



# ***T3***

***Three Row Potato Harvester***  
(machines from 2010)

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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.

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

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# CONTENTS

## INTRODUCTION

Introduction to the handbook	1.1
Warranty	1.2
Replacement parts	1.2

## SAFETY PRECAUTIONS

Safety	1.3
Machine noise level	1.3
Operation	1.3
Transport	1.4
Maintenance	1.4
Safe use of potato harvesters	1.5
Working safely near overhead power lines	1.7

## INSTALLATION

T3	1.9
Tractor suitability	1.9
Tractor wheel setting	1.9
Attaching the harvester	1.10
PTO shaft	1.11

## OPERATION

Drawbar	1.12
Digger assembly	1.12
Depth wheels	1.12
Diablo rollers	1.13
Automatic depth control	1.13
Disc coulters	1.14
Shares	1.14
Haulm intake rollers	1.15
Digger web	1.15
Web split	1.15
Digger suspension	1.16
Sieving web	1.16
Rotary agitators	1.16
Sweeping clod fingers	1.17
Clod breaking fingers	1.17
Haulm Roller	1.18
Omega separator units	1.19
Spreader unit	1.21
Discharge elevator	1.21
Rear axle	1.23
Rear axle tracking	1.23
Powered axle	1.24
Bleeding / filling wheel motors	1.25
Purging the wheel motor grease collars	1.25
Hydraulic systems	1.26
Electrical control system	1.30
Emergency stop button	1.30

## HARVESTING

Starting off your harvester	1.31
Damage prevention	1.31
Getting the best results during harvesting	1.33

## MAINTENANCE

Maintenance of the hydraulic systems	1.37
Residual hydraulic pressure dump procedure	1.39
Steering ram link circuit	1.40
Rear axle self-centring	1.41
Split web drive sprockets	1.41
Maintenance of the mechanical drives	1.41
Maintenance of the electrical system	1.42
New machines	1.42
Machine lubrication	1.42
Daily maintenance	1.43
Weekly maintenance	1.43
Annual maintenance	1.43
Out of season storage	1.44

## SPECIFICATIONS

Machine dimensions	1.45
Machine weight	1.45
Technical data	1.45
Machine nut and bolt tightening torques	1.45

### Introduction to the Handbook

This handbook provides the information for the operation, adjustment and maintenance of your Standen T3. 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 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.



#### **WELDING WARNING:**

Before carrying out any welding on the harvester always disconnect the KS1 & KS2 plugs from the bottom of the harvester control module and completely disconnect the harvester from the tractor. Failure to observe the above precautions may cause severe damage to the harvester and tractor electrical systems.

**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 OMEGA SEPARATION UNITS COMPRISED IN THIS HARVESTER ARE ONLY APPROVED FOR USE WITH EBONITE AND STEEL ROLLERS. RUBBER ROLLERS MUST NOT BE FITTED INTO THESE MACHINES IN THE PLACE OF THE EBONITE OR STEEL ROLLERS.**

Section 3 of this handbook contains a list 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 T3 has 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 safety 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 the operators must exercise great care 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.

### Machine Noise Level

Average continuous noise level at the operator's ear with machine harvesting crop is 80.75dB (maximum peak level 85.6dB). It should be noted that this level could vary dependant upon tractor/machine combinations.

### Operation



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



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 wear loose clothing and always tie back long hair whilst working on the picking area of the machine.



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 and disconnect the PTO shaft.



Never operate the machine with the discharge elevator in the folded transport position.



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.



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.

## Transport



Always switch off the electrical control system before transporting the harvester on the road.



When in transport, the digger assembly must be locked in the raised position.



The discharge elevator must be in the folded transport position and the machine levelling ram locked.



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.

## Maintenance



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



When working under the machine or if the machine is to be left to stand for any length of time, the digger assembly should be locked in the raised position.



Before working on the machine, all free moving parts should be locked to prevent them moving.



Inspect the hydraulic hoses and fittings for cuts and abrasions. Replace immediately.



The hydraulic system may be under pressure with the machine at rest. Ensure all residual pressure is released before disconnecting any pipework.



Regularly lubricate the machine as per the operator's handbook and check the tightness of all nuts and bolts.



Always use mechanical or additional help when lifting heavy parts.



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

*HSE information sheet*

# Safe use of potato harvesters

Agriculture Sheet No 13



## Introduction

This information sheet outlines the key dangers common to most potato harvesters. It also lists essential Do's and Don'ts for the safe operation of these machines.

A study of accidents investigated by HSE showed that 11 people were killed and 121 seriously injured when working with potato harvesters between 1988 and 1996.

Five people died and seven were seriously injured when they were run over by potato harvesters.

Ninety-seven people injured arms or legs when caught in haulm or cleaning rollers. These accidents often caused amputations.

All users of potato harvesters need to identify the hazards caused by their harvesters and make sure all those working with these machines know and follow safe working practices to prevent accidents and serious injuries.

## Key dangers

Injuries are caused by:

- getting caught in haulm and cleaning rollers;
- harvesters and tractors running over people;
- falling from access ladders and platforms;
- getting caught in conveyors or elevator chains;
- getting caught by the drive mechanisms;
- getting wrapped around the power take-off (PTO) shaft;
- failing to switch off all power sources;
- handling bags of potatoes;
- poor working positions causing back strains etc.

## Do's and Don'ts

### Do:

- make sure everyone working on the harvester has understood the safety instructions in the handbook;
- provide the operator with clear instructions on the safe way to clean the harvester of haulm, stones, potatoes etc;
- agree a system for communicating between the platform and the tractor driver, eg sound the horn before starting the engine, reversing or engaging drives;
- check that **all** haulm, clod and cleaning rollers are properly guarded. Fit additional guards if anyone can reach the rollers with arms or legs from any position. Manufacturers can help with guard kits;
- fit an alarm or stopping device on the platform;
- make sure you and any of your employees, relief drivers and contractors are properly trained in the safe use of the potato harvester and have read this sheet;
- remember that putting the PTO out of gear will not cut the power to some hydraulically driven components;
- take particular care when reversing; make sure you can see what is behind or seek assistance if the view is obscured;
- stop the tractor engine and pocket the ignition key before you carry out any work on the potato harvester;
- make sure all guards are in position and correctly fitted before starting work;
- **stop the engine before anyone clears a blockage;**
- **stop the tractor before anyone gets on or off the harvester.**

### Don't:

- reach into the potato harvester unless all drives are stopped;
- climb over harvesters;
- jump on or off the harvester when it is moving;

- leave the driving position of a moving or running tractor;
- work under box handling attachments without using the supports provided;
- carry out maintenance with the tractor engine running;
- park or carry out maintenance when under or near overhead power lines;
- run the harvester with the guards raised or removed;
- allow children on or near the harvester.

## General guidance

Take care when working in difficult conditions or those with weed or haulm problems - don't overload the machine. Remember that avoiding blockages is easier than clearing them. Use drive reversing mechanisms when fitted and encourage the use of conveyor controls to optimise picking conditions.

Make use of relevant training courses such as those run by ATB Landbase, manufacturers and dealers. They will help to ensure the safe and efficient use of your potato harvester.

## Further information

HSE priced and free publications are available by mail order from:

HSE Books, PO Box 1999, Sudbury, Suffolk CO10 6FS  
Tel: 01787 881165 Fax: 01787 313995.

HSE priced publications are also available from good booksellers.

For other enquiries ring HSE's InfoLine Tel: 0541 545500 or write to HSE's Information Centre, Broad Lane, Sheffield S3 7HQ.

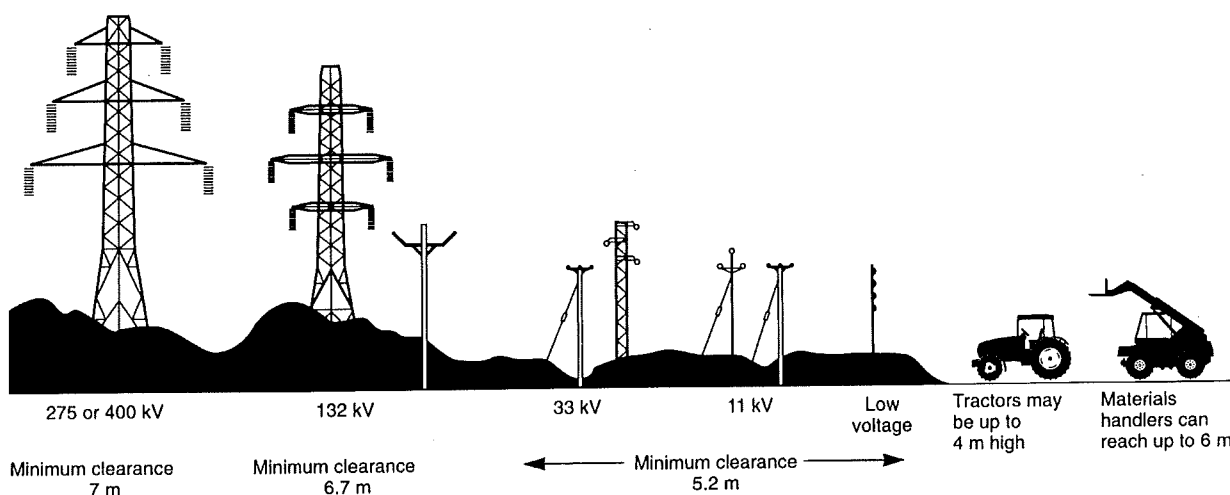
This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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*HSE information sheet*

# Working safely near overhead power lines

Agriculture Information Sheet No 8 (rev)



Be aware of line heights

**Introduction**

About five people are killed every year in accidents involving overhead power lines during agricultural work. Machinery (eg combines, tipping trailers and loaders); equipment (eg irrigation pipes and ladders); and activities (eg stacking) are often involved. Contact with the lines does not need to be made. Electricity can flash over when machinery or equipment gets close to overhead lines.

Most incidents involve high-voltage lines supported on wooden poles, but the dangers of other power lines cannot be ignored.

This information sheet outlines the steps you can take to reduce the risks when working near overhead power lines. Remember the Electricity at Work Regulations 1989 apply to work activities carried out near power lines.

**Planning precautions**

**Consult your local electricity company.** They will provide free information and advice about precautions and safe working procedures which can be followed near power lines.

**Find out** the maximum height and maximum vertical reach of your machines and those used by contractors.

**Find out** the routes of **all** overhead lines on your land or near your boundaries. Mark them on the farm map. The electricity company will give you this information.

**Make sure** you have information about all the lines on your land - if not, contact the owners of those lines.

The farm map can be used as a reference when planning cropping or other work, instructing machine operators and contractors, or buying new equipment.

In cases where there is a significant risk area, it is sensible to discuss the following measures with the electricity company:

- **access:** creating alternative access points and routes - this is often the cheapest option;
- **divert lines:** benefits can arise from burying lines or changing routes - an option particularly suited to farmyards;
- **barriers and goal posts:** by erecting goal posts and barriers, machines which have to pass beneath lines can be limited to a safe height - an option especially suited to gateways and tracks.

**Working safely**

Key elements of safe systems of work are:

**Training**

Everybody who works near overhead power lines with a machine or equipment needs to know what the dangers of overhead lines are and the precautions to follow.



## Visitors

Contractors are at risk when they work on farms where overhead lines are present. Make sure they know where the lines are and tell them the precautions they need to take. Routes can be marked with safety signs to warn all visitors of the dangers.

## Use of machinery

Accidents can be avoided if the following operations are not carried out within a horizontal distance of at least 9 m from power lines on wooden poles or at least 15 m of lines on metal towers:

- stacking bales or potato boxes;
- folding sprayer booms;
- tipping trailers or lorries;
- operating materials handlers;
- working on top of combines or other high machinery.

## Risks can be reduced by:

- using sprayers with horizontally folding booms;
- taking care not to damage poles and stays;
- making sure machinery can operate safely near any overhead lines;
- fitting shorter radio aerials to high machines so they cannot cause danger;
- carrying irrigation pipes horizontally using two people and not storing pipes near power lines.

## EMERGENCY ACTION IN THE EVENT OF AN ACCIDENT

- **Never touch an overhead line - even if it has been brought down by machinery, or has fallen. Never assume lines are dead.**
- **When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground.**
- **If you need to get out to summon help or because of fire, jump out without touching any wires or the machine. Keep away.**
- **Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect the power.**

## Further advice

For further advice and information contact your local electricity supply company. You can also get advice from the Farm Energy Centre, National Agricultural Centre, Stoneleigh Park, Warwickshire CV8 2LS (Tel: 01203 696512). To obtain the latest edition of their handbook *Safe use of electricity in farming and horticulture* (FEC 2100: 3rd edition 1992), send them a cheque for £2.50 made payable to Farm Energy Centre.

## Further reading

*Avoidance of danger from overhead electrical lines* GS 6 (rev) HSE Books 1991 ISBN 0 11 885668 5

*Farm Electric The safe use of irrigators and slurry guns near overhead electric power lines* Electricity Association Technology Ltd. Available free from the Farm Energy Centre, National Agricultural Centre, Stoneleigh Park, Warwickshire CV8 2LS

*Memorandum of guidance on the Electricity at Work Regulations 1989* HSE Books 1989 ISBN 0 11 883963 2

*Management of health and safety at work. Management of Health and Safety at Work Regulations 1992. Approved Code of Practice* HSE Books 1992 ISBN 0 7176 0412 8

An HSE video called *Shock horror* is available for purchase or hire from CFL Vision, PO Box 35, Wetherby LS23 7EX (Tel: 01937 541010).

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 6FS. Tel: 01787 881165 Fax: 01787 313995.

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HSE home page on the World Wide Web:  
<http://www.open.gov.uk/hse/hsehome.htm>

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**T3**

The Standen T3 is a tractor drawn potato harvester designed to harvest three rows of potatoes, clean, elevate, and load them into a trailer running alongside. The basic machine is built with a digging width of 2500mm, and direct loads the crop with no manning on the machine.



Before starting work, check that the machine is in a safe working condition. Check components that could work loose during operation such as wheel nuts, chains, sprockets and share arms etc. These checks are especially important during the first week of work.



Pay attention to the maintenance and lubrication instructions within this handbook and pay particular attention to the safety precautions, they are written as a guide to protect you and others.

**Tractor Suitability**

The recommended tractor for the T3 is four-wheel drive with 180 bhp for the basic unmanned machine and 200 bhp when used with a front mounted topper. These powers may need to be varied to achieve optimum output under different crop conditions, and depending on the specification of the harvester.

The harvester requires a constant hydraulic oil supply from the tractor of a minimum 50 litres/minute with a low back pressure/free return to the tractor. A load sensed oil supply above this figure this is recommended. Also required is a 12volt D.C. negative earth power supply rated at 30 amps to feed the electrical control box mounted inside the tractor cab. The control box allows the hydraulically and electrically powered functions on the harvester to be operated from the drivers seat while the machine is working.

The T3 is designed to be towed from the pick-up hitch hook of the tractor and imposes a transferred load of 2.5 tonnes to the tractor with basic unmanned model.

Should the T3 be towed from the tractor clevis hitch then the optional ring hitch spacer must be used to eliminate chop on the clevis pin.

**Tractor Wheel Setting**

Both the front and rear wheels of the tractor must be set to straddle the bed at either 72" (1.83m) or 108" (2.74m) centres. This will ensure the wheels run in the centre line of the wheelings. The instructions for adjusting the tractor wheels are given in the tractor manufacturer's handbook.



When carrying out wheel adjustments, always place the jack on firm ground under a solid part of the tractor. Before removing a wheel, place a stout support under the tractor frame in case the jack should become dislodged.

## Attaching the Harvester



The operator should have read and understood the tractor operator's manual prior to attaching the machine and putting it to work.

