



QM

Potato Harvester / Windrower
From Serial No. QM154

Standen Engineering Limited.
Hereward Works,
Station Road, Ely,
Cambridgeshire.
CB7 4BP
England.

EU & UKCA Declaration of Conformity

According to the Machinery Directive 2006 / 42 / EC
& The Supply of Machinery (Safety) Regulations 2008

Manufacturer: Standen Engineering Limited
Station Road, ELY
Cambridgeshire
CB7 4BP England

We declare that the product, described below, meets the requirements of the above mentioned directive and has been assessed against and complies with the essential safety requirements application as specified in the Standards listed here.

Model	Quality Master
Serial No.	QM.....

British Standards used in the implementation of this certificate

BS EN ISO 12100-1
BS EN ISO 12100-2
BS EN ISO 13857

Place of Issue: Standen Engineering Limited, Station Road, Ely,
Cambridgeshire, UK



M R Gammon - Technical Manager
For Standen Engineering Limited

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
Operation	1.3
Transport	1.4
Maintenance	1.4
Safe use of potato harvesters	1.5

INSTALLATION

QM description	1.7
Tractor suitability	1.7
Tractor wheel setting	1.7
Attaching the harvester	1.8
PTO shaft	1.9

OPERATION

Driver control box	1.10
Drawbar	1.12
Depth wheels	1.12
Automatic depth control	1.13
Disc coulters	1.13
Shares	1.14
Anti Roll-back Flaps	1.14
Haulm intake rollers	1.14
Main web	1.15
Rotary agitators	1.16
Sweeping clod fingers	1.16
Clod breaking fingers	1.16
Haulm extraction roller	1.17
Haulm fingers	1.18
Omega separator	1.18
Galaxy star separator	1.19
Star spreader	1.20
Discharge elevator	1.21
Windrow conveyor	1.21
Axle adjustment	1.23
Wheel steering and self-centring	1.24
Machine levelling	1.24
Easi-pic table	1.25
Tractor powered hydraulic circuit	1.26
Open-centre and closed-centre hydraulics	1.26
Windrow conveyor hydraulic circuit	1.27
Omega separator hydraulic circuit	1.27
Electrical control system	1.28

HARVESTING

Starting off your harvester	1.29
Damage prevention	1.29
Getting the best results during harvesting	1.31

MAINTENANCE

Maintenance of the hydraulic systems	1.35
Residual hydraulic pressure dump procedure	1.37
Maintenance of the mechanical drives	1.38
Proximity sensors	1.38
Machine lubrication	1.39
Daily maintenance	1.40
Weekly maintenance	1.40
Annual maintenance	1.40
Out of season storage	1.41

SPECIFICATIONS

Dimensions	1.42
Weight	1.42
Technical data	1.42
Nut and bolt tightening torque	1.42

Introduction to the Handbook

This handbook provides the information for the operation, adjustment and maintenance of your STANDEN QM (Quality Master). 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.

Warranty

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

Replacement Parts

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

The rear 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 QM 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.

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.



When in transport, the discharge elevator must be in the folded transport position.



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

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.



Health and Safety
Executive

Safe use of potato harvesters

HSE information sheet

Agricultural Information Sheet No 13 (Revision 1)

Introduction

This information sheet is aimed at operators of potato harvesters. It describes typical hazards from the use of potato harvesters and gives guidance on how to minimise the risks to operators and others during harvesting work. It does not cover other health or safety issues there might be when grading, handling or stacking potatoes (see 'Further information').

There are particular features of different types of potato harvester, which you should take into account when considering the hazards, risks and precautions. For example manned harvesters, with workers stationed at a picking table, may create risks that are different from unmanned machines. This information sheet covers the typical hazards likely to be found when using most types of manned and unmanned potato harvesters.

Hazards

There have been fatal and serious incidents, including crush injuries, and amputations of arms or legs, from contact with harvesters' moving parts. The greatest risk of injury comes from contact with components and, in particular, from:

- contra-rotating rollers, such as haulm and cleaning rollers;
- conveyors or elevator chains;
- drive mechanisms;
- inadequately guarded power take-off (PTO) shafts.

Other risks created by potato harvesting work include:

- being struck or run over by the harvester or tractors;
- falling from access ladders or work platforms.

Control measures

It is extremely dangerous to carry out any work on a machine while it is under power. The most important safety measure is to follow the 'safe stop' procedure

before carrying out any maintenance or adjustments, including dealing with a blockage or other problem:

- Handbrake on.
- Controls neutral.
- Stop engine.
- Remove key.

There have been many serious and fatal accidents where workers have tried to clear blockages; carry out cleaning; or run the machine with the guards removed; or worked on the machine with the engine running or power engaged. So always follow the safe stop procedure.

Dealing with blockages

- Follow the safe stop procedure before trying to deal with a blockage.
- Never reach into the haulm or cleaning rollers with an arm or leg when the machine is running.
- Follow the instructions for clearing blockages set out in the instruction handbook.
- Remember that avoiding blockages is easier than clearing them.
- Take care when working in difficult harvesting conditions or those with weed or haulm problems – take your time and don't overload the machine.
- Use drive reversing mechanisms when fitted and encourage the use of conveyor controls to optimise picking conditions.

Guarding

- Check that all haulm, clod, stone separator 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.
- Net-type guards for contra-rotating rollers are easily defeated and should not be used. Replace them with securely fixed metal guards.
- The power take-off shaft should be fully enclosed in a guard along its entire length from the tractor power take-off to the power input connection on

the harvester. Other drive shafts should be guarded to the same standard.

- Make sure all guards are in position and correctly fitted before starting work and stop work if any guards become broken or defective.

General guidance on safe working practice

- Make sure everyone working on the harvester understands the safety instructions in the handbook, including the safe way to clean the harvester of haulm, stones, potatoes etc.
- On a manned harvester, there should be a two-way system for communicating between the workers on the picking/sorting platform and the tractor driver. These machines should also be fitted with an audible warning alarm intended to draw the attention of those on the platform to the starting of the moving parts, eg before starting the engine, reversing or engaging drives.
- Machines with a picking/sorting platform require emergency stops accessible from the work position to stop the conveyor to the platform.
- Take particular care when reversing; make sure you can see what is behind the harvester or get help if the view is obscured. People have been killed when they got off a manned harvester or approached a machine on foot and were run over by it.
- Stop the tractor before anyone gets on or off the harvester and do not allow anyone to jump on or off the harvester when it is moving or stationary. Always use the access ladder to mount or dismount from the picking platform and do not climb over the machine.
- Picking/bagging platforms on manned harvesters require guard rails to prevent people falling off the machine.
- Take advantage of relevant training/courses provided by manufacturers/dealers. They will help to ensure the safe and efficient use of your potato harvester.
- Workers on a manned harvester will also require training. Don't forget the training needs of any temporary or casual staff.

Maintenance

- Do not run the harvester with the guards raised or removed for maintenance or cleaning purposes.
- Always use some form of mechanical support when working below any raised components, eg if working under box handling attachments, use the supports provided.

- Remember that putting the power take-off (PTO) out of gear will not cut the power to some hydraulically driven components.
- Avoid parking the harvester or carrying out maintenance on it when under or near overhead electricity power lines.

Further reading

Power take-offs and power take-off drive shafts Leaflet AS24(rev1) HSE Books 2009 www.hse.gov.uk/pubns/as24.htm

Tractor action: A step-by-step guide to using tractors safely Leaflet INDG185(rev2) HSE Books 2009 www.hse.gov.uk/pubns/indg185.htm

Working safely with agricultural machinery Leaflet INDG241(rev1) HSE Books 2012 www.hse.gov.uk/pubns/indg241.htm

Further information

Potato Council Safe Potato Operations DVD (copies can be ordered from the British Potato Council website at www.potato.org.uk).

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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QM Description

The QM is a tractor-drawn 2-row harvester designed to harvest potatoes, clean, elevate, and load them into a trailer running alongside. The basic machine is built with a digging width of 1460mm, and direct loads the crop with no manning on the machine. Optionally, a manned picking table can be fitted. The QM can also be built as a windrower to discharge the crop onto either the adjacent un-harvested bed or one bed further over.



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

Power requirement for the QM is 65hp (minimum) when fitted with Galaxy separator and 100hp (minimum) when fitted with Omega separator.

The harvester is designed to be towed from the pick-up hitch hook of the tractor. The machine 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 12 volt D.C. negative earth power supply rated at 50 amps to feed the electrical control system. A control box is 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.

Tractor Wheel Setting

Both the front and rear wheels of the tractor must be set to straddle the bed to be lifted. 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, fig. 1) should be adjusted accordingly to compensate. To adjust the eye position, remove the bolts (item 2, fig. 1) and move the eye to the required position. 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, fig. 1), rotating the stand and then re-securing with the pin.

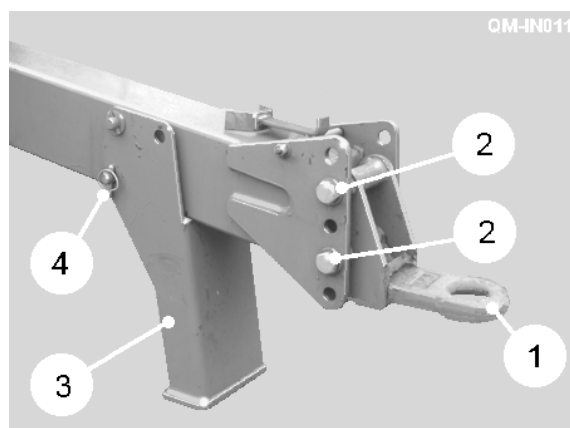


Fig. 1

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 control box securely inside the tractor in a position where it is 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 (+). Connect the harvester control harness plug to the socket on the tractor harness, ensuring that the harness is safely routed. Connect the lighting plug to the tractor lighting socket.

PTO Shaft

The harvester is designed to operate with a PTO drive having a maximum speed of 540 rpm. An overload clutch is fitted to one end of the PTO shaft and this must be connected to the machine.

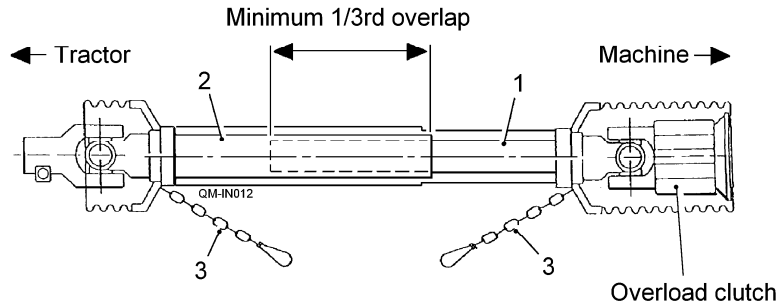


Fig. 2



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 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.

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 1/3rd 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.

Driver Control Box

The control box switches and buttons operate the various hydraulic and electrical functions of the harvester. Depending on machine build, the control box fascia may differ from the one shown.

The buttons (item 1 & 2, fig. 3) turn the control box ON and OFF. The adjacent LED will illuminate when the box is switched ON.



When the machine is being towed along public roads, the control box must be switched OFF to avoid any risk of switches being accidentally activated.

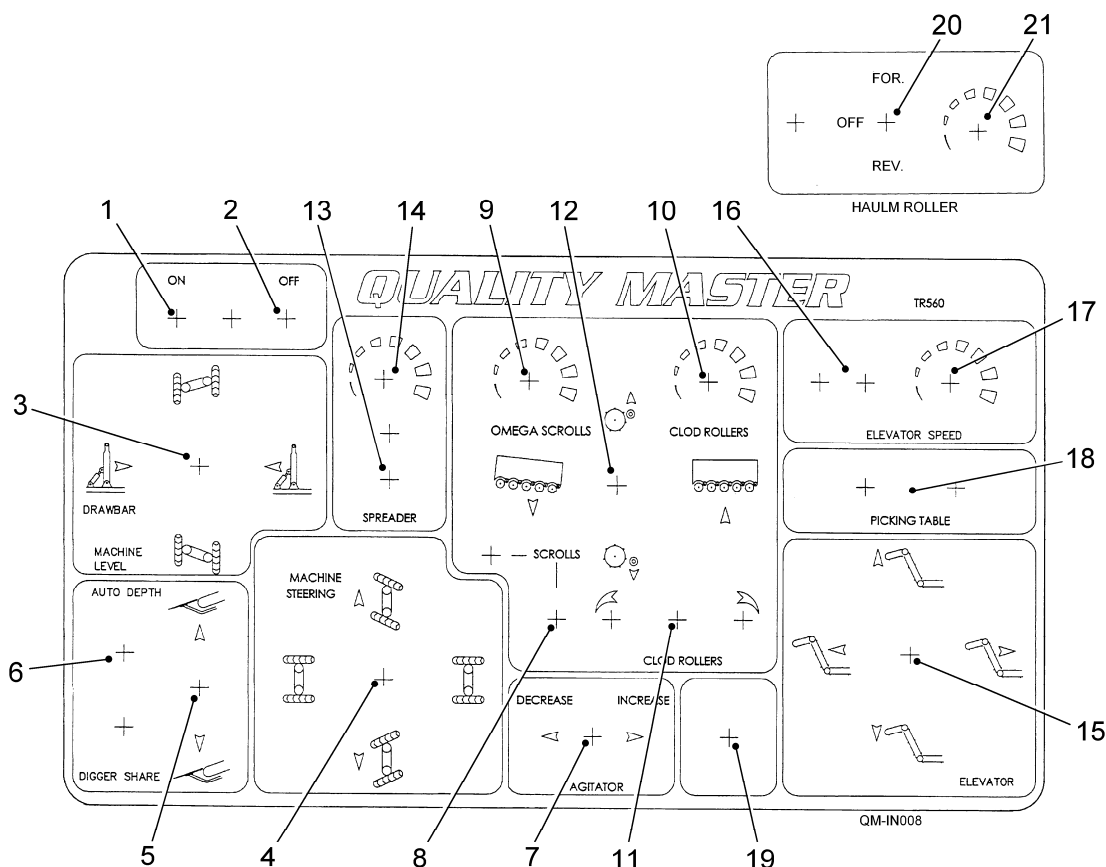


Fig. 3

The joystick (item 3, fig. 3) controls the drawbar ram and machine levelling ram. The drawbar ram moves the front of the harvester to the left / right in relation to the tractor. The levelling ram raises / lowers the RH side of the machine.

