



SP Series
2/3 Row
Potato Planters

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IMPORTANT

This operator's handbook should be regarded as part of the machine. Suppliers of both new and second-hand machines are advised to retain documentary evidence that this handbook was supplied along with the machine.

On installation of the machine (i.e. starting off in the field), the New Machine Installation Record Card should be completed by the dealer/distributor and be countersigned by the customer. The document is proof that the correct procedures have been followed.

The New Machine Installation Record Card should be returned to Standen Engineering Limited within 7 days of installation. Failure to do so may invalidate the machine warranty.

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On delivery check that the machine is as ordered and has not been damaged in transit. Please report any shortfall to your Standen dealer.

The contents of this handbook, although correct at the time of publication, may be subject to alteration by the manufacturers without prior notice.

Standen Engineering Limited operates a policy of continual product development. Therefore, some illustrations and/or text within this publication may differ from your machine.

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Introduction to the Handbook

This handbook provides the information for the operation, adjustment and maintenance of your **Standen SP Series 2/3 Row Potato Planter**. To enable you to achieve the best results from the machine, the manufacturer recommends that you read the handbook thoroughly prior to using the machine for the first time.

Record below the details of your machine.

Dealers name.....

Address.....

.....

Telephone number.....

Machine serial number.....

Date purchased.....

Date started work.....



This symbol indicates important safety messages within this handbook. When you see this symbol, be alert to the possibility of injury to yourself or others and/or damage to the machine and carefully read the message that follows.

Throughout this handbook the terms 'front', 'rear', 'left-hand' (LH) and 'right-hand' (RH) are derived from the tractor driver's position facing forward in the normal direction of travel.

Adjustments to the machine may have to be made singly or in combination according to soil conditions. Always allow the machine to settle to a new setting before making further adjustments.

Recommended lubrication and maintenance instructions are included in this handbook and if followed will help to keep the machine in a safe working condition.

Warranty

Should the machine suffer any faults or defects within the warranty period, please contact your dealer. The warranty shall be effective only if the dealer is informed of any such defect as soon as practicable upon discovery.

Replacement Parts

Recommended replacement parts are designed for your machine and have the full backing of the warranty. Only when recommended parts are used can responsibility be considered under the terms of the warranty.

The rear section of this handbook contains lists of spare parts available through your Standen Agents. Each illustration shows a complete unit or assembly in exploded form. Standen's policy of continual product development means that components or even complete assemblies are redesigned from time to time. Where possible the modifications are shown in the remarks column.

The first printing of each page in the spare parts section is identified as issue 1 at the foot of the page. When a complete unit or assembly has been redesigned the appropriate pages are revised and printed as issue 2. The revised pages are filed behind the existing issue so that a complete modification history is gradually built up. When using an illustration and parts list it is essential that both are of the same issue.

Always quote the full serial number of your machine when ordering spare parts.

Safety

The Standen SP Series Potato Planters have been designed to comply with current Safety Regulations. However, as with all machinery there will be inherent dangers whilst operating and carrying out maintenance on the machine. The following list of precautions should therefore be brought to the attention of all persons operating and working on the machine. The list is not exhaustive. All machinery is potentially dangerous and great care must be exercised by the operators at all times. Standen Engineering Limited will not accept liability for damage or injury caused by their products except when such liability is specifically imposed by English statute.



The machine must never be operated by untrained personnel or children.

The tractor must be of a suitable size to lift the implement safely. This may entail the fitting of front weights to counterbalance the machine when in the raised position.

Always check that the machine has been correctly mounted to the tractor before setting off on operations and the stabilizers are correctly set.

Never set machinery in motion before ensuring that everyone in the vicinity is aware of your intentions.

Never allow children or animals in the vicinity where machines are working and never allow anyone to ride on the machine.

Never attempt to fit drive chains or drive belts to the machine while the drive sprockets or pulleys are in motion.

Normal safe working procedures should be adopted at all times. Reduce speed when transporting the machine on sloping ground.

Do not work on ground where there is a possibility of overturning or across steep slopes.

The working area should be kept clear and free of obstructions at all times. Be alert for hidden obstructions. Should the machine hit an obstruction, stop and check for damage before proceeding.

Wear substantial or proper safety footwear. Avoid loose clothing near moving parts. Wear gloves when handling the implement or parts with sharp edges.

Before carrying out any work on the machine, lower the machine to the ground, switch off the tractor engine, apply the handbrake, remove the ignition key. Never work on or pass under the machine when it is raised on the tractor hydraulic linkage.



When left free standing i.e. not attached to the tractor, the machine must be on level ground.

The operator must not leave the tractor seat until the machine has been lowered to the ground, the tractor engine switched off, the handbrake applied and the ignition key removed.

Never reverse or turn unless the machine is in the raised position.

All guards, covers, warning transfers and safety devices must be correctly fitted and operable at all times.

Inspect the machine on a regular basis and replace damaged or worn parts as necessary.

Inspect the machine for damage after use. Rectify as required.

Never operate the machine in a state of disrepair.

When in transport the moulding board/ridgers should be raised and secured into the transport position.

Only transport the machine at a speed suitable to the prevailing conditions. Be aware of the weight and overall length of the machine at all times.

When in transport keep the hopper empty. Always fill the hopper in the field. Transporting with a full hopper causes strain on both planter and tractor and will pack the potatoes in the hopper causing 'bridging' when planting commences.

Always ensure road lights are clean and in good working order.

Always use mechanical or additional help when lifting heavy parts.

Regularly check hydraulic hoses for chafing or damage and replace as necessary.

Care must be taken when carrying out any work on the hydraulic system. Even when stopped and disconnected from the tractor, residual pressure will exist within the hydraulic system. Therefore, before commencing any work on the hydraulics ensure that the system is free of residual pressure.

Safety is the responsibility of the persons working with this machine. Think "safety" at all times. Read and remember the contents of this handbook.

Overview

Standen SP Series Potato Planters can be built in many forms e.g. 2 row, 3 row, manual space selector, hydraulic space selector etc. The machines are designed to plant potatoes with extreme gentleness and accuracy in either standard planting or bed work.

Tractor Suitability

The SP Series planter is suitable for tractors of 100 hp minimum.



The tractor must be of a suitable size to lift the implement safely. This may entail the fitting of front weights to counterbalance the machine when in the raised position.

Attaching the Planter to the Tractor

The planter is designed to be mounted onto the tractor 3-point linkage. The lower link arm brackets (item 1, figure 1) are adjustable to accommodate all tractors. Adjust both brackets equally either side of the headstock.



When fitting to the tractor ensure the planter is standing on firm level ground. The operator should have read and understood the tractor operators manual prior to attaching the machine and putting into work.

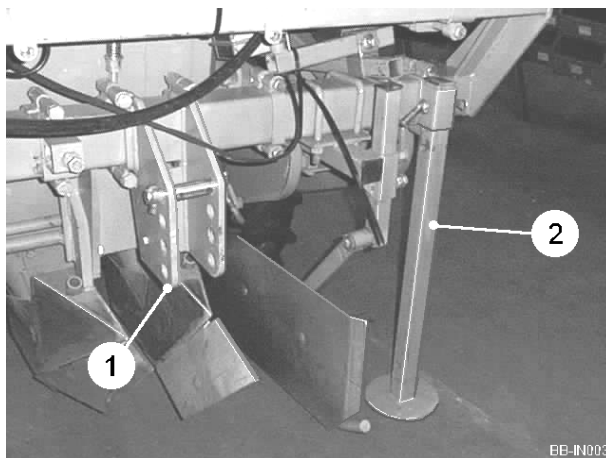


Fig 1

Reverse the tractor up to the planter and engage the tractor lower link arms onto the planter link arm brackets. The tractor lower link arms and stabilisers must be set to ensure the planter runs central to the tractor. Fit the top link and adjust to level the planter. If the planter is fitted with hydraulic depth control, the top link is replaced by a hydraulic ram (see section 'Hydraulic Depth Control' for fitting instructions).

Once mounted to the tractor, the hydraulic and electrical control services can be connected. The hydraulic pressure hose (marked red), should be connected to the tractor constant supply port. The return hose (marked blue) should be connected to the tractor return port. The electrical control box should be mounted securely inside the tractor cab in a position where it is comfortable to operate when seated. Connect the cable between the planter and control box ensuring it is safely and securely routed in the tractor cab. The box requires a 12v D.C. supply.

Connect the power lead directly to the tractor battery, blue lead to negative (-) terminal and brown lead to positive (+) terminal. Finally, connect the planter road lights plug to the tractor 7-pin socket.



The parking stands (item 2, figure 1) must be raised before commencing work. When disconnecting the planter from the tractor always ensure the stands are lowered to support the machine.

Planting

Careful planting is one of the pre-requisites for a good crop of high quality potatoes. The potatoes should be planted in straight ridges without gaps and at a correct and even depth. This is achieved when, at the beginning of planting, the functions of the planter and the different adjustments are carefully studied.

The seed potatoes used can vary a great deal (i.e. different varieties, shape, size, number of sprouts, skin quality etc.) and the planter must be adjusted accordingly.

On machines fitted with manual space selector, when ready to plant, first lift the planter on the tractor three point linkage and turn the right hand land wheel until every cup on the elevators is filled. This way the machine commences to plant immediately on starting. Seed population tables are included at the end of this section of the handbook.

Land Wheel Adjustment

The planter land wheels must be set to straddle the rows. The LH and RH wheel units are adjustable to allow the wheels to be set between 142cm (56") for a two row machine, 152cm (60") for a three row machine and 203cm (80").

