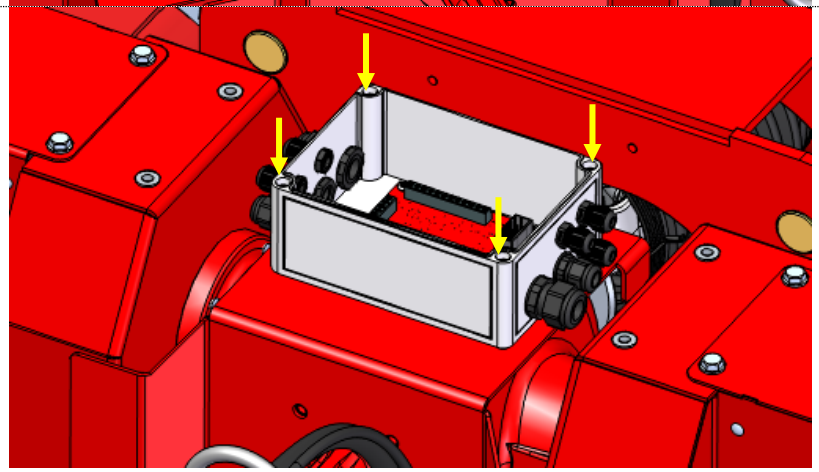
1x Power cable
1x Hand controller cable
3x Proximity sensor cables
1x PTO sensor cable
2x Clutch cables
1x Actuator cable
1x Valve bank cable



Using a flat head screwdriver, undo all four lid screws.

Do not fully remove the screws from the lid, simply undo them (counter clockwise) until they are no longer engaged in the thread.

Open the Drive Protect enclosure lid.

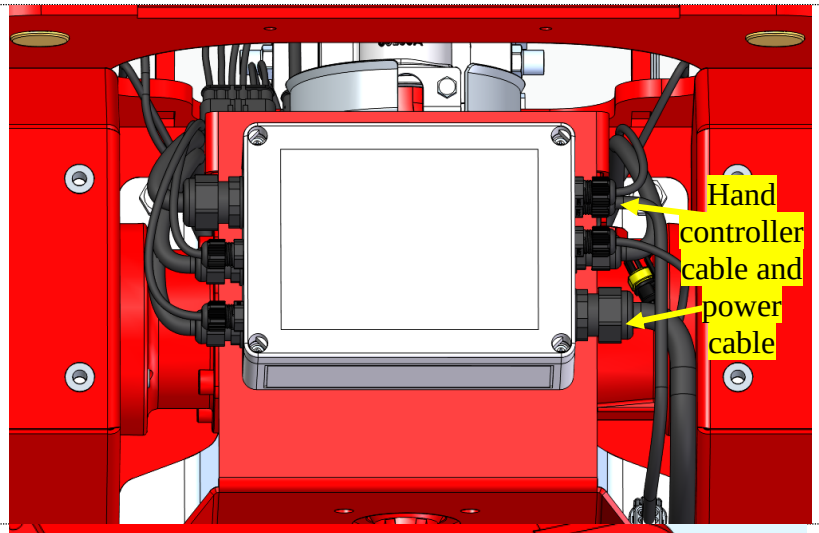


Using a Philips head screwdriver, undo the four M4 screws securing the enclosure to the mounting bracket.

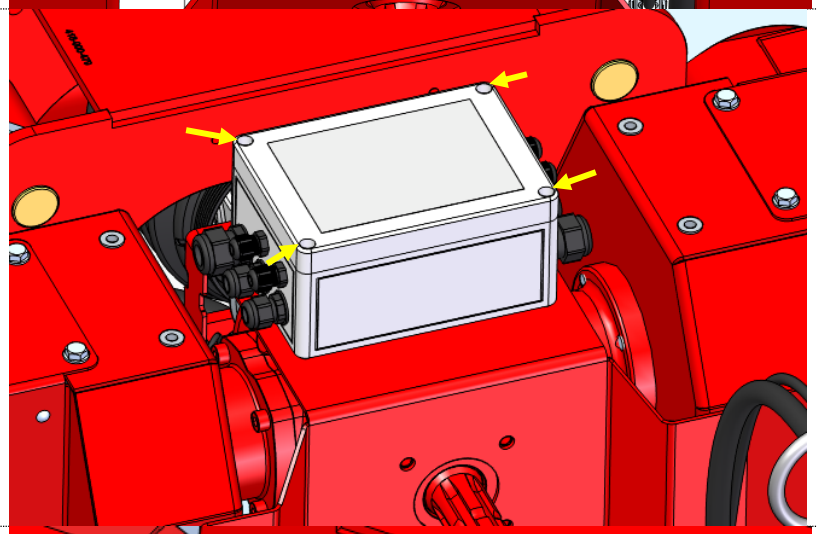
Remove these screws and keep them. They will be used to mount the replacement unit.

Remove the enclosure and re-fit the lid. Take care when removing the power cable from the slot in the front cover.

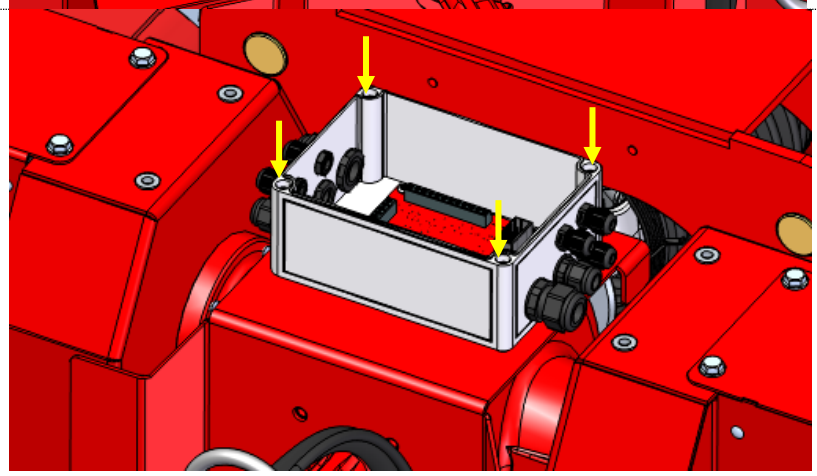
Collect the replacement Drive Protect unit.



Position the unit on the mounting bracket as shown. The Power Cable and Hand Controller cables should be on the left-hand side of the mower, as viewed from behind the mower.



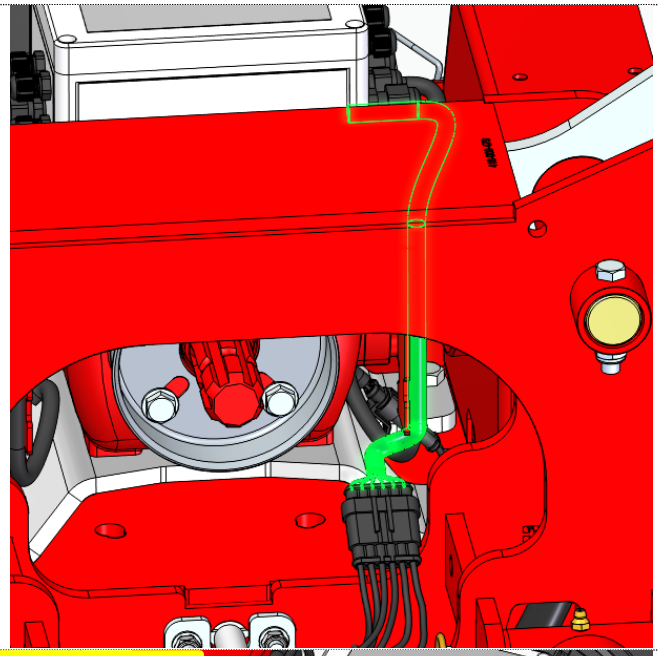
Using a flat screwdriver, remove the lid of the replacement unit.



Using the M4 screws set aside previously, fasten the unit to the mounting bracket.

Tighten the screws firmly but be careful not to damage the unit in the process.

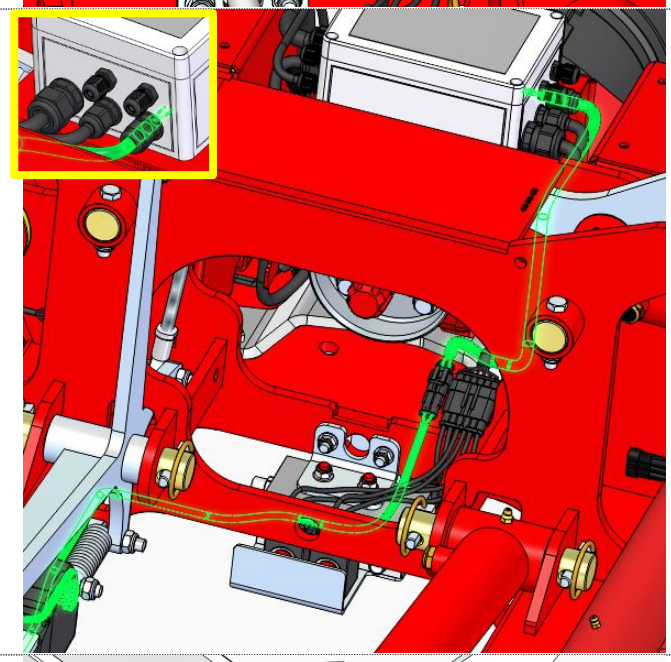
Refit the enclosure lid and tighten all four screws with a suitable flat head screwdriver.



Route the 6-pin connector (Plug) from the right side of the control unit down the cable leg and connect the plug and socket together on the valve bank as shown.

Ensure the clips on the connector fully close.

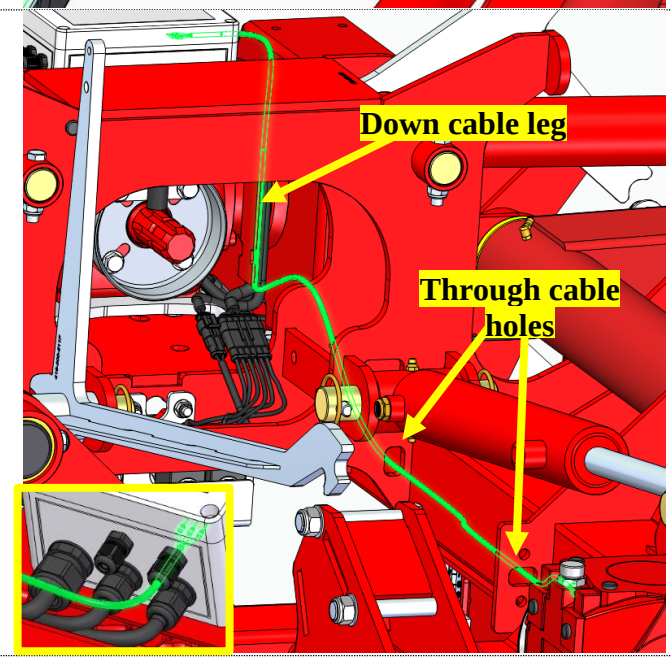
Note:
Some Cables and Mower parts are hidden for clarity.



Route the 2-pin connector (Plug) on the **UL** cable from the front right side of the control unit (cable shown in insert) down the cable leg and connect the plug to the socket from the actuator cable routed earlier.