The joystick (item 4, fig. 3) controls the wheel steering left / right and self-centring circuit. The angle of the wheels is displayed by the steering indicator (see fig 21). To centre the wheels automatically, move and hold the joystick forward or backward (indicated by the symbols) until the wheels have returned to the centre (straight ahead) position.

The switch (item 5, fig. 3) raises / lowers the digger shares in and out of work. The switch (item 6, fig. 3) turns the automatic depth control ON / OFF.

The switch (item 7, fig. 3) is supplied when optional electric pitch adjustment is fitted to the main web agitators. The pitch adjustment raises / lowers the web relative to the agitators, thus controlling the amount of agitation applied to the main web.

The button (item 8, fig. 3) turns the Omega Separator unit ON / OFF. The dial (item 9, fig. 3) controls the speed of the scrolls, and the dial (item 10, fig. 3) controls the speed of the clod rollers. The switch (item 11, fig. 3) reverses the clod rollers, and the switch (item 12, fig. 3) increases / decreases the angle of the Omega Separator unit.

The switch (item 13, fig. 3) turns the star spreader unit ON / OFF. The dial (item 14, fig. 3) controls the speed of the spreader stars.

The joystick (item 15, fig. 3) controls the discharge elevator bottom section fold in / fold out function, and the top section (swan neck) raise / lower function.

The button (item 16, fig. 3) turns the discharge elevator web drive ON / OFF. The dial (item 17, fig. 3) controls the speed of the discharge web.

The switch (item 18, fig. 3) turns the picking table unit ON / OFF.

The communication buzzer (item 19, fig. 3) can be sounded by the operatives when a picking table unit is fitted to attract the drivers attention.

The switch (item 20, fig. 3) on top of the control box is supplied when a hydraulically driven haulm extraction roller is fitted. The switch sets the haulm roller to FORWARD / OFF / REVERSE. The dial (item 21, fig. 3) controls the speed of the haulm roller.

Drawbar

The steerable 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 main web is retained in the raised position by transport chains. Before attempting to operate the digger assembly the transport chains (item 1, fig. 4) will need to be unhooked from the chassis and placed on the stowage hook (item 2, fig. 4).

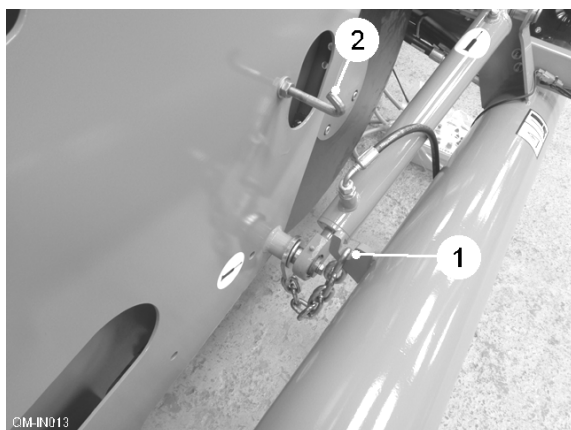


Fig. 4

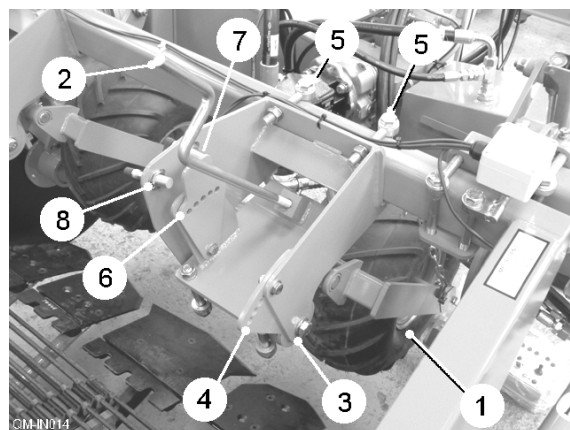


Fig. 5

Depth Wheels

The depth wheels (item 1, fig. 5) running on each ridge control the share depth. Their setting is very important to the effective operation of the harvester. The handle (item 2, fig. 5) sets the working depth of the wheels. Turning the handle clockwise decreases the digging depth, turning the handle anticlockwise increases the digging depth.

The wheels are mounted on rubber torsion springs (item 3, fig. 5) 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 repositioning the pressure-setting quadrant (item 4, fig. 5), weight can be removed from the depth wheel, or extra pressure can be added to the wheel.

Row width settings are adjusted by loosening the clamp bolts (item 5, fig. 5), 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.

Automatic Depth Control

The AUTO DEPTH function, when activated, automatically lowers the digger until the depth wheels rest on the ridge. As the ridge height changes, the edges of the target plate (item 6, fig. 5) rotate in front of the proximity sensors (item 7 & 8, fig. 5) which then actuate the LH and RH depth rams independently to maintain the correct digging depth in each row.

Initial depth setting should be made with the machine on a firm level surface. Place a 10" (250mm) spacer block under each depth wheel and lower the digger until the shares touch the ground. In this position, adjust the target plate Item 6, fig. 5) to be central between the proximity sensors (item 7 & 8, fig. 5). To allow for a dead-band zone, the sensors are each mounted in a slot. To increase the dead-band, move the sensor away from the edge of the trigger plate. When triggered, a light will appear on the sensor body. A dead-band zone must always exist where the depth roller is able to rise and fall slightly without triggering the depth rams.

Disc Coulters

On row work, the harvester is fitted with four disc coulters (item 1, fig. 6). 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. 6) 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, on the outer discs turn the adjuster handle (item 3, fig. 6) which also increases the spring load on the disc. On the inner discs, loosen the clamp plate and raise/lower the complete disc unit. The disc coulters are each fitted with a scraper (item 4, fig. 6). This should be set as close to the disc as possible without fouling it.

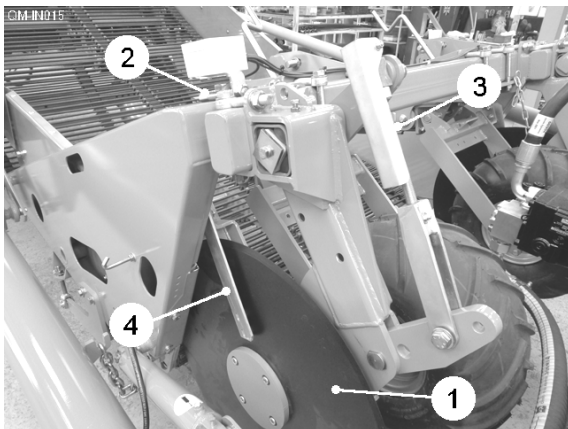


Fig. 6

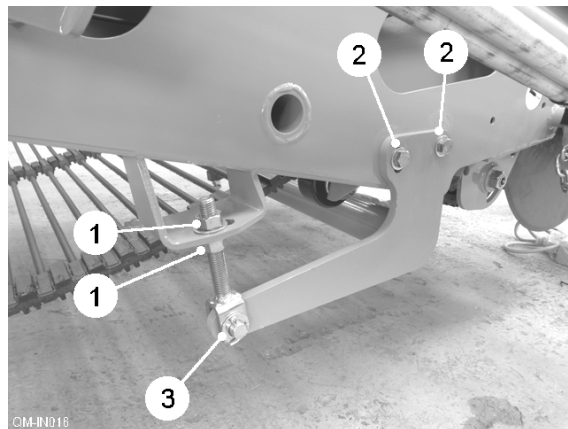


Fig. 7

Shares

To adjust the angle of the shares loosen the locknuts (item 1, fig. 7) on both sides of the machine, slacken mounting bolts (item 2, fig. 7) and re-position adjuster (item 3, fig. 7). 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 practicable 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.

Anti Roll-back Flaps (optional)

The anti roll-back flaps (item 1, fig. 8) prevent the crop from rolling out of the front of the main web between the discs coulters and the web sides.

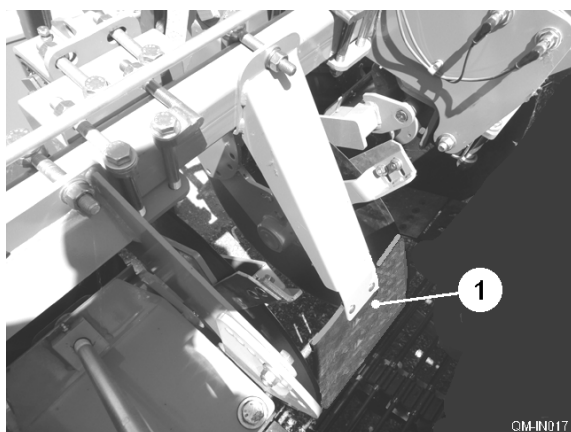


Fig. 8

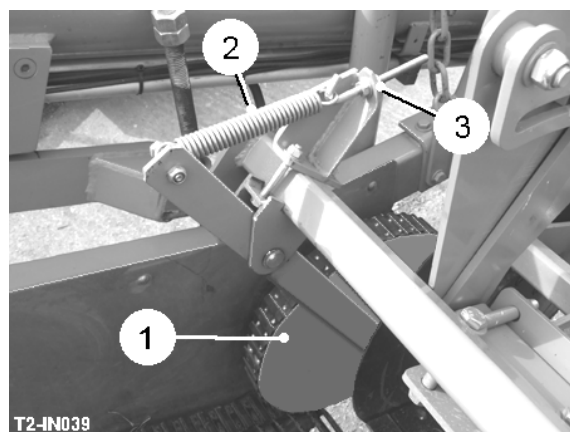


Fig. 9

Haulm Intake Rollers (optional)

Haulm intake rollers (item 1, fig. 8) may be fitted in place of anti roll-back flaps. The haulm intake rollers draw in loose haulm and trash from the sides of the ridges and feed it onto the main web, thus preventing it from building up on the leading edges of the web sides or between the centre disc coulters. The rollers also prevent the crop from rolling out of the front of the main 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. Each haulm roller is fitted with a tension spring (item 2, fig. 8) tensioned by an adjuster (item 3, fig. 8). Adjust the tension to give a positive drive on the web bars.

Main Web

The main web is available in 28mm, 32mm, 35mm, 40mm, 45mm and 50mm pitches. The speed of the main web can be altered by changing the gearbox sprocket (item 1, fig. 10). The standard 24 tooth sprocket can be replaced with an 18 tooth sprocket to give 75% web speed, or a 16 tooth sprocket to give 66% web speed. The alternative sprockets are supplied with the machine.

To change the sprocket:

1. Remove the gearbox chain guard (item 2, fig. 10).
2. Loosen the gearbox mounting bolts x4 (item 3, fig. 10).
3. Loosen the chain tensioner screws x2 (item 4, fig. 10).
4. Remove the sprocket retaining screw and washer (item 5, fig. 10) and slide the sprocket from the shaft.
5. Fit the new sprocket and replace the retaining screw and washer (item 5, fig. 10).
5. Refit the drive chain.
6. Tension the chain by adjusting the screws (item 4, fig. 10). Ensure the sprockets run parallel to each other.
7. Retighten the gearbox mounting bolts (item 2, fig. 10).
8. Finally, refit the drive guard (item 2, fig. 10).