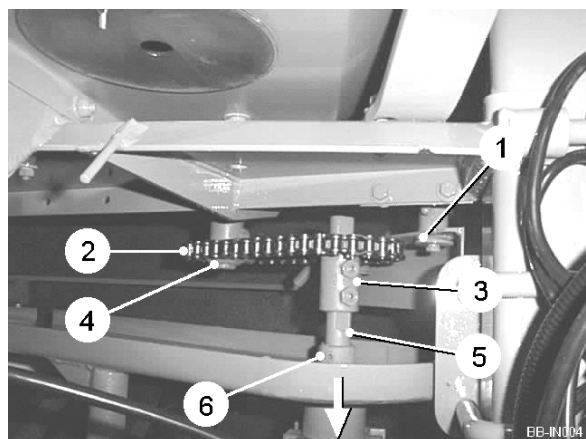


Fig 2

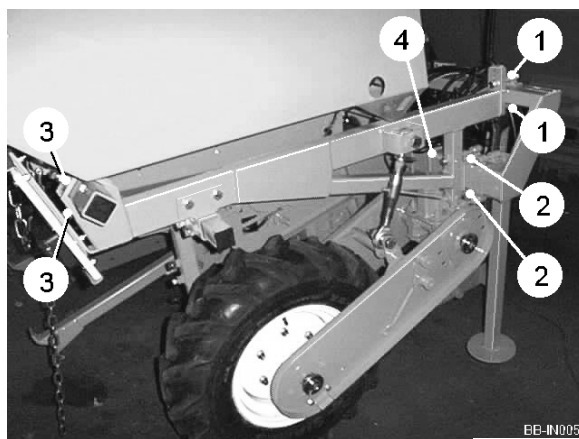


Fig 3

To adjust the land wheels:

Loosen the chain tensioner (item 1, figure 2) and remove the drive chain (item 2, figure 2) (machines with manual space selector only). Loosen the LH and RH wheel unit frame securing bolts (item 1, 2 & 3, figure 3) and soil retention panel front mounting 'U' bolts (item 4, figure 3). Slide the wheel units soil retention panel mountings to the required setting ensuring they are adjusted equally about the machine centre-line. When in position, retighten the securing bolts (item 1, 2 & 3, figure 3) and 'U' bolts (item 4, figure 3). Loosen the drive sprocket (item 3, figure 2) and reposition it to align with the driven sprocket (item 4, figure 2). Ensure the retaining bolts locate firmly on the drive shaft flat. Finally, refit the drive chain (item 2, figure 2) and set it to the correct tension by adjusting the chain tensioner (item 1, figure 2).

Depending on the row width setting and wheel setting, a different drive shaft (item 5, figure 2) may be required. When built, the planter will have been set-up for the customers original requirements and therefore supplied with the correct drive shaft.

Additional drive shafts are available from your Standen dealer (see the spare parts section of this handbook).

To change the drive shaft:

Loosen the chain tension roller (item 1, figure 2) and remove the drive chain (item 2, figure 2). Loosen the drive sprocket (item 3, figure 2) and adjacent locking collar (item 6, figure 2) and withdraw the drive shaft in the direction of the arrow. Reassemble using the correct length of drive shaft.

Setting the Seed Spacing (machines with manual space selector only)

The seed spacing is adjusted by changing the ratio of the drive transmission taken from the RH land wheel.

To change the seed spacing:

Choose the required seed spacing from the sprocket table decal on the machine and select the sprockets indicated. Remove the drive chain (item 1, figure 4) by rotating the tensioner (item 2, figure 4) to increase slack. If this is difficult, release the tension by loosening the spring anchor (item 3, figure 4). Remove the sprocket retaining bolts (item 4, figure 4) and slide the sprockets from their shafts. Fit the selected sprockets ensuring they locate on the driving pins (item 1, figure 5). When fitting the 16 tooth sprocket, the sprocket boss (item 2, figure 5) is not required. When refitting the sprocket boss, or fitting the 16 tooth sprocket, ensure the drive shaft pin (item 3, figure 5) engages in the boss. Replace the sprocket retaining bolts (item 4, figure 4). Re-fit the drive chain (item 1, figure 4) and adjust the tension by repositioning the spring anchor (item 3, figure 4).

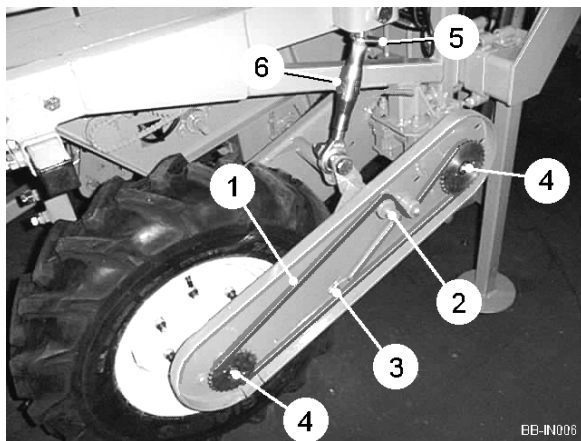
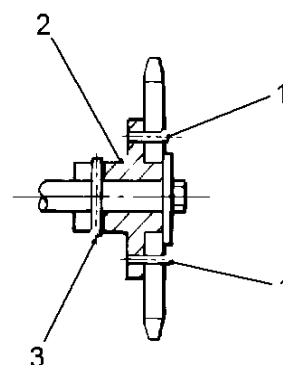


Fig 4



EB-IN007

Fig 5

Setting the Planting Depth

The floating openers are adjustable for depth by raising or lowering the land wheels relative to the planter body. Raising the wheels will allow the opener to dig deeper and conversely lowering the wheels will allow the opener to dig shallower. To adjust the planting depth, loosen the lock plates (item 5, figure 4) and rotate the turnbuckles (item 6, figure 4) to raise or lower the land wheels relative to the planter body. Ensure both sides are adjusted equally. Additional adjustment can be achieved by adjusting the top link between the tractor and the planter although making the openers dig too deep by this method could result in the soil 'bulldozing' in front of the planter.

Floating Openers

The bottom springs (item 1, figure 6) allow the openers (item 2, figure 6) to ride over obstructions reducing damage to the planter. The top springs/spacers (item 3, figure 6) carry the weight of the openers and prevent them from 'nose diving' in soft soil. The bottom springs should be set to allow the ground pressure during work to lift the opener into the working position as shown (see figure 6). To adjust, reposition the locknuts (item 4, figure 6). On 2 row machines fitted with an opener depth wheel, the bottom springs should be released to allow the depth wheel to float freely and the top springs should be set to allow 25mm (1") of free downward movement during work.

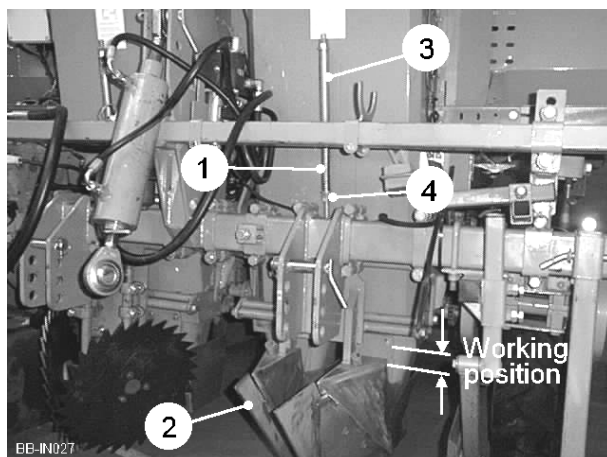


Fig 6

Soil Retention Panels

The soil retention panels (item 1, figure 7) prevent soil from flowing into the wheelings from the openers. Vertical adjustment is provided to allow the panels to be raised/lowered to match wheel height. To adjust the height loosen the front leg retaining screws (item 2, figure 7) and raise/lower the leg to the required position. Loosen the rear leg retaining screws (item 1, figure 8) and adjust the leg height so that the panel (item 1, figure 7) runs parallel with the ground. The angle at which the pivot arms (item 3, figure 7) operate should be approximately 30° from horizontal allowing the panels to ride the contours of the ground. The depth chains (item 2, figure 8) should be adjusted to allow the panels to float when in work but prevent them from dropping too low when the planter is lifted on the tractor linkage. The skids (item 4, figure 7) are fitted to assist the soil retention panels in riding over the ground. The skid should be set slightly below the bottom edge of the panel. To adjust loosen the retaining bolts (item 5, figure 7).

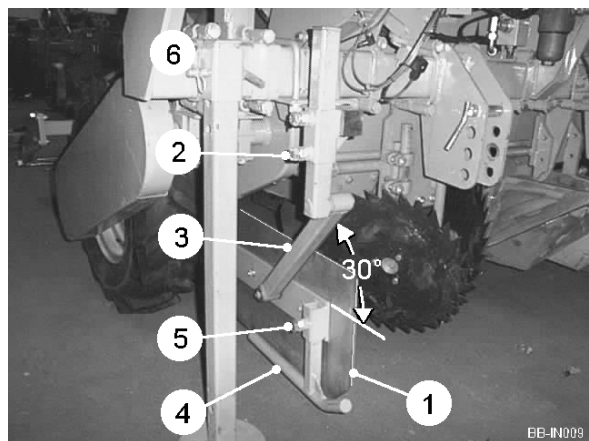


Fig 7

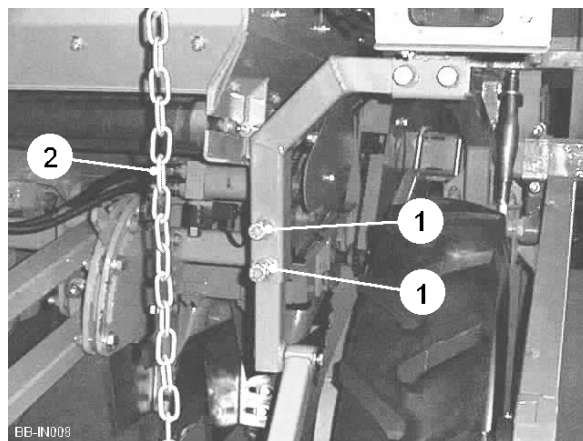


Fig 8

Bed Forming Board and Ridger Bodies (optional)

The ridge shape and size is controlled by the height and width of the bed forming board (item 1, figure 9), the setting of the ridgers (item 1, figure 10), and the spring pressure exerted on the trailing arms (item 2, figure 9) and tool bar (item 3, figure 9).