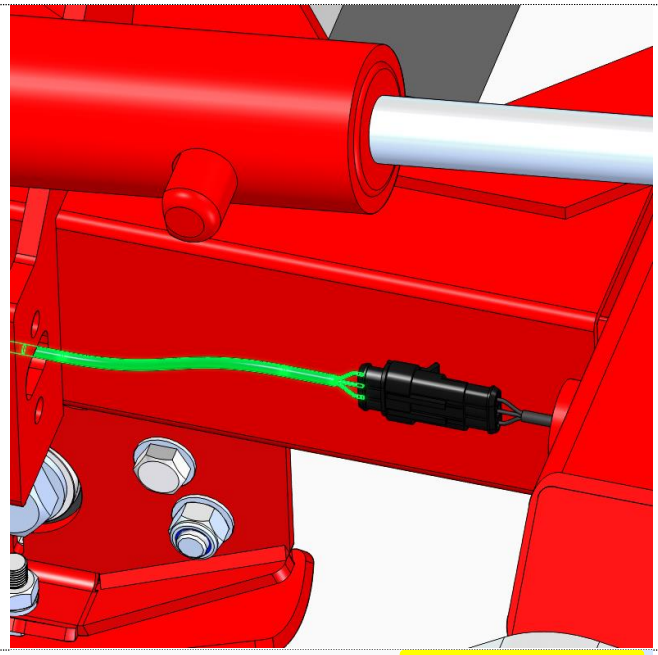
Ensure the clips on the connector fully close.

Note:
Some Cables and Mower parts are hidden for clarity.



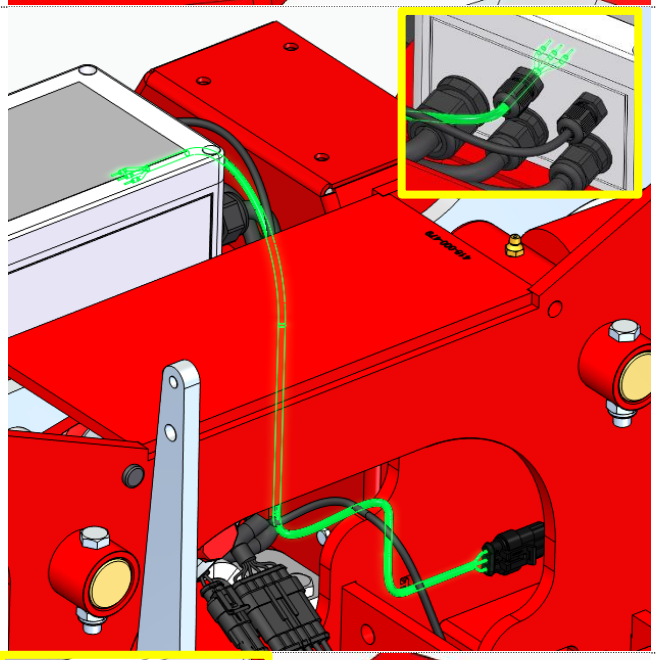
Route the 3-pin connector (Plug) on the **PB** cable from the front right side of the control unit (cable shown in insert) down the cable leg and through the two cable holes along right side of the chassis.

Note:
Some Cables and Mower parts are hidden for clarity.



Connect the 3-pin connector (Plug) on the **PB** cable to the connector (Socket) of the rear sensor routed earlier.

Ensure the clips on the connector fully close.

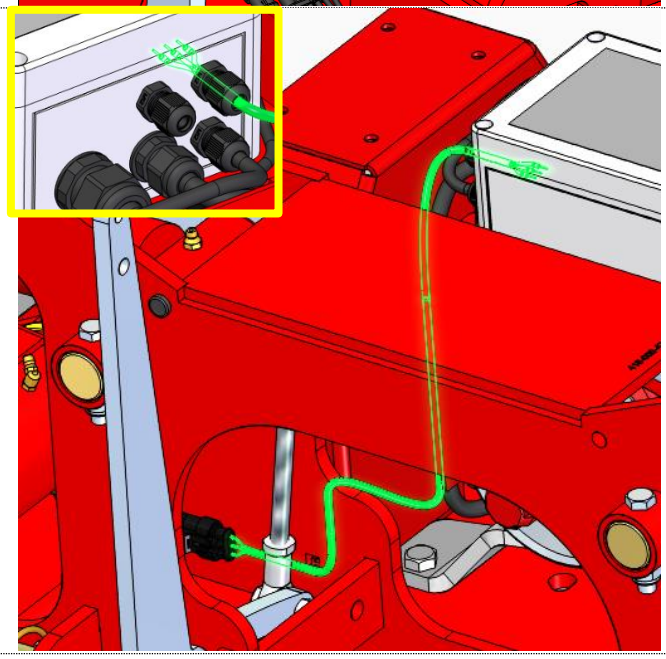


Route the 3-pin connector (Plug) on the **PR** cable from the right side of the control unit (cable shown in insert) down the cable leg and connect the plug to the socket from the Right sensor installed earlier.

The cable runs between the front and rear plates of the ram tower.

Ensure the clips on the connector fully close.

Note:
Some Cables and Mower parts are hidden for clarity.

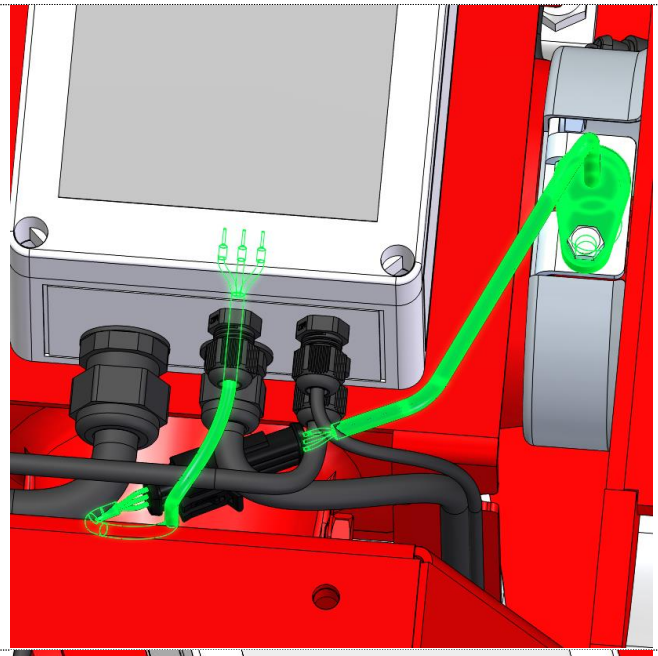


Route the 3-pin connector (Plug) on the **PL** cable from the left side of the control unit (cable shown in insert) down the cable leg and connect the plug to the socket from the Left sensor installed earlier.

The cable runs between the front and rear plates of the ram tower.

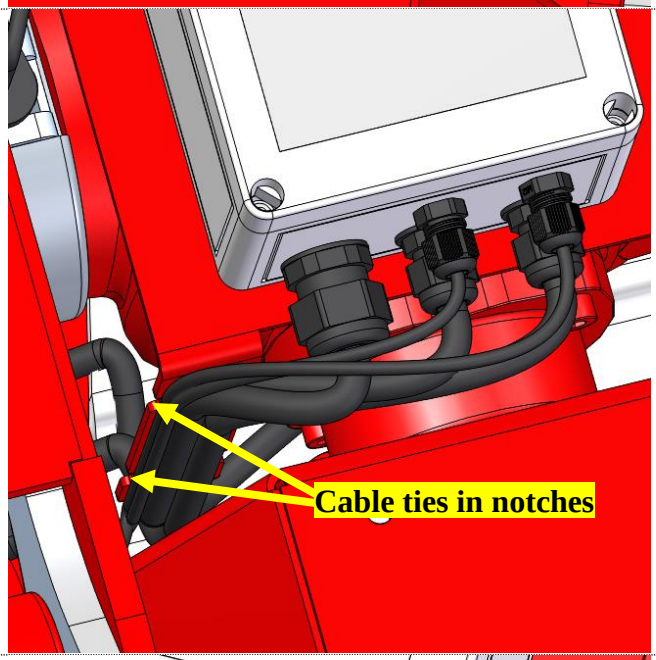
Ensure the clips on the connector fully close.

Note:
Some Cables and Mower parts are hidden for clarity.

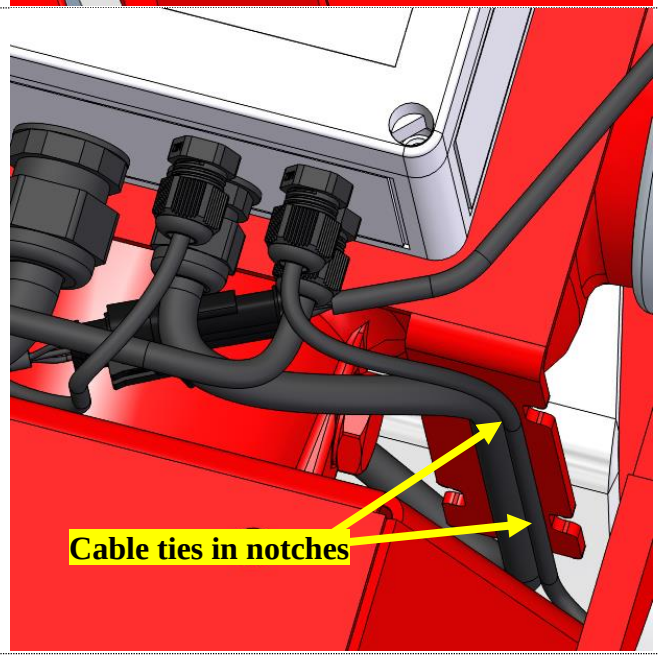


Route the 3-pin connector (Socket) from the PTO sensor installed earlier under the cables on the left side of the control unit and connect to the connector (Plug) on the **PTO** sensor cable.

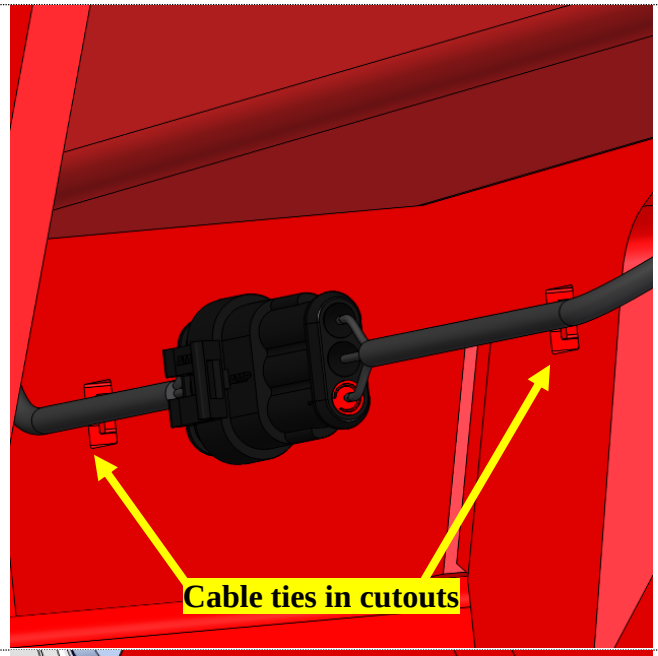
Ensure the clips on the connector fully close.