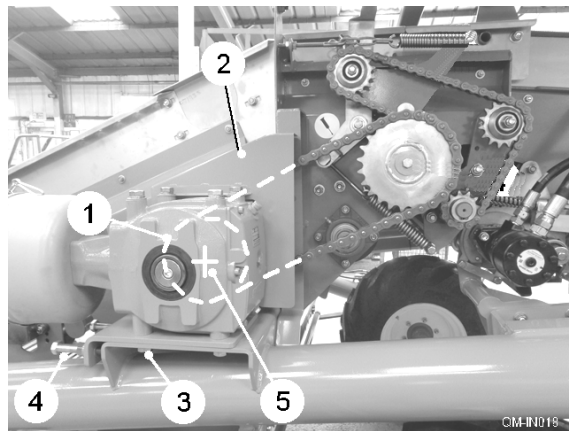


Fig. 10

Rotary Agitators

A chain-driven agitator shaft (Item 1, fig. 11) is fitted inside the main web. The amount of agitation imparted to the crop is controlled by the support roller shaft (item 2, fig. 11). Raising the support roller shaft will lift the web away from the agitator. Lowering the shaft will lower the web onto the agitator. The higher the web is lifted, the less effect the agitator will have on the crop flow. The shaft is raised / lowered by changing the hole position in the adjuster strap. An optional electric actuator (item 3, fig. 11) can be fitted in place of the strap. 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.



Fig. 11

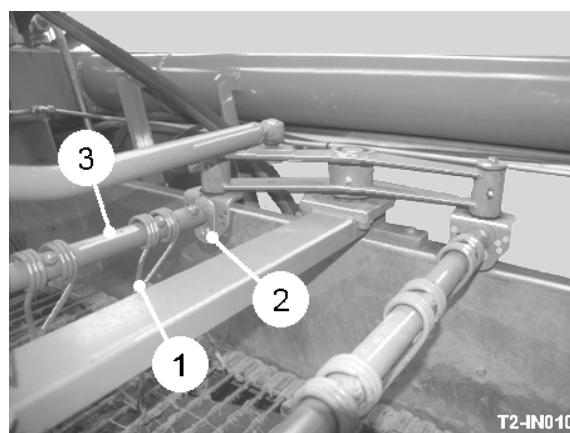


Fig. 12

Sweeping Clod Fingers (optional)

The sweeping clod fingers are designed to spread the ridge to the full width of the main web, so maximising the area used for soil separation, and to break up the ridge when the soil is solid and start to separate the potatoes from the soil.

To set the height of the fingers (item 1, fig. 12) above the web, remove the clamp bolts (item 2, fig. 12) and rotate the mounting bar (item 3, fig. 12) 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.

Clod Blocks (optional)

The trailing rubber blocks mounted above the main web 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 blocks can be raised above or lowered down onto the web. Care should be taken not to set the blocks to operate too rigidly onto the web or bruising and skin scuffing may occur.

Haulm Extraction Roller

The rubber covered haulm roller (item 1, fig. 13) is positioned immediately behind the main web. The roller is chain driven from the main web drive and contra-rotates against the web to form a pinch point to extract the haulm. The roller is held in position against the web by spring pressure and the gap between the web and roller can be adjusted. A wider setting is likely to take out small potatoes. The optimum setting is to have the haulm roller running just clear of the web bars so as to prevent vibration and give maximum grip to extract the haulm.

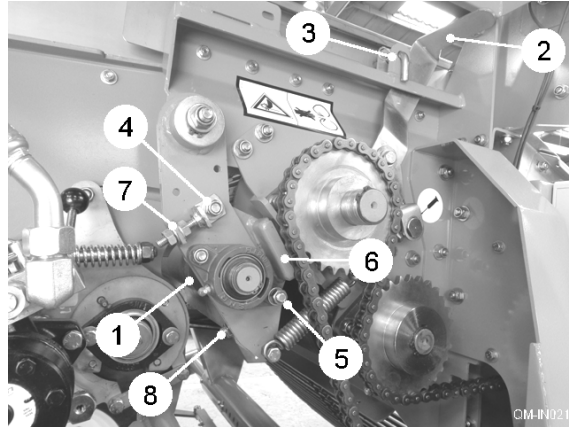


Fig. 13

The handles (item 2, fig. 13) are used to release the spring tension if a blockage occurs and before carrying out any adjustments to the roller setting. The handles are operated by pulling back so the retaining pin (item 3, fig. 13) can be removed, then carefully allowing the handle to travel forward, thus releasing the spring tension. Always reset the handles before commencing work.



The handles (item 2, fig. 13) have considerable spring pressure acting on them. Operate with care.

To adjust the gap, using the handle release the spring tension and slacken the bolts (item 4 & 5, fig. 13) locking the bump stop mounting (item 6, fig. 13). Adjust the setscrew (item 7, fig. 13) in or out to achieve the desired new position. Repeat on the opposite side of the machine. Make sure that both ends of the roller are set to the same position to keep the roller parallel to the web. Finally, retighten all nuts and bolts and reset the spring tensioner handles (item 2, fig. 13).



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.

The haulm extraction roller is fitted with a scraper (item 8, fig. 13) which should be closely adjusted to remove loose soil from the roller.

Haulm Fingers

A row of haulm fingers (item 1, fig. 14) are mounted above the haulm extraction roller to assist in guiding the haulm into the extraction point. The finger assembly is adjustable for angle by moving the lever (item 2, fig. 14) on the LH side of the machine. When the lever is in the forward position the haulm fingers are out of work. Moving the lever rearwards lowers the fingers towards the crop and haulm passing over the web. Adjustment should be made such that the fingers are lowered sufficiently to guide the haulm without interfering with the crop passing by them.

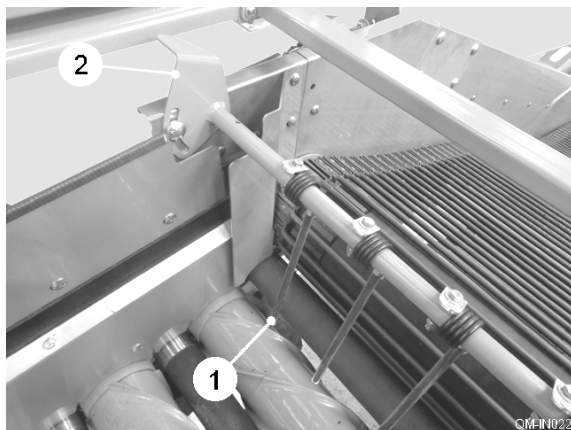


Fig. 14

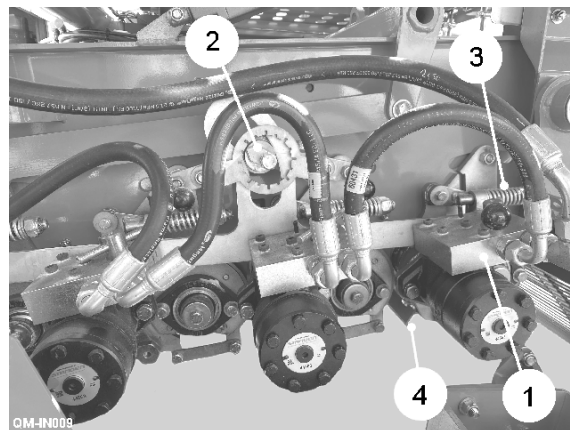


Fig. 15

Omega Separator (optional)

The Omega Separator is positioned immediately behind the haulm extraction roller. The Omega unit consists of five scroll rollers and four clod rollers each driven by a hydraulic motor. Manual reversing valves (item 1, fig. 15) are fitted to 3 of the 4 clod rollers so that the rotation direction of the clod rollers can be set independently.



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

The height of the scroll roller tips can be specified as 10mm (standard) or 6mm for a less aggressive action. The clod rollers can be either rubber, mild steel or stainless steel, and are available in different diameters. Stainless steel is the least aggressive due to the smooth, shiny surface, while rubber 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.

The relative height of the clod rollers to the scrolls is set via the control box. Raising the height of the clod roller introduces a larger ripple 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.

For effective haulm removal, the clod rollers will normally be adjusted to run approximately 1 to 2mm away from the tip of the scrolls. The gap is set by rotating the cam (item 2, fig. 15) on each side of the unit. Clod roller spring tension is adjusted on the spring rod nuts (item 3, fig. 15). All adjustments must be made evenly on both sides.

Each clod roller is fitted with a scraper (item 4, fig. 15) which needs to be closely adjusted to remove loose soil from the rollers.

To achieve a steady crop flow over the unit, the angle of the Omega can be adjusted via the control box. A shallow angle will tend to slow the crop flow over the unit, while a steeper angle will encourage the crop to move faster.

Galaxy Star Separator (optional)

The Galaxy Star Separator is positioned immediately behind the haulm extraction roller. The unit is a stone and clod separator consisting of six rows of 14 finger polyurethane stars and three contra-rotating steel clod rollers. The unit is mechanically driven from the digger web drive. To accommodate varying soil and crop conditions, and alternative clod roller shapes, the gap between the clod rollers and the stars can be adjusted.



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

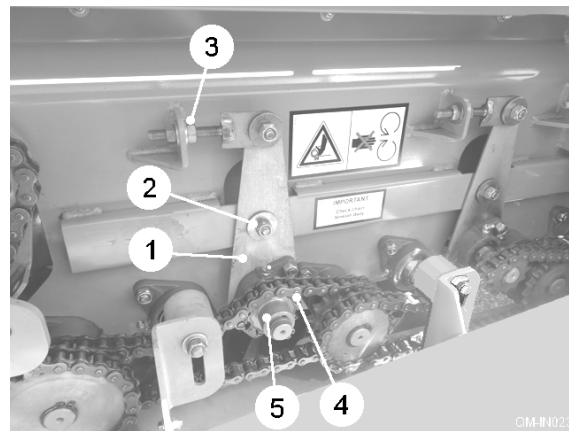


Fig. 16

The clod rollers are independently adjustable on their mounting arms (item 1, fig. 16). To adjust, slacken the bolts (item 2, fig. 16) (one each side) locking the arms to the side panels, and turn the lock nuts (item 3, fig. 16) to reposition the clod roller. It is important that the clod roller adjustment is carried out so that both ends of the roller are parallel to the star shaft. Finally, retighten all nuts and bolts.

Scrapers are fitted under each clod roller. These should be adjusted to be as close as possible to the roller without actually touching it.

If crop loss is being experienced, or if the flow over the first part of the Galaxy is being held up, then it is advisable to reverse the direction of the first clod roller. This is done by re-routing the drive chain (item 4, fig. 16) to drive the clod roller sprocket (item 5, fig. 16) from above (as shown). The clod roller will then run in the same direction as the stars. When a clod roller has been reversed, its scraper should be turned over to allow clear passage of soil etc.

As a guide, the square clod roller is the norm and contends with most conditions, whether driven in the normal direction of travel or in reverse. The need to change rollers comes when working in small crops, where there is a degree of crop loss as the clod roller operates. If crop is being lost at this point, then alternative shaped clod rollers can be fitted. If a small amount of loss is being experienced, then change to the hexagonal roller. If the loss continues or is severe, then change to the round roller. The change of shape reduces the gap to the star shaft.

Star Spreader (not used with Easi-pic)

The star spreader unit (item 1, fig. 17) distributes the crop evenly over the width of the discharge elevator or windrow conveyor. On machines with Galaxy separator the spreader is chain driven from the Galaxy unit. On machines with Omega separator the spreader is hydraulically driven from the separator hydraulic valve. ON/OFF and speed control are provided from the control box.

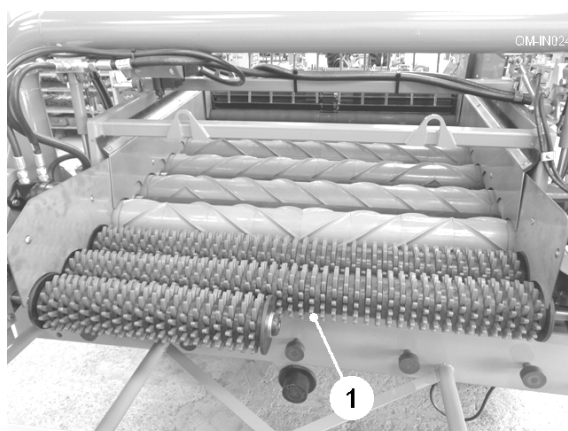


Fig. 17

Discharge Elevator

The 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.

Folding and unfolding of the centre and top sections is controlled by the joystick on the control box. Fold in and fold out of the centre section is primarily used to set the working height and reach. Raise and lower of the top section adjusts the discharge height of the crop into the trailer and allows for even loading.

Elevator ON/OFF and speed control can be adjusted from the control box. Adjust the speed according to the volume of crop being handled. Excess speed will throw the crop too hard into the trailer.

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.