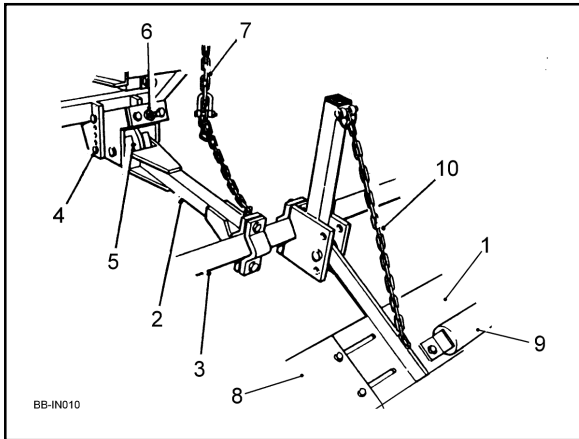


Fig 9

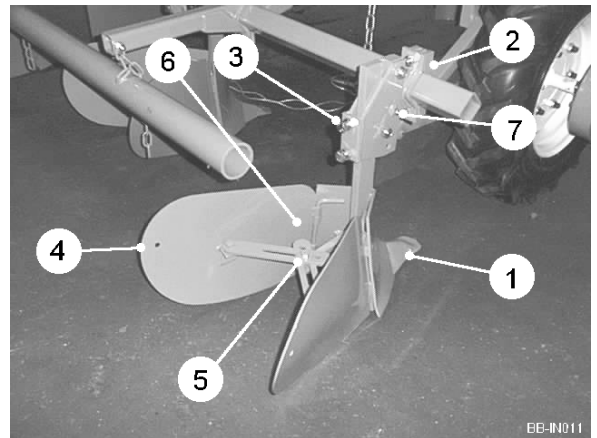


Fig 10

The height at which both the board and the ridger bodies operate can be varied by removing the bolts (item 4, figure 9) and repositioning the trailing arms (item 2, figure 9) to align with a different hole. The arms should run parallel to the ground during work. The pressure exerted by the torsion springs (item 5, figure 9) is adjusted by repositioning the adjuster rod locknuts (item 6, figure 9). Shortening the adjuster rods will increase the spring pressure. Adjust both sides equally.

The chains (item 7, figure 9) should be set to allow the ridgers and bed forming board some free downward float when raising the planter out of work at the end of each row, the ridgers can then be drawn forward to cover the remaining uncovered sets in the row before raising the planter fully and making the headland turn. Adjust the locknuts/chains accordingly.

To adjust the width of the bed forming board (item 1, figure 9), slide the board extensions (item 8, figure 9) to the required position. The weight (item 9, figure 9) flattens the bed. By adding extra weights the bed can be flattened further. The chains (item 10, figure 9) hold the bed forming board at the required height. The chains are also used to hold the board in the raised transport position.

The ridger bodies (item 1, figure 10) create the sides of the bed. The position of the ridger bodies relative to the board can be adjusted by loosening the retaining bolts (item 2, figure 10) and sliding the ridger units along the tool bar. The position of the ridger units is important to ensure a nicely formed bed. Leaving a large gap between the ridger units and the board will cause a ridge to be formed on top of the bed.

The height of the ridger bodies can be adjusted by loosening the retaining bolts (item 3, figure 10) and then raising or lowering each unit. The angle at which the ridger bodies operate can be altered in the same way. To adjust, loosen one bolt and then tighten the other. Which bolt to tighten and which to loosen depends on the required direction of tilt.

The wings (item 4, figure 10) can be adjusted by loosening the securing bolt (item 5, figure 10) and pulling them apart or pushing them together. In addition, the wings on some ridgers can be raised or lowered by loosening the bolt (item 6, figure 10). The lower the wing is positioned, the less soil will be lifted.

Each ridger body is protected by a shear bolt (item 7, figure 10). If the ridger hits an obstruction the bolt will break and allow the ridger body to swing backwards so avoiding any serious damage to the machine.



If a bolt shears, stop, lift the machine out of work and check for damage. Reset the ridger and replace the shear bolt. The shear bolts should be kept tight at all times.

Multi-Adjustable Moulding Board (optional)

The adjustable moulding board (item 1, figure 11) is mounted to the rear of the planter via parallel linkage arms (item 2, figure 11). During work these arms should be at approximately 10° from horizontal. This can be achieved by repositioning the bolts (item 1, figure 12) into a different set of holes. The height and downward pressure exerted by the moulding board is controlled by the reaction arm (item 2, figure 12) and upper and lower stops. The lower stop (item 3, figure 12) controls the height of the board whilst simultaneously reduces the pressure of the board on the bed. The upper stop (item 4, figure 12) induces a downward pressure on the board by loading the rubber torsion springs (item 5, figure 12) within the lower arm pivots. Both stops are adjusted by loosening their retaining bolt and sliding the stop around the slot to the required position. If when in work no pressure is required on the bed, the stops can be adjusted to allow the reaction arm (item 2, figure 11) to move freely. The support chains (item 3, figure 11) should be adjusted to allow the moulding board to float when in work but prevent it from dropping too low when the planter is lifted on the tractor linkage.

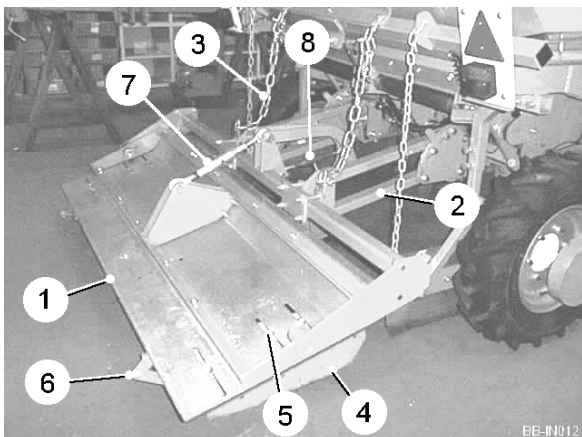


Fig 11

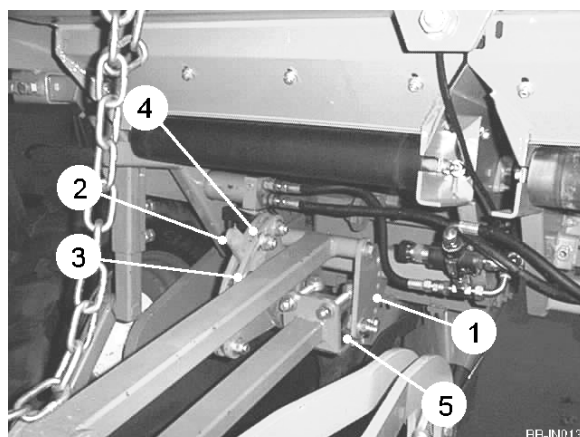


Fig 12

The position of the wings (item 4, figure 11) is important to ensure a nicely formed bed. The outer wings are adjustable for both position and angle. The position of the wing determines the width of the finished bed. To adjust, loosen the mounting bolts (item 5, figure 11) and slide the outer wing assembly to the required position.

The angle at which the wings operate will determine the shape of the bed. To adjust, loosen the retaining bolt (item 6, figure 11) and rotate the wings to the required position. The top link (item 7, figure 11) sets the moulding board angle. Initially the angle should be set at approximately 5° from horizontal. Increasing the angle will allow more soil under the board. The depth at which the centre plough operates is set using the top link (item 8, figure 11). The deeper the plough is set, the more soil it will push sideways. Care should be taken however as going too deep may move the seed in the bed.

Feed of Potatoes to Cups

When planting, check that the flow of potatoes from the hopper to the feeding cups is satisfactory and that no 'bridging' occurs. The size of gap between the hopper and the feed belts (item 1, figure 13) can be altered by adjusting the regulator plates (item 2, figure 13).



Fig 13

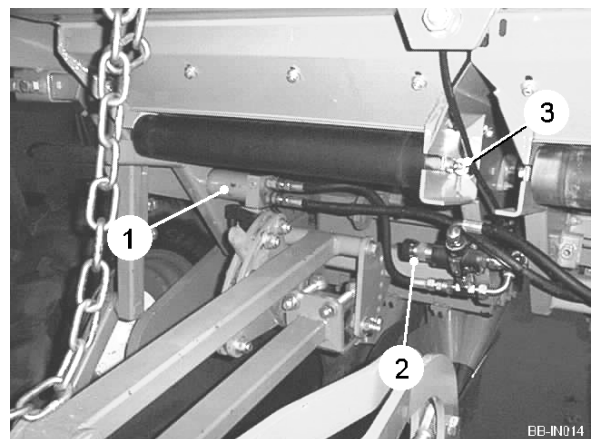


Fig 14

Feed Belts

The feed belts (item 1, figure 13) convey the seed potatoes from the hopper to the feeding pockets. Each feed belt is driven by a hydraulic motor (item 1, figure 14). The speed of the belts can be varied by turning the flow divider knob (item 2, figure 14). The higher the number the quicker the belt will run. To create a positive drive, spring loaded tensioners (item 3, figure 14) maintain constant tension on the belt. To alter the tension turn the adjuster nuts. Ensure both sides are adjusted evenly.



Do not overtighten the feed belts otherwise premature wear of the bearings and belts may occur.

The feed belt drive chains (item 1, figure 15) are each fitted with a tensioner (item 2, figure 15). Adjust the chain tension to be tight enough to give positive drive without undue stretching. The feed belt motors are actuated by the sensors (item 1, figure 16) situated between the belts and the feeding pockets. When the quantity of potatoes in one of the feeding pockets is so small that the distance between the sensor and the potatoes is more than 8cm (or the feeding pocket is empty), the sensor gives the relay an impulse.

This impulse closes the circuit causing the relevant motor to engage and drive the feed belt to transport the potatoes to the feeding pocket. When the quantity of potatoes in the feeding pocket increases such that the distance between the potatoes and the sensor is approximately 8cm, the sensor gives the relay a new impulse which then causes the motor to disengage and so stop the drive to the feed belt. The feed belt will remain at standstill until the quantity of potatoes in the feeding pocket is small enough that the process is repeated. This way the potato layer in the feeding pocket is always kept thin and the feeding cups do not damage the potatoes.