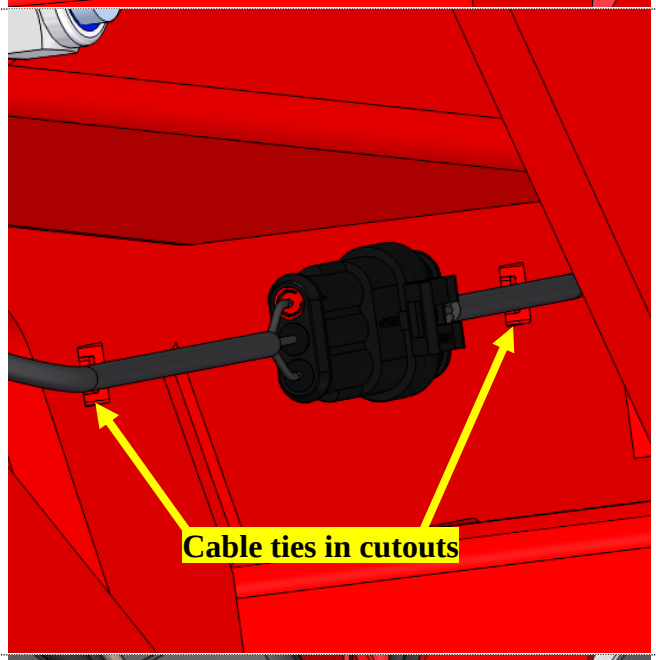
Secure the cables on the **RIGHT** side of the control unit to the cable leg with two cable ties around the cable leg and cables in the two notches as shown.



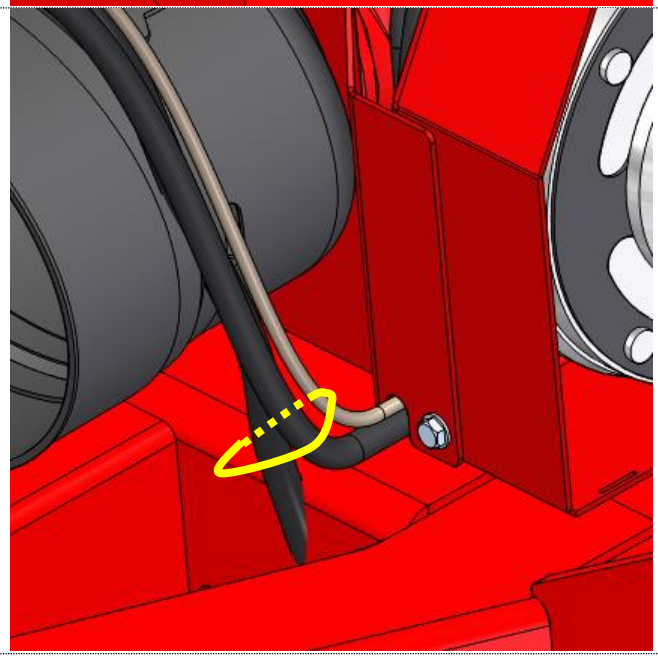
Secure the cables on the **LEFT** side of the control unit to the cable leg with two cable ties around the cable leg and cables in the two notches as shown.



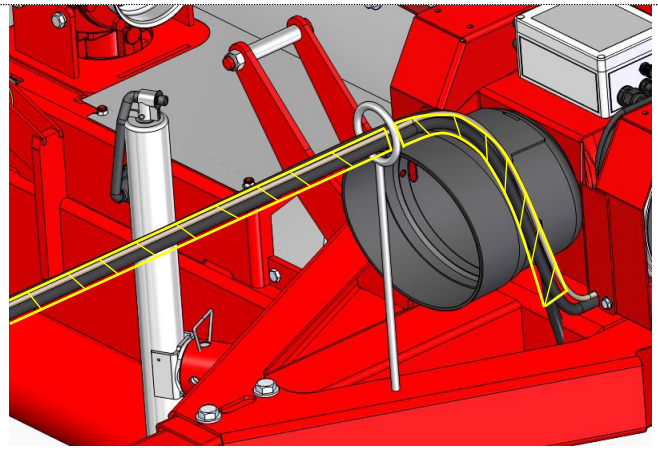
Secure the **RIGHT-SIDE** sensor cable to the inside of the ram tower with two cable ties through the cable tie slots in the front ram tower plate.



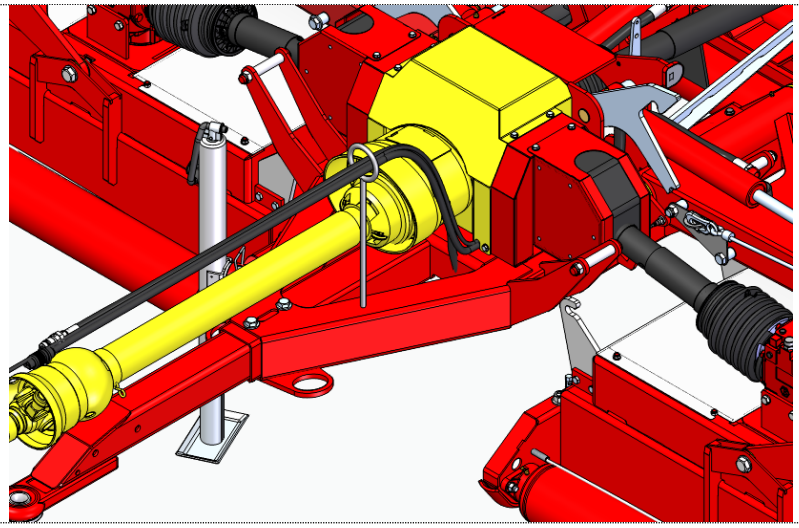
Repeat for the **LEFT-SIDE**.



Use a cable tie to secure the power cable, hand controller cable and hydraulic hose together as shown.



Refit the spiral wrap on the cables and hydraulic hose between the mower and the tractor.



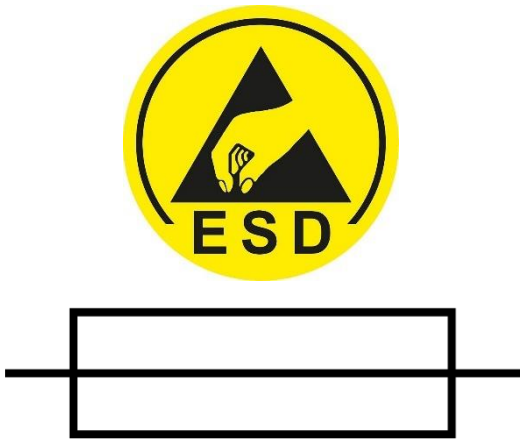
Replace the previously removed cable ties, and re-fit the Drive Protect module front and centre covers, PTO Cone, and wide angle PTO shaft.

This process is now complete

BEYOND THIS POINT ONLY AUTHORISED DEALERS ARE TO PERFORM THESE REPAIRS

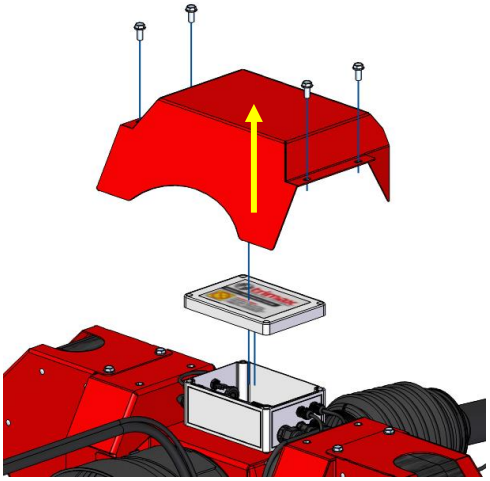
Undertaking these repairs without the correct tools and training could cause damage to the mower and will not be covered under warranty.

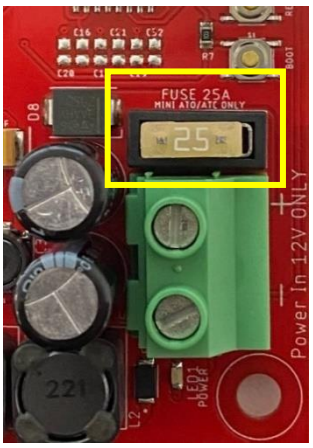
MLS DRIVE PROTECT CONTROL UNIT FUSE REPLACEMENT



If the MLS Drive Protect control unit fuse blows it can be replaced.

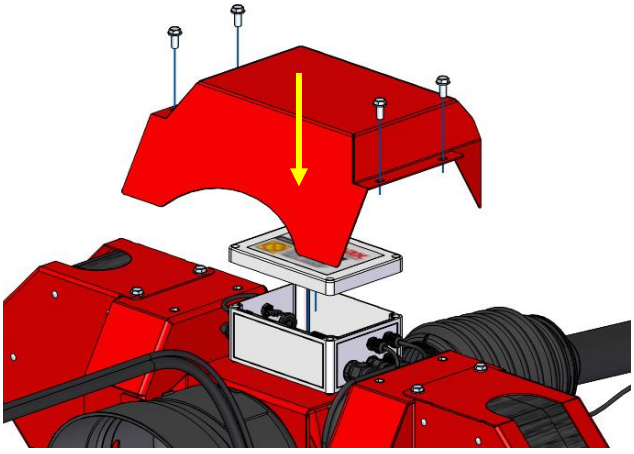
Note:
If the fuse has blown it could indicate a problem with the control unit or an electrical short. If the fuse has already been replaced and has blown again, this is likely the case.





Remove the central control unit cover and the Drive Protect enclosure lid as shown.

Using needle nose pliers, replace the 25A ATO fuse (clear fuse shown), with a 30A ATO fuse (green).



Refit the enclosure lid and secure the lid screws.

Refit the sheet metal cover and tighten the bolts.

This process is now complete

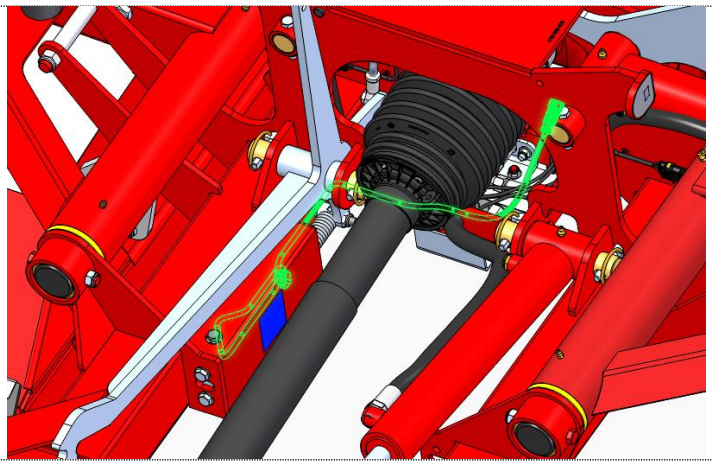
2 PIN SUPERSEAL SOCKET REPLACEMENT – ACTUATOR

Note:
The actuator cable can be replaced as a standalone part - part number: **421-000-094**

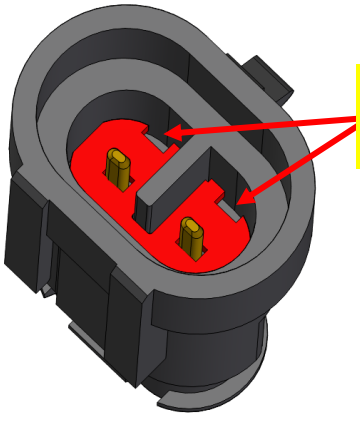
If this cannot be sourced, the following instructions can be used to replace the socket only. The same method is used to replace the clutch socket.