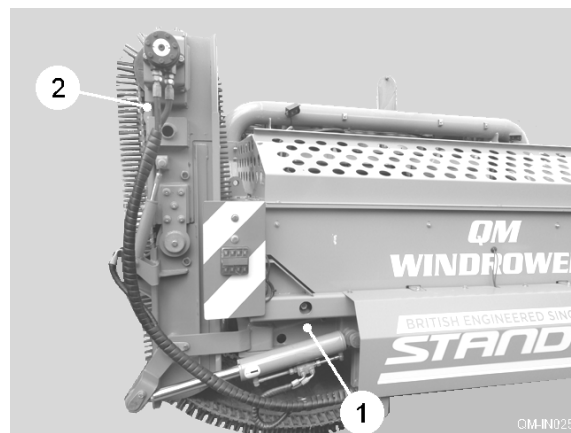


Fig. 18

Windrow Conveyor

The windrow conveyor (item 1, fig. 18) is fitted in place of the discharge elevator. The conveyor is designed to fold within the width of the machine for transport and to open out to discharge onto either the adjacent un-harvested bed or one bed further over.

To unfold the conveyor:

The conveyor will only fold or unfold with the CROSS CONVEYOR POSITION switch (item 1, fig. 18a) in the TRANSPORT position.



When folding / unfolding, both the left and right hand sections of the conveyor operate at the same time. Ensure everyone in the vicinity is aware of your intentions.

Operate the TRANSPORT FOLD switch (item 2, fig. 18a) to lower the conveyor. Once fully lowered, the CROSS CONVEYOR POSITION switch (item 1, fig. 18a) must be set to WORK position, disabling the fold/unfold function and enabling all other cross conveyor functions.

The whole conveyor can be moved to the left or right by 1200mm using the CONVEYOR SIDESHIFT switch (item 3, fig. 18a).

The discharge direction is selected by the CROSS CONVEYOR DRIVE switch (item 4, fig. 18a) and speed is controlled by the dial (item 5, fig. 18a). Adjust the speed according to the volume of crop being handled.

To reduce the drop height of the crop, the conveyor end sections (item 2, fig. 18) can be lowered using the switches (item 6, fig. 18a) marked CROSS CONVEYOR END ANGLE.

To fold the conveyor:

Raise the end sections (item 2, fig. 18) to horizontal and then side-shift the conveyor until approximately in the centre. Press and hold the CONVEYOR CENTRE button (item 7, fig. 18a) to fully centralise the conveyor.

Once fully centred, set the CROSS CONVEYOR POSITION switch (item 1, fig. 18a) to TRANSPORT and fold up the conveyor using the TRANSPORT FOLD switch (item 2, fig. 18a).



Always ensure the conveyor is fully centred before operating the TRANSPORT FOLD function. Failure to do so will cause serious damage to the machine.

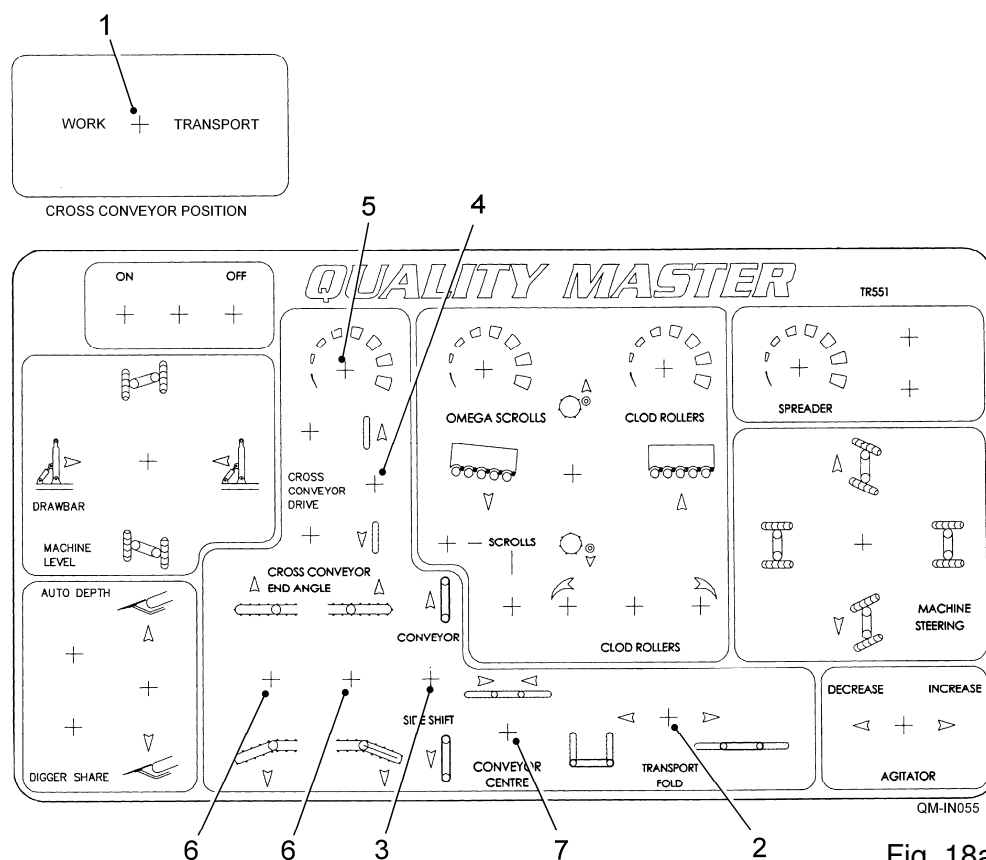


Fig. 18a

Axle Adjustment

The harvester wheels will need to be set to match the row widths being lifted.



Before commencing axle adjustments, ensure adequate jacks and axle stands of 2500 kg capacity are available, along with wheel chocks. It is important that the machine is correctly fitted to the tractor and that the tractor handbrake is applied whilst axle adjustments are carried out.

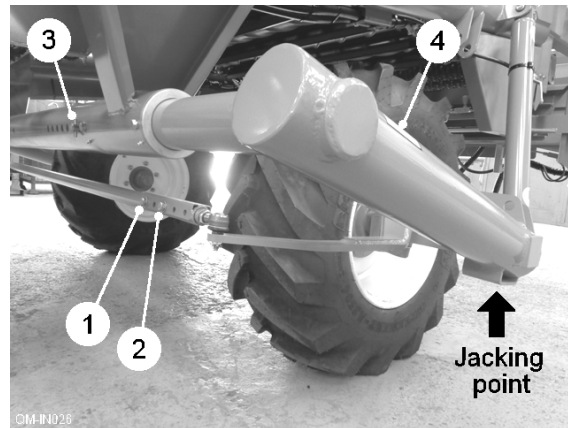


Fig. 19

1. Place chocks at the front and rear of the opposite wheel to the one being adjusted.
2. Jack up the machine using the jacking point situated under the axle (see fig. 19).
3. Place an axle stand under a suitable point on the main chassis and lower the jack to allow the axle stand to take the weight of the machine.
4. Remove the track rod bolts (item 1 & 2, fig. 19).
5. Remove the axle beam pin (item 3, fig. 19).
6. Slide the axle (item 4, fig. 19) to the new position.
7. Replace the axle beam pin (item 3, fig. 19).
8. Repeat the operation for the opposite wheel.
9. Reassemble the track rod until there is approximately 25mm toe in at the front of the wheels when they are in the straight ahead position.
10. Finally, replace and tighten the track rod bolts (item 1 & 2, fig. 19).

Even though the RH wheel runs on cleared ground, both axles must be set correctly. If, after having set the wheels to the required row widths, the LH wheel is found to damage the edge of the row, it may be advisable to move the wheel in by one hole. For narrow settings, or for any special conditions which may be encountered, additional hole settings are available (see fig. 20).

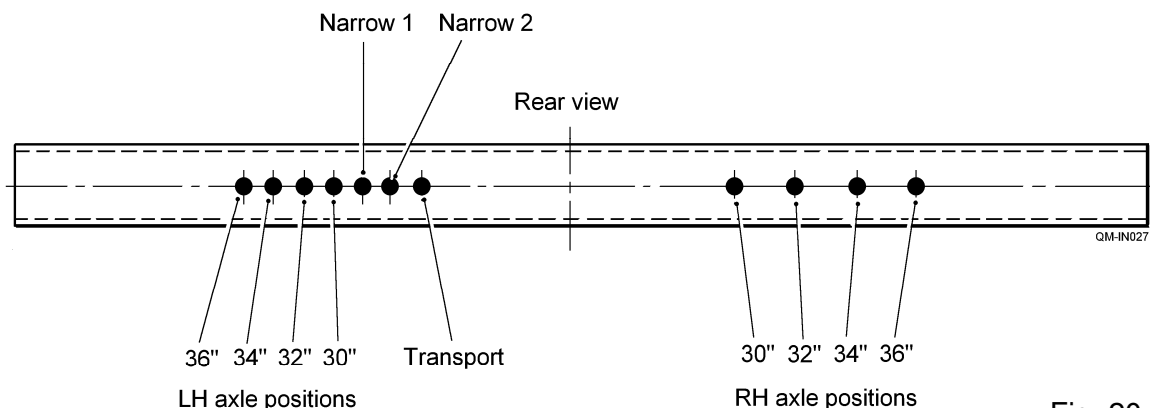


Fig. 20

Wheel Steering and Self-centring



Only operate the steering while the machine is moving, otherwise components may be damaged.

Wheel steering is controlled from the control box. Use the steering to keep the machine correctly in the rows, especially on slopes. If the LH wheel is allowed to run on or against the next ridge, the soil may become compressed, making the crop difficult to separate. Also, potatoes may be damaged. A steering indicator (item 1, fig. 21) is fitted to show the attitude of the wheels. To centre the wheels automatically, move and hold the joystick forward or backward (indicated by the symbols).

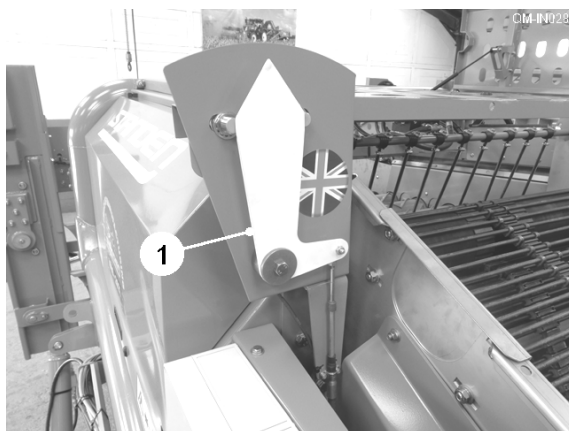


Fig. 21

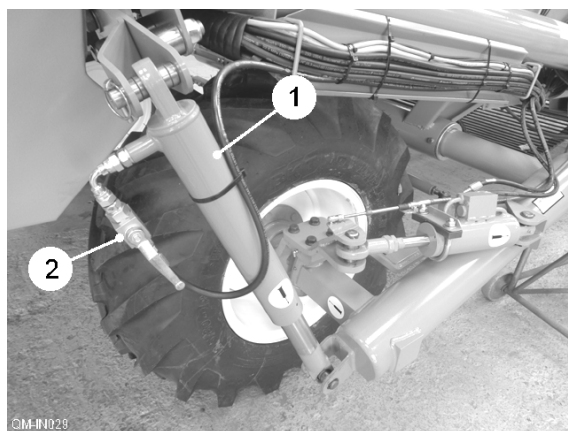


Fig. 22

Machine Levelling

The RH axle beam is connected to the chassis by the hydraulic ram (item 1, fig. 22). Extending the ram will raise the chassis on that side while closing the ram will lower the chassis. Levelling is controlled from the control box. Ensure the transport lock valve(s) (item 2, fig. 22) are in the open position for work. Use the levelling when working on slopes. This will ensure an even spread of crop across the full width of the machine, thus making maximum use of the separation area. An optional electronic level sensor can be fitted to give automatic levelling control.



Always close the transport lock valve(s) (item 2, fig. 21) when transporting the machine on the road.

Easi-pic Table (optional)

A 2-man or a 4-man Easi-pic table can be fitted to the rear of the harvester. The speed of the picking belt is controlled by a flow control valve (item 1, fig. 23) mounted on the RH side of the unit. The knob on top of the valve controls the speed, a higher number giving a higher speed. Emergency stop buttons are fitted above the picking belt which, when pressed, shut down all hydraulic drives and electrical controls. Communication buzzer buttons are also fitted. A system of communication between the tractor driver and the pickers should be adopted to prevent any misunderstanding of signals.



The emergency stop button does not isolate any mechanically driven components.

If the emergency stop button is tripped, the button must be reset before the in-cab box will latch on.

During transport, the 4-man Easi-pic platforms on either side of the unit should be slid inboard to reduce the width of the machine and to aid manoeuvring.

To achieve this :

1. Remove the clip pins (item 1, 2 & 3, fig. 24).
2. Lower the front and rear rails (item 4, fig. 24) down flat onto the platform base.
3. Remove the platform locking pins x2 (item 5, fig. 24).
4. Slide the platform (item 6, fig. 24) fully inwards to the transport position.
5. Refit the platform locking pin (item 5, fig. 24) and resecure with the 'R' clip.



Always secure the platforms in the transport position before taking the machine on the road.