Raise the harvester on the pick-up hitch. The harvester chassis should be nominally level. If the chassis is in a nose up attitude or extremely nose down, the drawbar eye (item 1, figure 1) should be adjusted accordingly to compensate. To adjust the eye position, remove the bolts (item 2, figure 1) and move the eye to the required position. Refit the eye using a minimum of 3 bolts. The eye can be turned over to achieve a second range of adjustments. The stand (item 3, fig 1) is provided so that the machine is held at a suitable height for safe coupling to the tractor. When the machine has been securely attached to the tractor, the stand can be folded back into the working position by removing the pin (item 4, figure 1), rotating the stand and then resecuring with the pin.

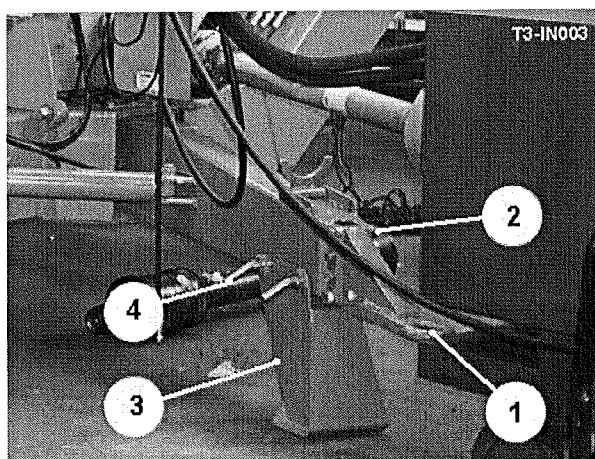


Fig 1

Switch off the tractor engine before making any other connections. The hydraulic and electrical connections can then be made. Connect the hydraulic return hose marked 'RETURN' to the tractor manufacturers recommended low back-pressure return coupling. Connect the pressure hose marked 'FLOW' to the tractor outlet recommended for constant supply. If in doubt, refer to the tractor handbook. Connect the load sense hose to the tractor L/S outlet. Mount the in-cab control boxes securely inside the tractor in a position where they are comfortable to operate when seated. Connect the control box power supply cable directly to the tractor battery. The black lead to negative (-) and the red leads to positive (+). Mount the tractor harness plug on the rear of the cab in an accessible position. Connect the control box, and touch screen cables. Connect the harvester control harness plug to the socket on the tractor harness, ensuring that the harness is safely routed. Connect the power lead. Connect the lighting plug to the tractor lighting socket.

## PTO Shaft



It is essential that the PTO shaft be matched to the tractor to give the correct drive-line and to ensure that it is safe in work. An incorrectly fitted or badly guarded PTO shaft can be lethal. Do not take chances.

The machine is geared to operate at 1000 rpm PTO speed.

The PTO shaft supplied with the machine may require cutting to the correct length to suit individual tractors but should be kept as long as possible in all cases.

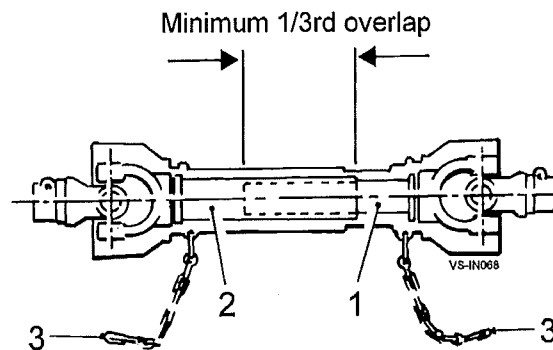


Fig 2

1. Separate the male shaft (item 1, fig 2) and female shaft (item 2, fig 2) and fit them to the tractor and harvester respectively.
2. Support the shafts alongside each other and mark the maximum possible length.
3. Cut the surplus length equally from both male and female drive tubes and guards.



Ensure a minimum of  $\frac{1}{3}$ <sup>rd</sup> overlap and check that there is no possibility of the shafts butting up when the tractor linkage is raised.

4. Once the correct length of shaft has been obtained, remove all rough edges and swarf.
5. Grease the shafts to ensure they telescope correctly and then fit the shaft in place.
6. Check the PTO shaft does not foul any part of the machine or tractor and inspect the guards to make sure they are fitted correctly and are not damaged.
7. Finally, attach the safety chains (item 3, fig 2) to secure anchoring points on the tractor and machine ensuring that the chains will not over-tighten when the machine is turning.

Refer to the manufacturers instructions. These are fitted to all PTO shafts when the machine is delivered.

## Drawbar


The steerable drawbar is operated by the switch 'Drawbar right/left' on the touch screen, or the left hand joystick on the slave box. The drawbar is used in conjunction with the axle steering to ensure the machine operates parallel to the rows.



Only operate the drawbar when the digger assembly is raised or when the machine is moving otherwise components may be damaged.

## Digger Assembly

The digger assembly, which includes the depth wheels, disc coulters, shares and digger web, is retained in the raised position by the transport lock cables (item 1, fig 3) fitted on both sides of the machine. Before attempting to operate the digger assembly, the transport lock cables will need to be released by removing the retaining clips and washers (item 2, fig 3).

The digger assembly is controlled electronically from the in-cab control box. The 'Digger Share' rocker switch manually raises and automatically lowers the digger web. When set to  the digger is in the automatic / lower position, and will continue to lower until the depth wheels or shares rest on the ridge. Returning the switch to the neutral position will hold the digger at its present setting. In operation the digging depth is set using the 'Auto Depth' control. The set depth is displayed on the service terminal screen allowing the operator to adjust the working depth through the field.

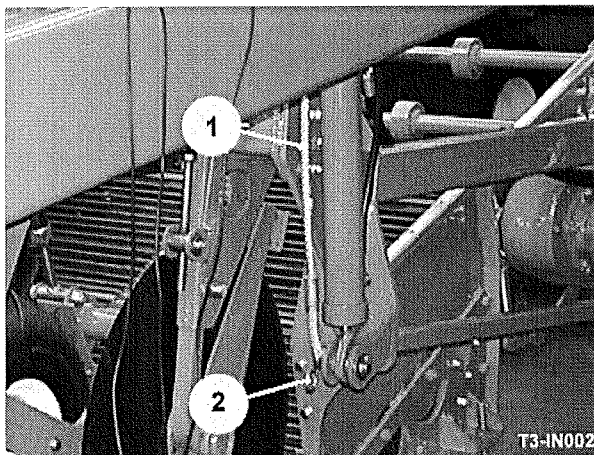


Fig 3

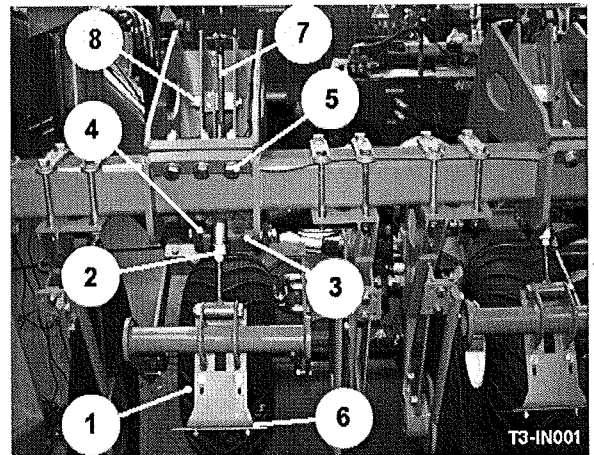


Fig 4

## Depth Wheels

The depth wheels (item 1, fig 4) running on each ridge control the share depth. Their setting is very important to the effective operation of the harvester. The turnbuckle (item 2, fig 4) sets the working depth of the wheels. Lengthening the turnbuckle will cause the shares to run shallower beneath the top of the ridge and shortening will allow the share to run deeper.

The wheels are mounted on rubber torsion springs (item 3, fig 4) which allow the weight to be carried off the wheels to reduce compaction of the ridge, or for additional pressure to be put on the ridge to consolidate it in light conditions when the flow over the shares is poor.


The pressure setting needs to be made when the machine is in work so that the relative working position of the depth wheel to the ridge is correct. By positioning the clamp bolt (item 4, fig 4) in the pressure-setting quadrant, weight can be removed from the depth wheel, or extra pressure can be added to the wheel.

**NOTE: Care should be taken to ensure that the depth wheels are not locked solid. Free float must be available when the digger is raised and lowered.**



Row width setting is adjusted by loosening the clamp bolts (item 5, fig 4) and sliding the wheel assembly until positioned centrally over the ridge. Repeat for the other wheel ensuring they are set symmetrically about the centre line of the machine. The depth wheels are each fitted with a scraper (item 6, fig 4). The scrapers should be set as close to the wheels as possible without fouling them.

### Diablo Rollers (optional)

Diablo rollers can be fitted in place of the depth wheels. Rubber torsion springs allow the weight to be carried off the roller to reduce compaction of the ridge, or for additional pressure to be put on the ridge to consolidate it in light conditions when the flow over the shares is poor. Hydraulically powered diablo rollers are available for use in soil conditions where poor ridge flow over the shares onto the digger web is regularly experienced.

The button  starts/stops the diablo roller drive and speed can be varied by adjusting the flow setting on the service terminal. Setting the speed of the diablo rollers to run slightly faster than ground speed will induce a positive flow of the ridge onto the shares. Care must be taken not to run the diablo rollers excessively fast as this can cause scuffing to potatoes that are near the top of the ridge.

### Automatic Depth Control

Pressing the button  turns on the automatic depth control. Selecting  will manually raise the digger. The depth wheels control the depth setting of each digger ram independently. The time delay for each side of the digger can be set by adjusting the left and right delay parameters via the service terminal. Maximum and minimum dead-band limits can also be set. When the auto-depth control is active, a numerical figure representing the set depth is displayed. In work, the digging depth can be varied using the auto-depth parameter on the service terminal.

A depth sensor (item 7, fig 4) is fitted to each outer depth wheel unit. The depth control unit allows each wheel to sense the height of the ridge it is running on and in doing so, maintains the constant depth of the share below the top of the ridge. The depth control sensor detects the position of the top link of the depth turnbuckle. Initial digging depth should be set with the harvester standing on a firm level surface. Place a 10" (250mm) block under each roller and lower the digger shares to the ground. Then set the turnbuckles so that the top pins (item 8, fig 4) are 30mm from the top of the slots in the mountings. By default, the depth on the screen should be set to 250mm. The depth adjustment can be varied approximately +/-75mm by the operator from the tractor cab.

## Disc Coulters

On three row work the harvester is fitted with six disc coulters (item 1, fig 5). On full width bed work the harvester is fitted with two disc coulters. The discs run on either side of the ridge, cutting and parting the haulm and trash in front of the shares whilst at the same time containing the ridge and feeding it over the shares onto the digger web.

To set the disc coulters row width/cutting width, release the clamp bolts (item 2, fig 5) and slide the disc assembly along the bridge beam to the required position. When correctly set the discs should be approximately 20mm clear of the edge of the share blades. To set the disc coulters depth, turn the adjusting handle (item 3, fig 5), which also increases the spring load on the disc. The disc coulters are each fitted with two scrapers (item 4 & 5, fig 5). These should be set as close to the disc as possible without fouling it.

For very light soil conditions hydraulically powered disc coulters are available to help keep the discs turning. Total combinations of hydraulic options need to be discussed with Standen Engineering Limited. Spring loading is also part of the powered disc specification and can be supplied as a separate option.

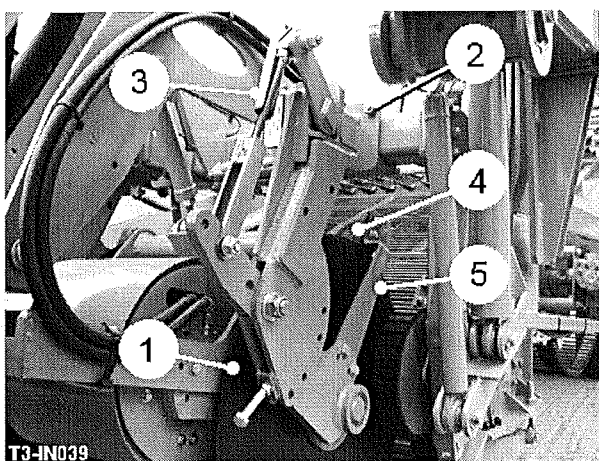


Fig 5

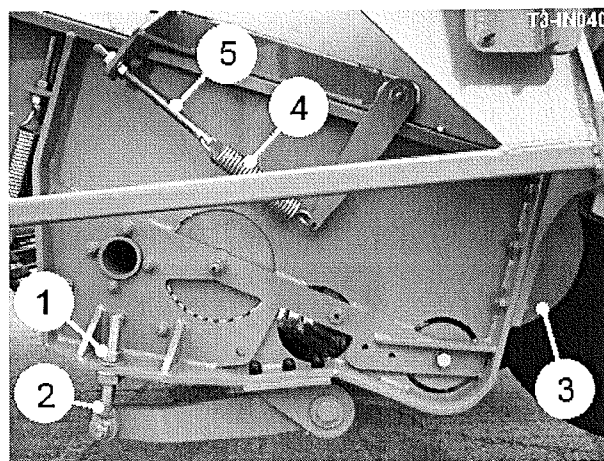


Fig 6

## Shares


To adjust the angle of the shares loosen the locknuts (item 1, fig 6) on both sides of the machine, and re-position adjuster (item 2, fig 6). Ensure both sides are adjusted evenly by measuring from the tip of the outer shares up to the disc support bridge above. The points of the share should be kept as high as practical whilst still maintaining adequate digging depth. Lowering the points will assist penetration but may increase risk of crop damage. If the soil has been adequately cultivated this should not be necessary. If the pitch is too steep (points lowered) it can greatly increase the loading or bulldozing effect on the share frame, especially when in hard or tough conditions. Regularly check for soil build-up on the share frame (especially in wet conditions) as a pad of soil at this point will create a considerable braking effect on the digger web. Ensure that the share frame is not in contact with the web bars at this point.

### Haulm Intake Rollers

The haulm intake rollers (item 3, fig 6) are fitted for two reasons. The primary reason is to draw in loose haulm and trash from the sides of the ridges and feed it onto the digger web, thus preventing it from building up on the leading edges of the web sides or between the centre disc coulters. The second function is to prevent potatoes from rolling out of the front of the digger web between the discs coulters and the web sides. Depending on the width of the digger web and the row width configuration to be lifted, the haulm roller build will vary. The rollers are spring loaded onto the digger web bars. The outer roller assemblies are fitted with tension springs (item 4, fig 6), and are tensioned by the adjusters (item 5, fig 6). The centre rollers (if fitted) are mounted on a spring-loaded arm and are tensioned with a coil spring and threaded adjuster. The scrapers fitted to each roller should be set as near to the roller as possible without fouling it. Alternatively, rubber deflectors may be fitted between the centre disc units.

### Digger Web

The standard specification machine is fitted with a 2500mm wide 36mm pitch digger web. Should an alternative pitch be required to suit crop and soil conditions this will be a special requirement and will need to be discussed with Standen Engineering Ltd. The spring-loaded tension rollers (item 1, fig 7) maintain the drive on the return side of the web. To tension the web, loosen the locknuts (item 2, fig 7) and reposition the spring adjuster (item 3, fig 7). Ensure both sides are adjusted equally.

The web is driven by the hydraulic motor gearbox unit mounted on the LH side of the digger web side frame. The  button starts/stops the digger web and the speed is set on the service terminal.