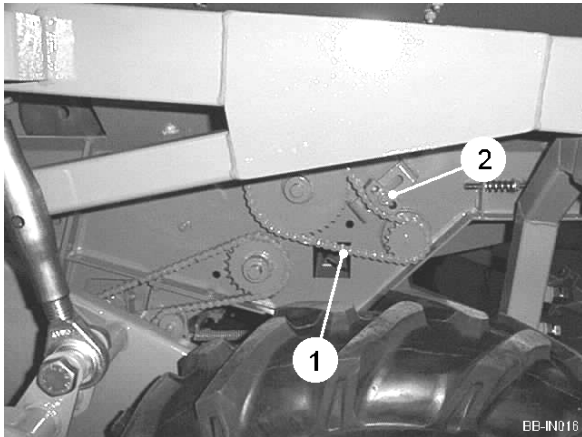


Fig 15

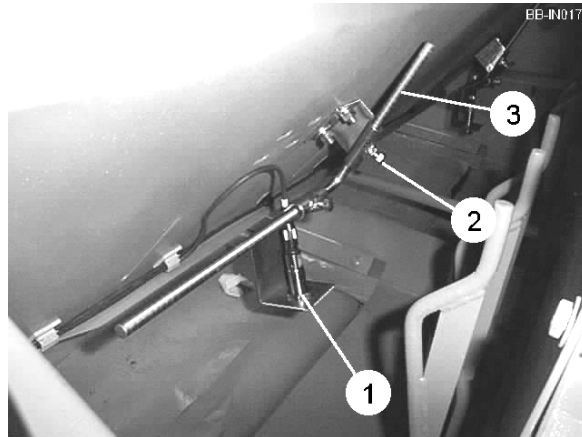


Fig 16

Depending on the size of potatoes being planted, it may be necessary to alter the height of the sensor (item 1, figure 16) in relation to the feeding pocket. The sensor should be positioned higher for larger potatoes and lower for smaller potatoes. To adjust the height of the sensor, loosen the set screw (item 2, figure 16) and slide the support arm (item 3, figure 16) to the required position and re-tighten.

The sensors are adjusted at the factory for a reaction distance of approximately 8cm. Minor adjustments to the sensing distance can be made by turning the screw located on the side of the sensor. The sensing distance is increased by turning the screw clockwise and decreased by turning it anti-clockwise.

Cup Belts

The cup belts pick up the seed from the feeding pocket and transfer them to the ground. Rapid locking brackets (item 1, figure 17) fitted to each of the tunnels keep the cup belts tensioned and also allow rapid maintenance of the cup belts. To slacken the cup belts, push the handles fully down until hanging loose. Each belt is tensioned by two spring adjusters (item 2, figure 17) which when tensioned correctly avoid slipping of the belt around the top and bottom rollers. Always adjust both sides evenly.



Ensure the cup belts are not over-tightened otherwise premature failure of the bearings and belts may occur. After adjustment ensure the belts are running in the centre of the rollers so as to avoid damage to the edge of the belts.

The centre cup belt drive chain (3 row only) is fitted with a tension roller. The drive chain should be set to give a positive drive.

Insert Cups

The shape of the feeding cups is designed to pick up the irregular long shaped seed in a large grade. For a seed grade with a wide range of sizes and long seed, every alternate cup should be fitted with a medium insert. For a narrow range seed grade with more irregular shapes a full set of medium inserts should be fitted. For a small size seed grade, small inserts should be fitted. To attach the inserts, simply press them into the hole in the centre of the feeding cups.

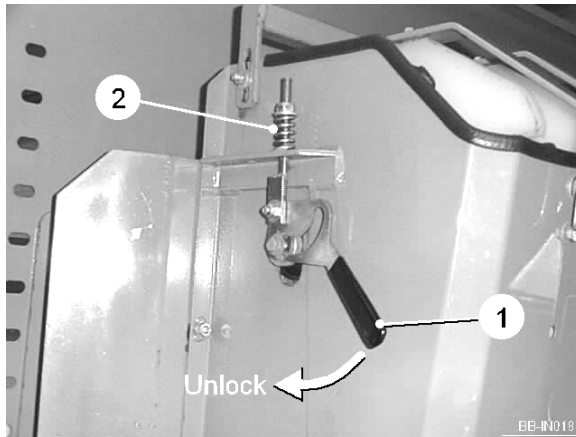


Fig 17

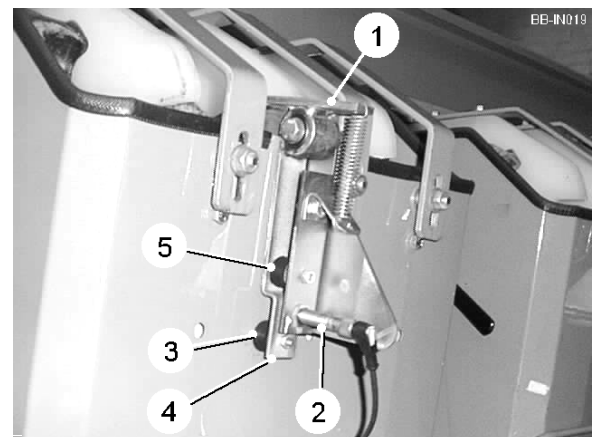


Fig 18

Seed Monitors

The seed monitors fitted to the top of each tunnel are designed to detect the potatoes as they pass over the top of the cup belts prior to planting. Each time a potato activates a monitor the proximity sensor sends an impulse which illuminates the relevant light for that row on the control box. If during work a light remains off for longer than a predetermined period, an audible warning will sound indicating that there are no potatoes in the feeding cups in that row possibly suggesting a 'bridge'. The time delay can be adjusted between 1 and 3 seconds by turning the timer knob on the control box. The delay is increased by turning the knob clockwise and decreased by turning it anti-clockwise. If necessary the timer can be reset to operate between 1 and 10 seconds by resetting the number 8 dip switch within the control box.

The seed monitors should be adjusted so that the potatoes in the RH cups of each cup belt consistently trip the pivot plates (item 1, figure 18) thus activating the proximity sensors (item 2, figure 18). Initially the bottom stop (item 3, figure 18) should be adjusted so that a gap of approximately 3mm exists between the pivot plate (item 1, figure 18) and the inner face of the tunnel. Loosen the proximity sensor retaining nuts and slowly move the sensor closer to the sensor plate (item 4, figure 18) until it activates. When activated a red light appears on the sensor body. Screw the sensor out until the sensor deactivates and continue for another half turn then retighten the retaining nuts. This setting should leave a gap of approximately 1-2mm between the proximity sensor and the sensor plate. Finally, adjust the top stop (item 5, figure 18) to prevent the sensor plate coming into contact with the proximity sensor. If everything is adjusted correctly the proximity sensor will be activated and deactivated with only a slight deflection of the seed pivot plate (item 1, figure 18).

Cup Belt Agitators

The cup belt agitators control the number of potatoes in a cup. The planter can be fitted with either manually or electrically adjusted agitators. When planting seed of good quality and size it is possible to drive faster without compromising planting accuracy. The agitation in this case can be kept to a minimum. If the seed is uneven the influence of the agitator can be increased by driving faster. In this case there will be more movement of the cups and the excess potatoes will drop off. When using potatoes which tend to fall out of the cups i.e. oversized or oblong etc. the speed should be slow and agitation set to minimum otherwise gaps may occur.

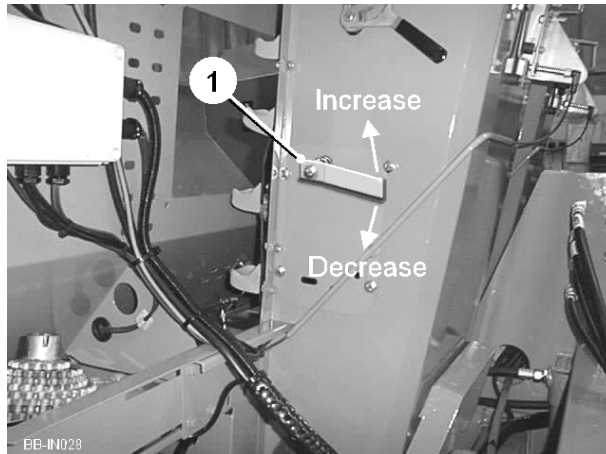


Fig 19

On manually adjusted agitators, the handles (item 1, figure 19) fitted to the side of each tunnel are used increase/decrease the amount of agitation. Raising the handle will increase agitation while lowering it will decrease agitation. The stronger the agitation the easier the excess potatoes will fall from the cups.

The electrically adjusted agitator is controlled from a tractor mounted control box. A dial on the control box increases/decreases the speed of the agitator motors situated within the cup belt tunnels.

Hydraulic Depth Control

Hydraulic depth control allows the depth at which the openers dig to be adjusted whilst planting. A depth ram (item 1, figure 20) replaces the top link between the planter and tractor. The ram is actuated from the tractor via the control valve (item 2, figure 20). Two control box buttons marked 'raise' and 'lower' raise/lower the openers.

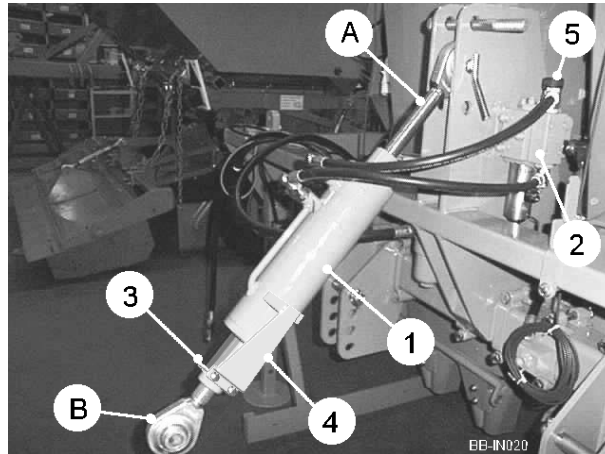


Fig 20

The fitting and setting up of the depth ram is vital to ensure the correct operation of the depth control system. Therefore, the following procedure must be adhered to before operating the planter.

1. Connect the planter to the tractor 3-point linkage lower link arms and connect the hydraulics and electrics to the tractor (see section 'Attaching the Planter to the Tractor').
2. With the planter on the ground, adjust both wheel legs until the planter is slightly nose down (see section 'Setting the Planting Depth').
3. Measure the top link hole centres between planter and tractor. When in position the ram should be slightly down at the tractor end relative to the ground. Use the additional holes in the planter headstock to achieve this.
4. Set the depth ram to its mid-stroke position.
5. Screw ram end 'B' fully home, and then screw it out 25mm.
6. Adjust ram end 'A' to achieve the required centres. Ram end 'A' may require cutting. If the centres still cannot be achieved, then ram end 'B' will also require cutting.