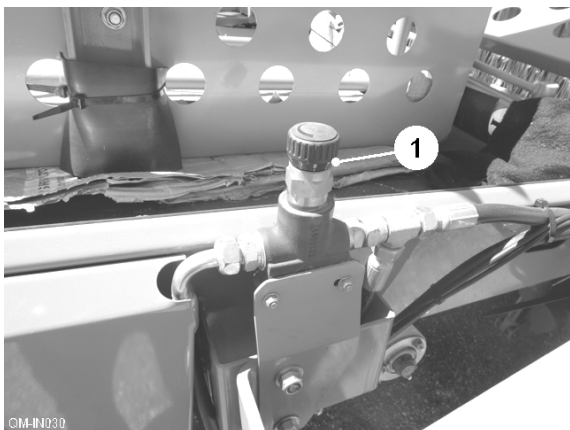


Fig. 23

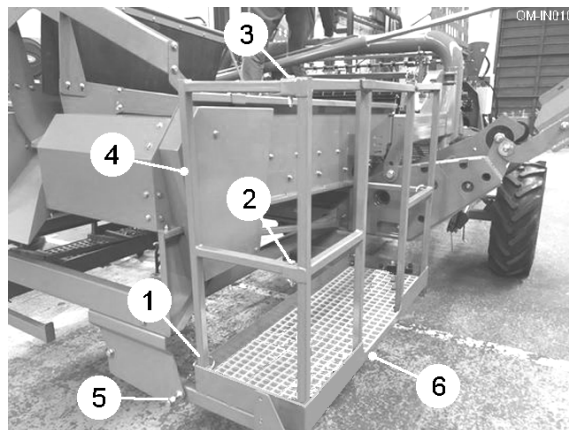


Fig. 24

Tractor Powered Hydraulic Circuit

The hydraulic ram services and discharge elevator motor drive are supplied with hydraulic oil from the tractor. The oil is fed through the pressure filter (item 1, fig. 25) into the inlet of the auxiliary valve bank (item 2, fig. 25). The elevator motor valve has priority over the ram service valves. The return oil flow from the valves and motor 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.

When sweeping clod fingers or windrow are fitted, an additional motor valve section is added to the end of the valve block after the elevator motor section. On machines fitted with Omega separator two additional ram valve sections are added for separator angle and clod roller height.

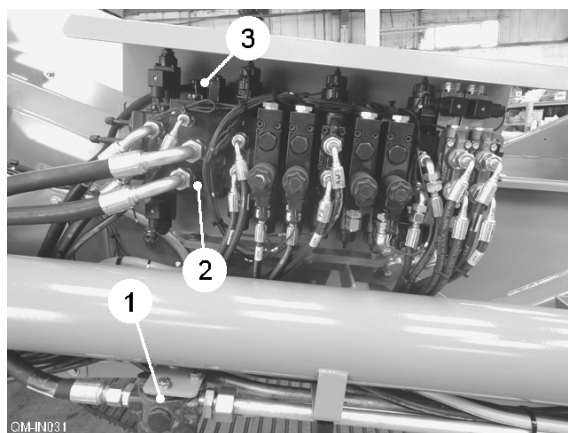


Fig. 25

Open-centre and closed-centre Hydraulics

Two types of hydraulic system are currently in use by tractor manufacturers, OPEN-CENTRE or CLOSED-CENTRE. Consult the tractor manufacturers handbook or dealer for further information.

The main hydraulic valve bank incorporates an adjustable screw (item 3, fig. 25) which enables easy changing from closed-centre to open-centre.

Closed-centre system, turn the screw clockwise until fully closed.

Open-centre system, turn the screw anticlockwise until fully out.

Load-sensing system turn the screw clockwise until fully closed.

Windrow Conveyor Hydraulic Circuit

The windrow slave valve (item 1, fig. 26) is powered from the auxiliary valve bank. The slave valve operates the conveyor side shift rams , fold rams and end angle rams.

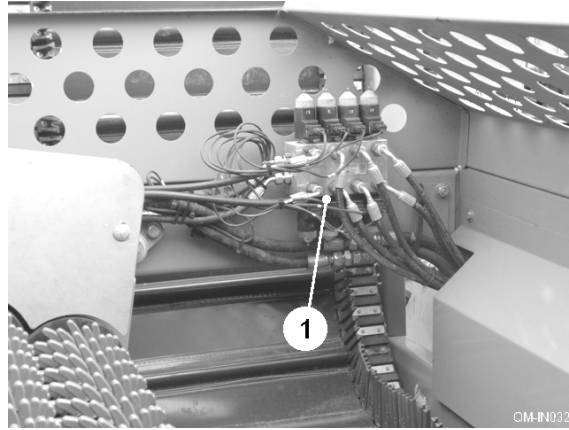


Fig. 26

Omega Separator Hydraulic Circuit

The circuit comprises a hydraulic oil tank (item 1, fig. 27), a pump (item 2, fig. 27), and separator valve (item 1, fig. 28) which powers the Omega scroll motors and clod roller motors. The separator valve also powers the spreader motor (if fitted). Return oil from the motors is recombined at the manifold (item 2, fig. 28) and returned back to tank.

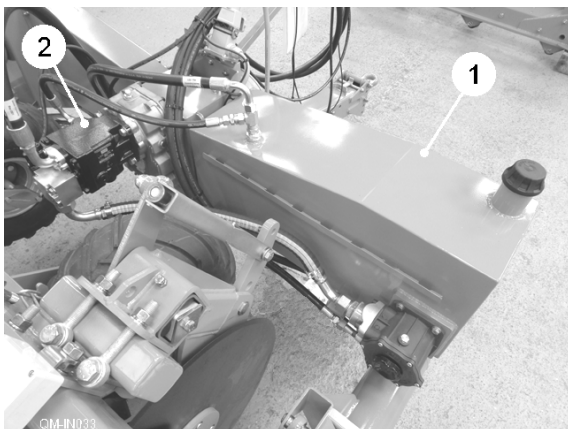


Fig. 27

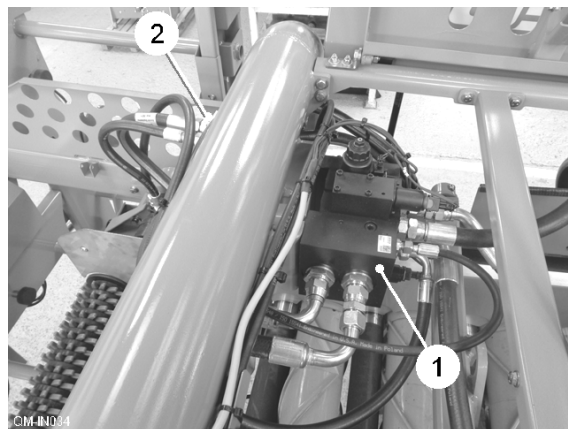


Fig. 28

Electrical Control System

Control for the major functions of the QM are provided electronically by the switches on the control box (see fig. 29). The control box fascia varies depending on the specifications of the machine.



Fig. 29

Ensure that all plug and socket connections are clean and coupling pins undamaged before connection, and that they are securely locked together before the power is switched on.



Do not store or leave the control box outside in the open and always disconnect the control box from the tractor electrical supply when not in use, so avoiding draining the battery.

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 chains from their transport 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 conditions:

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 wrapping and blockages around the roller mountings.

Damage prevention:

Do not hold the crop on the separator unit 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 discs 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.

Sweeping Clod Fingers (optional)

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 Blocks (optional)

The clod blocks 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.

Rotary 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 Extraction Roller

To reduce the risk of damage to the crop it is best to let the crop land 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

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 rubber, ebonite, plain 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. 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.

Galaxy Star Separator

On the Galaxy separator module, ensure the correct shape of clod roller is fitted for your requirements, either round, hexagonal or square. The shape of the clod roller affects the level of extraction. The round roller is the least aggressive, while the square roller is the most aggressive. Excessive speed of the Galaxy unit causes propulsion of the crop/soil/stone over the separator. Insufficient speed will cause a nipping effect on the crop. If brushes are fitted over the Galaxy unit, only use them in very bad conditions. Always apply a film of grease to the clod rollers after work to keep them bright, this will assist flow when the machine starts work again. Failing to do so makes the clod roller very greedy until the rust has worn off.

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.

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. 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 system.

The Omega hydraulic tank oil level should be carefully monitored. The cold oil level should be kept to the lower mark on the dipstick (item 1, fig. 30) with the dipstick screwed fully in. Maintain the level by topping up or refilling with Esso Nuto 46 Hydraulic Oil. The reservoir holds approximately 100 litres. Should a high water content become apparent the hydraulic oil should be changed.



Fig. 30

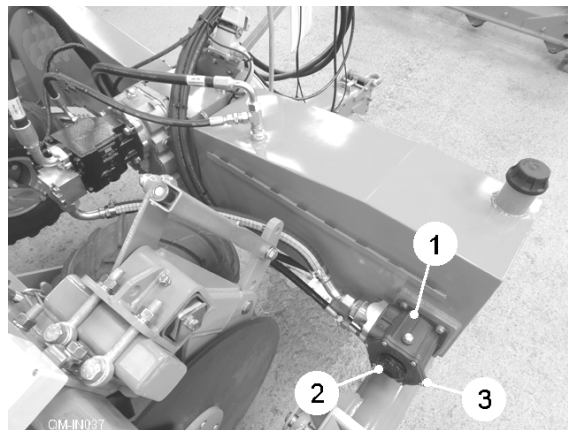


Fig. 31

The suction filter element (item 1, fig. 31) should be replaced after the first 50 hours running time and then every 500 hours or annually thereafter. The suction filter element are serviced as follows:

1. Wind the suction filter screw (item 2, fig. 31) fully out anti-clockwise to close the cut-off valve within the filter housing.
2. Release the six screws (item 3, fig. 31) 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 screw (item 2, fig. 31) fully in clockwise to open the cut-off valve.
6. Run the system and check for leaks.

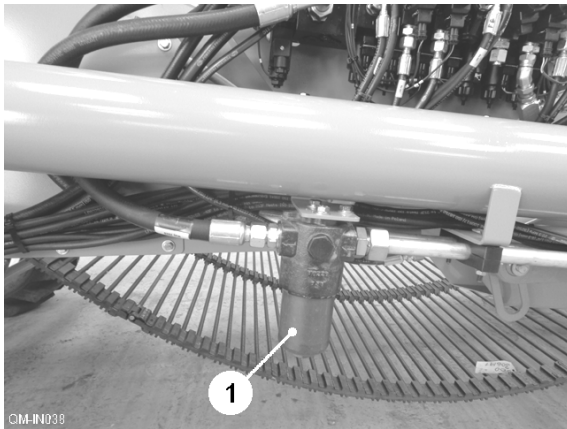


Fig. 32



Fig. 33

The auxiliary valve pressure filter element (item 1, fig. 32) and Omega pressure filter element (item 1, fig. 33) 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. 32), 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.

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. Operate the machine level ram to set the machine to its lowest 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.

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 guides 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.

Proximity Sensors

Proximity sensors are used in the auto-depth control circuit and the axle self-centring circuit. The sensors are factory set and in normal circumstances should not require any adjustment. A 3mm gap should exist between the sensor face and the target plate moving in front of it.

Tests should be carried out with the PTO shaft disconnected, control box switched on and tractor engine running at normal working speed.



Always disengage the PTO shaft before carrying out any tests.

Depending on the circuit being checked, activate either the share auto-depth or axle auto-centring circuit. Trigger each sensor in turn by placing a metal object (such as a screwdriver) in front of the sensor. As the sensor is triggered a light should illuminate on the sensor body. If the light does not illuminate the sensor should be replaced.

Machine Lubrication

Regular lubrication will ensure that the QM 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.

Shafts and bearings fitted with grease nipples should be lubricated using medium 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 and exposed threads etc. to ensure they remain free of corrosion. Regularly apply wax oil to the RH axle beam to reduce friction.

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.