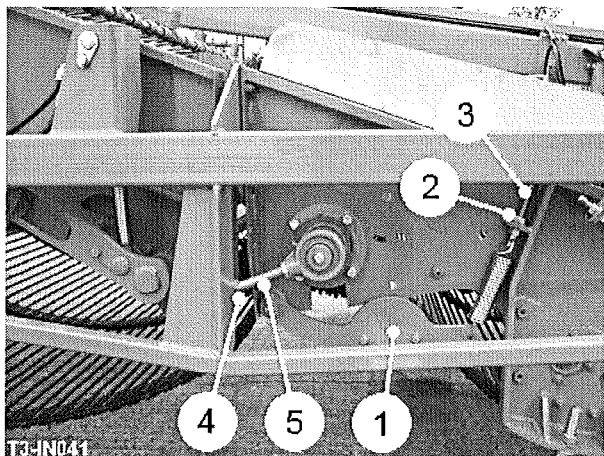


Fig 7

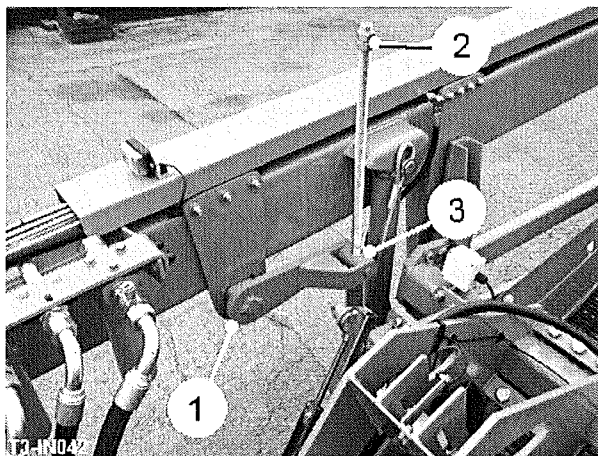


Fig 8

### Web split.

The drop height from the digger web to the sieving web can be adjusted using the 'Web Split' button on the slave box. The gap between the two webs can be manually set according to the crop size, and the separation required. The gap is adjusted by releasing the locknuts (item 5, fig 7) and moving the adjuster (item 6, fig 7) until the required gap is obtained. Ensure both sides are adjusted evenly.




## Digger Suspension

If required, the digger assembly can be suspended on the rubber torsion blocks (item 1, fig 8). This is normally set to act when the digger is operating in conditions where the soil pan is close to the digging depth and the maximum depth needs to be limited.

The suspension is set with the digger at maximum depth. Release the lock nuts (item 2, fig 8), and wind them down to the top of the trunnion (item 3, fig 8). Continue to wind down the nuts equally on both sides, one full turn at a time, until the required 'carry off' is reached with maximum digging depth still retained. Finally, retighten the lock nuts.

## Sieving Web

The 2500mm wide sieving web is available in 28mm, 32mm, 36mm, 40mm, 45mm and 50mm pitches to suit the crop and soil conditions being harvested. The sieving web drive uses the 'Standen Wrap Drive' configuration fitted with a reverse running assister drive on the return side. This gives a virtually slip-free drive under most conditions and eliminates web drive sprockets allowing for easy web pitch changes. Changing webs is a simple operation of removing the web joining rod, connecting the alternative web to the end of the existing web, then slowly winding it on as the other is wound off and then joining the replacement web together on the machine.

Sieving web drive is controlled electronically from the service terminal. The  button starts/stops the sieving web and the pre-set speed is adjustable via the service terminal.

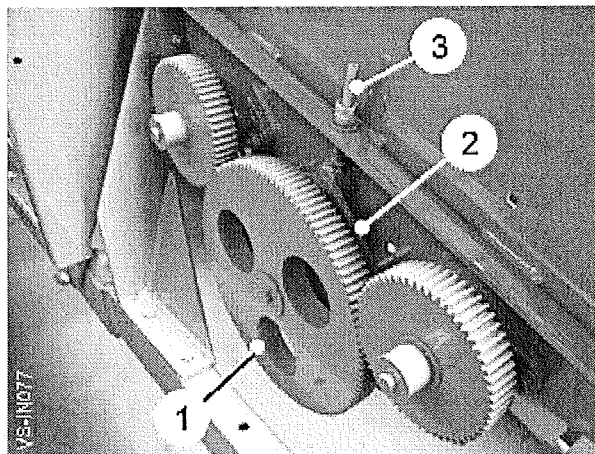



Fig 9

## Rotary Agitators

Two pairs of rotary agitator shafts are fitted inside the sieving web. These are designed to separate the soil from the crop as it is elevated up the web.


The button  starts/stops both pairs of shafts. Frequency of agitation can be varied by adjusting the set speed on the service terminal. The front or rear pair of shafts can also be selected to freewheel.

The faster the speed the more separation takes place, but also more bruising damage may occur. The amount of agitation necessary will depend on the crop and soil conditions encountered. On light soils care should be taken not to remove too much soil too early as this can lead to crop damage if the entire soil cushion has been removed before reaching the haulm roller.

The meshing of the agitator motor drive gears (item 1, fig 9) can be set by loosening the motor plate (item 2, fig 9) and using the adjuster (item 3, fig 9) to raise or lower the motor plate. A small amount of backlash should be allowed between the gears.

### Sweeping Clod Fingers (optional)

The sweeping clod fingers have three functions. Firstly, to spread the ridge to the full width of the digger web and so maximise the area used for soil separation, secondly to break up the ridge when the soil is solid and start to separate the potatoes from the soil, and thirdly to rub the soil through the web before reaching the rotary agitators.

The button  starts/stops the clod fingers and speed can be varied by adjusting the preset speed on the service terminal.

To set the height of the fingers (item 1, fig 10) above the web, remove the clamp bolts (item 2, fig 10) and rotate the mounting bar (item 3, fig 10) until the fingers are at the required height. It is not always necessary to set both rows of clod fingers completely down, it is often better to have the second row lower than the first. In heavy green top or rubbish, the clod fingers may cause material to ball up and overload the haulm roller. If this occurs, the fingers should be lifted out of work.

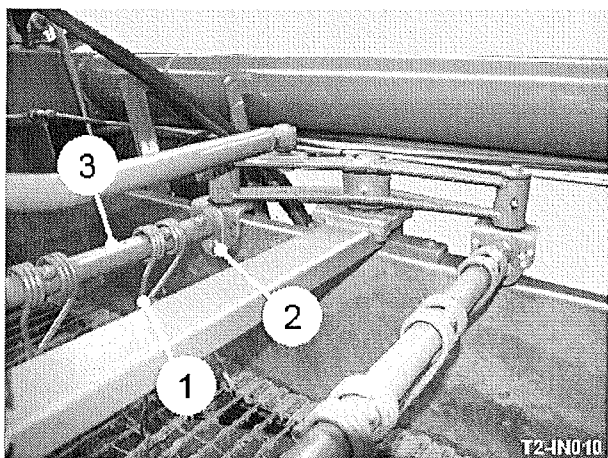


Fig 10

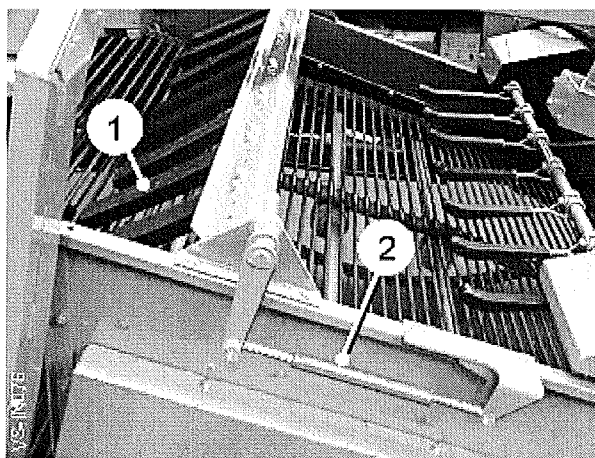



Fig 11

### Clod Breaking Fingers (optional)

The clod breaking fingers consist of one or two rows of trailing rubber blocks (item 1, fig 11). These operate by rolling the clods and potatoes which, in some soil conditions, has the effect of splitting the clods and allowing the smaller pieces to fall through the web.

To vary their effectiveness the clod fingers can be raised above or lowered down onto the web by adjusting the turnbuckle (item 2, fig 11). Care should be taken not to set the fingers to operate too rigidly onto the web or bruising and skin scuffing may occur.

## Haulm Roller

The haulm roller is designed to pinch the haulm and trash and drop it onto the ground under the machine. The haulm roller is directly driven by the hydraulic motor (item 1, fig 12). Roller speed is controlled from the service terminal screen. For some types of crop such as onions etc. it is advantageous to reverse the direction of rotation of the haulm roller. To reverse the haulm roller, simply press the button  on the service terminal.



Do not attempt to adjust, unblock or open any of the access guards to the haulm roller while the machine is running and never attempt to reach into the haulm roller from below. Always stop the tractor and turn off the engine first.



Due to the danger of flying objects, eye protection must be worn when visually monitoring haulm roller performance.

To increase/decrease the gap between the haulm roller and digger web, release the locknut (item 2, fig 12) and turn the setscrew (item 3, fig 12). The gap must be set equally on both sides. **Do not close the gap too much or the web joiner may foul the haulm roller causing damage to both.**

To increase/decrease the haulm roller spring tension, adjust the setting of the spring tensioner (item 4, fig 12). Adjust both sides evenly and check the setting by measuring the length of exposed thread on the spring tensioners.

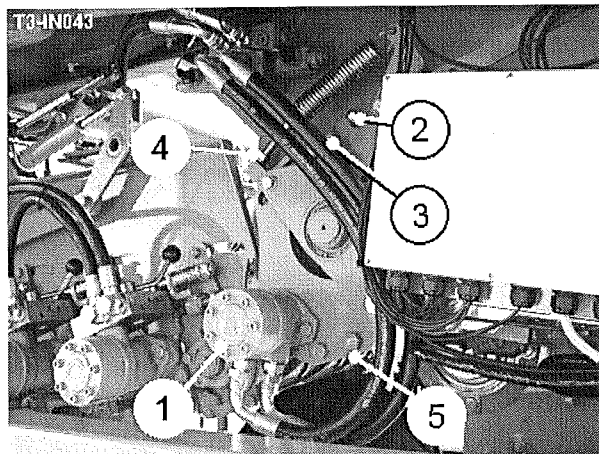


Fig 12

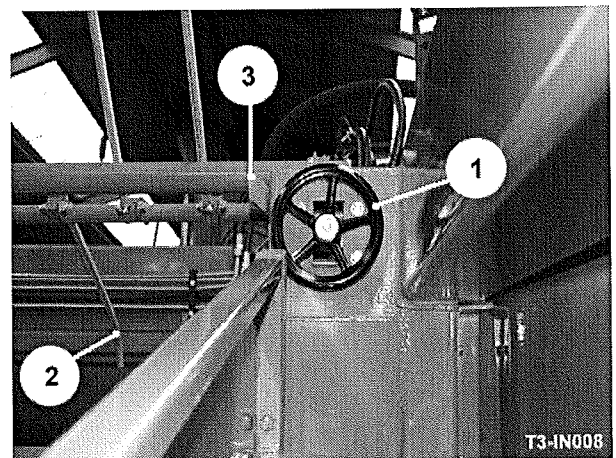


Fig 13

Rotating the position of the haulm roller relative to the digger web alters the amount of material the roller removes. The roller position can be adjusted by turning the hand wheel (item 1, fig 13) mounted on the LH side of the machine. The higher the roller is positioned relative to the web, the more material will be removed. Lowering the roller relative to the web will allow the flow of material to pass over the top of the roller onto the 1<sup>st</sup> separator unit. Adjusting the haulm roller until the maximum amount of haulm is removed with the minimum amount of potatoes being pulled through or nipped requires careful setting. This setting will need to be altered for different crop conditions, but the initial setting should start with the roller well down and then gradually raising it up. For effective harvesting this is one of the most critical adjustments, hence the simplicity with which it can be varied on the T3.

The haulm roller is fitted with a scraper (item 5, fig 12). Set the scraper as close to the roller as possible without actually fouling it.

### Haulm Fingers

The function of the haulm fingers (item 2, fig 13) is to catch the haulm and direct it down into the haulm roller. Moving the haulm fingers away from the web will allow a clearer flow for the crop. In green top or heavy trash it may be necessary to rotate some of the fingers out of the crop flow to prevent overloading of the haulm roller and excessive damage to the crop. By releasing a clamp bolt and raising/lowering the handle (item 3, fig 13) the fingers can be raised and lowered. A plastic sleeve is fitted to each finger. The sleeves prevent bruising of the potatoes and should be replaced when they wear through or are lost.

### Omega Separator Units

The 1<sup>st</sup> Omega Separator unit is positioned immediately behind the haulm roller. From the 1<sup>st</sup> Omega unit, the crop passes over a transfer roller onto the 2<sup>nd</sup> Omega unit. Each Omega unit consists of four rows of polyurethane scrolls and four clod rollers.

Separation on both Omega units operates in the same way. The height of the polyurethane scrolls can be specified as 10mm (standard) or 6mm for less aggressive action. The clod rollers can be ebonite, mild steel, or stainless steel. Stainless steel is the least aggressive due to the smooth, shiny surface, while ebonite will give more aggressive, general-purpose results. Also, fitting a smaller diameter clod roller allows larger more aggressive gaps to be set through the separator.

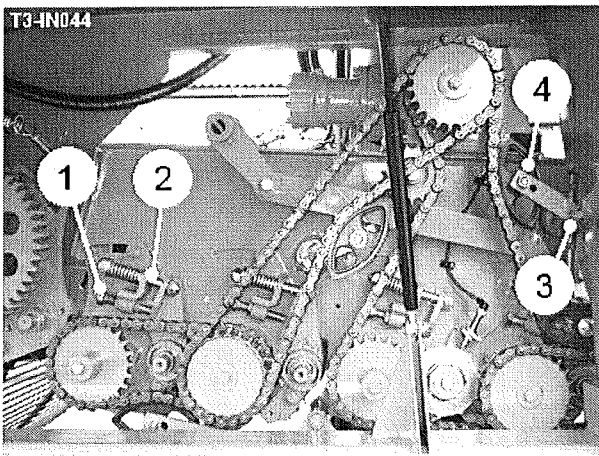


Fig 14

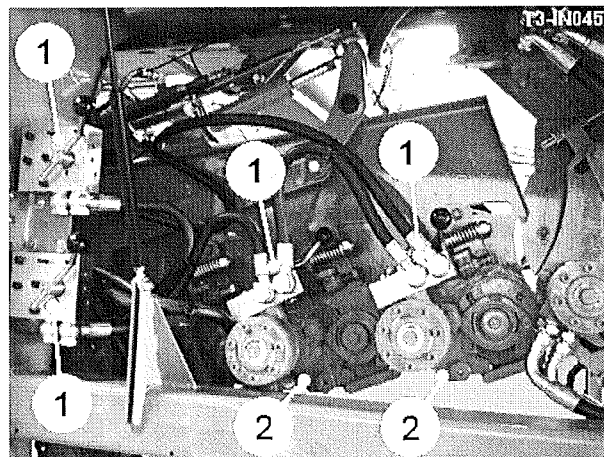


Fig 15

**THE OMEGA SEPARATION UNITS COMPRISED IN THIS HARVESTER ARE ONLY APPROVED FOR USE WITH EBONITE AND STEEL ROLLERS. RUBBER ROLLERS MUST NOT BE FITTED INTO THESE MACHINES IN THE PLACE OF THE EBONITE OR STEEL ROLLERS.**

By raising the height of the clod roller relative to the scroll, a larger ripple is introduced into the crop flow creating more separation by allowing the crop to ride over the soil and top. To work in conjunction with this, the relative speed and rotation direction of the clod rollers can be set.

The 1<sup>st</sup> Omega unit is normally run with the 1<sup>st</sup> clod roller rotating with the crop flow to move the crop away from the haulm roller. When running a clod roller in reverse to the crop flow, the higher the speed, the more aggressive the separation will be. Reducing the speed lessens the pinching effect of the clod rollers.