Always ensure there is at least 50mm of the thread engaged in the ram.

7. Fit the ram between the tractor and planter with the piston end adjacent to the tractor.
8. With the depth ram still in its mid-stroke position, loosen the 'U' clamp (item 3, figure 20) and move the depth indicator (item 4, figure 20) until the top edge aligns with the mid position mark on the depth indicator decal.

The speed at which the ram moves can be adjusted using the valve control knob (item 5, figure 20). The ram should be set to move slowly and smoothly. The depth ram should only control planting depth when in work. The wheel legs should be adjusted if a more permanent depth is required (see section 'Setting the Planting Depth')

Optional Automatic Depth Control (prior to 2013)

Automatic depth control ensures that the desired planting depth is maintained irrespective of the contours of the bed. Two PIR (passive infra red) sensors (item 1, figure 21) positioned either centrally in front of the planter, or to the left or right at the rear of the planter depending on configuration, activate the hydraulic control valve operating the depth ram (item 1, figure 20). The depth ram then raises/lowers the planter relative to the wheels thus maintaining planting depth.

The 'up' and 'down' sensors are preset at the factory to a sensing distance of approximately 460mm and 490mm respectively, giving a neutral (dead-band) zone of approximately 30mm (to adjust the sensor settings see section 'Depth Control Sensor Adjustment').

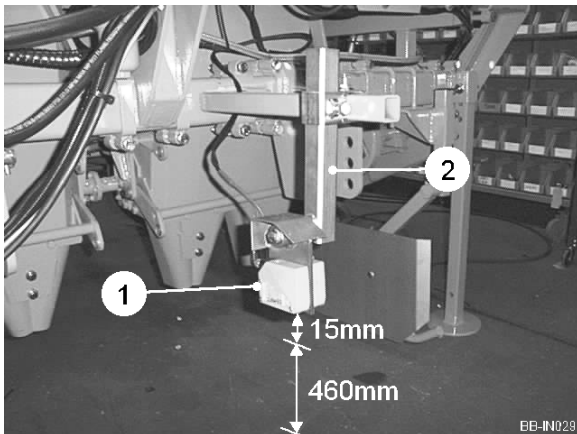


Fig 21

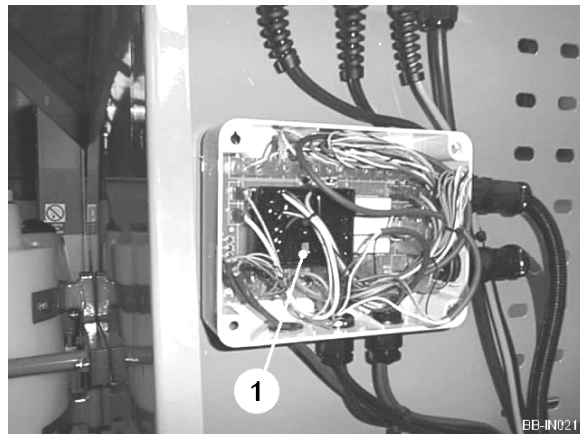


Fig 22

Fig 22

A timer is built into the depth control circuit which is designed to provide a time delay between activation of the 'up' sensor and actuation of the hydraulic control valve. The time delay can be adjusted between 1 and 5 seconds by turning the relay potentiometer screw (item 1, figure 22) located under the junction box lid. Time delay is increased by turning the screw clockwise and decreased by turning it anti-clockwise. Normally a 3 second delay smoothes out any surface irregularities allowing the planter to gradually change height according to changes in bed height.

To set the automatic planting depth:

1. Position the planter over the prepared bed.
2. With the feed belt/auto-depth control box 'OFF/OFF AUTO' switch in the 'OFF' position, set the depth ram to mid-stroke position using the push button switches marked 'RAISE/LOWER'.
3. Set the opener planting depth (see section 'Setting the Planting Depth').

4. Fully lower the auto-depth sensor leg (item 2, figure 21) and then gradually raise it until the point at which both 'up' and 'down' sensor lights illuminate (approx 460mm above bed). Ensure the sensors are sensing the height of the bed and not any other surface in-between.
5. Raise the sensor leg a further 15mm to position the sensors in the middle of the preset neutral (dead-band) zone. When in the neutral zone only the 'down' sensor will be illuminated. Raising the leg higher will cause both 'up' and 'down' sensor lights to switch off.
6. Engage the auto-depth control by setting the control box 'OFF/ON AUTO' switch to the 'ON' position. If necessary re-adjust the height of the sensor leg to regain the desired planting depth.
7. Drive forward and check the planting depth. Make further adjustments if necessary.

If during work adjustments in planting depth need to be made manually, the auto-depth control can be over-riden by pressing the control box buttons marked 'RAISE/LOWER'.

Depth Control Sensor Adjustment (prior to 2013)

The 'up' and 'down' PIR sensors are preset at the factory to a sensing distance of approximately 460mm and 490mm respectively, giving a neutral (dead-band) zone of 30mm. If the sensors need adjustment the following procedure should be followed.

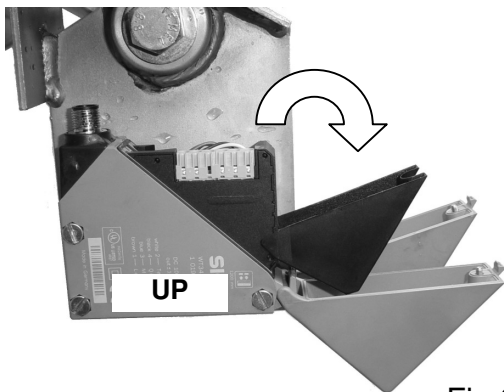


Fig 23

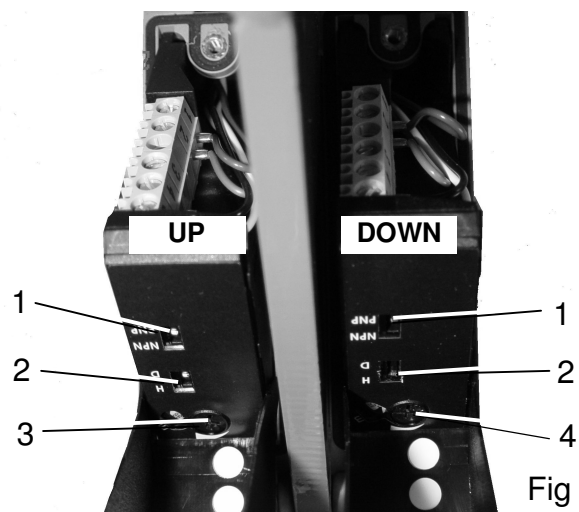


Fig 24

1. Loosen the single screw on top of each sensor and flip open the access covers (see figure 23).
2. The switch (item 1, figure 24) should be set to 'PNP' on both sensors.
3. The switch (item 2, figure 24) should be set to 'D' for the 'down' sensor and 'H' for the 'up' sensor.
4. Place a non-reflective surface on the ground under the sensors and position the sensor unit leg (item 2, figure 21) to the required 'up' activating distance.
5. Slowly turn the 'up' sensor screw (item 3, figure 24) until its indicator light illuminates.
6. Slowly turn the 'down' sensor screw (item 4, figure 24) until its indicator light also illuminates. With both lights illuminated this becomes the 'raise' position.

7. Gradually raise the sensor leg until the 'up' sensor indicator switches off leaving the 'down' sensor indicator illuminated. This is the neutral (dead-band) position where no actuation (raise/lower) of the control valve will occur.
8. Continue to raise the sensor leg until both sensor indicators switch off. This point is the 'lower' position.
9. The vertical distance travelled between both sensor indicators being illuminated and both being switched off is the dead-band. The dead-band zone should allow approximately 30mm of movement before actuating the control valve. To adjust the distance turn the down' sensor screw very slightly clockwise to increase, or anti-clockwise to decrease the dead-band.

Note: The 'up' sensing distance should always be shorter than the 'down' sensing distance for the sensors to operate correctly. The closer the two sensing distances are, the narrower the dead-band will be.

DOWN sensor indicator	UP sensor indicator	Machine action
ON	OFF	Neutral (dead-band). No movement.
ON	ON	Raise.
OFF	OFF	Lower.
OFF	ON	Sensors set incorrectly. Trying to raise and lower at same time.

Hydraulic Space Selector

The hydraulic seed space selector (if fitted) comprises of an electro-hydraulic drive assembly with both oil supply and electrical connection from the tractor. The unit replaces the chain drive transmission from the RH land wheel to the planter elements. The seed space setting required is electronically selected on a control box mounted inside the tractor cab. The unit requires a hydraulic supply from the tractor of a minimum 13.5 litres/minute (3 gal).

The seed space selector main components consist of a control box (item 1, figure 25) and a hydraulic motor valve assembly (item 1, figure 26) with electrically controlled flow regulator to drive the planting elements, a monitor fitted to the output shaft of the hydraulic motor to provide speed information to the control box and a monitor fitted to the land wheel axle to provide forward speed information to the control box. The monitors consists of toothed monitor wheels and proximity sensors which read the time interval between each tooth.

The control box should be mounted securely inside the tractor cab in a position adjacent to the planter main control box. Electrical power for the space selector is provided via the main control box. Connect to the main control box via the plug leads which are attached to both boxes.



Fig 25

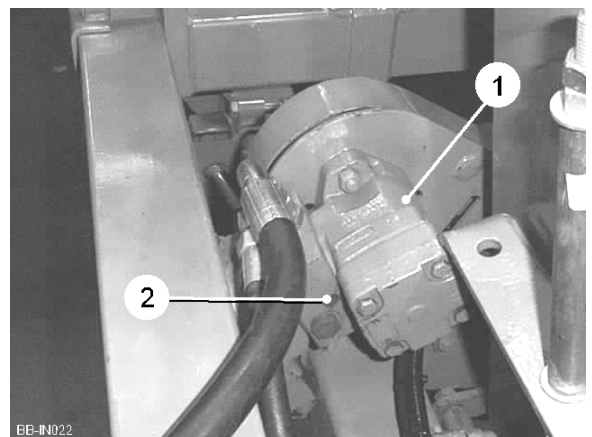


Fig 26

Hydraulic System

The motor valve assembly (item 1, figure 26) has a screw (item 2, figure 26) fitted into the base plate. When the assembly leaves the factory the screw will be in the 'out' position for use with open centre hydraulic systems.