Dimensions

	Basic Machine	With 2-man POB	With 4-man POB
Length:	7.95 m	8.70 m	9.30 m
Width (in transport):	2.60 m	2.94 m	2.60 m
Height (in transport):	3.53 m	3.53 m	3.53 m

Weights

Gross weight:	**** kg	**** kg	6700kg
Weight on drawbar:	**** kg	**** kg	660 kg

Technical Data

PTO input speed:	540 rpm 6 spline x 1 3/8"
Tractor hydraulic flow rate:	Minimum 50 ltr/min
Omega hydraulic tank capacity:	100 ltr Esso Nuto 46 Hydraulic Oil
Electrical requirements:	12V DC negative earth
Maximum road speed:	32 kmh (20 mph)
Tyre size:	12.5/80-18 10 Ply Trac-grip
Tyre pressure:	2.5 bar (36 psi)
Wheel nut torque (M18 x 1.5):	310 Nm
Row widths:	76cm to 90cm (30" to 36")

Nut and Bolt Tightening Torque

M6 nyloc zinc plated nut	14 Nm
M8 nyloc zinc plated nut	31 Nm
M10 nyloc zinc plated nut	60 Nm
M12 nyloc zinc plated nut	118 Nm
M16 nyloc zinc plated nut	282 Nm
M20 nyloc zinc plated nut	515 Nm
M24 nyloc zinc plated nut	936 Nm
M6 bolt/steel nut	9 Nm
M8 bolt/steel nut	26 Nm
M10 bolt/steel nut	52 Nm
M12 bolt/steel nut	95 Nm
M16 bolt/steel nut	230 Nm
M20 bolt/steel nut	440 Nm
M24 bolt/steel nut	766 Nm

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

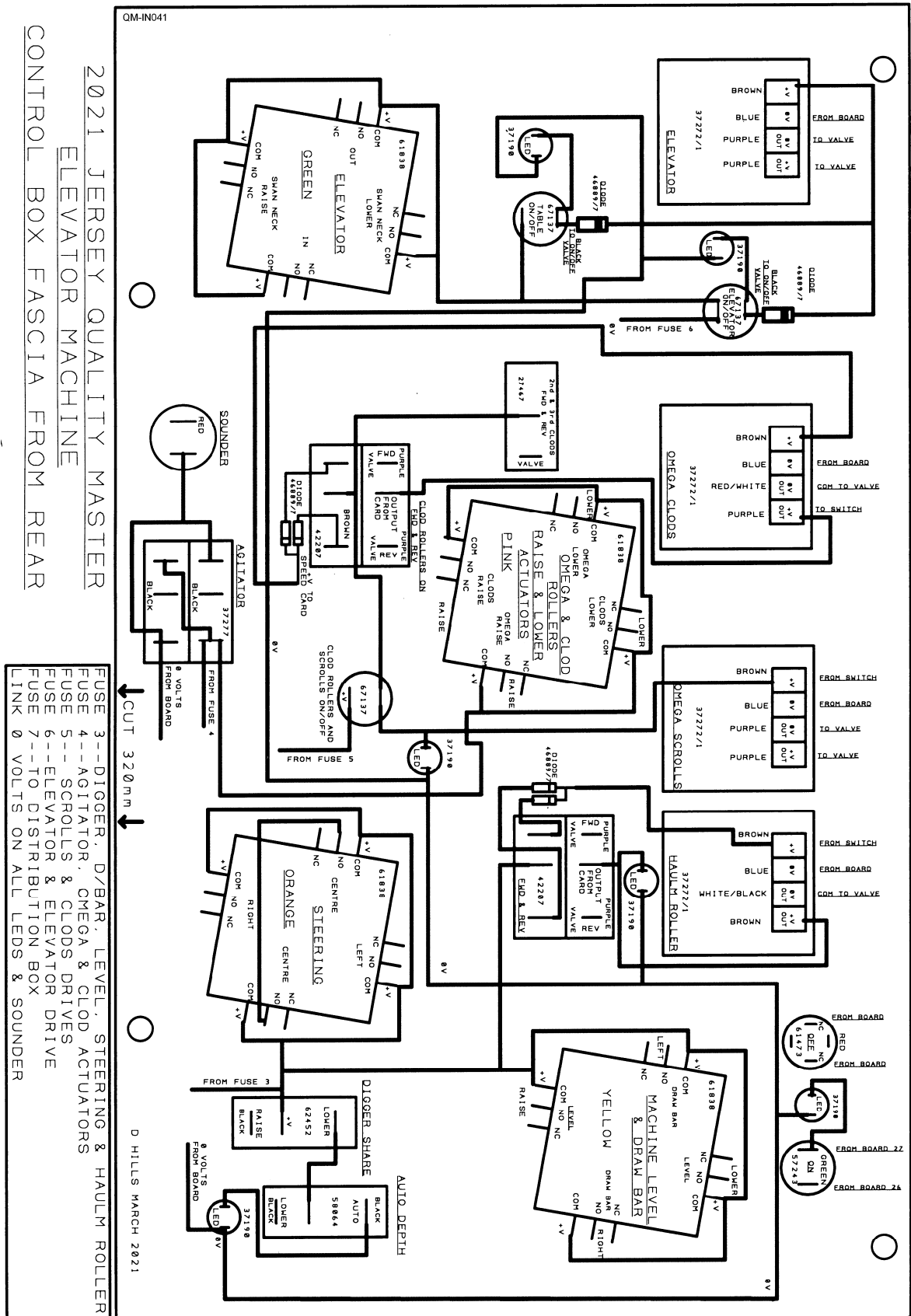
QM HARVESTER CIRCUIT DIAGRAMS

Control Box Fascia from Rear	2.1
Valve Loom	2.2
Omega Valve Loom	2.3
Cable Numbers	2.4
Control Box Board	2.5
Distribution Box Board	2.6

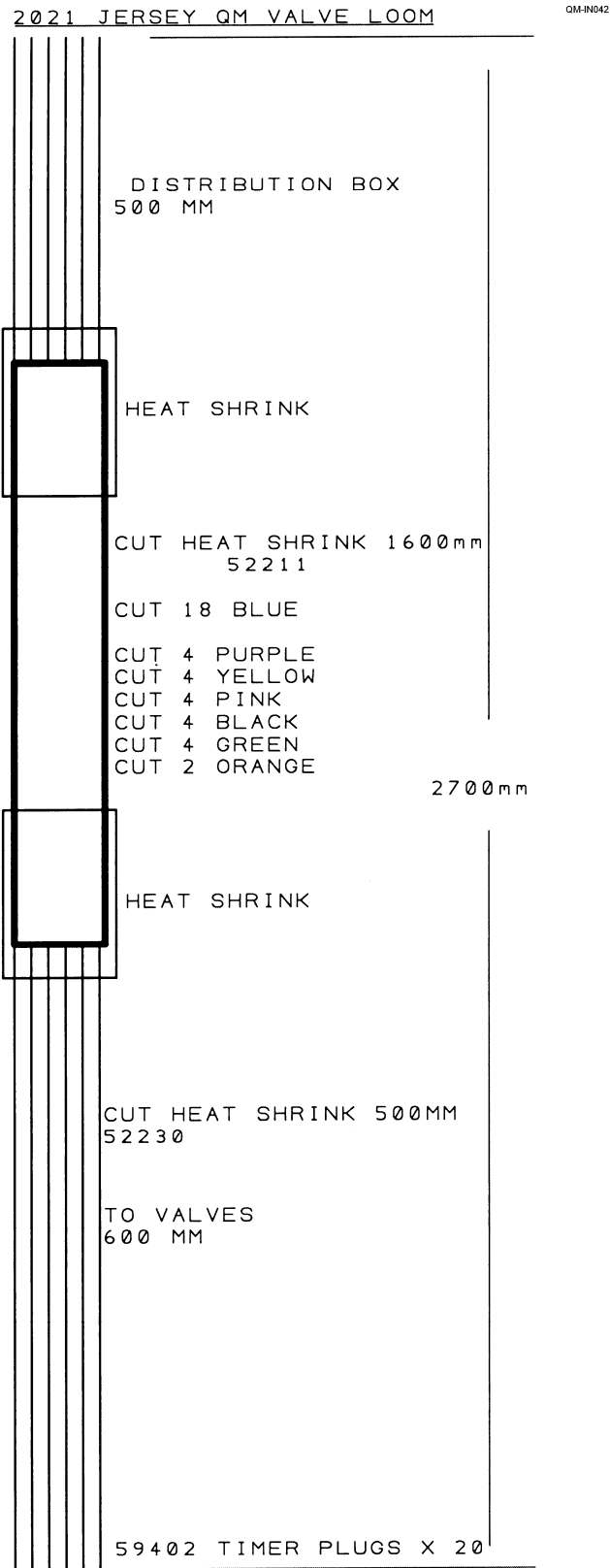
QM WINDROWER CIRCUIT DIAGRAMS

Control Box Fascia from Rear	2.10
Valve Loom	2.11
Omega Valve Loom	2.12
Slave Valve Loom	2.13
Cable Numbers	2.14
Control Box Board	2.15
Distribution Box Board	2.16
Diode Board for Slave Valve	2.17