Running the clod roller with the crop flow at a slow speed will give some separation, while increasing the speed will transfer all the crop and soil. The clod rollers will normally be adjusted to run approximately 1 to 2 mm away from the tip of the scrolls for effective haulm removal. The clod roller gap is set by adjusting the stop bolts (item 1, fig 14) against the spring tension on the clod roller mounting plates. Spring tension is adjusted on the spring tie bolts (item 2, fig 14). All adjustments must be made evenly on both sides of the units.

To encourage a steady feed over the separators, they are individually mounted allowing them to be hydraulically angled between 0° and 8°. When increasing the angle of the 1<sup>st</sup> unit, the angle of the 2<sup>nd</sup> unit will need to be reduced to prevent a pocket from forming in front of the 2<sup>nd</sup> unit which could interrupt the crop flow.

The scroll speed and clod roller speed of each unit can be set on the service terminal screen. In addition, each clod roller motor is fitted with a manual reversing valve (item 1, fig 15) allowing the operator to fine tune the separation.

The 1<sup>st</sup> Omega separator angle and clod roller heights are adjusted by the second functions on the left-hand joystick. The 2<sup>nd</sup> Omega separator angle and clod roller heights are adjusted by the second functions on the right-hand joystick. Pressing and holding the front button on the joystick while operating the joystick north/south axis, raises and lowers the clod rollers. The east/west axis operates the angle.

Each clod roller is fitted with a scraper (item 2, fig 15) which needs to be closely adjusted to remove loose soil from the rollers. Drive chain tension is set by releasing the bolt (item 3, fig 14) and rotating the tensioner mounting (item 4, fig 14).

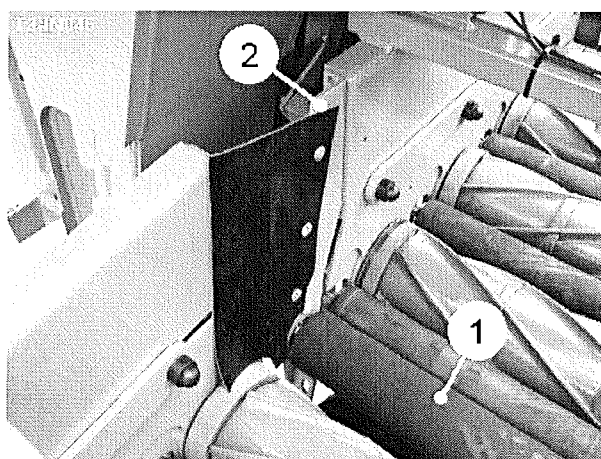


Fig 16



The height of the transfer roller (item 1, fig 16) can be adjusted by repositioning the roller side plates (item 2, fig 16) on the 1<sup>st</sup> Omega frame.



Make all adjustments evenly. Uneven adjustment may cause shafts to run out of line and eventually cause premature failure of the shafts and drives.

### Spreader Unit

The spreader unit webs are designed to distribute the crop evenly over the full width of the discharge elevator.

For the spreader to run, the auxiliary valve bank discharge section must first be turned on using the button  on the service terminal screen. The button  will then start/stop the spreader independently of the elevator web. The speed of the spreader web is controlled from the service terminal screen via the flow divider mounted behind the RH wheel.

The spreader drive chain (item 1, fig 17) is tensioned by adjusting the motor plate (item 2, figure 17) in the mounting slots. The spreader webs are tensioned using the locknuts (item 1 & 2, fig 18). Ensure both sides of the web are adjusted evenly.

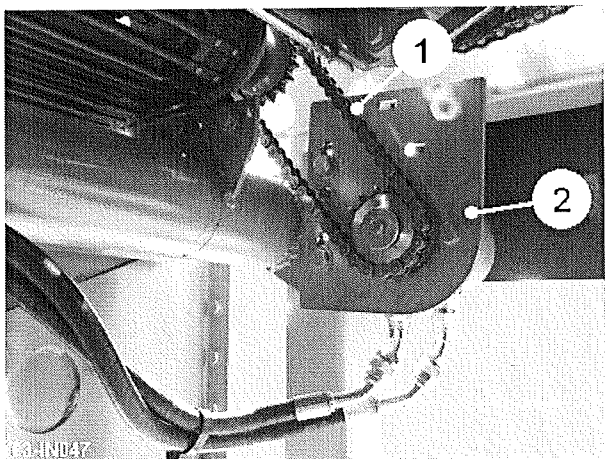


Fig 17

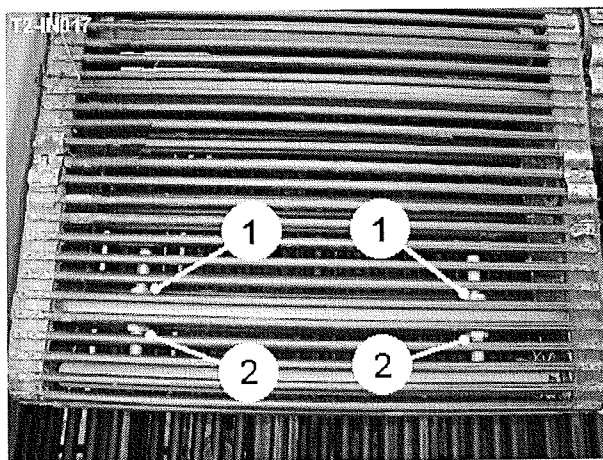



Fig 18

### Discharge Elevator

The 3 section discharge elevator is designed to fold within the width of the machine for transport and open out for work when loading potatoes into a trailer running alongside. When in work (except when opening up) the base section of the elevator should be fully out.

The elevator base section is controlled from the buttons on the service terminal screen. Folding and unfolding of the centre and swan neck sections is controlled by the slave box right-hand joystick. Fold in and fold out of the centre section is primarily used to set the working height and reach. Raising and lowering of the swan neck section adjusts the discharge height of the crop into the trailer and allows for even loading. The optional auto height sensor (if fitted) is activated by pressing the button  on the service terminal.

**NOTE:** The auto height sensor is turned off automatically if any of the elevator fold functions are operated.

The speed of the discharge web is controlled from the service terminal.

The service terminal button  starts /stops all the elements of the rear section of the harvester. With the service terminal button  on, the joystick button  starts/stops only the elevator web by operating the bypass valve (item 11, fig 24).

Because the tractor oil supply is used to power the discharge elevator, the maximum speed of the web will depend on the hydraulic flow from the tractor and may be subject to slight fluctuation when ram services are operated. If ram services are taken to relief (dead headed) the elevator will stop while the tractor relief valve is blowing.




### Rear Axle


The tracking ram (item 1, fig 19) enables the RH wheel to be tracked out from under the machine for work. Hydraulic wheel motors are fitted as standard.

The 'Machine Level' button on the slave box and service terminal screen operates the levelling ram (item 1, fig 20) inside the LH wheel leg.



A manual ram lock valve is fitted to the top of the levelling ram which must be in the open position for the ram to operate. Ensure the valve is closed again before transporting the harvester on the road.

Optional automatic levelling can be fitted to maintain side-to-side 'horizon' level when operating on undulating ground. The automatic levelling is activated by the button  on the service terminal.

The left-hand joystick steers the rear of the machine in the indicated direction. The button  operates the self-centring circuit to automatically set the wheels to the straight-ahead position.

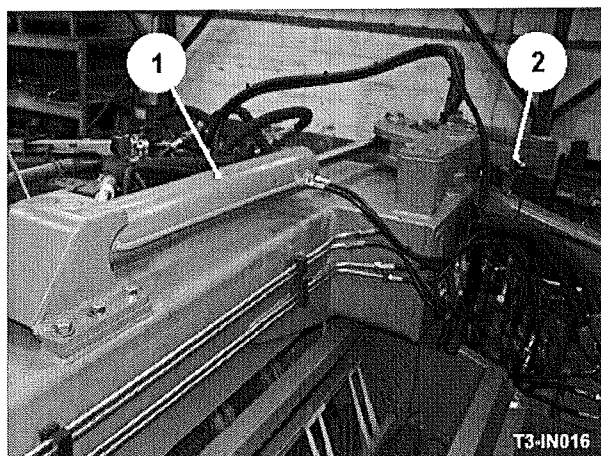


Fig 19

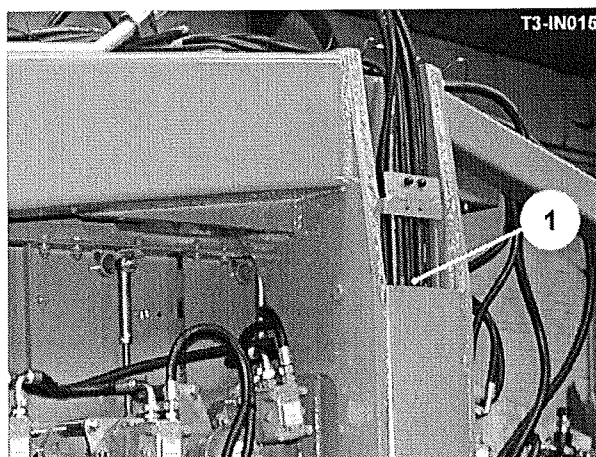


Fig 20

### Rear Axle tracking



**Before tracking the RH wheel, always ensure the machine is on firm, level ground with the elevator folded fully in to avoid stress on the axle and chassis.**

The harvester wheels are set at a fixed track position. The LH wheel is tracked to match a position suitable for all row widths. The RH wheel is tracked in a symmetrical position about the centre line for opening up and then rotated into the working position to give a better balance for operation. Tracking is done from the service terminal screen. If the wheel does not move easily, slowly move the machine forwards or backwards as appropriate to assist. Ensure the wheel has been fully rotated inboard or outboard before proceeding. Consult Standen Engineering Ltd. for information on different row widths and wheel rims.



## Powered Axle

The powered axle is designed to provide additional traction during work. The powered axle is capable of transferring up to 63 hp from the tractor PTO to hydraulically drive the harvester wheels giving a maximum speed of 5.5 kmh (3.5 mph). This is achieved by means of a load sensing, pressure compensated, variable displacement pump, which provides the hydraulic oil flow to drive the wheel motors.



Ensure the wheel motor casings are filled with hydraulic oil before starting (see heading 'Bleeding / Filling Wheel Motors'). Failure to do so may cause premature failure of the motors.



Each wheel motor is fitted with a grease collar. The collar must be purged with grease to prevent ingress of dirt and dust (see heading 'Purging the Grease Collar').

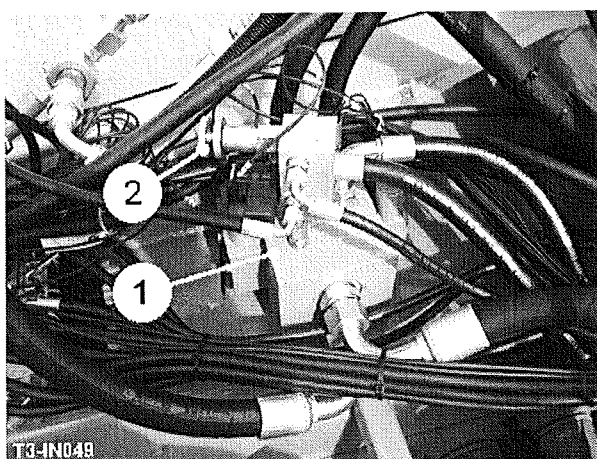





Fig 21

The axle drive can be set to forward , neutral or reverse  from the yellow rocker switch on the slave box or from the service terminal. When forward or reverse is selected, the directional control valve (item 1, fig 21) demands oil flow from the pump to provide the necessary flow required to match the harvester wheel speed to the tractor speed. When the flow matches, the pressure compensator within the pump maintains a constant pressure in the hydraulic system which is set on the external pressure control valve (item 2, fig 21) from the service terminal. This valve allows a low operating pressure to be set which is adjustable to give the required drive assistance for normal harvesting. Forward speed can be matched to the tractor by using the speed adjust on the service terminal. When the high pressure button  is pressed, the system operating pressure is increased to the setting of the main compensator within the pump.

When the RH wheel is rotated to the inboard or outboard position, the proximity switches (item 2, fig 19) reset the valve control to reverse the rotation of the wheel.

**Bleeding / Filling Wheel Motors**

Place the wheel motor in a position in which the filler plug (item 1, fig 22) is at the top. Remove the plug and pour in hydraulic oil until all trapped air has been eliminated. Refit the plug and repeat for the second motor. Run the motors unloaded. Finally, operate the motors under load and check for leaks and extraneous noise.

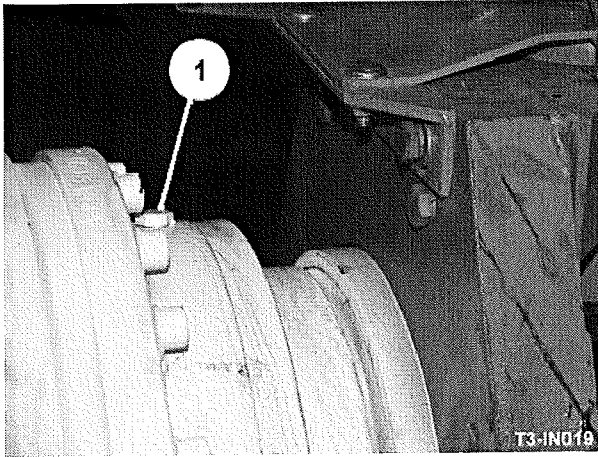


Fig 22

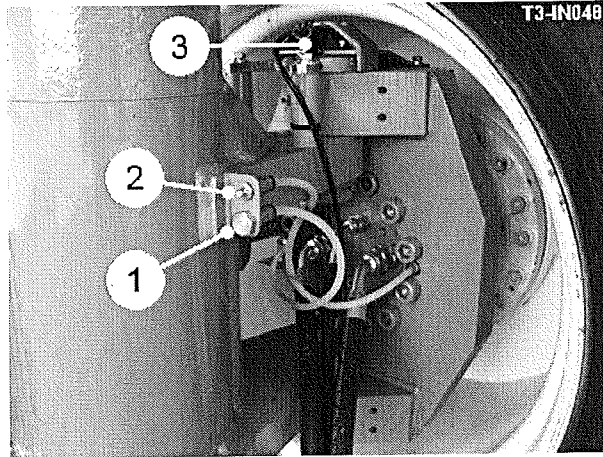


Fig 23

**Purging the Wheel Motor Grease Collar**

The grease collar must not be pressurised when purging as this can cause internal seal damage. Always follow the procedure below.

1. Remove the plug (item 1, fig 23)
2. Add grease through the grease nipple (item 2, fig 23) until grease is expelled through the plug hole.
3. Refit the plug (item 1, fig 23).

## Hydraulic Systems

Two completely separate hydraulic systems consisting of five circuits are fitted to the harvester. The hydraulic rams, discharge elevator and spreader unit are powered from the tractor external supply. The webs and the other hydraulically driven elements on the machine are supplied from four PTO driven pumps and the onboard oil supply. The pumps are fed through the two suction filters submerged in the front beam and fed to the valves through pressure filters.