To ensure accurate results, regular maintenance of the tractor hydraulic oil filters (as recommended by the tractor manufacturer) is essential. Contaminated oil will result in excessive wear.

Calibrating the Control Box to the Motor Valve

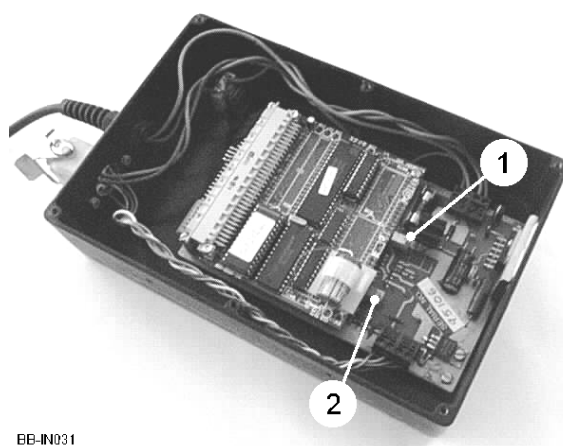
Owing to the manufacturing tolerances of the motor valves, it is necessary to calibrate each control box (item 1, figure 25) to its own motor valve assembly (item 1, figure 26). Calibration will have been checked at the factory prior to dispatch. However, it may be necessary to carry out a further check as the tractor used may have a different hydraulic system and/or output. Always use a tractor, as the unit requires the normal 12v d.c. electrical supply and an adequate supply of warm oil. To carry out a check when the hopper is full, simply disconnect the drive chain from the hydraulic motor valve before calibrating.

To check the 'constant' (no oil flow required):

1. With 'R' depressed switch on the control box and then release 'R'. The constant will appear in the LH display.
2. Press the 'Up' or 'Down' arrow to increase or decrease the constant to '49' for machines with 135mm cup belt centres, or '44' for 122mm cup belt centres.
3. Switch off the control box.

To check the motor valve output (oil flow required):

1. With 'U' depressed, switch on the control box and then release 'U'.
2. Remove the back of the control box.
3. Press 'R'.
4. Press the 'Down' arrow. Signal for low end value.
5. Adjust the potentiometer with yellow dot (item 1, figure 27) until the motor just starts to run. '0.00' to '0.04'.
6. Press 'R'.
7. Press the 'Up' arrow. Signal for high end value.
8. Adjust the potentiometer with red dot (item 2, figure 27) until the motor runs at approximately '98' to '100'.
9. Repeat steps 3,4,5,6,7,8 and check.



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Fig 27

Calibrating the Control Box Area Recorder

To ensure accuracy, the area recorder 'count' must be calibrated to suit the particular field conditions and also preference for information to be displayed in acres or hectares. The area recorder receives impulses from the wheel monitor which together with wheeling (bed width) information is processed into acres/hectares planted.

1. Using the chart, select the relevant 'measured distance' from the acres or hectares column and accurately mark out the distance in the field.
2. With the 'Up' arrow depressed, switch on the control box and then release the 'Up' arrow. The display shows '--:--'.
3. Press 'R'. the display resets to '00:00'.
4. With the hopper half full and the planter lowered onto its wheels, drive the planter accurately over the measured distance and stop.
5. Make a note of the control box 'count'.
6. Repeat steps 3,4,5 several times to find the average 'count'.
7. Switch off the control box.
8. With 'A' depressed, switch on the control box and then release 'A'.
9. Press the 'Up' and 'Down' arrows until the display reads the average 'count'.
10. Switch off the control box. The 'count' is now programmed into the recorder memory bank.

		Wheelings (Bed Width)				
		152cm (60")	163cm (64")	173cm (68")	183cm (72")	203cm (80")
Measured Distance	0.01 acre	26.55m	24.9m	23.43m	22.14m	19.92m
	0.01 hectare	65.62m	61.54m	57.9m	54.7m	49.21m

Hydraulic Space Selector in Operation

At the end of each row, disengage the planter drive using the tractor hydraulic controls and lift the planter until the wheels are just clear of the ground, draw forward to cover the remaining uncovered sets in the row and then lift the planter fully before making the headland turn. On recommencing planting, engage the planter drives using the tractor hydraulic controls.



The control box must be left switched on at the end of each row and the drive engaged and disengaged using the tractor hydraulic controls. This will prevent possible electrical surges but more importantly prevents the initial high speed surge of the cup belts at the start of planting. The surge can cause sets to be 'thrown' at the operator and will destroy spacing for the first few metres of each row.

Seed Spacing

Press button selection is provided for 40 different seed spacings ranging from 10cm to 51cm (4" to 20"). The selected spacing is shown by the control box LH digits. To increase the spacing press the 'Up' arrow. To decrease the spacing press the 'Down' arrow. Monitoring of the actual spacing and of the forward speed is given by the RH digits when the planter is in work. The figures '88' will appear when the unit is switched on and the planter is stationary. The letters 'EE' indicate loss of hydraulic oil supply.

Planting Rate

By pressing the 'R' button, information is given on the number of sets being planted per second. The in-built control system allows for a planting rate of up to 7 sets per row, per second, after which the letters 'HH' will appear in the RH display indicating too high a forward speed. The figure 'O' appears when the planter is stationary. Normal operating speeds will give a reading of 3 or 4 in the RH display.

Unload/Prime

The 'U' button, when pressed, starts the hydraulic motor which provides a drive to the cup belt when the planter is stationary. This function can be used to both prime the planter before setting into work and unload the hopper after work.

Seed Population

The precise control and constant monitoring of the hydraulic drive by the space selector makes it possible to predetermine the seed population per acre/hectare at specific seed spacings. Effectively each cup and therefore each set is counted and provided the planter has been correctly set-up with full cups, both seed spacing and population will be accurate.

Set-up procedure:

1. With 'P' depressed, switch on the control box. The LH digits display the wheelings (bed width) i.e. 60", 64", 68", 72" or 80". With 'P' depressed, press the 'Up' arrow to change the display to read the wheelings required.
2. When the wheelings have been set, press the 'Down' arrow. The LH digits now display the number of rows. Either (a) 2 rows, (b) 3 rows, (c) 3 rows less 10% centre row, (d) 3 rows less 15% centre row, (e) 3 rows less 20% centre row. With 'P' depressed, press the 'Down' arrow to change the display to read the number of rows required.
3. Switch off the control box. The calculator is now programmed for both wheelings and rows.
4. Switch on the control box. Set the required seed spacing by pressing the 'Up' or 'Down' arrows.
5. Press 'P' and hold. The display will now read the plant population. Multiply the four digit figure by 10 to obtain the sets per acre/hectare.

Area Recorder

The 'Area' button when pressed, provides a record of the number of acres/hectares that have been planted. This information is automatically stored by the memory bank after the wheelings have been programmed (see Seed Population). It can be accessed at any time by pressing 'A'. Four digits will appear in the display i.e. 15:37 which indicates an area of 15:37 acres/hectares. After a days work the unit can be reset to zero by pressing and holding down 'A' immediately followed by 'R'.

Converting from Three to Two Rows

The three row planter is designed to convert from three to two rows and vice versa. A cover plate kit is required to achieve this.

The adjustable LH cover plate (item 1, figure 28) should be bolted on top of the RH cover plate (item 2, figure 28) and set at the correct width to cover the centre hopper feed belt. The mounting bracket (item 3, figure 28) should then be bolted to the lug behind the front centre tie panel as shown. The cover plates can now be slid under the front of the hopper, from the inside, and bolted to the mounting bracket.

To complete the conversion the centre opener should be removed. With the centre feed belt covered, the belt can be switched off using the feed belt/auto-depth control box switch marked 'Centre Clutch On/Off'.

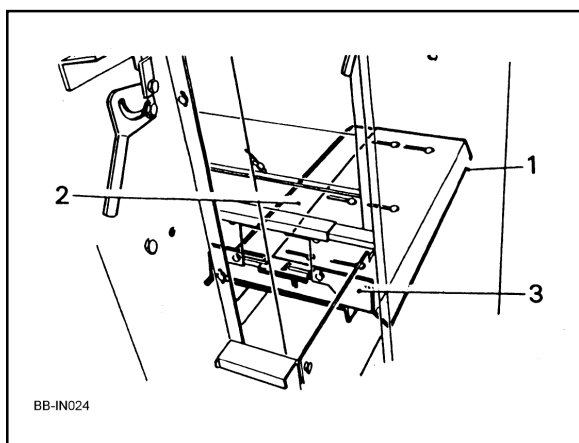


Fig 28

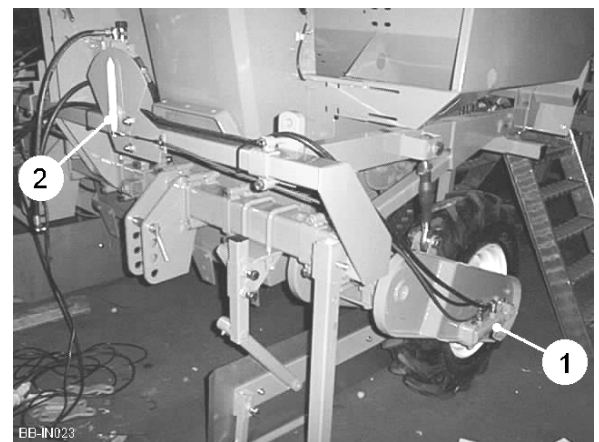


Fig 29

Hillside Axle Kit

An optional steerable axle kit can be fitted to assist in controlling the planter on hillsides etc. The kit consists of a steerable LH wheel actuated by a hydraulic ram (item 1, figure 29). The ram is connected to a double acting spool valve on the tractor. A wheel position indicator (item 2, figure 29) is fitted to assist the operator.