To perform this task, some tools are required:

- Superseal crimp tool – **Sealey AK3858** with **H3 jaws** (0.75mm & 1.0mm)
- Small flathead screwdriver
- Replacement socket kit – **421-000-145**
- Wire strippers
- Small hook to remove retention clip



Begin by disconnecting the actuator cable. Follow the process shown in the "Unlock Actuator replacement" section of this manual.



Remove the damaged or faulty plug:

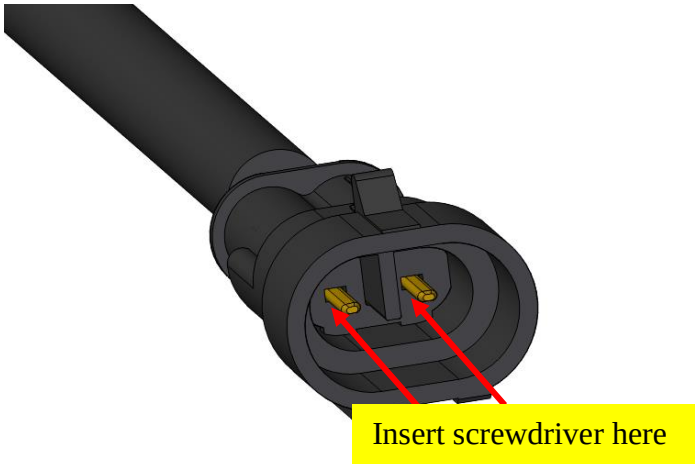
If there is enough slack in the wiring (at least 50mm), the cable can simply be cut near the plug end.

Otherwise, begin to disconnect the plug by removing the red retention clip.

Cut away the heatshrink using sidecutters, or very carefully using a Stanley knife.

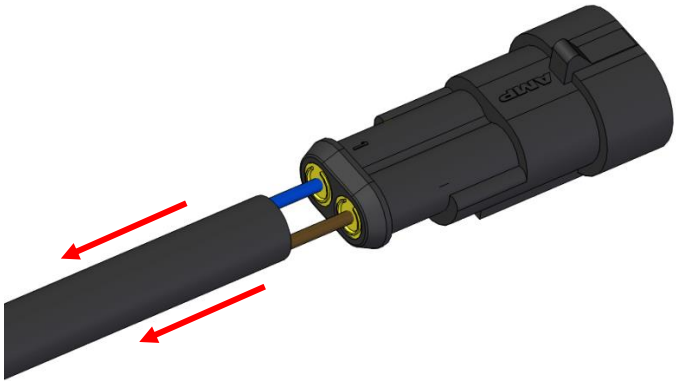
Ensure the cable is not damaged in the process.

IMPORTANT:
If the cable is damaged is must be replaced.



With the retention clip and heatshrink removed, use a small flat head screwdriver to press down the retention tag holding in each pin.

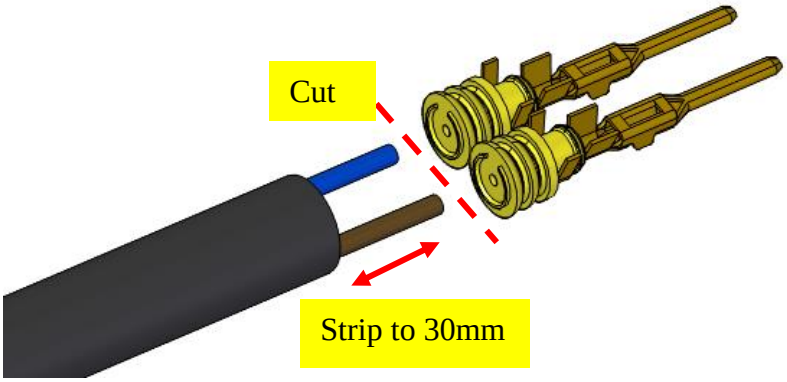
Give each pin a gentle tug while doing this to pull them free.



The pins should now be free to pull out the rear of the plug completely.

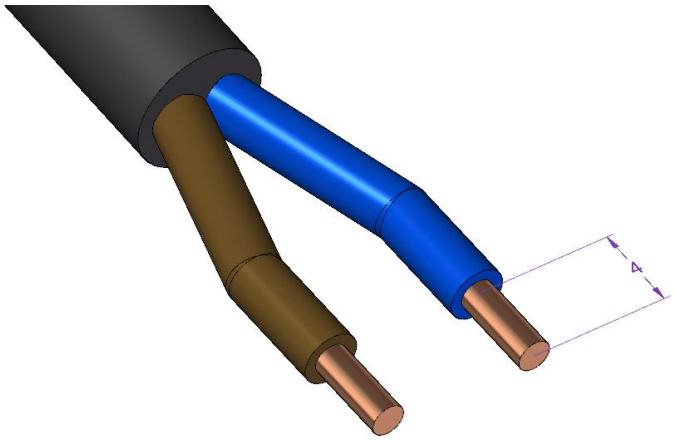
If the pins are undamaged, skip the steps on replacing the pins and simply replace the damaged socket.

If the pins are damaged, replace the pins.



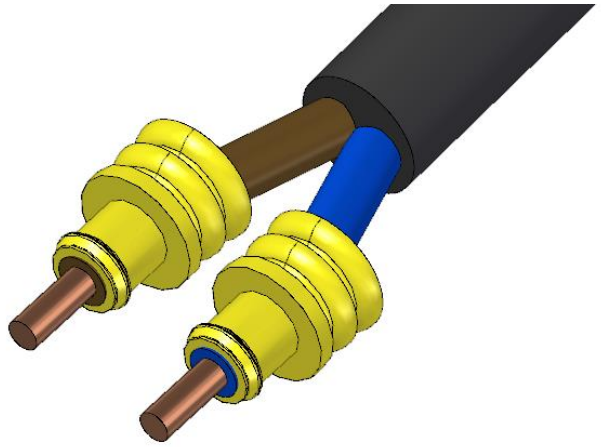
Cut off the damaged pin(s).

Strip the **outer** insulation (black) so that 30mm of the BLUE and BROWN wires are exposed.



Cut all wires other than the BLUE and BROWN back to the insulation. Leave only the blue and brown wires at around 30mm length.

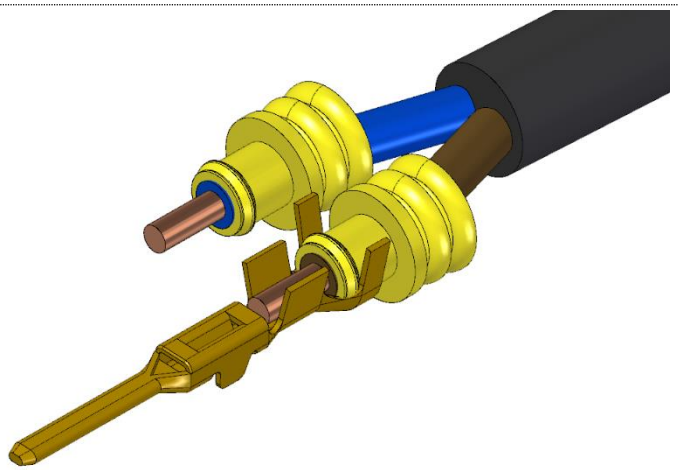
Strip 4mm from the insulation of the blue and brown wires.



Apply one **1.4-1.7mm rubber seal** to each wire as shown. These are green in colour.

Align the end of the seal with the end of the insulation of each wire.

Note:
It may be easier to apply the rubber seal before stripping the insulation.



Apply one **male** crimp terminal to each wire.

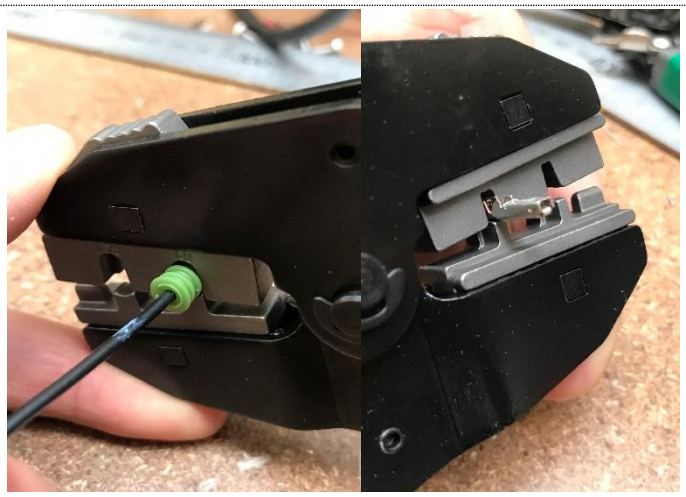
Ensure the larger tabs on the crimp are positioned over the small section of the wire seal, and the small tabs over the exposed wire.

Use the crimp tool shown to crimp the terminals to the wire and the wire seal.

Place the wire, seal, and crimp into the crimping tool in the orientation shown.

Crimp the terminal using the **1mm** slot on the crimp tool jaws.

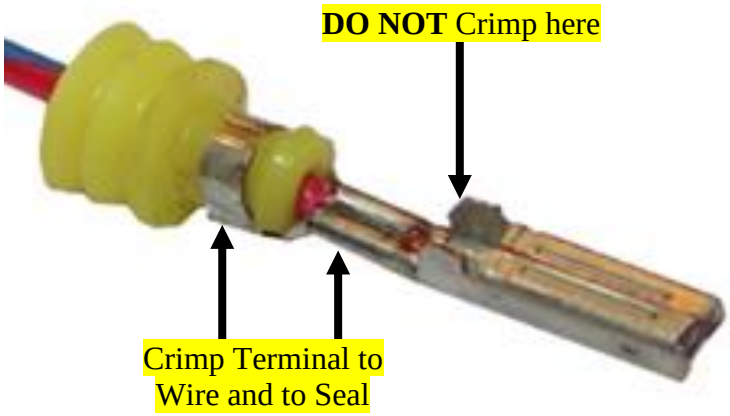
Note:
Green wire seals shown. These are smaller and are not used on the clutch or actuator. Female crimp shown. Do not use these.



Ensure the crimp and seal are correctly aligned in the jaws and that the wings of the crimps go into the jaws as shown.

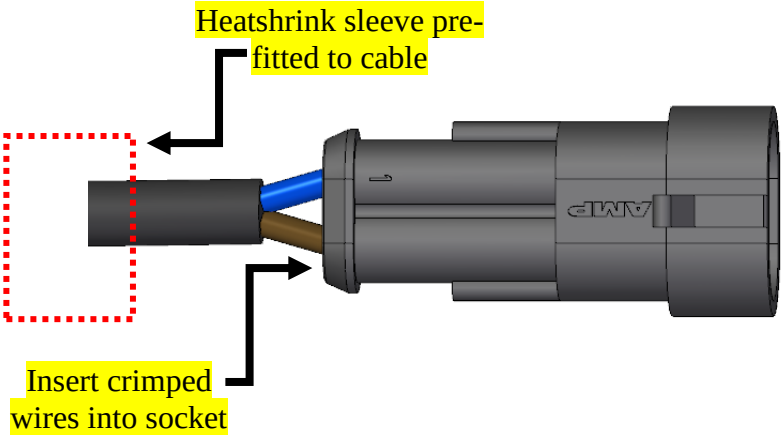
Crimp until the ratchet in the tool releases.

Do this for both crimp terminals.



One completed crimp shown.

Note:
DO NOT Crimp the area shown, these tags retain the terminal in the Terminal Holder!