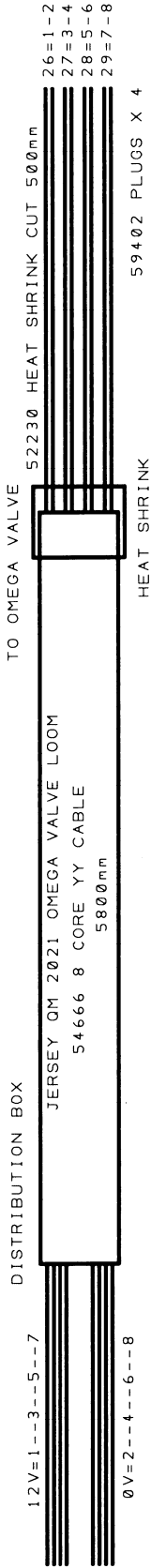
Control Box Fascia from Rear



Valve Loom



Omega Valve Loom



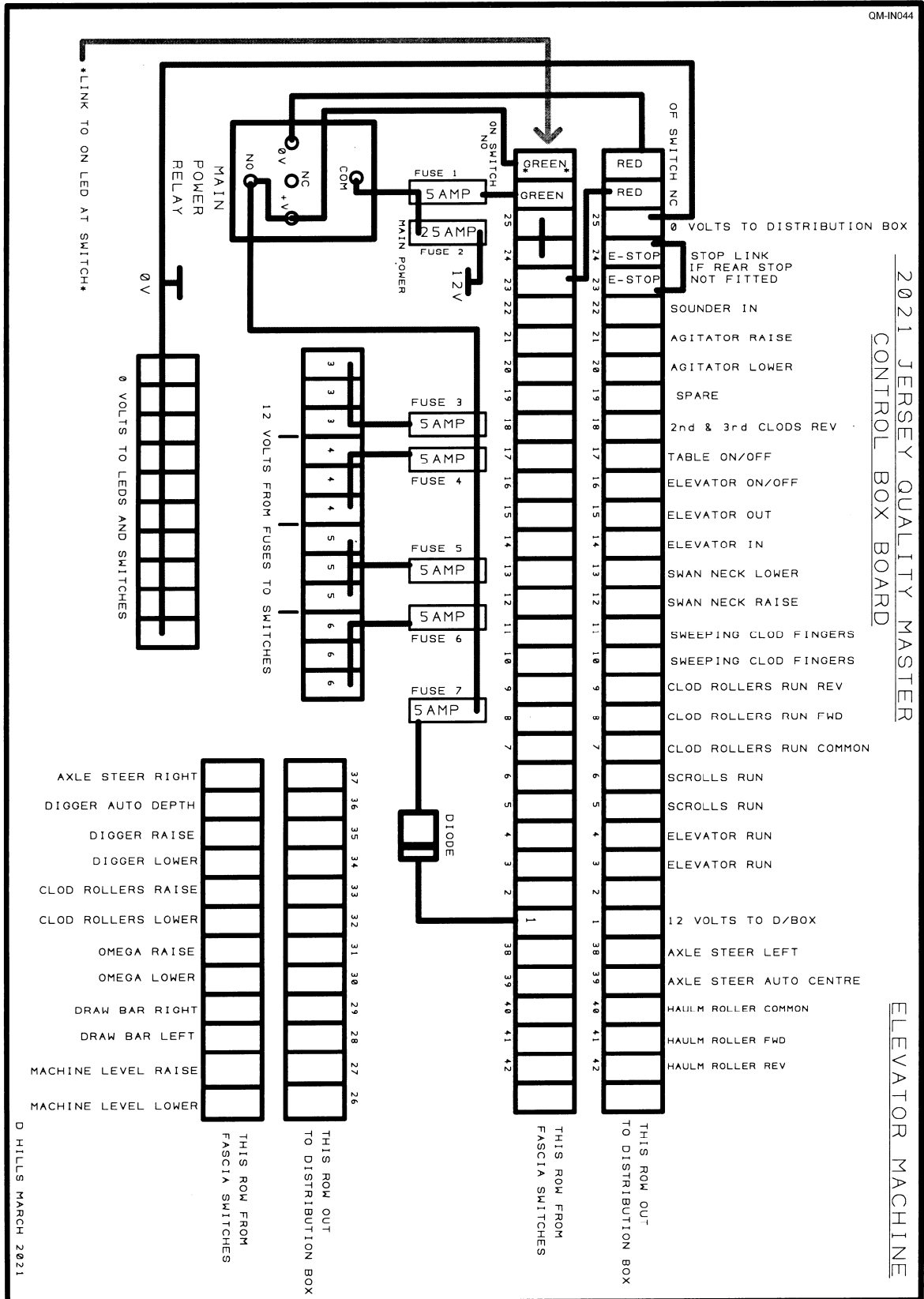
Cable Numbers

2021 JERSEY MACHINE CABLE NUMBERS

YY CABLE NUMBER	CONTROL BOX FUNCTION		VALVE PLUG NUMBER	VALVE PLUG CABLE COLOUR & NOTES	CONTROL BOX CABLES	JERSEY 2021 MACHINE
1	12 VOLTS					
2						
3	ELEVATOR RUN	AUX VALVE	1 LOOM	PURPLE	PURPLE	
4	ELEVATOR RUN		LOOM	PURPLE	PURPLE	
5	SCROLLS RUN	OMEGA VALVE	26 8 CORE YY	YY CABLE 1=12V 2=0V	PURPLE	
6	SCROLLS RUN				PURPLE	
7	CLOD ROLLERS RUN COMMON				RED & WHITE	
8	CLOD ROLLERS RUN FWD	OMEGA VALVE	27 8 CORE YY	YY CABLE 3=12V 4=COM	PURPLE	
9	CLOD ROLLERS RUN REV	OMEGA VALVE	28 8 CORE YY	YY CABLE 5=12V 6=COM	PURPLE	
10	SPREADER RUN	AUX VALVE	2 LOOM	PURPLE	PURPLE	CLOD FINGERS
11	SPREADER RUN		LOOM	PURPLE	PURPLE	CLOD FINGERS
12	SWAN NECK RAISE	AUX VALVE	3 LOOM		GREEN	
13	SWAN NECK LOWER	AUX VALVE	4 LOOM		GREEN	
14	ELEVATOR IN	AUX VALVE	5 LOOM	RED	GREEN	
15	ELEVATOR OUT	AUX VALVE	6 LOOM	RED	GREEN	
16	ELEVATOR ON/OFF	ON/OFF VALVE	23 2 CORE	VALVE AT BASE OF ELV	BLACK	
17	TABLE ON/OFF	ON/OFF VALVE	24 2 CORE	VALVE AT BASE OF ELV	BLACK	
18	2 nd & 3 rd CLODS REV (LINK CABLES)		25 2 CORE	VALVE ON CLOD MOTOR	BLACK	2 nd & 3 rd CLODS REV
19						
20	AGITATOR LOWER	ACTUATOR	2 CORE	2 CORE		
21	AGITATOR RAISE	ACTUATOR	2 CORE	2 CORE		
22	SOUNDER IN				RED	
23	E-STOP					
24	E-STOP					
25	0 VOLTS					
26	MACHINE LEVEL LOWER	AUX VALVE	7 LOOM	YELLOW	YELLOW	
27	MACHINE LEVEL RAISE	AUX VALVE	8 LOOM	YELLOW	YELLOW	
28	DRAW BAR LEFT	AUX VALVE	9 LOOM	YELLOW	YELLOW	
29	DRAW BAR RIGHT	AUX VALVE	10 LOOM	YELLOW	YELLOW	
30	OMEGA LOWER	AUX VALVE	11 LOOM	PINK	PINK	
31	OMEGA RAISE	AUX VALVE	12 LOOM	PINK	PINK	
32	CLOD ROLLERS LOWER	AUX VALVE	13 LOOM	PINK	PINK	
33	CLOD ROLLERS RAISE	AUX VALVE	14 LOOM	PINK	PINK	
34	DIGGER LOWER	AUX VALVE	15-LL---16-RL LOOM	BLACK X 2	BLACK	
35	DIGGER RAISE	AUX VALVE	17-LR---18-RR LOOM	BLACK X 2	BLACK	
36	DIGGER AUTO DEPTH	SENSOR				
37	AXLE STEER RIGHT	AUX VALVE	19 LOOM	ORANGE	ORANGE	
38	AXLE STEER LEFT	AUX VALVE	20 LOOM	ORANGE	ORANGE	
39	AXLE STEER AUTO CENTRE	SENSOR			ORANGE	
40	HAULM ROLLER RUN COMMON			BOTH BLACKS		HAULM ROLLER COM
41	HAULM ROLLER RUN FWD	OWN VALVE	21 2 CORE	RED	PURPLE	HAULM ROLLER FWD
42	HAULM ROLLER RUN REV	OWN VALVE	22 2 CORE	RED	PURPLE	HAULM ROLLER REV
	HAULM ROLLER VALVE USES OIL FROM OMEGA VALVE SO IT WILL NEED POWER LINK WHEN HAULM ROLLER IS ON	HAULM ROLLER OMEGA VALVE	29 8 CORE YY	YY CABLE 7=12V 8=0V		

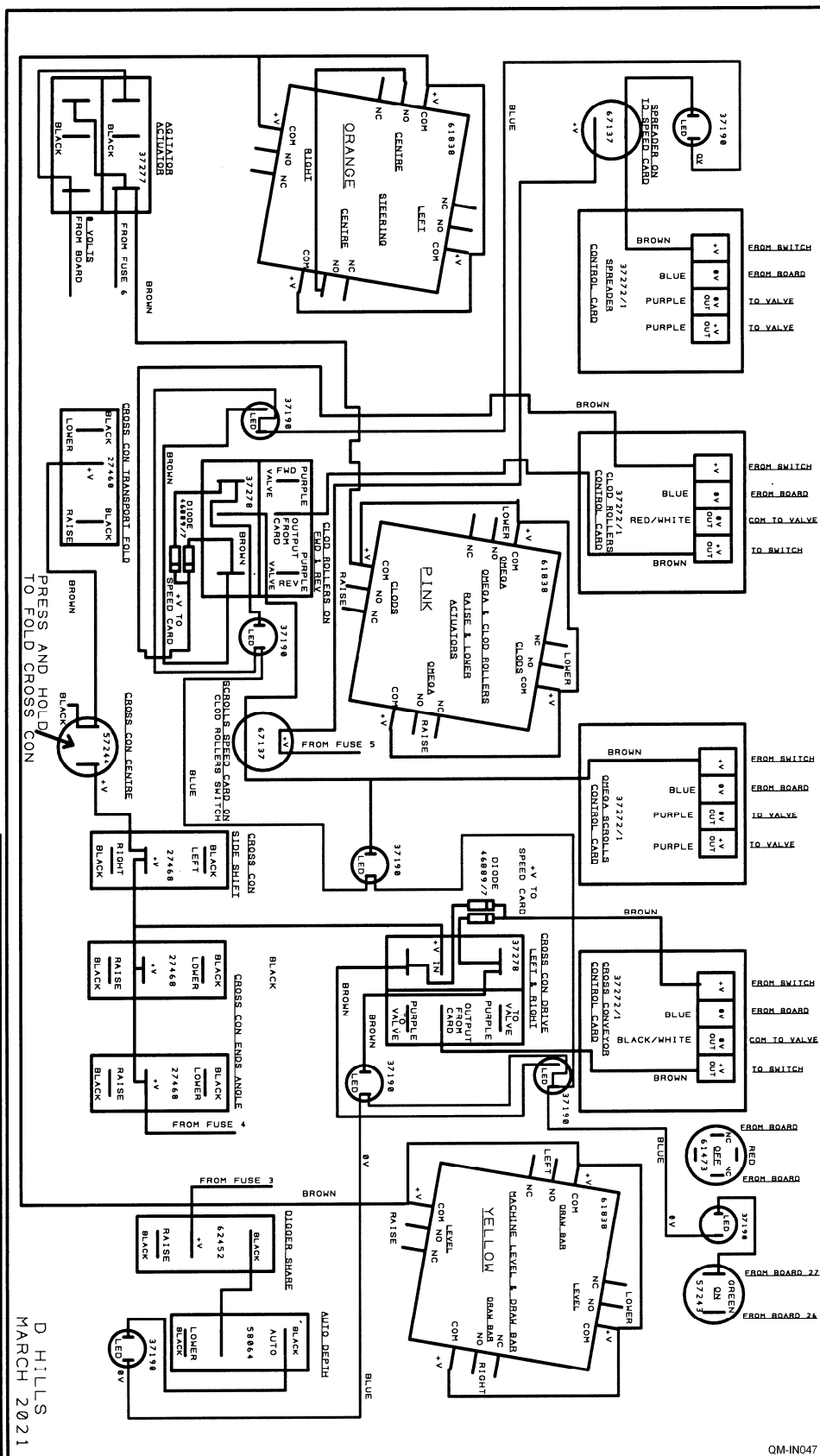
QM-IND46

Control Box Board

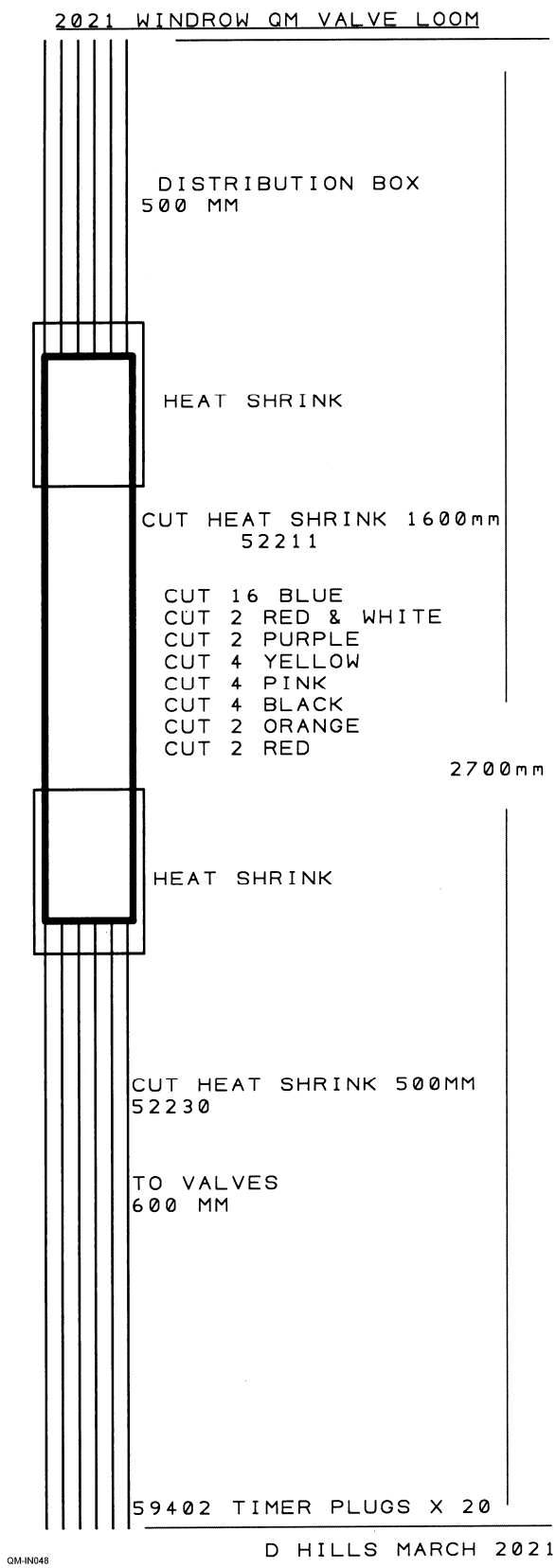


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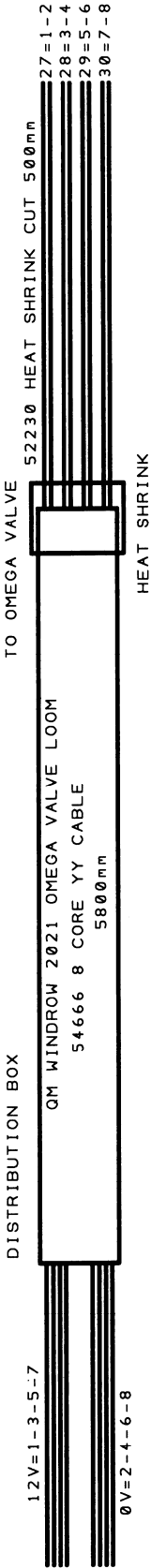
2021 QUALITY MASTER
WINDROW
CONTROL BOX FASCIA FROM REAR