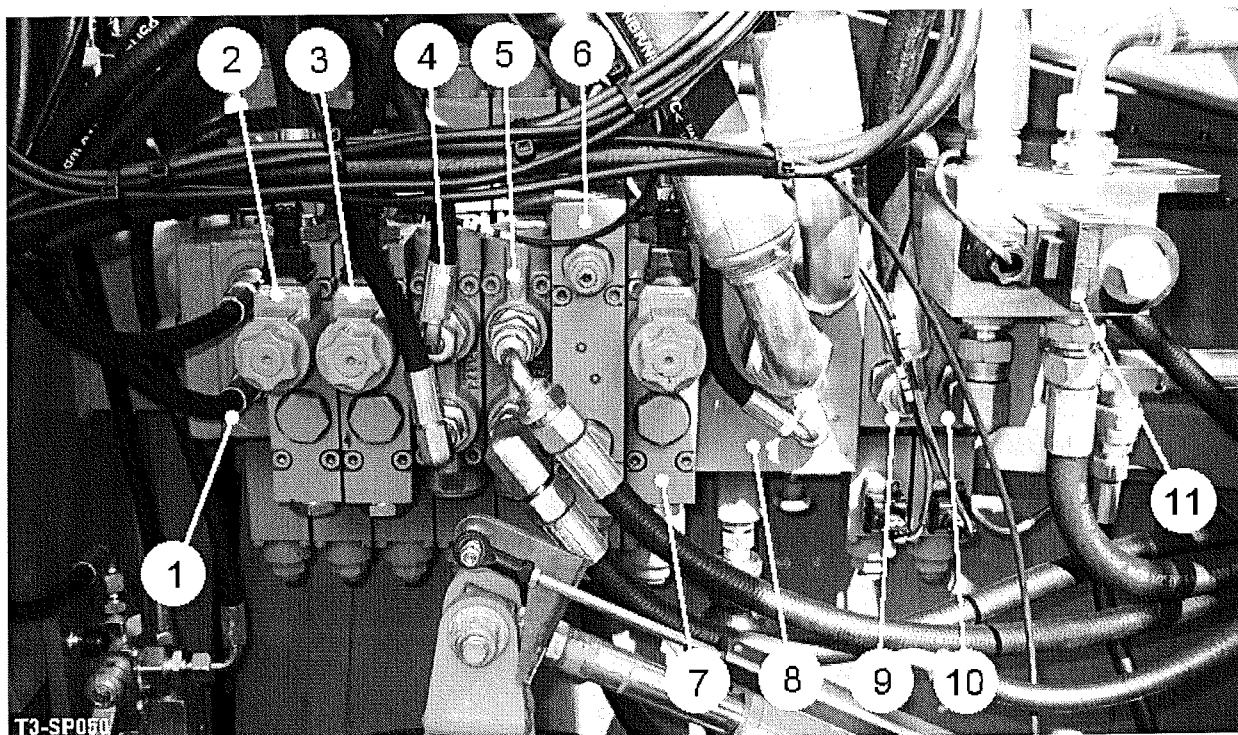


Fig 24

Item 1 = Master section  
Item 2 = RH digger lift  
Item 3 = LH digger lift  
Item 4 = Axle steer

Item 5 = Elevator base  
Item 6 = Elevator centre  
Item 7 = Elevator swanneck  
Item 8 = Valve inlet section

Item 9 = Sweeping fingers  
Item 10 = Elevator/spreader  
Item 11 = Bypass valve

### Circuit 1 – Auxiliary Hydraulics

The hydraulic ram services and discharge elevator/spreader drives are supplied with hydraulic oil from the tractor. A minimum supply of 50 litres/minute is fed through the pressure filter (item 1, fig 36) into the inlet section of the auxiliary valve bank (see fig 24). The system will accept up to 80 litres/minute maximum. The flow rate of all the valves are proportionally controlled from the electrical system and are adjustable via the service terminal. Additional ram services are powered by the master valve section via slave valves. The slave valve (see fig 25) operates the drawbar, web split, wheel tracking ram and machine level. The slave valve (see fig 26) operates the 1<sup>st</sup> and 2<sup>nd</sup> Omega separator angles and clod roller heights. The elevator valve section at the rear of the auxiliary valve bank powers the discharge web and spreader motors. The elevator/spreader valve has priority over the ram service valves. The flow rate for the spreader is adjustable independently up to the flow set for the elevator. The return oil flow from the valves and motors recombines and is returned to the tractor, ideally through a low back pressure or free-flow return coupling. No separate relief valve is fitted to the auxiliary circuit, the system relies totally on the tractor relief valve.

The auxiliary valve bank is capable of operation with open centre, closed centre, or load sensed tractor systems. When sweeping clod fingers are fitted, an additional valve section is added to the end of the valve block.

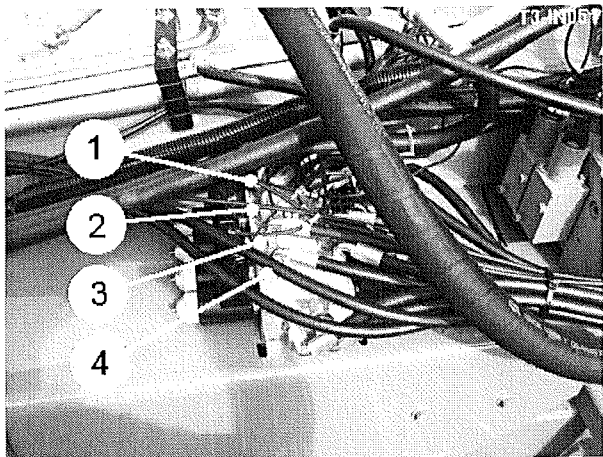


Fig 25

- Item 1 = Drawbar steer
- Item 2 = Web split
- Item 3 = Wheel tracking
- Item 4 = Machine level

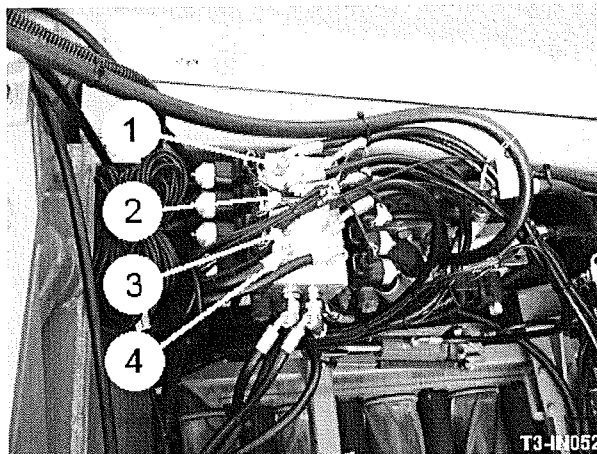


Fig 26

- Item 1 = 2<sup>nd</sup> Omega angle
- Item 2 = 2<sup>nd</sup> Omega clod roller
- Item 3 = 1<sup>st</sup> Omega angle
- Item 4 = 1<sup>st</sup> Omega clod roller

### Circuit 2

The pump (item 1, fig 27) powers the digger web, sieving web and haulm roller. From the pump the feed is into the valve (see fig 28). On/off and speed control is from the service terminal. The digger web speed should be adjusted to give a consistent crop take-away from the shares, and the sieving web speed should be adjusted to give a consistent crop take-away from the digger web.

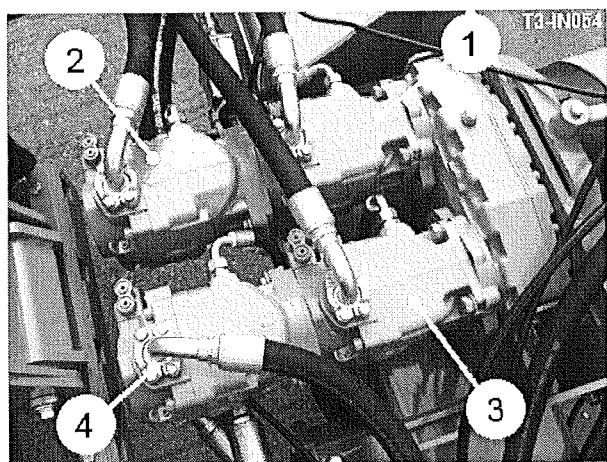


Fig 27

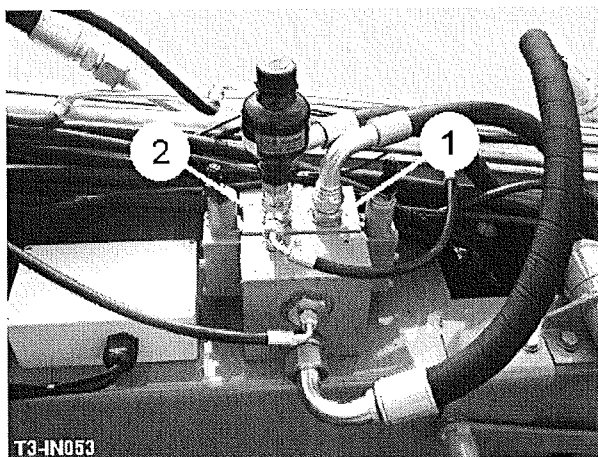
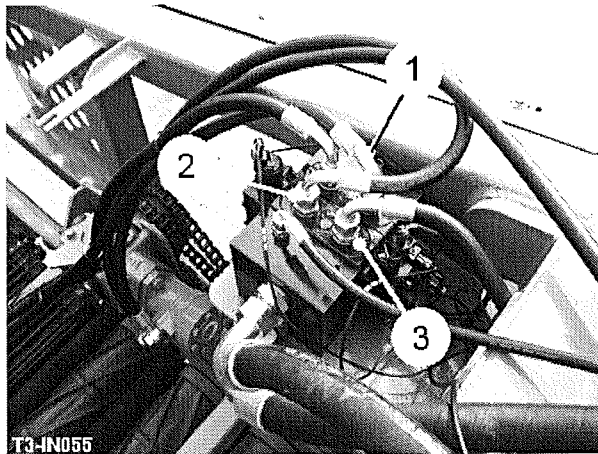


Fig 28

- Item 1 = Digger web
- Item 2 = Sieving web & haulm roller

## Circuit 3

The pump (item 2, fig 27) powers the 2<sup>nd</sup> Omega separator Unit and powered diablo roller option. From the pump the feed is into the valve (see fig 29). On/off control and scroll speed is proportionally controlled from the service terminal. The clod rollers are in a series circuit fed from a double-acting valve allowing the clod roller set to be reversed. This also enables the operator to reverse the rollers to eject a blockage. A manual reversing valve is fitted to each clod roller motor allowing individual rotations to be set.

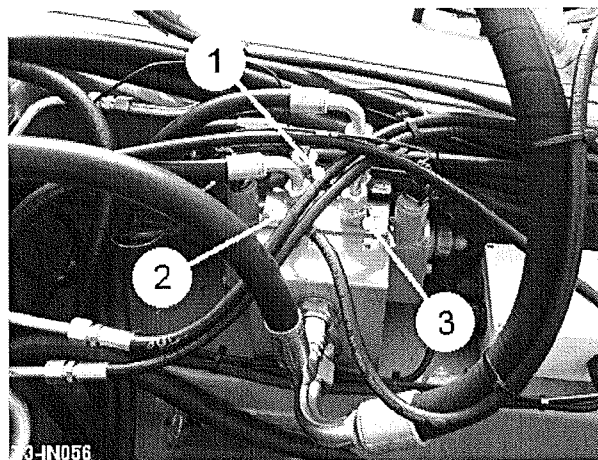


- Item 1 = 2<sup>nd</sup> Omega clod rollers
- Item 2 = 2<sup>nd</sup> Omega scrolls
- Item 3 = Powered diablo roller option

Fig 29

## Circuit 4


The pump (item 3, fig 27) powers the 1st Omega separator Unit and rotary agitators. From the pump the feed is into the valve (see fig 30). On/off control and scroll speed is proportionally controlled from the service terminal. The clod rollers are in a series circuit fed from a double-acting valve allowing the clod roller set to be reversed. This also enables the operator to reverse the rollers to eject a blockage. A manual reversing valve is fitted to each clod roller motor allowing individual rotations to be set.

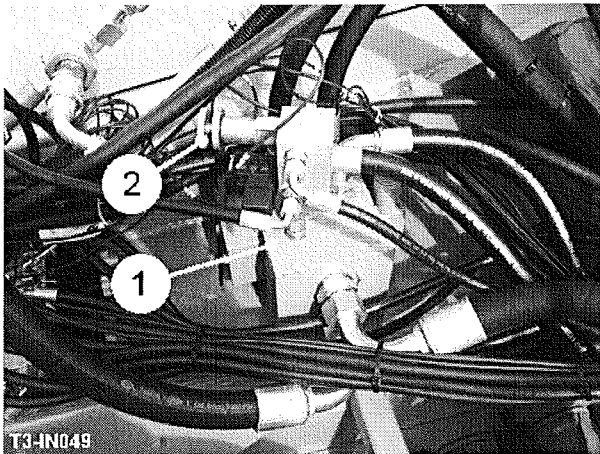


- Item 1 = 1st Omega clod rollers
- Item 2 = 1st Omega scrolls
- Item 3 = Rotary agitators

Fig 30

**Circuit 5**

The pump (item 4, fig 27) supplies the powered axle. From the pump the feed is into the valve (see fig 31). The axle drive is switched for forward and reverse from the slave box or the service terminal. When the high pressure button  is pressed, the system operating pressure is increased to the setting of the main compensator within the pump.



Item 1 = Powered axle valve  
Item 2 = External pressure control valve

Fig 31



## Electrical Control System



**WARNING:** Always switch off the electrical control system before transporting the harvester on the road.

Control of all the operating functions of the T3 are through the Can-bus control system. The in-cab controls are covered by the touch-screen service terminal (Item 1, fig 32) and the slave box (Item 2, fig 32). The slave box covers all the basic switched functions used in normal operation and these are also repeated on the service terminal. The primary function of the touch screen service terminal is to allow easy access to all the variable functions such as speeds etc., and to allow all the operating functions to be monitored on the screen. Setting and monitoring can be carried out by following the instructions in the 'Control System' section, or as shown on the display screen.

**NOTE:** If the tractor engine is stopped and restarted the control system should be turned off and on again to protect the program from showing errors.

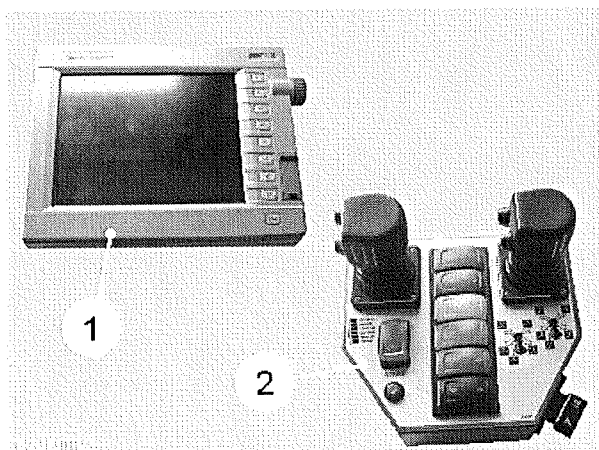


Fig 32

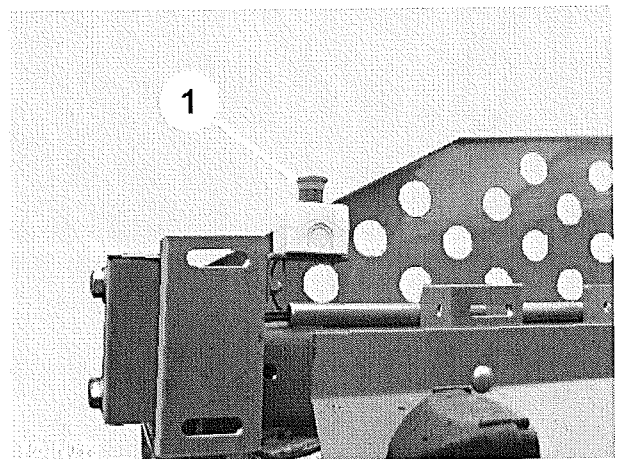


Fig 33



Do not store the control consoles outside and always disconnect them from the tractor supply when not in use, so avoiding the possibility of draining the battery. Ensure that plug pins are clean and undamaged before connection and they are securely locked together before the power is switched on.

## Emergency Stop Button

If fitted, the manual emergency stop button (item 1, fig 33) mounted at the rear of the harvester shuts down all hydraulic drives and electrical controls by turning off the machine control module and displaying the 'Press Start' screen on the service terminal. The service terminal remains live but will not operate any function.