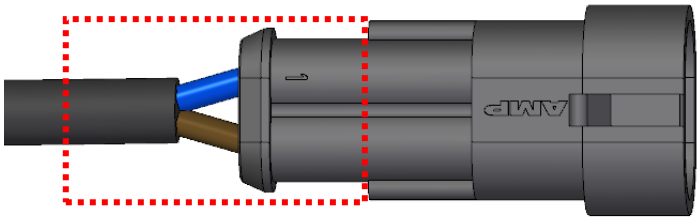


Slide a roughly 30mm long piece of black Ø10-12mm heatshrink onto the cable as shown.

Insert the crimped wires into the socket as shown.

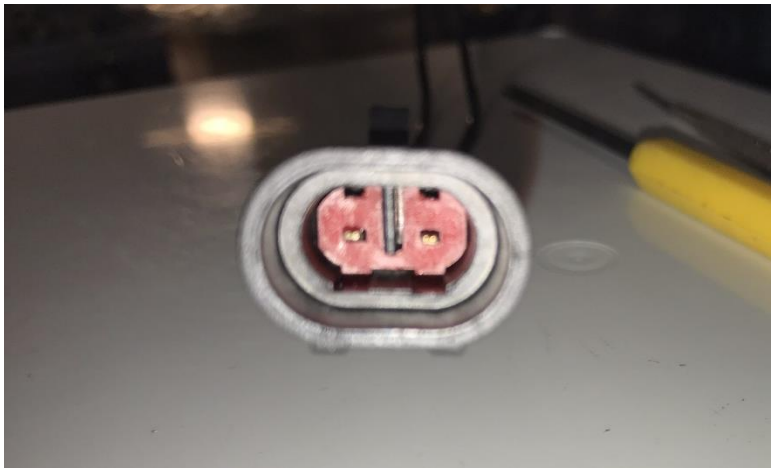
Pin 1: Blue wire
Pin 2: Brown wire

Ensure the crimps are locked into place by pulling on the wires with an appropriate amount of force.



Fit the heatshrink over the cable indicated in RED dashed lines.

Using a heat gun, heat the heatshrink so that it contracts tight around the plug and cable.

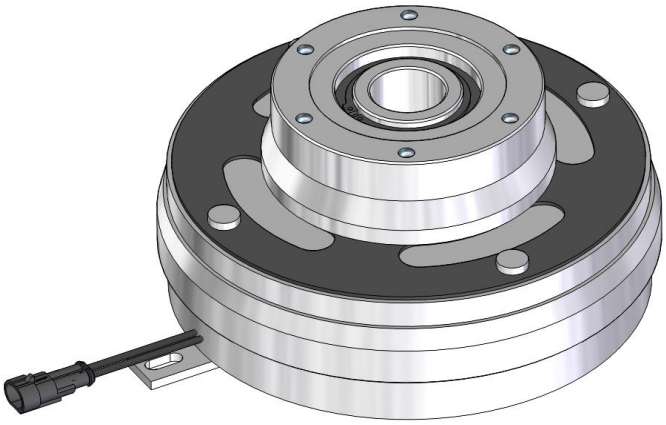


Finally replace the red clip into the socket and press inwards to lock the terminals in place. This should click when secured.

Both pins should be correctly aligned in the socket as shown.

This process is now complete

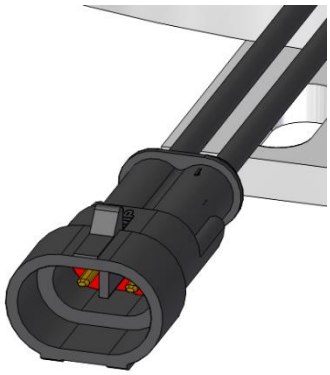
2 PIN SUPERSEAL SOCKET REPLACEMENT – CLUTCH



If the clutch electrical socket is damaged, it can be replaced.

Follow the same procedure to dismantle the socket as shown in the "2 Pin Superseal socket replacement – actuator" section above.

Note:
If there is enough slack in the wires, the plug can simply be cut off.

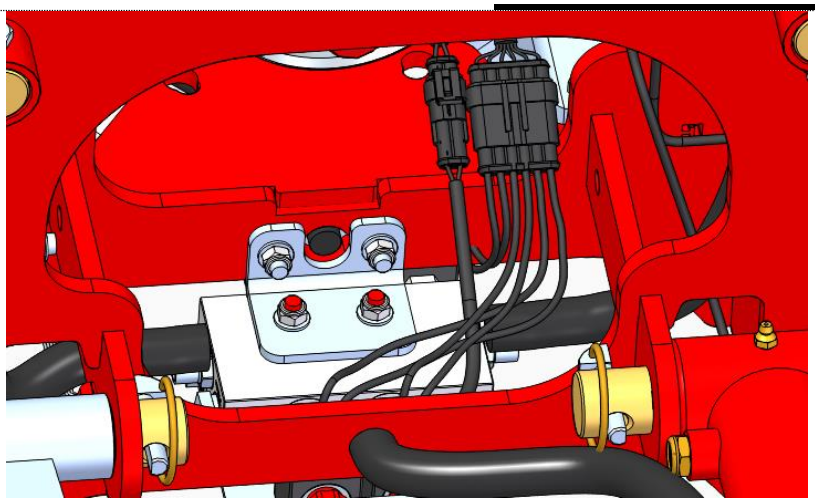


Once the plug is removed, replace it with 1.8-2.4mm wire seals (yellow), male crimps and a female socket included in the replacement kit **421-000-145**.

Note:
The polarity is not important. The pins can be plugged into the socket in either orientation.

This process is now complete

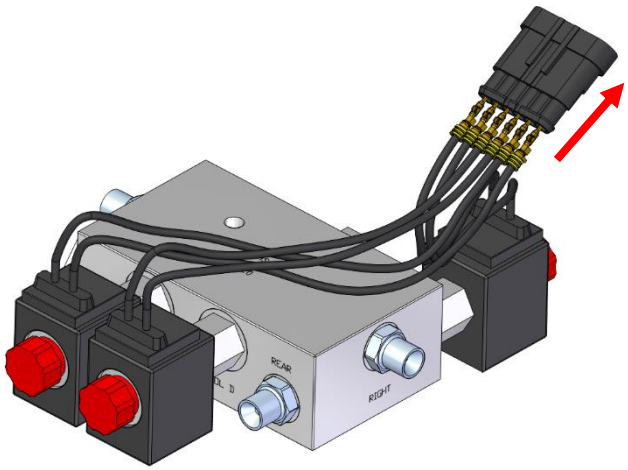
6 PIN SUPERSEAL SOCKET REPLACEMENT – VALVEBANK



This section covers replacement of the 6 pin socket on the hydraulic valvebank.

If only the socket is damaged, this can be replaced by a Trimax dealer.
Replacement kit: **421-000-152**.

Note:
In the event of a damaged valvebank, the entire unit should be replaced. This procedure is provided above.



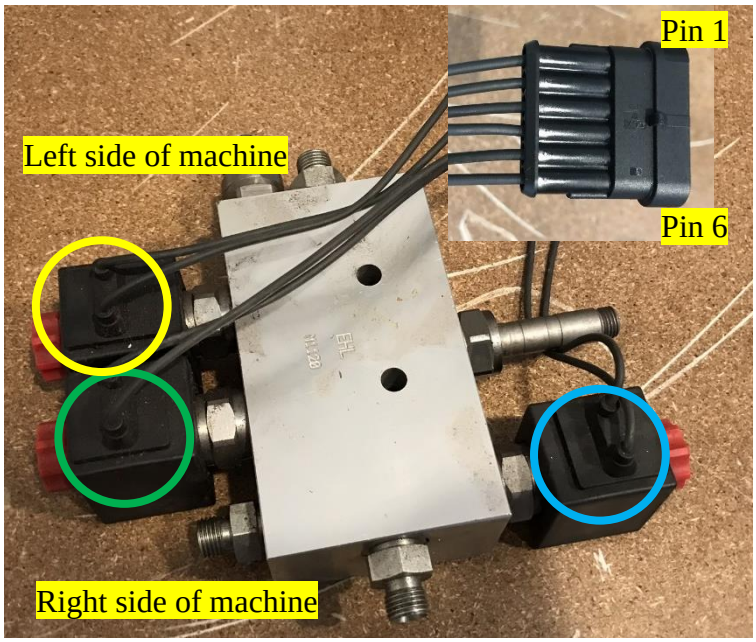
Remove the socket:

Remove the red retaining clip inside socket, use a screwdriver to depress the crimp retaining tags, and remove all wires from the socket.

This process is shown in more detail in the "2 Pin Superseal socket replacement – actuator" section.

If the pins are damaged, replace them following the same method as shown in the "2 Pin Superseal socket replacement – actuator" section.

Replace them with **male crimps** and **1.8-2.4mm** wire seals. These are included in the socket replacement kit.



Finally, insert the wires into the socket as shown.

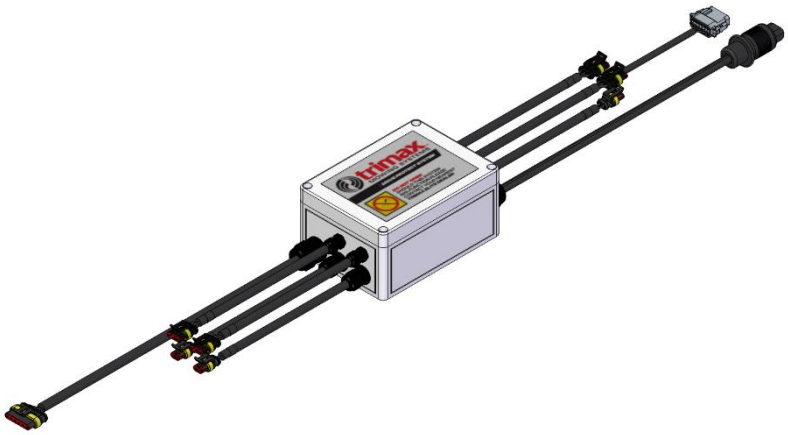
IMPORTANT:
Each individual valve is not polarity specific. Provided the wire pairs are connected to the correct 2 pins on the socket, the polarity does not matter.

Sol A: Not used
Sol B: Pins 5 & 6
Sol C: Pins 1 & 2
Sol D: Pins 3 & 4

Note:
The pin numbers are written on the socket.

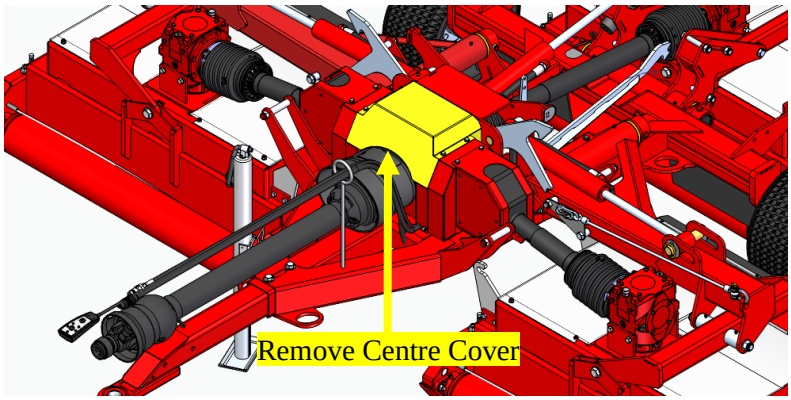
This process is now complete

DRIVE PROTECT MODULE CABLE REPLACEMENT – SENSORS, POWER, CLUTCHES AND ACTUATOR



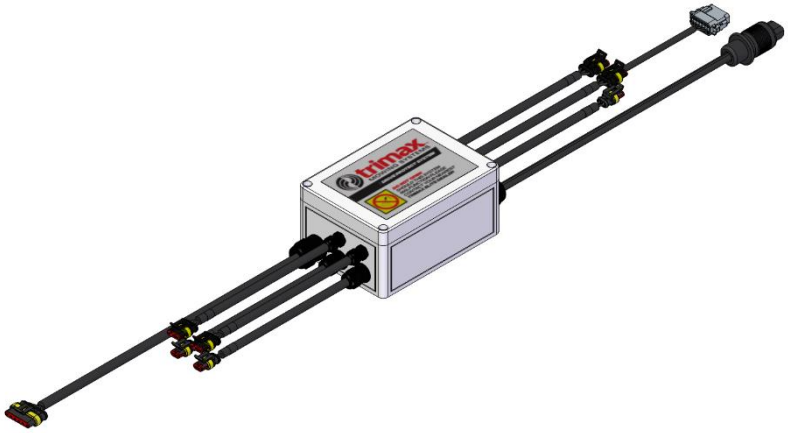
In the event of a broken cable or plug on the Drive Protect enclosure, it is possible to replace the damaged cable, rather than replacing the entire unit.