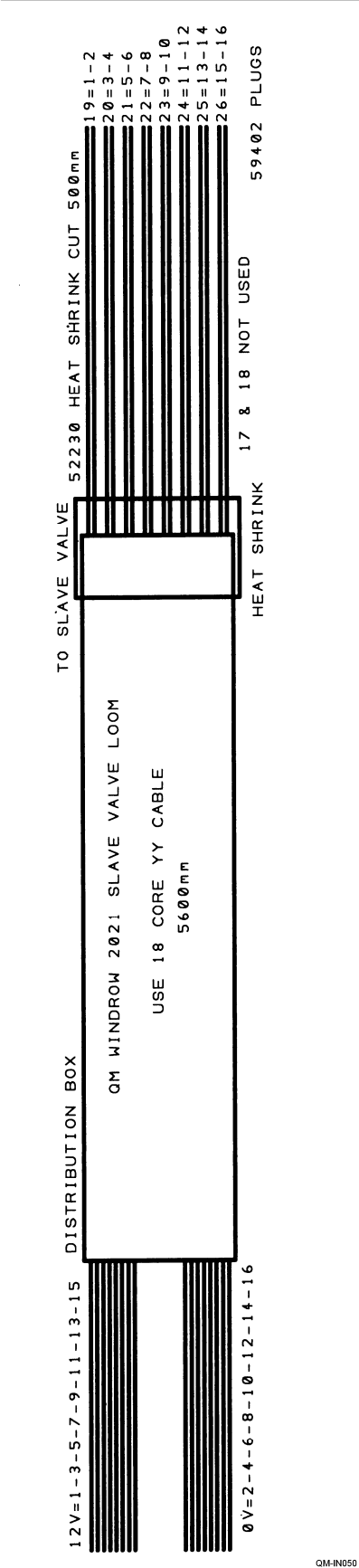
Valve Loom



Omega Valve Loom



Slave Valve Loom



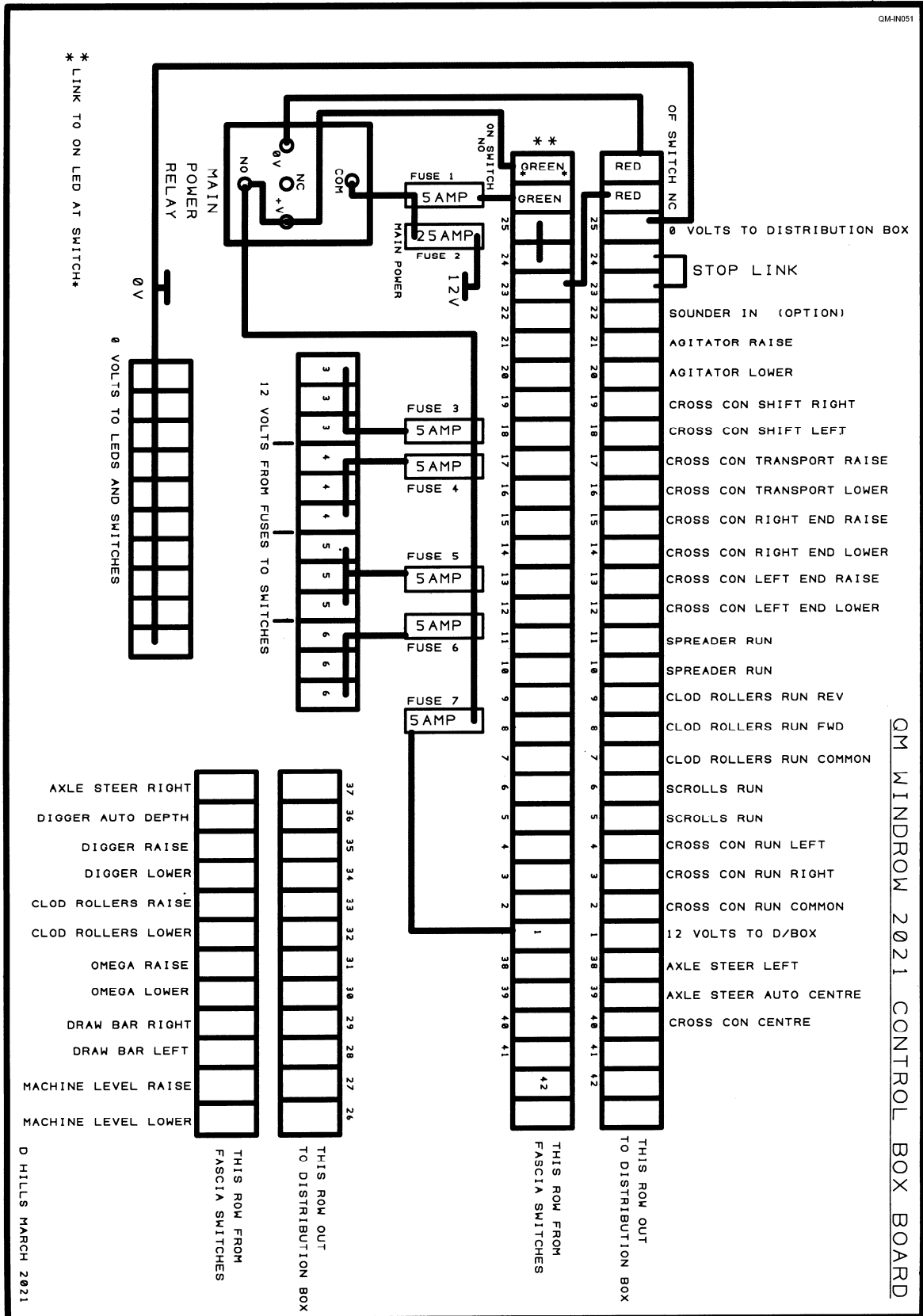
Cable Numbers

2021 Q M WINDROW CABLE NUMBERS

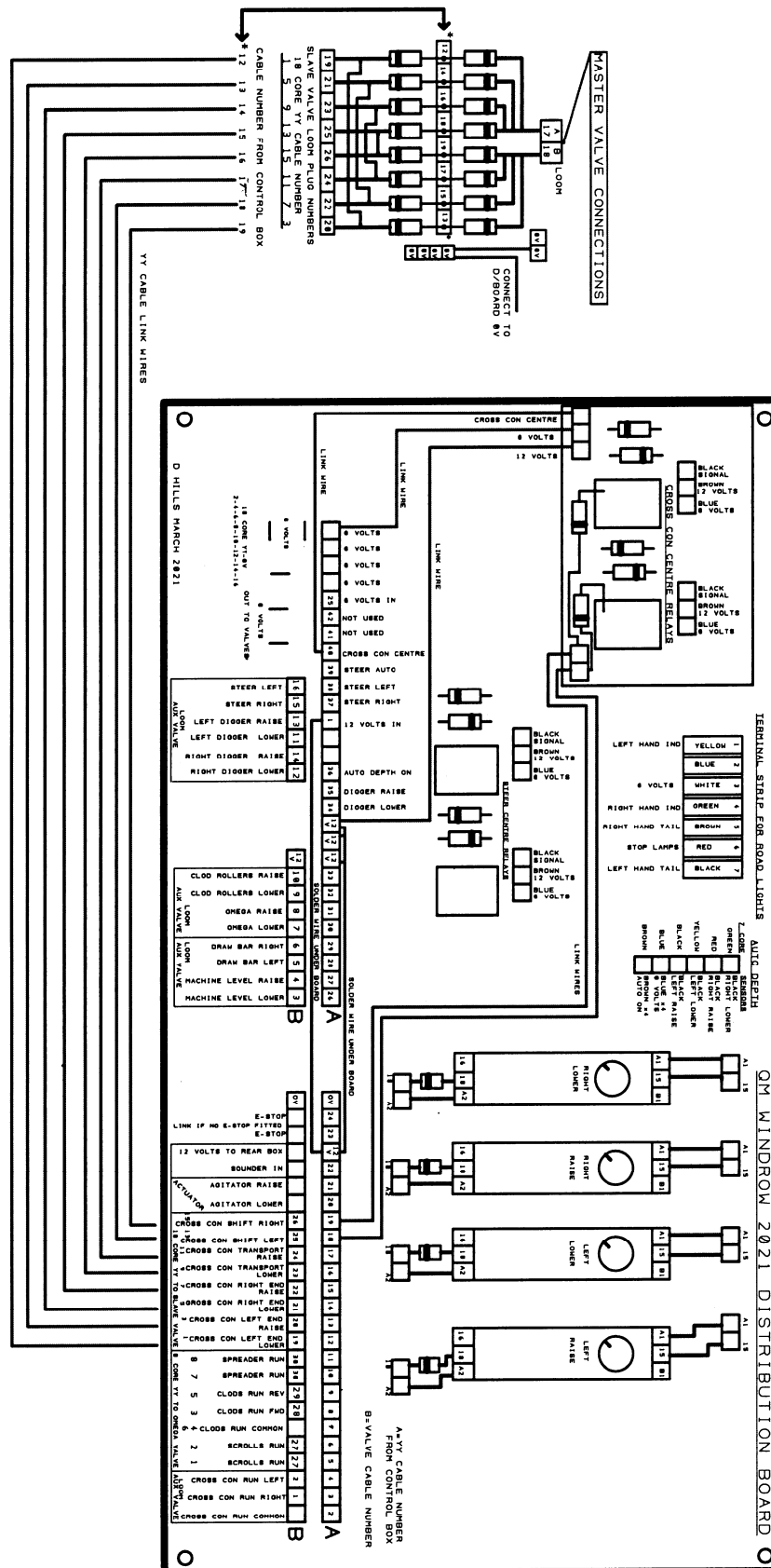
YY CABLE NUMBER	CONTROL BOX FUNCTION		VALVE PLUG NUMBER	VALVE PLUG CABLE COLOUR	CONTROL BOX CABLES
1	12 VOLTS				
2	CROSS CON RUN COMMON			RED & WHITE	RED & WHITE
3	CROSS CON RUN RIGHT	AUX VALVE	1 LOOM	PURPLE	PURPLE
4	CROSS CON RUN LEFT	AUX VALVE	2 LOOM	PURPLE	PURPLE
5	SCROLLS RUN	OMEGA VALVE	27 8 CORE YY	YY CABLE 1=12V 2=0V	PURPLE
6	SCROLLS RUN				PURPLE
7	CLOD ROLLERS RUN COMMON				RED & WHITE
8	CLOD ROLLERS RUN FWD	OMEGA VALVE	28 8 CORE YY	YY CABLE 3=12V 4=COM	PURPLE
9	CLOD ROLLERS RUN REV	OMEGA VALVE	29 8 CORE YY	YY CABLE 5=12V 6=COM	PURPLE
10	SPREADER RUN	OMEGA VALVE	30 8 CORE YY	YY CABLE 7=12V 8=0V	PURPLE
11	SPREADER RUN				PURPLE
12	CROSS CON LEFT END LOWER	SLAVE VALVE	19 18 CORE YY	YY CABLE 1=12V 2=0V	BLACK
13	CROSS CON LEFT END RAISE	SLAVE VALVE	20 18 CORE YY	YY CABLE 3=12V 4=0V	BLACK
14	CROSS CON RIGHT END LOWER	SLAVE VALVE	21 18 CORE YY	YY CABLE 5=12V 6=0V	BLACK
15	CROSS CON RIGHT END RAISE	SLAVE VALVE	22 18 CORE YY	YY CABLE 7=12V 8=0V	BLACK
16	CROSS CON TRANSPORT LOWER	SLAVE VALVE	23 18 CORE YY	YY CABLE 9=12V 10=0V	BLACK
17	CROSS CON TRANSPORT RAISE	SLAVE VALVE	24 18 CORE YY	YY CABLE 11=12V 12=0V	BLACK
18	CROSS CON SHIFT LEFT	SLAVE VALVE	25 18 CORE YY	YY CABLE 13=12V 14=0V	BLACK
19	CROSS CON SHIFT RIGHT	SLAVE VALVE	26 18 CORE YY	YY CABLE 15=12V 16=0V	BLACK
20	AGITATOR LOWER	ACTUATOR	USE 2 CORE FROM DIBOX	2 CORE	
21	AGITATOR RAISE	ACTUATOR	USE 2 CORE FROM DIBOX	2 CORE	
22	SOUNDER IN				
23	E-STOP				
24	E-STOP				
25	0 VOLTS				
26	MACHINE LEVEL LOWER	AUX VALVE	3 LOOM	YELLOW	YELLOW
27	MACHINE LEVEL RAISE	AUX VALVE	4 LOOM	YELLOW	YELLOW
28	DRAW BAR LEFT	AUX VALVE	5 LOOM	YELLOW	YELLOW
29	DRAW BAR RIGHT	AUX VALVE	6 LOOM	YELLOW	YELLOW
30	OMEGA LOWER	AUX VALVE	7 LOOM	PINK	PINK
31	OMEGA RAISE	AUX VALVE	8 LOOM	PINK	PINK
32	CLOD ROLLERS LOWER	AUX VALVE	9 LOOM	PINK	PINK
33	CLOD ROLLERS RAISE	AUX VALVE	10 LOOM	PINK	PINK
34	DIGGER LOWER	AUX VALVE	11=LL-12=RL LOOM	BLACK X 2	BLACK
35	DIGGER RAISE	AUX VALVE	13=LR-14=RR LOOM	BLACK X 2	BLACK
36	DIGGER AUTO DEPTH	SENSOR			
37	AXLE STEER RIGHT	AUX VALVE	15 LOOM	ORANGE	ORANGE
38	AXLE STEER LEFT	AUX VALVE	16 LOOM	ORANGE	ORANGE
39	AXLE STEER AUTO CENTRE	SENSOR			
40	CROSS CON AUTO CENTRE	SENSOR			
41	NOT USED				
42	NOT USED				
	MASTER A FOR SLAVE VALVE	AUX VALVE	17 LOOM	RED	
	MASTER B FOR SLAVE VALVE	AUX VALVE	18 LOOM	RED	

QM-IND54

Control Box Board



Distribution Box Board



Diode Board for Slave Valve