**NOTE:** The electrical control system will only function as a completely connected circuit. The emergency stop button completes the looped circuit and this circuit must be unbroken before the control box can be turned on or reset. If the emergency stop button is tripped, the button must be reset before the 'Start' button on the slave box will latch on to the machine control module.

### Starting Off Your Harvester

Before commencing work whether starting off a new machine or starting work in a new field, it is advisable to carry out the following checks.

Ensure the harvester is level when hitched to the tractor.

Ensure the hydraulic and electrical connections from the tractor are correctly made and are secure.

Ensure the tractor and harvester wheel settings match the rows to be harvested.

Ensure the shares are set to the correct row widths and are set centrally to the rows.

Release the digger transport cables from their transport position.

Ensure the transport lock valve on the machine level ram is in the open, working position.

Set the shares so that they are evenly spaced and the tip plates are in line with the top of the digger web.

Ensure the depth rollers are mounted centrally over the rows.

Set the disc coulters to the correct width to suit the ridges being lifted, typically 20mm from the outer edge of the share blade.

Ensure the disc coulters are sharp, especially in soft ground or trash.

Ensure the ant-roll flaps/haulm intake rollers are set to the correct width.

Check that the web pitch is suitable for the size of crop to be lifted.

### Damage Prevention

A machine that is incorrectly adjusted or operated can cause a significant amount of damage to the crop. The type of damage found in the sample will usually give an indication as to how the damage was caused and where it is occurring. Examine samples at various points. Start in the row in front of the machine and follow the path of the crop through to the trailer. Somewhere between the last undamaged sample and the first signs of damage will be the area causing the problem. The shape and nature of the damage will give clues as to the cause.

When satisfied that the tractor and harvester are set up correctly then commence work. Work the machine for approximately 30 metres and stop. Do not run the machine out, leave the crop and soil on all of the sections of the machine. By a series of visual checks you can assess how the harvester settings are performing, and carry out the following checks.

Damage can take various forms. The following comments will help find and cure some of the more common problems. Remember, the harvester is not always the culprit.



The speed and efficiency of mechanical harvesting can be greatly improved by good planting techniques and adequate cultivation methods. Visually check behind the harvester. If cut or sliced potatoes are evident, the digging depth or disc settings may be incorrect. Potatoes with an uneven cut are normally caused by the shares while a clean straight cut can be caused by the discs.

Check for correct depth of lifting by digging into the lifted rows. Potatoes in the ground indicate depth too shallow. If depth is too deep, then excessive soil will be lifted making the separating areas of the harvester work harder. Avoid lifting the unworked soil below the ridge. A small amount of extra depth will equate to many tonnes of extra soil being lifted.

If undamaged potatoes lie on the surface behind the machine, check their position. If they are to the side of the lifted rows, they may have spilled out of the front of the digger web. Check disc position and anti-roll flaps or haulm intake rollers if fitted. If potatoes lie on top of the lifted rows, check webs are correct pitch for crop being lifted and gap between star shafts is not too large.

If damaged potatoes lie on top of the lifted rows, these may be being lost through the separating areas of the machine. Check the following.

Crushed potatoes may be caused by the haulm roller or separator unit clod roller setting. Nipped potatoes may be caused by the cleaner unit roller size, speed, or angle.

Looking on top of the soil under the harvester may give an indication as to where these damaged potatoes are being produced.

Inspect the crop on the digger web. If cut potatoes are evident, check digging depth and disc settings. If clods or stones are present at the sides of the web, then the discs and shares may be set too wide and are picking up material from the wheelings. Excessive soil on the digger web indicates depth too deep.

Check these points with the appropriate section of this handbook. When making adjustments do so one at a time and try harvesting to see the result. More than one adjustment at a time may cause confusion.

In dry conditions:

Keep adequate soil around the crop to prevent risk of damage. Keep soil in the machine as long as possible to cushion the crop. A combination of digging depth and forward speed will help to achieve this. Keep agitation and crop movement down to a minimum. Set depth wheels to exert lightest amount of downward pressure so as not to disturb the ridge or bruise the crop. Use a water misting kit to minimise nipping.

In wet conditions:

Set digger web slightly faster than ground speed.

In clod conditions:

Open gap between star shafts in Star units. Fit smaller cleaner unit rollers.

In stony ground a stone can become wedged between the share blades preventing penetration. Make sure discs are kept sharp so that they cut the haulm and prevent rapping and blockages around the roller mountings.

#### Damage prevention:

Do not hold the crop on the separator units longer than necessary. Run the discharge elevator at a suitable speed to take the crop away smoothly without overloading the web flights or throwing the crop into the trailer.

## Getting The Best Results During Harvesting

### Tractor/Harvester

Ensure tractor wheel widths are at the correct settings for your row widths and system and that the tyre widths are not too wide as to crush the side of the ridges. Ensure tractor drawbar pin is not too long or the harvester drawbar set too low that it can drag and bunch up haulm which in turn will go into the harvester in large bunches and damage crop at the haulm extraction point. Ensure correct tractor forward speed to match the conditions and harvester capabilities. While standing on level ground and with the harvester connected to the tractor, ensure the drawbar eye is adjusted so that the elevator is parallel to the ground. This will ensure that the machine is at the correct angle for haulm rollers and separators to work at maximum efficiency.

### Shares

Ensure the shares are set at the correct width settings for your row widths and system. Make sure the outside corners are cut off the outside share blades, this will help to stop the haulm that the discs have pressed into the ground wrapping around the front corners of the blades. Make sure chamfer on front edge of blades is not too acute as to cause a restriction or bulldozing effect. Ensure the shares are clean and shiny before commencing work. This will reduce drag and help flow into the machine. In wet, heavy conditions, make sure the share area is kept clean. A build up of soil under the flaps may cause them to stand up, causing flow and damage problems to the crop. Also, keep the share frame area clean as this will prolong the life of the web, reduce drive roller wear, and reduce the load on the drive system. If using a centre share blade, ensure the blade is parallel with the other blades. This will maintain an even depth across the bed. Ensure the correct depth settings when moving to different fields and/or varieties. Use the correct share frame and blade configuration for your conditions. As soon as the harvester has finished work, apply a film of grease over the bright working surfaces. This will reduce corrosion and assist flow when the machine starts work next season.

### Disc Coulters

Ensure the disc are set to the correct depth. Too much depth will cause soil to slab and encourage the soil to stick to the discs preventing them from turning. Make sure the discs are kept sharp to cut the haulm and that the disc does not have to be set deeper to compensate for not cutting the haulm. In wet conditions set a wider gap between the discs and the share blades (25mm). If crop is rolling back down the web and hitting the discs causing damage, reduce the web speed slightly so there is more soil to carry the crop away. Make sure the discs are being scraped clean. This will help flow into the machine.

**Anti-roll Flaps/Haulm Intake Rollers**

Ensure the anti-roll flaps fill the gap between the discs and do not stop them from turning. If you experience problems with haulm rapping around the front roller mountings, the haulm intake rollers (if fitted) are adjustable forwards and sideways to position them for optimum performance. If this problem is allowed to continue, it may cause haulm to build up and possibly affect the next row by dragging the crop out or lift the digging depth out, causing damage to the crop. Ensure the rollers are turning at all times. The rollers constantly feed the haulm into the machine and reduce damage at the haulm extraction points. Downward pressure of the rollers is a balance between too little so that the rollers stop turning, and too much so that the rollers are unable to lift when required to.

**Depth Wheels**

Ensure the depth wheels are set to the correct width settings for your particular system. Double check as sometimes with ridging up during the growing season the ridge positions can vary. Do not apply too much pressure on the depth wheels. As a result of too much pressure, clods could be produced and soil made to stick to the crop. If happens, more agitation will be necessary meaning the possibility of more crop damage. Enough pressure to keep the wheels turning is sufficient in most conditions.

**Machine Level**

It is important to maintain the level attitude of the machine so that an even spread of material across the width of the machine is maintained to allow the separator and haulm extraction areas to work to their maximum capacity.

**Digger Web**

The digger web speed in conjunction with ground speed is essential for the harvester to work efficiently. Incorrect web speed can result in crop damage and poor harvester performance. If web speed is too fast this will result in roll back and poor take off after the share. Either decrease web speed or increase forward speed. If the web speed is too slow this will result in the machine being overloaded which will cause poor performance of the separating areas, putting undue stress on the mechanical components, reducing the life of the machine, and putting excessive amounts of soil and haulm into the discharge elevator. Either increase web speed or decrease forward speed. There must be enough web speed for the crop to be carried over the haulm roller and not into it.

**Web split**

The variable step between the digger web and sieving web is used to break up the ridge and to start to separate the crop from the soil. In the fully raised position the crop will pass across with minimum disturbance, while fully dropped the ridge will be broken up allowing the soil to drop through the web.

**Sieving web**

Separation on the sieving web is mainly controlled by changing the pitch of the web. The speed of the web relative to the digger web will give more or less spread to the crop on the web, and determine the amount of soil carried over onto the separators.

**Sweeping Clod Fingers (optional)**

The first row of the sweeping clod fingers should be set higher than the second row. The motion of the fingers should gradually disturb the ridge. If fingers are set too low then a restriction, and damage will occur causing loss of output. The speed of the fingers is adjustable from the service terminal. Ensure enough speed to result in an even spread of material across the width of the machine allowing the separator and haulm extraction areas of the machine to work to their maximum capacity.

**Clod Breaking Fingers (optional)**

The clod breaking fingers are adjustable for angle. This gives a restriction to the crop and soil to flow through. Ensure the blocks are not over adjusted such that crop is damaged by rubbing on the web bars, or that the flow of material is restricted too much causing haulm and debris to bunch up which can cause problems at the haulm extraction points. It is important that an even spread of material across the width of the machine is maintained to allow the separator and haulm extraction areas to work to their maximum capacity.

**Agitators**

Over use of the agitators is one of the main causes of damage and will result in roll back and bounce of the crop causing bruising etc. Always use the minimum amount of agitation. When starting to harvest it is best to begin with minimal agitation. Add more agitation as conditions dictate

**Haulm Roller**

The gap between the haulm roller and the web must be set to a minimum. The best way to achieve this is to turn the web until the web joiner is next to the haulm roller, and then adjust the gap so that the web joiner is only just missing the haulm roller. To reduce the risk of damage to the crop it is best to let the crop land on the stars past the haulm extraction point and let the haulm be guided back into the pinch point of the haulm roller by the haulm guide fingers.

**Haulm Guide Fingers**

Position the haulm guide fingers out of the way for minimum damage. Only apply tension to the fingers in very wet conditions or when trying to get maximum output from the machine. Ensure enough web speed for the crop to clear the haulm roller. Check condition of rubber finger covers daily before harvesting.

**Omega Separator Units**

Separation on all Omega units operates fundamentally in the same way. The height of the polyurethane scroll can be specified as 10mm (standard), or 6mm for less aggressive action. The clod rollers can be ebonite, mild steel, or stainless steel. Stainless steel is the least aggressive due to the smooth, shiny surface, while ebonite will give more aggressive, general-purpose results. Also, fitting a smaller diameter clod roller allows larger more aggressive gaps to be set through the separator. By raising the height of the clod roller relative to the scroll, a larger ripple is introduced into the crop flow creating more separation by allowing the crop to ride over the soil and top. To work in conjunction with this, the relative speed and rotation direction of the clod rollers can be set. When running the clod roller in reverse to the crop flow, the higher the speed, the more aggressive the separation will be. Reducing the speed lessens the pinching effect of the clod rollers. Running the clod roller with the crop flow at a slow speed will give some separation, while increasing the speed will transfer all the crop and soil.

**Spreader Unit**

Do not use excessive speed on the spreader unit as this will propel the crop into the rear elevator panel. Conversely, insufficient speed will cause a restriction in the flow.

**Discharge Elevator**

Correct discharge elevator speed is essential. The objective is to have the speed as slow as possible, filling every compartment with crop. As far as crop damage is concerned, the more crop in each compartment the better. It should also be fast enough not to cause the crop to spill out over the top of the web flights and roll back causing a restriction at the bottom of the elevator. Too much crop at this position can cause nipping as the web goes around the corner. When in work, apart from when opening up, the base section of the elevator should be fully out.

### Maintenance of the Hydraulic Systems

The components utilised in the design of the hydraulic systems have been chosen for their maintenance free characteristics. Should it be necessary to remove any of the hydraulic components, cleanliness is of the utmost importance. Before breaking any connection in the system, ensure the surrounding area is clean. Pressure wash the machine if possible. Prevent contamination entering the system by plugging any open pipe work and ports with plastic plugs or clean paper wipes. Do not use cloth or rags. Preventing contamination entering the system will prolong the life of the various hydraulic components and will help prevent component failure.



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 (see heading 'Residual Hydraulic Pressure Dump Procedure').



Remember that the tractor hydraulic oil supply serves the machine. Ensure the tractor hydraulic system is serviced in accordance with the manufacturers recommendations to prevent cross contamination of the harvester auxiliary system.

The hydraulic oil should be carefully monitored. The cold oil level should be kept to the lower mark on the dipstick (item 1, fig 34) with the dipstick screwed fully in. On earlier machines, the level should be approximately 100mm below the bottom of the chassis filler neck and covering the sight glass (item 1, fig 35). Maintain the filler level by topping up or refilling with Esso Nuto 46 Hydraulic Oil. The reservoir holds approximately 750 litres. If a high water content becomes apparent or a cloudiness in the oil, the hydraulic oil should be changed.

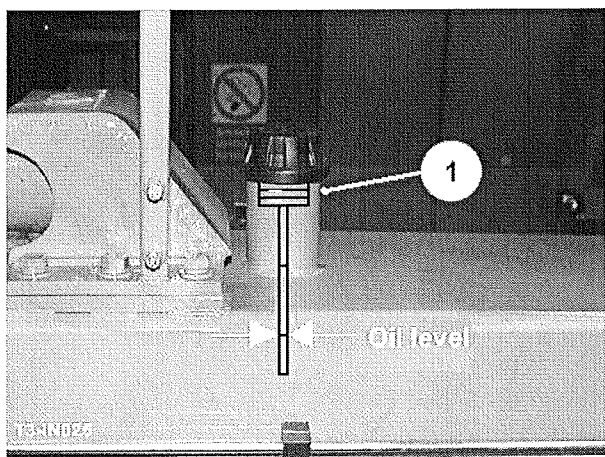


Fig 34

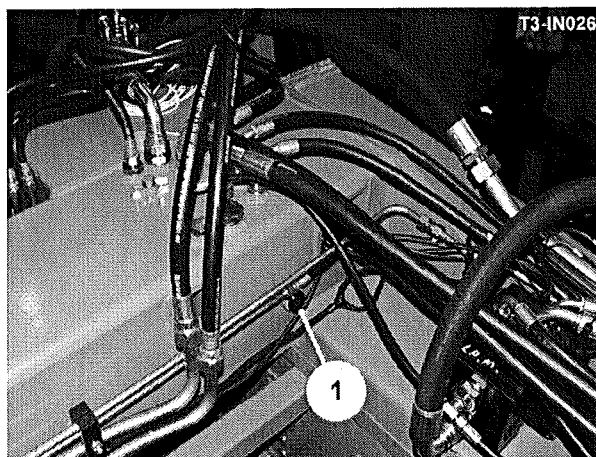


Fig 35

The oil reservoir drain plug (item 1, fig 36) is located underneath the centre of the front beam.



Regularly check all hoses for chafing or accidental damage and replace immediately.

The shut-off valves (item 2,3,4 & 5, fig 35) connected to the pump case drain lines allow maintenance to be carried out without draining the oil tank.