For part numbers of individual cables, refer to the spare parts listing provided with the mower.



Remove the Drive Protect Module Centre Cover as highlighted **YELLOW** in the image opposite.

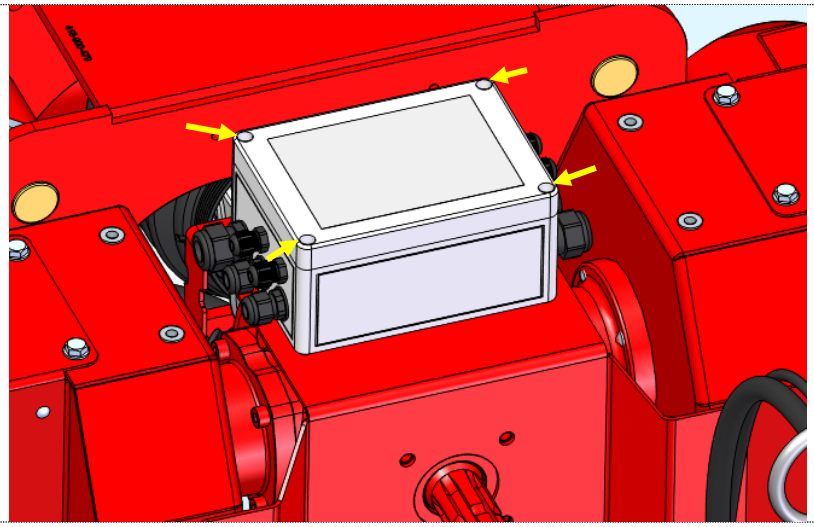
Note:
For more detail on this process, please refer to “Drive Protect module centre cover replacement” section of this Service Guide.



Removing the Drive Protect module may make the cable replacement process easier.

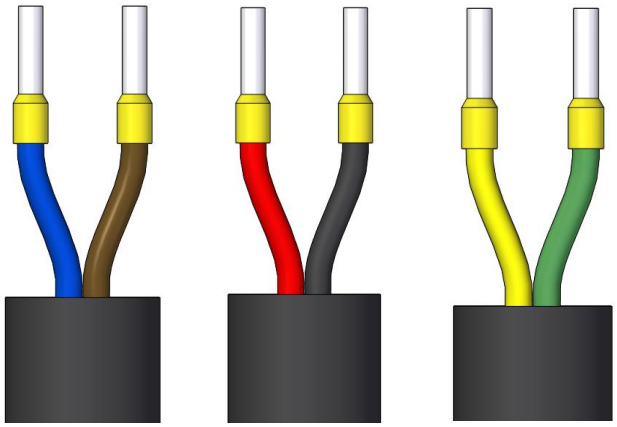
If required, remove the Drive Protect module.

For more detail, refer to the section “Drive Protect module replacement”.



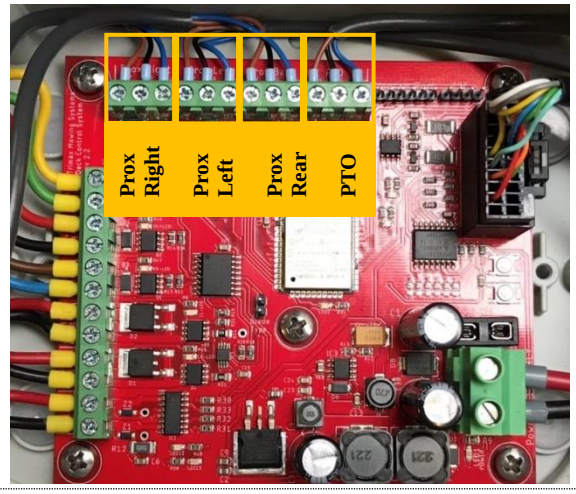
If removing a faulty cable without removing the Drive Protect module from the mower, begin by removing the lid.

To do this simply undo the 4 flathead screws securing the lid to the enclosure and lift off the lid.



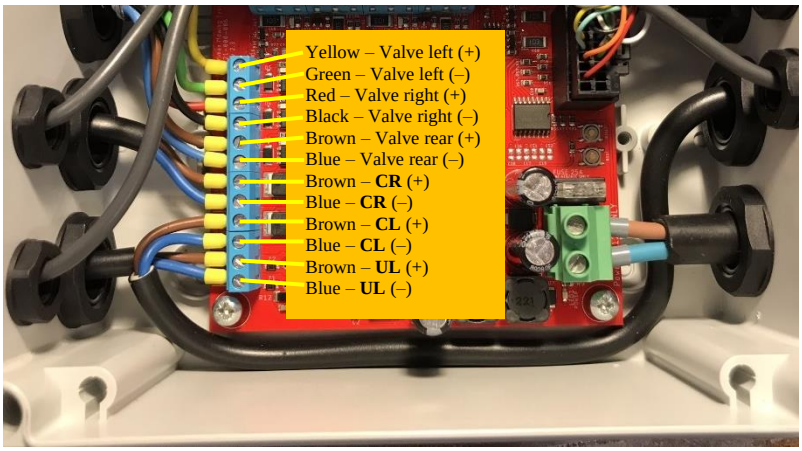
IMPORTANT:
Different wire and component colours may be used for the Drive Protect module than those shown.

For example: Wire pair colours such as red and black, can be used interchangeably with brown and blue, or another pair of colours. Keep this in mind when working on wiring.



The standard pinout for the circuit board input is shown here and in the next instruction step.

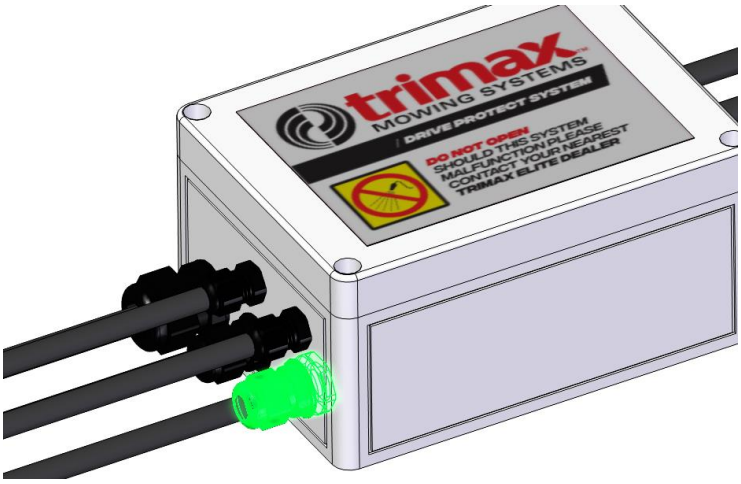
All sensors are wired positive, signal, negative from left to right. In the image shown, this is brown, black, blue.



IMPORTANT:
First, identify which cable inside the enclosure corresponds to the faulty cable.

The process for replacing a cable will be detailed using the Unlock Actuator Cable as the example.

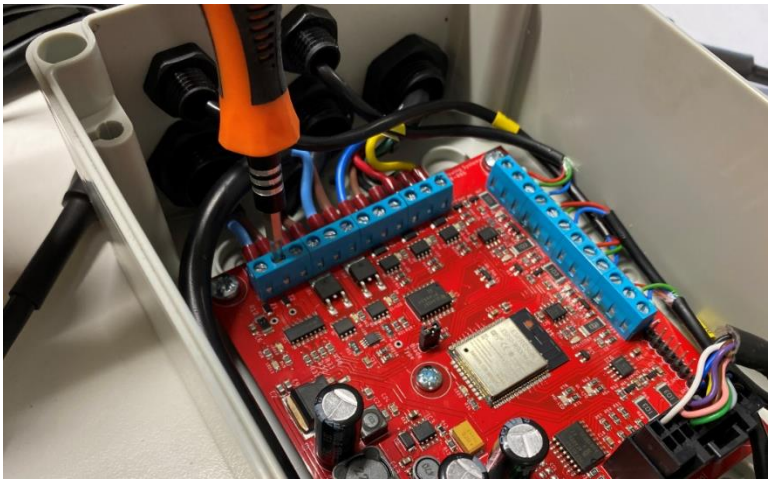
Lid shown for reference.



Undo the gland sealing nut for the cable which is being replaced.

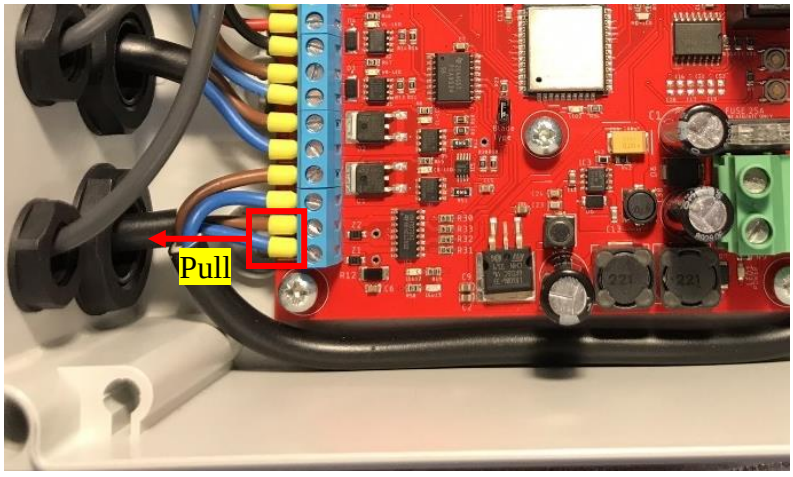
This should be “finger tight”, however if not, an appropriately sized open-ended spanner or crescent wrench can be used to loosen the nut.

Lid shown for reference.



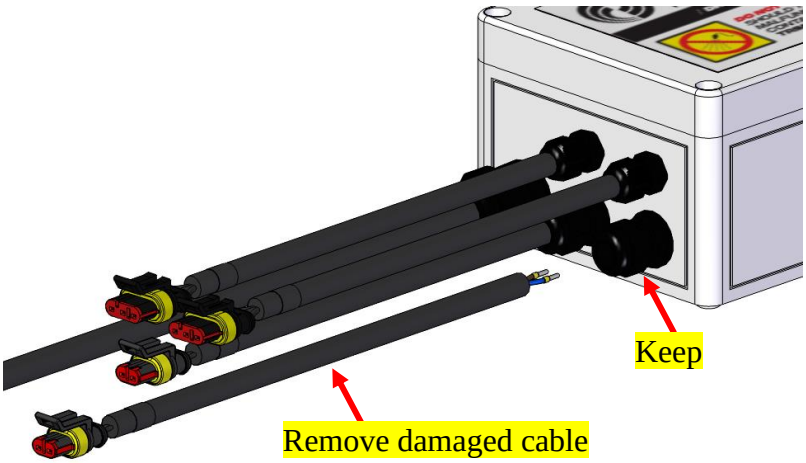
Using a flat head screwdriver, undo the screw terminal securing the faulty cable to the circuit board.