Proximity Sensor Adjustment

The hydraulic space selector proximity sensors are activated by the teeth of the monitor wheels passing in front of them. When activated a red light appears on the sensor body. Should the sensor not activate, the gap between the sensor and the monitor wheel may need adjustment. A retaining nut holds the proximity sensor in position. The distance between the sensor and the monitor wheel can be adjusted by loosening the retaining nut and then moving the sensor closer or further from the monitor wheel. This setting should be approximately 1mm to 1.5mm. Do not overtighten. The proximity sensor must be centrally mounted over the monitor wheel.

Fitting a New Automatic Depth Control Relay

Disconnect the power supply to the planter and remove the junction box lid. Connect the six wires (red, black, green/yellow, white, brown, blue) from the auto-depth relay to the circuit board terminals as shown (see figure 30). Secure the relay to the circuit board using the double sided adhesive pad supplied.

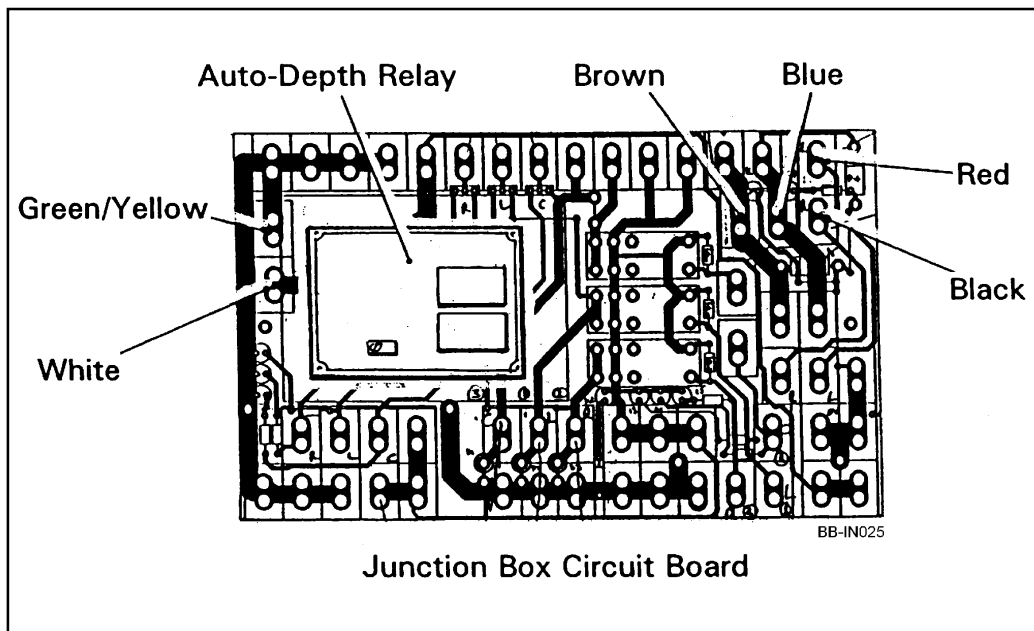


Fig 30

Lubrication

Regular lubrication is an integral part of looking after your machine. The schedule of maintenance outlined below is a guide to when certain actions should be carried out. If your machine requires a more frequent lubrication schedule because of your workload, then it is advisable to reduce the time intervals.

Shafts, bearings and pivot points fitted with grease nipples should be greased with good quality medium grease. Do not allow these points to run dry, as this will accelerate wear

When greasing bearings some are sealed and pre-lubricated. You should take care not to over grease this type as the seals may be damaged. If the seals become damaged it may be possible for dirt to enter the bearing causing accelerated wear.

Use only the BP lubricants recommended by Standen or an exact equivalent recommended by your lubricant supplier.

Medium grease = BP Energrease L S E P 2

Mechanical Drives Maintenance

All chain drives have adjusters that are visible when the appropriate guard is removed. Adjust the chains tight enough to give positive drive without undue stretching. Where plastic chain tension or guide blocks are fitted, these will show fairly rapid wear initially, but will settle down when the chain rollers rather than the side plates come into contact with the plastic. A suitable chain lubricant or a smear of grease should be regularly applied to the chains to prevent wear.

Electrical System Maintenance

The components within the electrical system are designed to be maintenance free. If it becomes necessary to carry out any repair, only a competent engineer capable of this type of work should carry out the repair. Periodically ensure that all multi pin plugs are correctly fitted into their sockets and are not becoming loose.

Hydraulic System Maintenance

The components within the hydraulic circuit are designed, on the whole, to be maintenance free. If it becomes necessary to carry out any repair, the work should be carried out by a competent engineer capable of this type of work.



Hydraulic oil under pressure is dangerous. Ensure that any residual pressure is released safely before working on the system. Do not release ram hoses without first supporting the part of the machine the ram controls.

Cleanliness is of paramount importance. Before dismantling any part of the hydraulic system, ensure the surrounding area is clean. If necessary, power wash the area to be worked on. Dirt must be prevented from entering the system, so any orifices left open, such as pipe ends or ports of motors must be blanked off with a suitable plug. Do not use cloth or rag, as the lint from these can contaminate.

As the tractor supplies the oil for the machine's hydraulics, ensure that the tractor hydraulic system is serviced in accordance with the manufacturer's recommendations to prevent any contamination of the machine's system. To extend the life of the hydraulic components it is important to monitor the condition of the hydraulic oil. Always maintain adequate oil level in the tractor's reservoir.

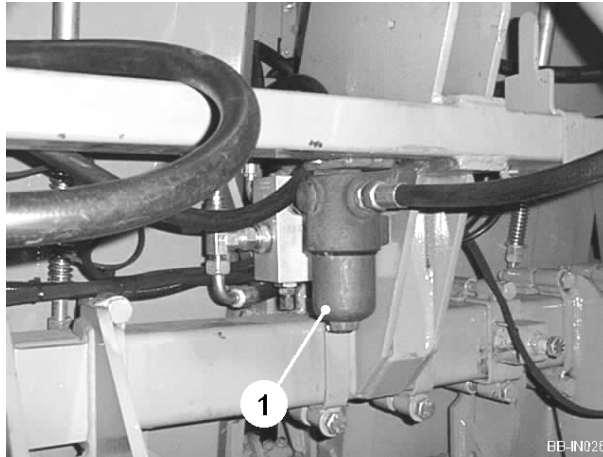


Fig 31

The pressure filter (item 1, figure 31) should be replaced after the first 50 hours running time and then every 500 hours or annually thereafter.

To replace the filter element:

1. Lower the planter to the ground. Switch off the tractor engine, apply the handbrake and remove the ignition key.
2. Operate the spool valve feeding the planter to release any residual pressure and then disconnect the feed hose from the tractor.
3. Unscrew the bottom casing using the spanner spigot.
4. Remove the filter element and rinse out the casing. Check the seal and renew if necessary.
5. Fit the new element and refit the casing ensuring that it is tight.
6. Run the system and check for leaks.

Daily Maintenance

During the working season the following daily maintenance should be carried out. Check all covers and guards are in position, free from damage. Repair or replace any found to be defective before operating the machine.

Carry out the following checklist: -

1. Check tension of all drive chains, adjust if necessary and lubricate with clean oil.
2. Check tyre pressures and adjust if necessary.
3. Check wheel nuts for tightness.

4. Check all hydraulic cylinders, valves and pipe work for signs of leaks or damage, repair or replace as necessary.
5. Carry out lubrication

Weekly Maintenance

During the working season the following weekly maintenance should be carried out.

1. Carry out all the procedures listed in daily maintenance.
2. Check all shafts, bearings for undue wear and replace as necessary.
3. Check all bearings for lubrication, grease as necessary.
4. Check openers, soil retention panels, ridgers/moulding boards etc. for excessive wear, replace if necessary.

Annual Maintenance

Prior to the start of the working season the following maintenance should be carried out.

1. Carry out all the procedures listed in daily and weekly maintenance.
2. Check feed belts and cup belts for any damage or wear and repair or replace as necessary.
3. Check metalwork for any damage or wear and repair or replace as necessary.
4. Inspect wheel bearings and check for excessive wear, replace as necessary. Re-pack with fresh grease on re-assembly.
5. Replace the pressure filter element. Use only genuine Standen replacement parts. **THESE ARE NOT WASHABLE ELEMENTS.**

Out of Season Storage

The machine can frequently operate in soils which contain chemical fertilisers etc. When the working season is completed wash and clean the machine thoroughly prior to carrying out the following checks and operations.

1. Apply oil, grease or an anti rust agent on any exposed bright metal surfaces which have been polished by the soil flow.
2. Clean all drive chains and lubricate with oil.
3. After carrying out the hydraulic residual pressure dump procedure, any parts of hydraulic cylinders rods that are still exposed should be greased or oiled to prevent corrosion.

4. Ensure that the tyres are inflated to the correct pressure.
5. Ensure that the hydraulic hose quick release couplings and the electrical connectors on the machine are kept clean and dry.
6. Check the whole machine carefully and note any repairs that may need to be carried out. It is always better to carry out any repairs well before the commencement of the following season.
7. Carry out all the lubrication checks outlined in routine maintenance.
8. Ensure the control boxes are kept in a safe, dry place and available for use at the commencement of work or for any maintenance to be carried out.
6. Ensure that this handbook is kept in a safe place and available for use at the commencement of work or for any maintenance to be carried out.