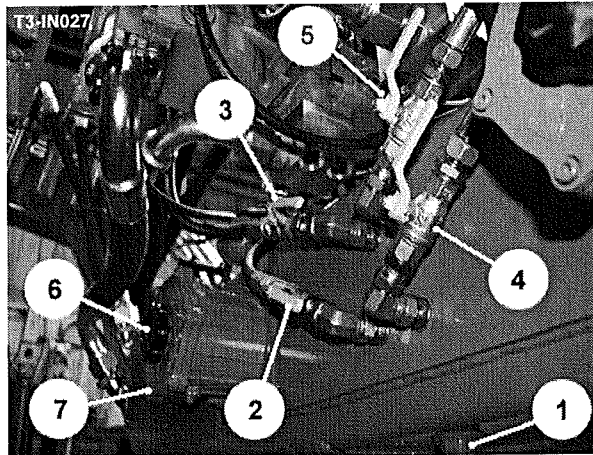


Fig 35

The suction filter elements should be replaced after the first 50 hours running time and then every 500 hours or annually thereafter. The suction filter elements are serviced as follows:

1. Wind the suction filter knob (item 6, fig 35) fully out anti-clockwise to close the cut off valve within the filter housing.
2. Release the screws (item 7, fig 35) holding the filter lid. A small amount of oil will be lost from the filter body.
3. Remove the top of the filter and withdraw the element.
4. Clean or replace the element and reassemble.
5. Wind the suction filter knob (item 6, fig 35) fully in clockwise to open the cut off valve.
6. Run the system and check for leaks.

The pressure filter elements (item 1 & 2, fig 36 & item 1,2 & 3, fig 37) should be replaced after the first 50 hours running time and then every 500 hours or annually thereafter.

To replace a pressure filter element:

1. Switch off the tractor engine and apply the hand brake.
2. In the case of the auxiliary circuit pressure filter (item 1, fig 36), operate the spool valve feeding the harvester to release any residual pressure and then disconnect the feed hose from the tractor.
3. Unscrew the bottom casing of the filter housing.

4. Remove the filter element and rinse out the casing.
5. Fit the new element and refit the casing ensuring that it is tight.
6. Run the system and check for leaks.

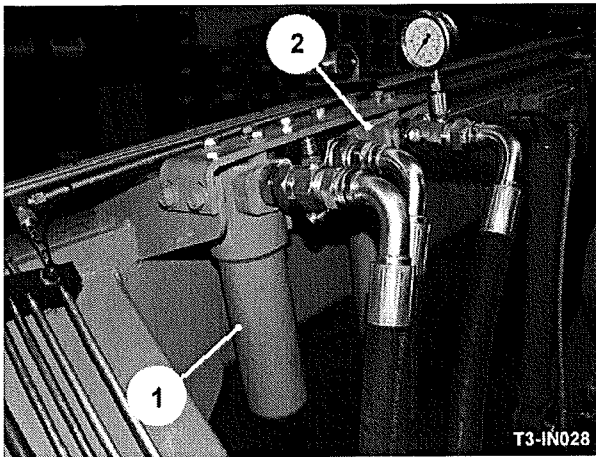


Fig 36

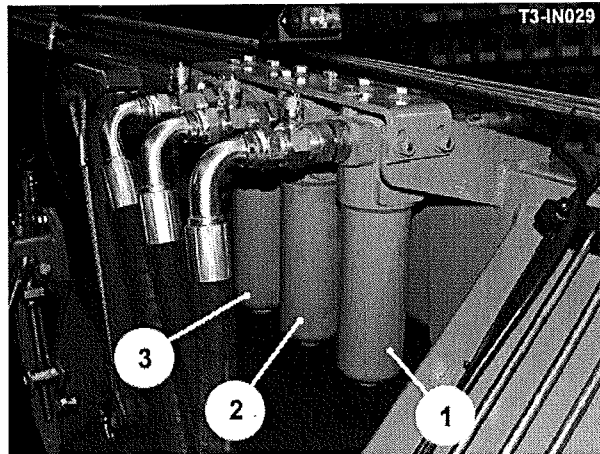


Fig 37

### Residual Hydraulic Pressure Dump Procedure

The following procedure outlines the method of relieving the residual pressure within the hydraulic system. It is essential that this procedure is carried out before any maintenance or repairs are attempted on the hydraulic system.

1. Set the discharge elevator into the fully folded position.
2. Place chocks to the front and rear of both wheels to prevent the machine from moving.
3. Lower the digger assembly to the ground.
4. Lower the harvester onto the drawbar stand and disconnect it from the tractor, leaving the hydraulic and electrical connections in place.
5. With the levelling ram lock valve in the open position, operate the levelling ram to lower the machine to its lowest position. Leave the ram lock valve in the open position.
6. Switch off the tractor engine.
7. Operate all switches on the driver's control box, in turn, to remove any remaining pressure within the hydraulic system.
8. Disconnect the hydraulic and electrical connections from the tractor.



## Steering Ram Link Circuit

The two rear axle steering rams are connected via a link circuit which ensures both rams actuate by equal amounts in opposite directions when turning. The link circuit diverts the oil within the annular section of the extending ram into the annular section of the ram opposite thus retracting that ram by the same amount. The circuit must contain the exact volume of oil necessary for the rams, and thus the wheels, to be set correctly. If oil is lost from the link circuit through leakage or during maintenance work etc., the wheels will no longer track correctly and the circuit volume will need to be reset. This is done using valves 1 and 2 located above the RH wheel leg (see figure 38).

1. Operate the steering fully to the left.
2. Open valve 1 to divert oil to the left hand steering ram.
3. Open valve 2 to allow oil from the right hand ram through the relief valve.
4. Operate the control box 'Swanneck' and 'Axle Steer Right' switches.
5. Close valves 1 and 2.

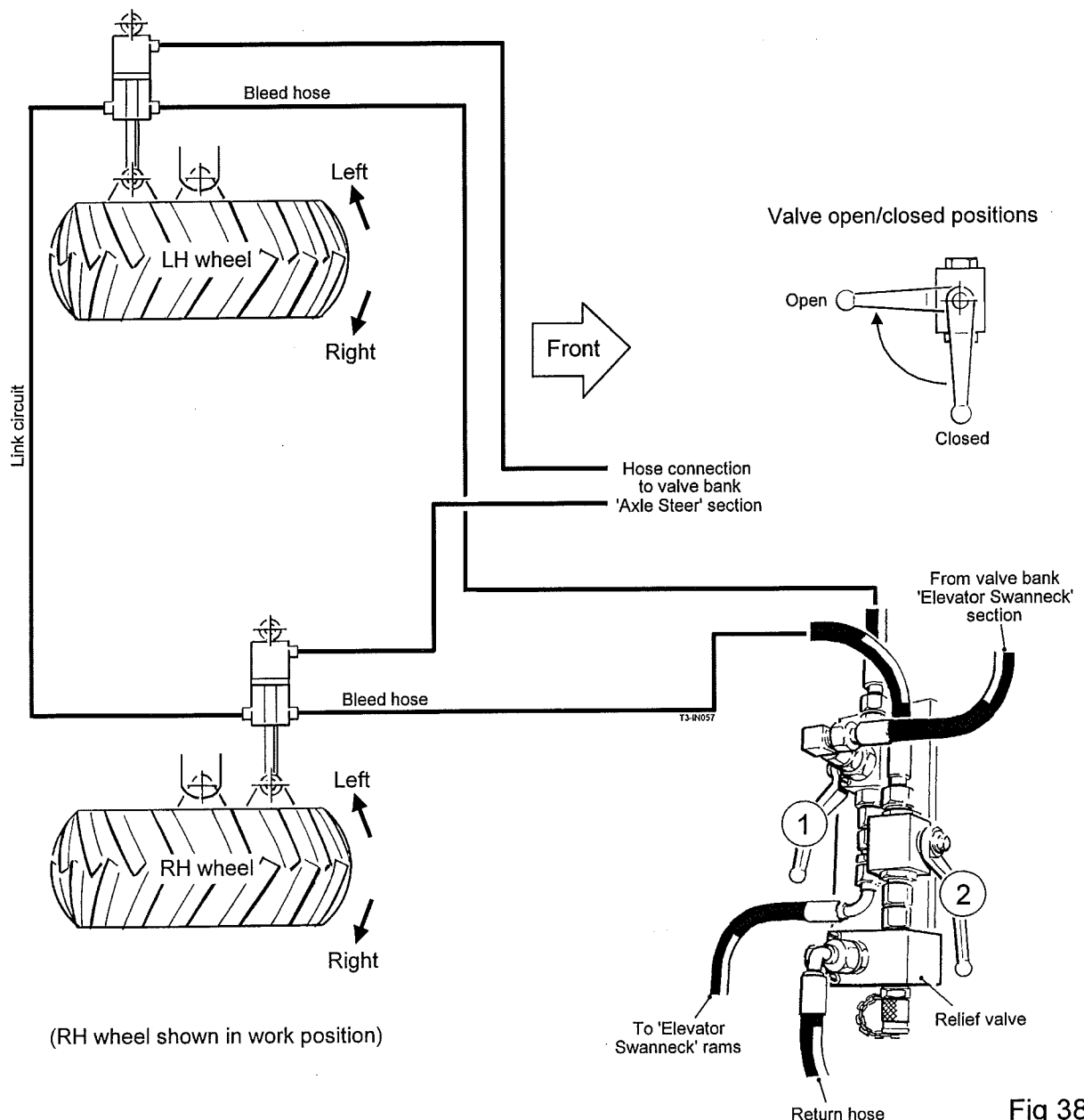


Fig 38

### Rear Axle Self-centring

The rotary sensor (item 3, fig 23) mounted on top of the RH axle king pin, feeds a position signal into the system which is used to bring the harvester wheels back to the straight-ahead position after manoeuvring. The centre position is factory-set, but may need to be adjusted after a period of service. The steering display and centring is controlled by the rotary sensor. The wheel centre position is then registered and set on the Can-bus display screen with centre and dead-band parameters.

### Split Web Drive Sprockets

Split web drive sprockets (item 1, fig 39) on some web drive shafts. The sprockets allow for worn sprockets to be replaced or alternative pitch sprockets to be fitted without dismantling the drive shafts. Most drive sprockets will have been split on initial installation, but if not, they should be split with a hammer and sharp chisel. Before splitting a sprocket on or off the machine, remove the fixing bolts. Keep the split halves of the sprockets in the correct pairs to prevent mis-match when fitting.

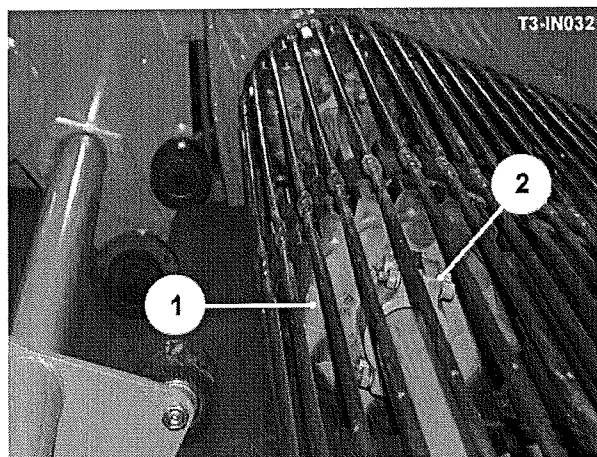


Fig 39

### Maintenance of the Mechanical Drives

Drive chains must be maintained at the correct tension. Maintaining correct tension, alignment and lubrication will ensure the efficient running of the harvester and prolong the life of the drive components. Adjust the chains 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 chain side plates come into contact with the plastic.

The input drive shaft from the tractor PTO should be checked for damage regularly and the inner and outer tubes checked to ensure a free sliding movement. Binding between the input drive shaft components will cause severe end loading on the gearbox input shaft leading to premature failure of the gearbox.

### **Maintenance of the Electrical System**

Trouble shooting of the control system must be carried out by a competent engineer familiar with electrical servicing. Items such as the Can-bus modules, display unit, and the control circuit boards may be damaged if incorrectly connected.



**Before carrying out any welding on the harvester always disconnect the KS1 & KS2 plugs from the bottom of the harvester control module and completely disconnect the harvester from the tractor. Failure to observe the above precautions may cause severe damage to the harvester and tractor electrical systems.**

### **New Machines**

It is important during the first few weeks with a new machine to keep a regular check for any bolts, screws, connections etc. which may work loose during this initial working period.

### **Machine Lubrication**

Regular lubrication will ensure that the Standen T3 provides a long and efficient service life. Depending on soil and weather conditions, the service schedule can vary. It is recommended that the harvester be given a thorough inspection at least weekly during the working season and at this time the machine should be greased and the gearbox oil levels checked. Optional automatic greasing kits can be fitted to the machine and are recommended for machines covering large acreages to reduce maintenance time.

Shafts and bearings fitted with grease nipples should be lubricated using a good quality general purpose grease. Bearings must not be allowed to run dry. When greasing it is better to give a little frequently than a lot a long intervals.

Some of the bearings are sealed and pre-lubricated. Care should be taken not to flood these bearings with grease or the seals may burst allowing grease to escape and dirt to get in. Should this happen, more frequent greasing will be required in order to keep the dirt at bay. When lubricating sealed bearings, only two strokes of the grease gun every twenty acres of work is necessary.

Non-sealed bearings should be greased at least once a day or every ten acres.

When checking the chain and gear drives, proprietary chain lubricant or a smear of grease should be applied to prolong their life.

Gearbox oil levels should be checked occasionally and topped up with EP90 gear oil.

Universal couplings (such as the PTO shaft) should be dismantled periodically and their shafts smeared with grease.

Apply grease to all pivot points, slideways and exposed threads etc. to ensure they operate easily and remain free of corrosion.

**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, and all retaining latches and hinges are in place and operative. 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 for any damaged or broken rollers, web bars or stars etc. Repair or replace as necessary.
4. Check wheel nuts for tightness.
5. Check all scraper clearances and adjust as necessary. Scrapers should be adjusted as close as possible without actually touching.
6. Check all hydraulic cylinders, valves and pipe work for signs of leaks or damage, repair or replace as necessary.
7. Carry out lubrication
8. Grease axle king pins

**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 and rollers for undue wear, and replace as necessary.
3. Check all bearings for lubrication, grease as necessary.
4. Check discs and shares blades for excessive wear, replace if necessary.
5. Check hydraulic and gearbox oil levels.

**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 all webs for damage or wear and repair or replace as necessary.

3. Check stars and replace any worn parts.
4. Check metalwork (e.g. side plates) for any damage or wear and repair or replace as necessary.
5. Replace the pressure and suction filter elements Use only genuine Standen replacement parts.