Be careful not to damage any components on the circuit board.



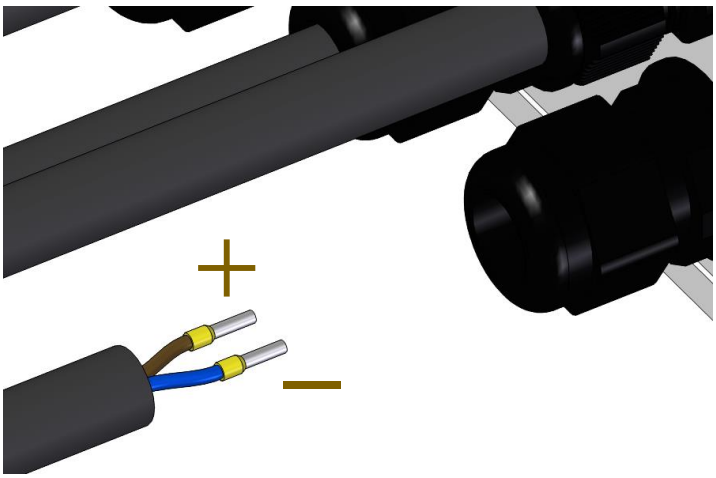
Carefully remove the wires from the circuit board screw terminals.

A pair of needle nose pliers may make this process easier.



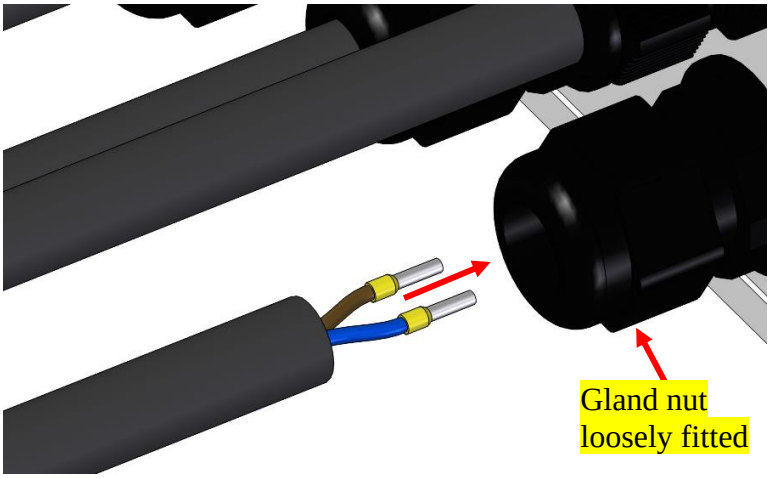
The cable can now be removed from the enclosure.

If the gland nut falls off, set this to one side or partially re-fit it to the enclosure as it is needed.



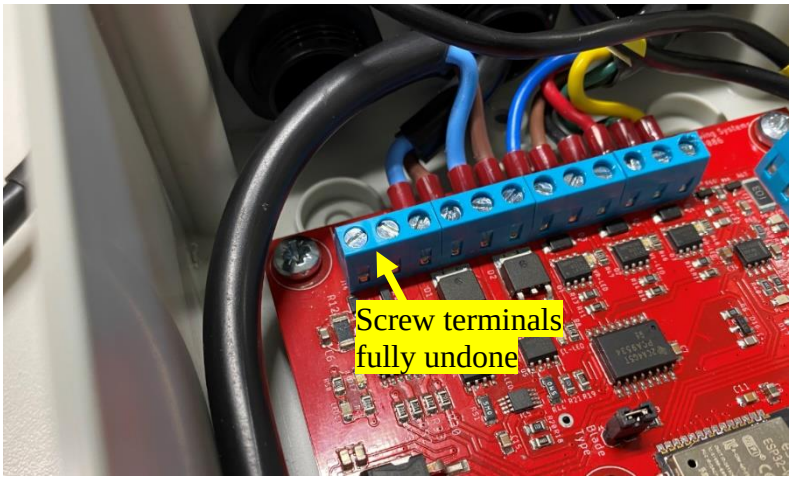
Collect the replacement cable to be fitted.

Identify the positive and negative wires of the cable. These should be either brown and blue, red and black, or yellow and green.



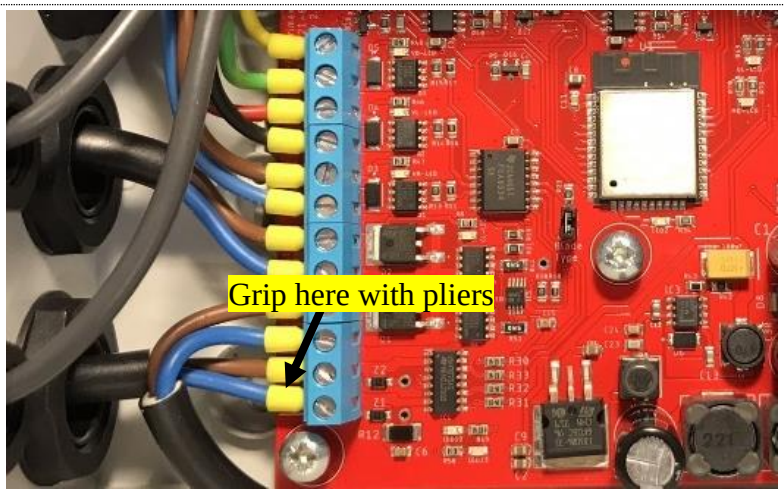
Loosely fit the gland sealing nut onto the gland as shown to ensure the gland nut is facing the right way and will not be forgotten. Do not tighten the nut.

Insert the cable into the enclosure through the gland.



Completely loosen the screws on the screw terminal for the cable being replaced. This makes it easier to fit the ferrule into the screw terminal block.

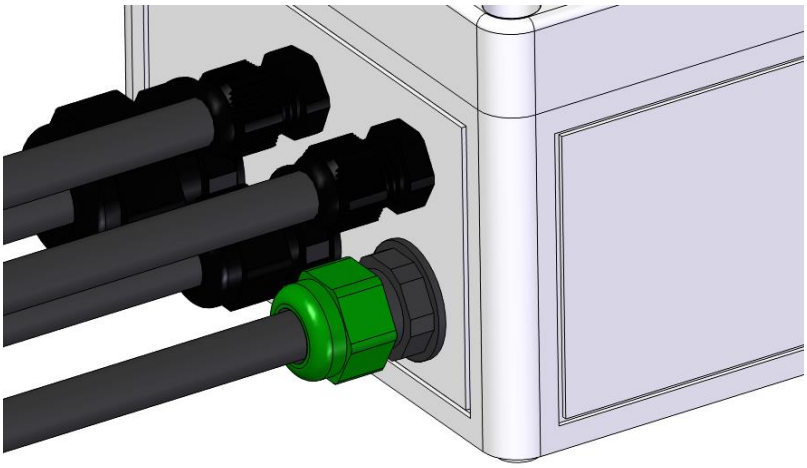
Leave the remaining screw terminals as they were. These should not need to be adjusted.



Fit the wires into the screw terminals in the polarity shown.

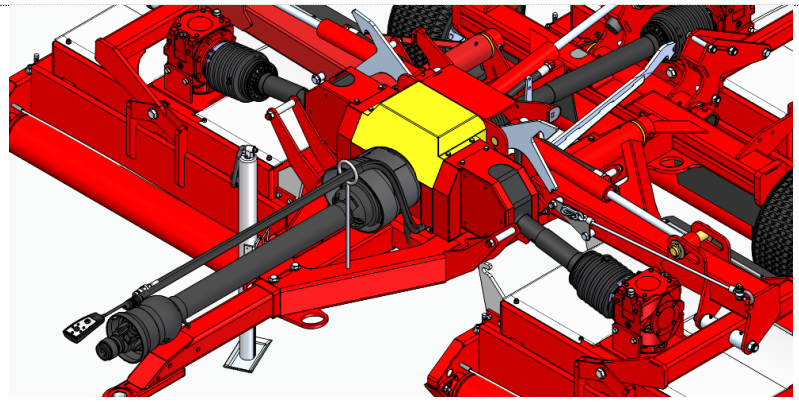
It may be easier to use a small pair of needle nose pliers gripping the ferrules to insert the wires into the terminals.

Tighten the screw terminals securely.



Finally, tighten the gland nut (highlighted in GREEN) such that the cable cannot slide back and forth inside the gland sealing ring as indicated.

This provides strain relief and ensures a watertight seal.



Refit the Drive Protect module lid and centre cover.

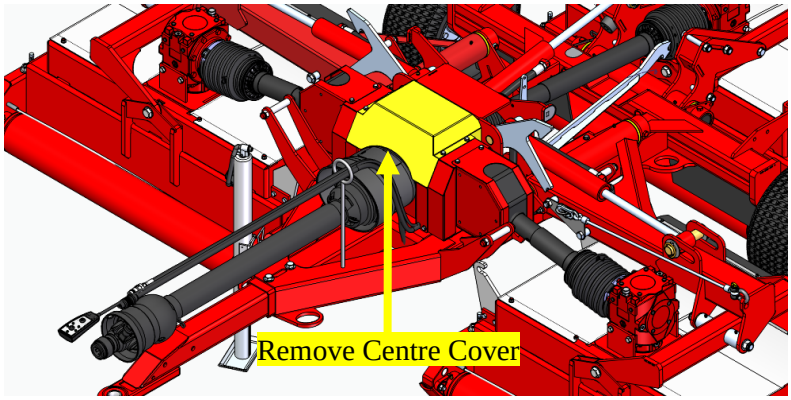
More details on these processes can be found in sections “Drive Protect module cover replacement” and “Drive Protect module replacement”.

This process is now complete

DRIVE PROTECT MODULE CABLE REPLACEMENT – HAND CONTROLLER

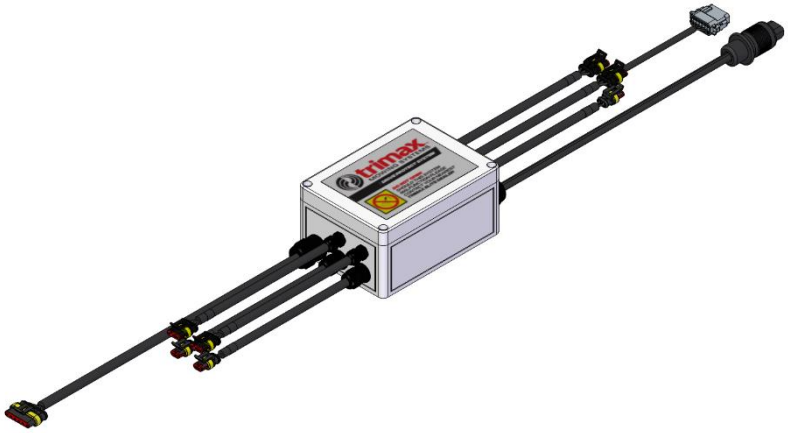
In the event of a broken hand controller cable or plug on the Drive Protect enclosure, it is possible to replace the damaged cable, rather than replacing the entire unit.