Machine Dimensions

Length (SP200, 240, 244)	2.30 m
Length (SP300)	2.60 m
Width	2.30 m
Height	2.23 m

Machine Weight

SP200 (2-row)	960 kg
SP240 (2-cup QUAD)	970 kg
SP244 (4-cup QUAD)	1000 kg
SP300 (3-row bed)	1150 kg

Technical Data

Row widths (2 row)	71 cm (28") to 91 cm (36")
Row widths (3 row)	38 cm (15") to 51 cm (20")
Seed spacing	13 cm (5") to 51 cm (20")
Hopper capacity	1500 kg
Tractor power requirement	75 Kw (100 bhp) minimum
Oil flow requirement	13.5 ltr/min (3 gal) minimum
Tyre size (standard)	7.5x16
Tyre pressure	2.4 Bar (35 psi) maximum

Nut/bolt torque

Description	Torque	Description	Torque
M6 nyloc zinc nut	10 lb/ft	M6 bolt/steel nut	7 lb/ft
M8 nyloc zinc nut	23 lb/ft	M8 bolt/steel nut	19 lb/ft
M10 nyloc zinc nut	44 lb/ft	M10 bolt/steel nut	38 lb/ft
M12 nyloc zinc nut	87 lb/ft	M12 bolt/steel nut	70 lb/ft
M16 nyloc zinc nut	208 lb/ft	M16 bolt/steel nut	170 lb/ft
M20 nyloc zinc nut	380 lb/ft	M20 bolt/steel nut	325 lb/ft
M24 nyloc zinc nut	690 lb/ft	M24 bolt/steel nut	565 lb/ft

1.31

SEED POPULATION TABLES

Seed Population per Acre

Seed Spacing	2 Row Planter Wheelings (Bed Width)					3 Row Planter Wheelings (Bed Width)			
	152cm (60")	163cm (64")	173cm (68")	183cm (72")	203cm (80")	163cm (64")	173cm (68")	183cm (72")	203cm (80")
13cm (5")	40,840	38,300	36,040	34,040	30,620	57,450	54,060	51,060	45,930
14cm (5.5")	37,920	35,560	33,460	31,600	28,440	53,340	50,190	47,400	42,660
15cm (6")	35,400	33,200	31,240	29,500	26,540	49,800	46,860	44,250	39,810
16cm (6.5")	33,180	31,120	29,280	27,660	24,880	46,680	43,920	41,490	37,320
18cm (7")	29,500	27,660	26,020	24,580	22,120	41,490	39,030	36,870	33,180
19cm (7.5")	27,940	26,200	24,660	23,280	20,940	39,300	36,990	34,920	31,410
20cm (8")	26,540	24,900	23,420	22,120	19,900	37,350	35,130	33,180	29,850
22cm (8.5")	24,120	22,620	21,300	20,100	18,600	33,930	31,950	30,150	27,150
24cm (9.25")	22,120	20,740	19,520	18,440	16,580	31,110	29,280	27,660	24,870
26cm (10")	20,420	19,140	18,020	17,020	15,300	28,710	27,030	25,530	22,950
28cm (11")	18,960	17,780	16,720	15,800	14,220	26,670	25,080	23,700	21,330
31cm (12")	17,120	16,060	15,100	14,260	12,840	24,090	22,650	21,390	19,260
33cm (13")	16,080	15,080	14,200	13,400	12,060	22,620	21,300	20,100	18,090
35cm (14")	15,160	14,220	13,380	12,640	11,360	21,330	20,070	18,960	17,040
38cm (15")	13,960	13,100	12,320	11,640	10,460	19,650	18,480	17,460	15,690
40cm (16")	13,260	12,440	11,700	11,060	9,940	18,660	17,550	16,590	14,910
42cm (16.5")	12,640	11,840	11,140	10,520	9,480	17,760	16,710	15,780	14,220
44cm (17")	12,060	11,300	10,640	10,040	9,040	16,950	15,960	15,060	13,560
46cm (18")	11,540	10,820	10,180	9,620	8,640	16,230	15,270	14,430	12,960
51cm (20")	10,410	9,760	9,180	8,680	7,790	14,640	13,770	13,020	11,670
53cm (21")	10,020	9,390	8,840	8,350	7,500	14,090	13,250	12,520	11,250
56cm (22")	9,480	8,890	8,360	7,900	7,100	13,330	12,540	11,850	10,650
59cm (23")	9,000	8,440	7,940	7,500	6,740	12,650	11,900	11,250	10,100
61cm (24")	8,700	8,160	7,680	7,250	6,520	12,240	11,510	10,880	9,770
65cm (25.5")	8,170	7,660	7,200	6,810	6,110	11,480	10,810	10,210	9,170
	or 2 rows at 76cm (30")	or 2 rows at 81cm (32")	or 2 rows at 86cm (34")	or 2 rows at 91cm (36")	or 2 rows at 102cm (40")	for 3 rows spaced at 41cm(16"), 43cm(17"), 46cm(18"), 48cm(19") or 51cm(20")			

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3 row with 10% reduction on centre row deduct 0.034%
 3 row with 15% reduction on centre row deduct 0.050%
 3 row with 20% reduction on centre row deduct 0.067%

Optional Automatic Depth Control (from 2013)

Automatic depth control ensures that the desired planting depth is maintained irrespective of the contours of the bed. The ultrasonic sensor (item 1, figure 32) activates the hydraulic control valve operating the depth ram (item 1, figure 20). The depth ram then raises/lowers the planter relative to the wheels thus maintaining planting depth. The 'RAISE' and 'LOWER' distances are preset at the factory to approximately 300mm and 315mm respectively, this gives a neutral (dead-band) zone of approximately 15mm. The active sensing distance is shown on the sensor display. To adjust the settings, see 'Depth Control Sensor Adjustment'.

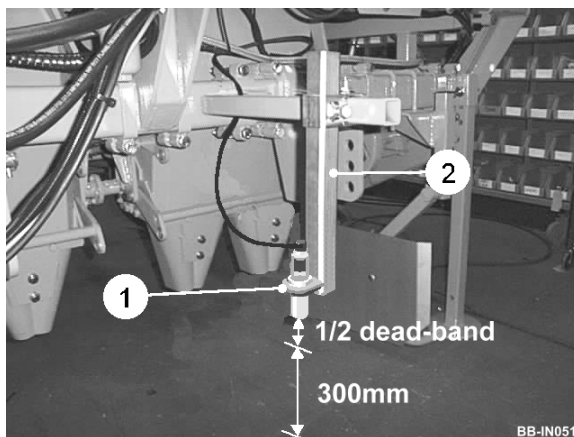


Fig 32

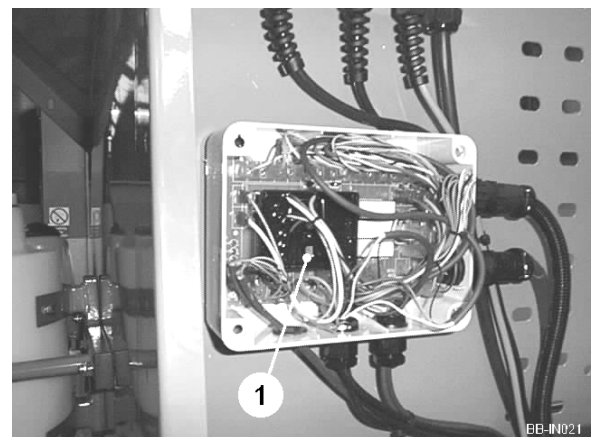


Fig 33

A timer is built into the circuit which is designed to provide a time delay between activation of the 'UP' sensor and actuation of the hydraulic control valve. The time delay can be adjusted between 1 and 5 seconds by turning the relay potentiometer screw (item 1, figure 33) located under the junction box lid. Time delay is increased by turning the screw clockwise and decreased by turning it anti-clockwise. Normally a 3 second delay smoothes out any surface irregularities allowing the planter to gradually change height according to changes in bed height.

To set the automatic planting depth:

1. Position the planter over the prepared bed.
2. With the feed belt/auto-depth control box 'OFF/OFF AUTO' switch in the 'OFF' position, set the depth ram to mid-stroke position using the push button switches marked 'RAISE/LOWER'.
3. Set the opener planting depth (see section 'Setting the Planting Depth').
4. Fully lower the sensor leg (item 2, figure 32) and then gradually raise it until both LED's (D1 & D2, fig 34) are illuminated green. This is the neutral (dead-band) zone. Raise the leg slightly to position the sensor in the middle of the neutral zone. Ensure both LED's are still green and then retighten the leg.

5. Engage the auto-depth control by setting the control box 'OFF/ON AUTO' switch to the 'ON' position. If necessary re-adjust the height of the sensor leg to regain the desired planting depth.
6. Drive forward and check the planting depth. Make further adjustments if necessary.

If during work adjustments in planting depth need to be made manually, the auto-depth control can be over-ridden by pressing the control box buttons marked 'RAISE/LOWER'.

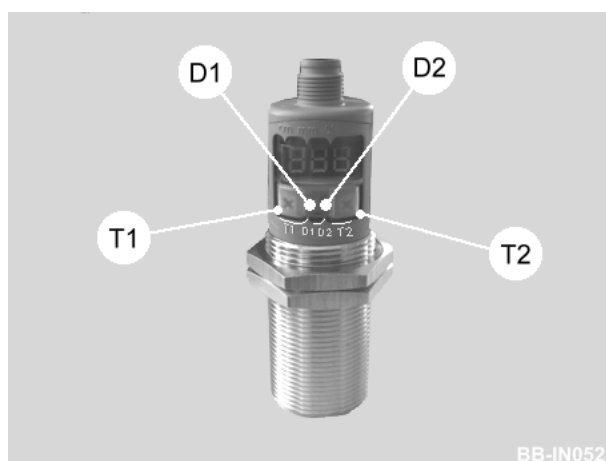


Fig 34

Depth Control Sensor Adjustment (from 2013)

SET RAISE DISTANCE (This must be a lower figure than the Lower Distance)

Press T1 + T2 for 3 seconds

Pro

Press



d1

Press

T1 + T2

3 0 0

Set Raise distance. Press T1 or T2 to alter (e.g.300mm)

Press

T1 + T2

- - -

single detect, has to be dashes (press T2 to alter)

Press

T1 + T2

┌ ─

This represents Raise

Press

T1 + T2

End

Press T1 + T2

Sensor now Ready to work

SET LOWER DISTANCE (This must be higher than the Raise Distance)

Press T1 + T2 for 3 seconds

Pro

Press



d1

Press

T2

d2

Press

T1 + T2

Set Lower distance, Press T1 or T2 to alter (e.g.315mm)

3 1 5

The difference between the Raise & Lower figure is the Dead band where the depth control is inactive

Press

T1 + T2

- - -

single detect, has to be dashes (press T2 to alter if a number)

Press

T1 + T2

└ ─

This Represents Lower

Press

T1 + T2

End

Press T1 + T2

Sensor now Ready to work

Wiring:

Brown = Power 12v

Blue = Earth 0v

White = Raise signal

Black = Lower signal