### **Out of Season Storage**

The machine can frequently operate in soils which contain residual 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 driver's control box is kept in a safe, dry place and available for use at the commencement of work or for any maintenance to be carried out.
9. 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:	11.30 m
Width (in transport):	3.50 m
Height (in transport):	3.80 m

**Machine Weight**

Weight	12.6 tonnes
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**Technical Data**

Tractor power requirement:	180 bhp (minimum)
Tractor hydraulic flow rate:	50 litres/minute (minimum)
Harvester oil reservoir capacity:	750 litres
Electrical requirements:	12V DC negative earth
Tyre size (standard):	700/40-26.5
Tyre pressure:	2.2 bar (32 psi)

**Machine Nut and Bolt Tightening Torques**

Powered axle wheel nuts	427 lb/ft (580Nm)
Cleaner unit roller shaft bolts	22 lb/ft

M6 nyloc zinc plated nut	10 lb/ft
M8 nyloc zinc plated nut	23 lb/ft
M10 nyloc zinc plated nut	44 lb/ft
M12 nyloc zinc plated nut	87 lb/ft
M16 nyloc zinc plated nut	208 lb/ft
M20 nyloc zinc plated nut	380 lb/ft
M24 nyloc zinc plated nut	690 lb/ft

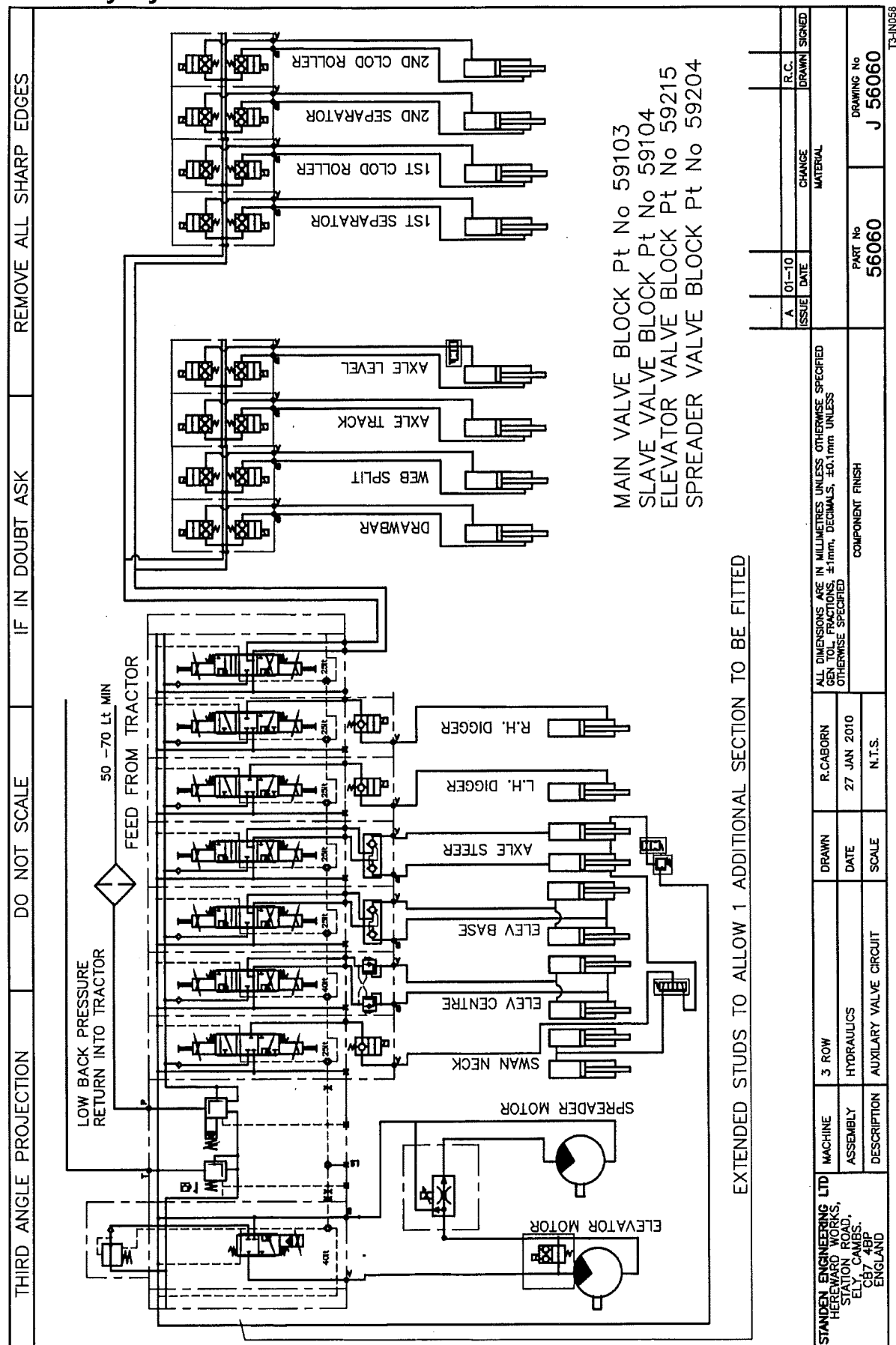
M6 bolt/steel nut	7 lb/ft
M8 bolt/steel nut	19 lb/ft
M10 bolt/steel nut	38 lb/ft
M12 bolt/steel nut	70 lb/ft
M16 bolt/steel nut	170 lb/ft
M20 bolt/steel nut	325 lb/ft
M24 bolt/steel nut	565 lb/ft

Standen Engineering's policy of continual product development means that specifications may be altered without prior notice. All dimensions are approximate.

## **DIAGRAMS**

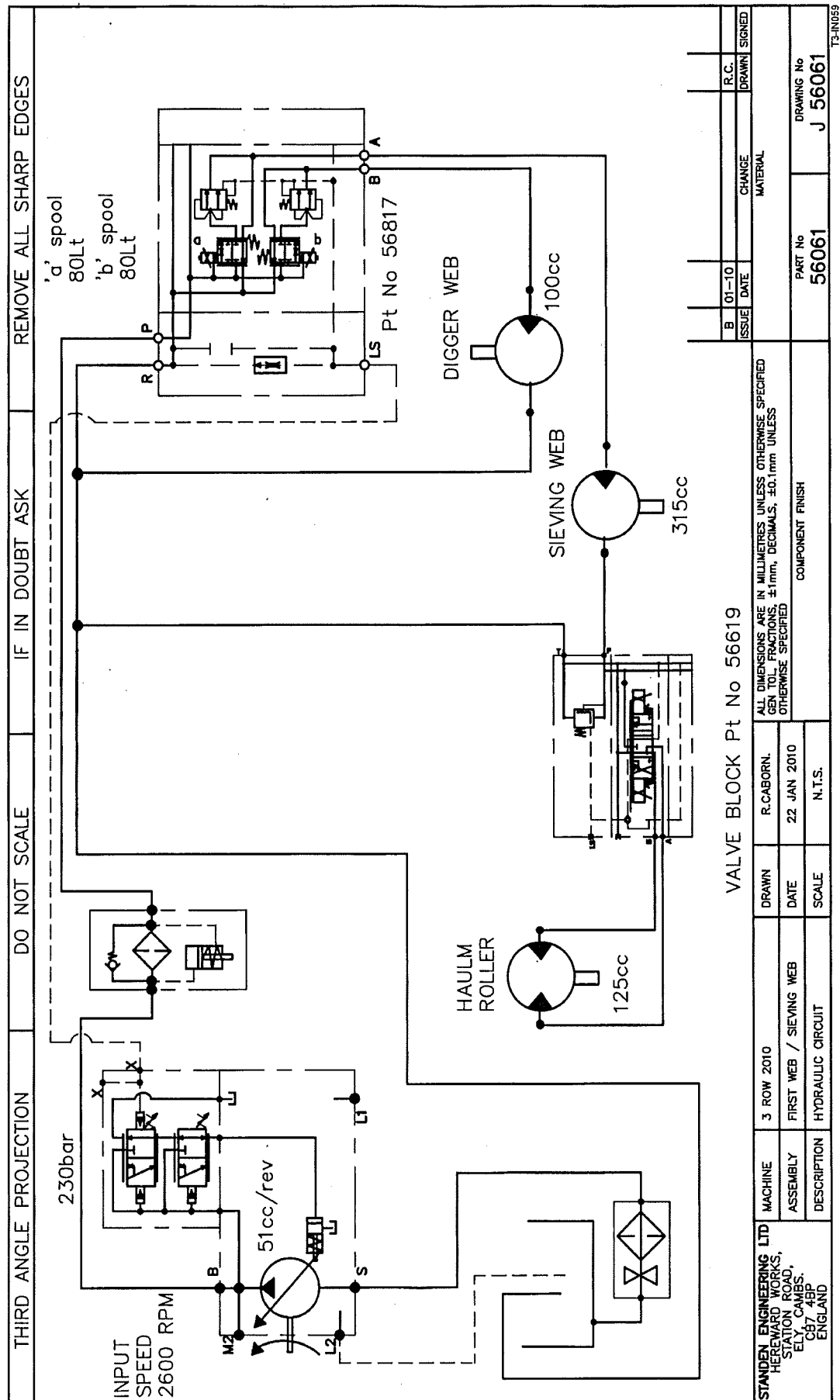
Auxiliary hydraulics	2.1
Digger web, sieving web & haulm roller hydraulics	2.2
2 <sup>nd</sup> Omega separator & powered diablo hydraulics	2.3
1 <sup>st</sup> Omega separator & rotary agitator hydraulics	2.4
Powered axle hydraulics	2.5

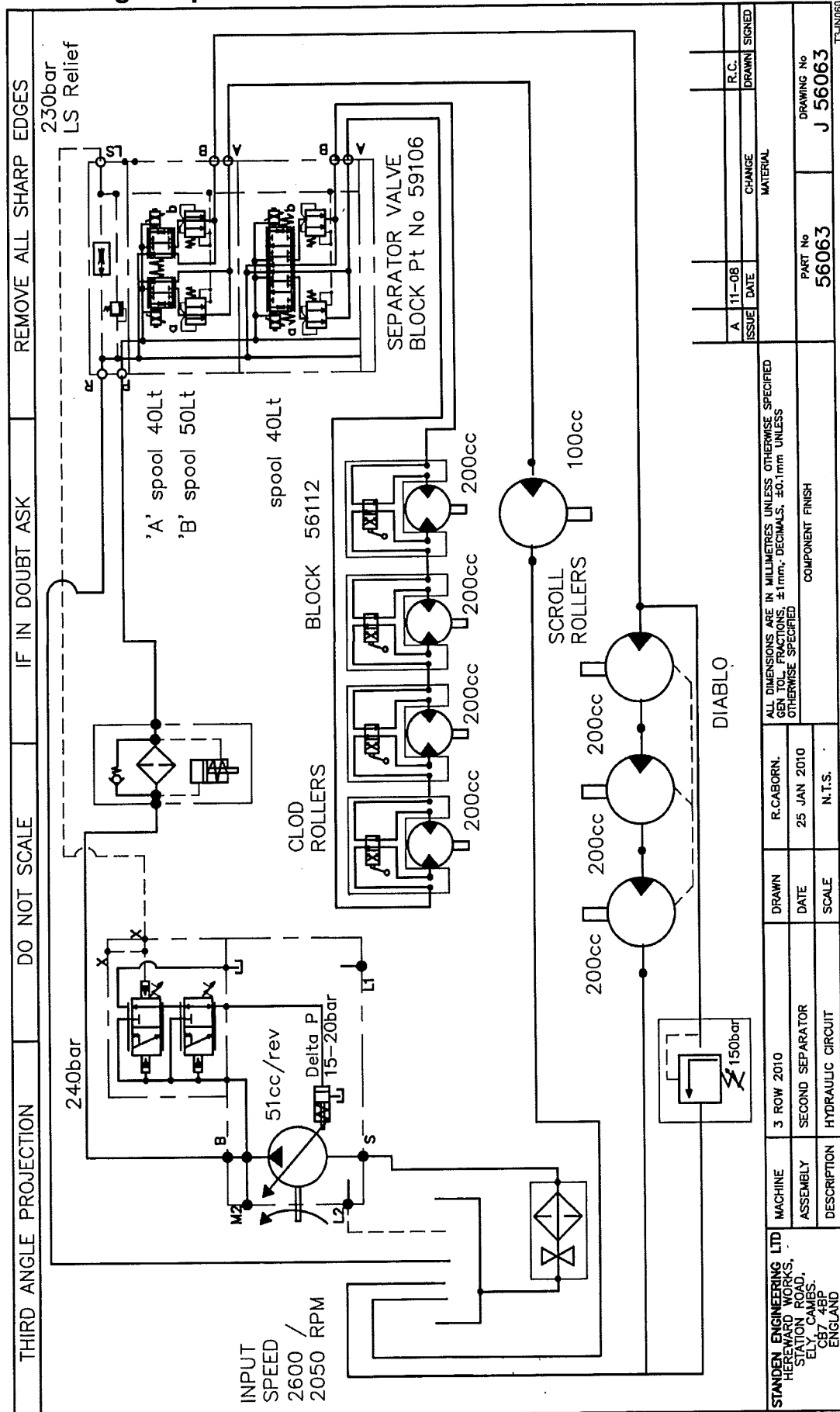
## Auxiliary Hydraulics



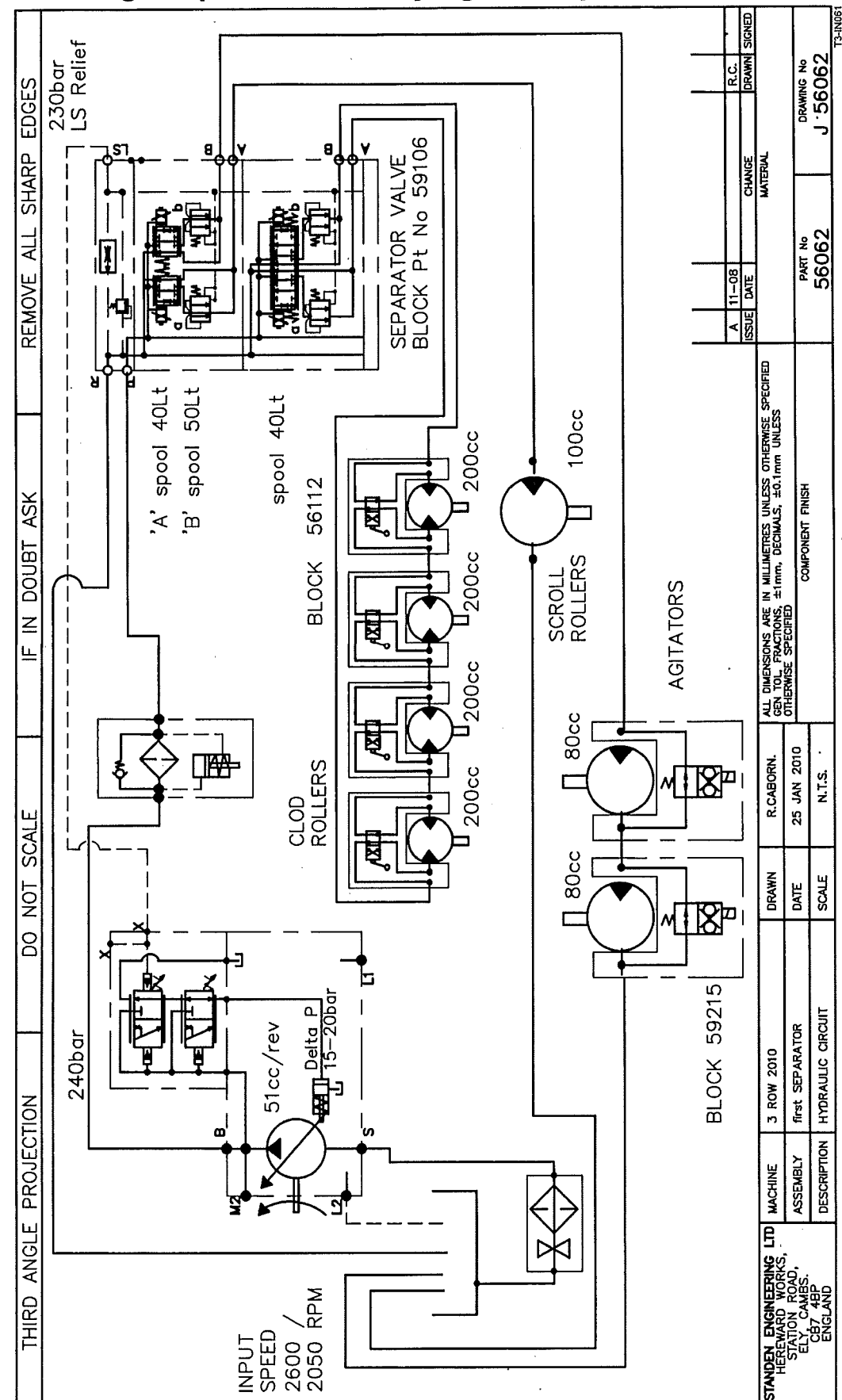


## Digger Web, Sieving & Haulm Roller Hydraulics



2<sup>nd</sup> Omega Separator & Powered Diablo Hydraulics

## 1<sup>st</sup> Omega Separator & Rotary Agitator Hydraulics



## Powered Axle Hydraulics