This is a more complex procedure than replacing the cables in the previous section and should not be undertaken without training and the correct tools.



Remove the Main PTO Shaft, Wide Angle PTO Cone and the Drive Protect Module Cover as highlighted **YELLOW** in the image opposite.

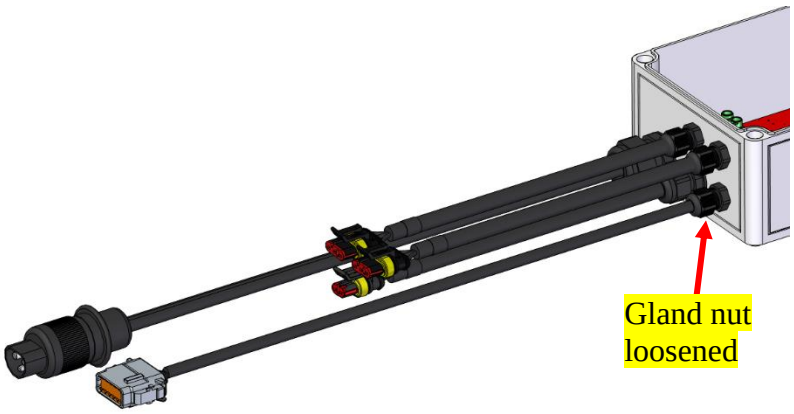
Note:
For more detail on this process, please refer to “Drive Protect module cover replacement” section of this Service Guide.



Removing the Drive Protect module may make the cable replacement process easier.

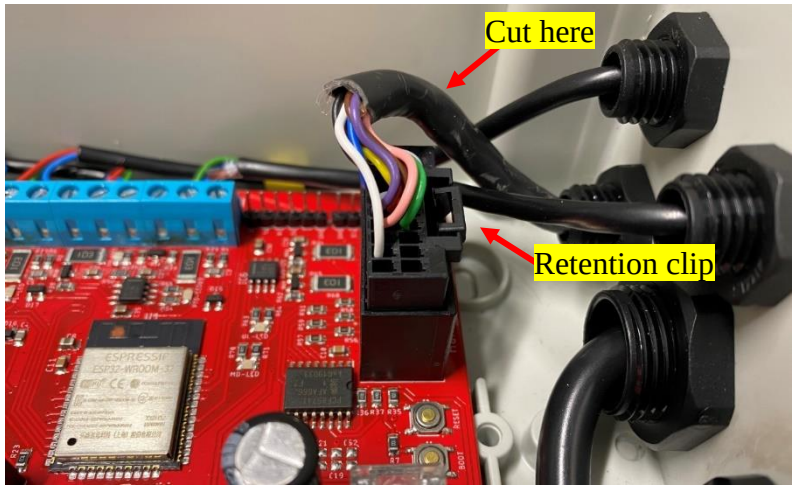
If required, remove the Drive Protect module.

For more detail, refer to the section “Drive Protect module replacement”.



Once the Drive Protect unit is set up and ready to be worked on, the hand controller cable can be removed.

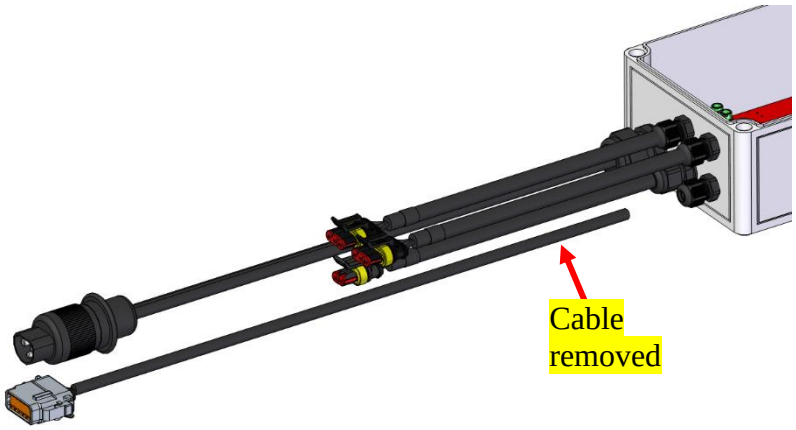
Begin by loosening the gland sealing nut securing the cable. The cable should be able to slide in and out a little.



Unplug the cable from the circuit board by pressing the retention clip and pulling upwards on the 20-pin plug.

Once the plug is removed from the circuit board, cut the plug off INSIDE THE ENCLOSURE. This will enable removal of the wire without removing the pins from the plug.

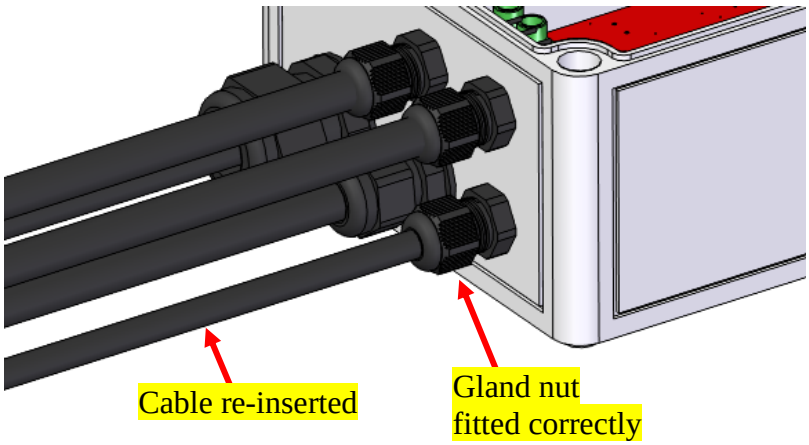
Keep the 20-pin plug end. This will be used later.



Remove the cable from the enclosure.

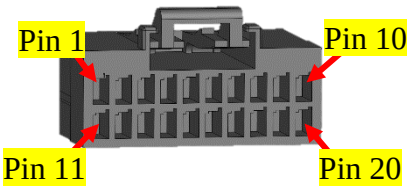
Keep the gland nut loosely fitted to the enclosure.

The replacement cable will be supplied with the plug disconnected. This enables the cable to be inserted into the enclosure. The pins are then inserted into the plug afterwards.



Insert the cable into the enclosure. The wires may need to be inserted one at a time and pulled through.

IMPORTANT:
Ensure the gland sealing nut is fitted and is facing the right way.

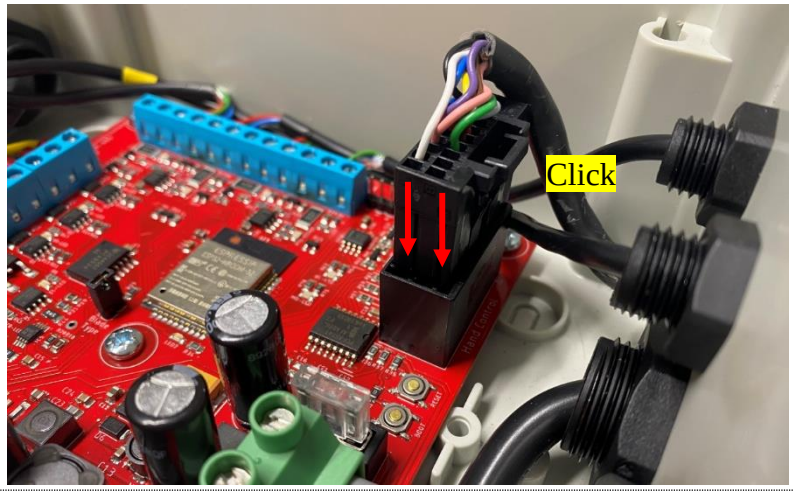


Pin 1 = Black (Ground)
Pin 2 = White (Unlock Button)
Pin 3 = NC
Pin 4 = NC
Pin 5 = Blue (LED5)
Pin 6 = Pink (LED3)
Pin 7 = Green (LED1)
Pin 8 = NC
Pin 9 = NC
Pin 10 = NC
Pin 11 = Grey (Mode Button)
Pin 12 = NC
Pin 13 = NC
Pin 14 = NC
Pin 15 = Yellow (LED UL)
Pin 16 = Cyan (LED4)
Pin 17 = Orange (LED2)
Pin 18 = NC
Pin 19 = Red (3.3V)
Pin 20 = NC
Note: Purple and Brown unused

Insert the pins into the 20-pin plug in the same orientation as the previously cut-off plug.

The wire colours should match.

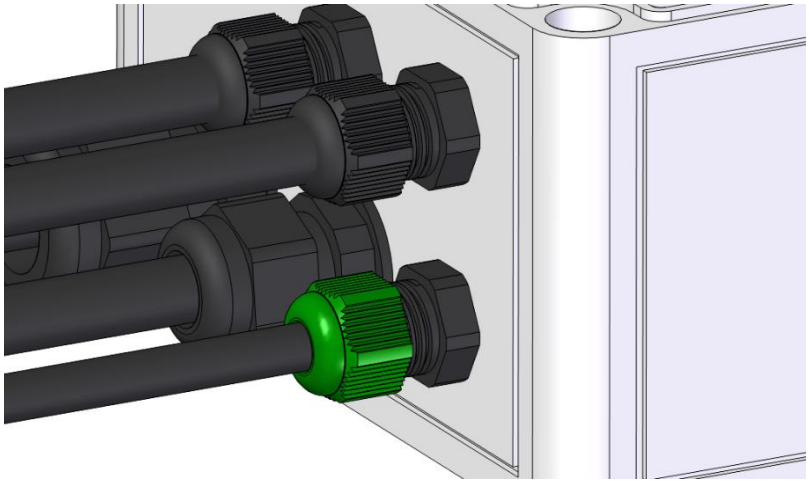
If plug is damaged or pins are no longer inserted, refer to the pin assignment in the image shown.



Plug the cable into the circuit board.

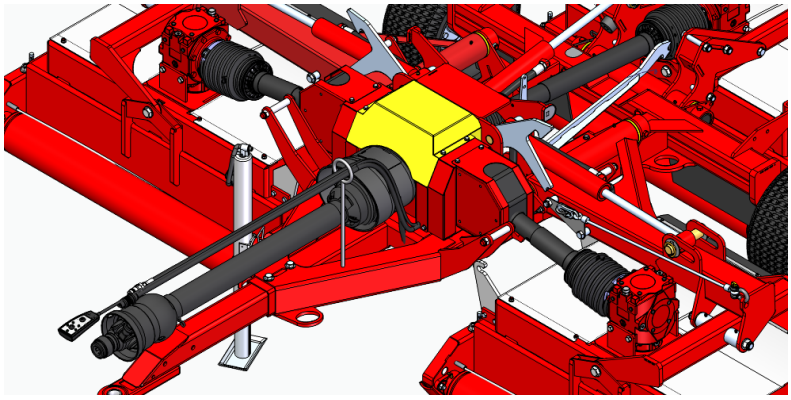
An audible click should be heard as the plug clips into the socket on the circuit board.

Give the cable a gentle tug to ensure the plug has engaged properly.



Tighten the gland with a small amount of slack cable inside the enclosure, around 25mm.

The cable should not be able to slide back and forth inside the gland once tightened.



Refit the Drive Protect module lid and centre cover.

More details on these processes can be found in sections “Drive Protect module cover replacement” and “Drive Protect module replacement”.

This process is now complete