

Owners Manual



(www.taege.com)

Heavy Duty Seed Drills

**MKII (Manual Drive)
240, 300 and 360M Series
Standard and Contractors Models**

**From Serial Number
2003 80 onward**

Dated: 10.11.03

48 Years Specializing in the Design and Manufacture of Innovative Farm Machinery

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1 Introduction

This manual sets out technical information for your guidance in the proper use and servicing of this implement including ordering spare parts and seeking additional advice. Extra copies can be downloaded free from www.taege.co.nz/drills/manuals. Specifications for the drills including lists of basic spares and available options are given in Annex I. Operational Guidelines are contained in Section 6. Introductory agronomy notes are provided in Annex II.

The drill model, serial and chassis numbers are recorded on the front right hand side of the drill, below the gearbox on the main 75mm x 75mm chassis cross member. ***Reference to the right and left hand side of the drill is as you see it from behind the drill looking toward the tractor.*** Be sure to quote part number(s) from attached parts list together with drill model plus serial and chassis number when seeking advice and/or ordering spare parts. Please leave a copy of this manual with the drill at all times even when it is sold, including the parts list and other attachments.

Thank you for buying a Taege® seed drill, we pride ourselves in 48 years of specializing in the design and manufacture of innovative farm machinery. Your seed drill has been carefully designed and manufactured to provide years of dependable service, given normal care and proper operation incorporating guidelines outlined in this manual. Our dealers and agents are carefully selected, experienced and trained to help you. A professional team of consultants and advisors backstop them.

2 Safety First

Please:

- Focus on being prepared for emergencies;
- Read this operators manual carefully;
- Always follow recommended safe practices for operating this drill and associated equipment, including tractors and other machinery used in conjunction with it;
- Identify and avoid un-safe terrain;
- Use safety chains and locking pins on drawbars¹. Do not exceed 40km/hr while using un-sprung end-tow kit or towing the drill in normal working position².
- Keep all covers in place at all time unless removed for repairs or servicing;
- Stop the drill before making adjustments;
- Lower drill to ground or put on props when not in use and/or working around machine;
- Don't ride on or allow passengers on drill;
- Avoid high pressure fluids;
- Ensure tractor is turned off and machine hydraulics disconnected when working on drill.
- Tighten all nuts and bolts after initial use and thereafter at regular 30 hr intervals apart from boot bolts which must be checked daily;
- Tractor hydraulics must always be operated in the float position to ensure full drill penetration and proper contour following, especially in hard going.
- Use only genuine spare parts;
- Insert additional delimiter blocks on the wheel rams so they are locked in the fully extended position while transporting to and from drilling area.
- Use a safety strap to hold land wheel in retracted position while using end-tow.
- Watch for moving parts and stay well clear of drill while it is moving;
- Practice safe handling of agricultural chemicals including treated seed.

¹ Double safety chains should be used to secure drills both on end tow, and behind tractors in the working position.

² Custom-built end-tow suspension units are available with mudguards for road use as an optional extra.

- Wear appropriate safety equipment while operating the drill including filling seed / fertilizer boxes and/or adjusting drill. This includes safety glasses, gloves, ear protection, close fitting clothing and steel capped boots.
- Visit www.osh.dol.govt.nz for additional guidance and instruction on safe practices in the rural sector and/or other sectors targeted for the intended use of this drill.

3 Warranty and Acquisition

Your Taege® machine is covered by our 12-month warranty (from the date of purchase) on faulty parts and/or workmanship subject to normal use. Ensure your dealer completes and returns the attached warranty validation certificate (Annex III) within 10 days of purchase, to Taege Engineering Ltd, Main West Road, Sheffield, New Zealand.

Upon delivery immediately:

- a) Record basic information below.

Basic Information	
Model:	Delivery Date:
Serial Number:	
Chassis Number:	
Owner:	Dealer:

- b) Check for shipping damage. In cases of shipping damage, ask dealer to arrange for appropriate claim to be lodged immediately.
- c) Assemble any parts supplied loose and generally inspect machine using this manual to familiarise yourself with its features (IV).
- d) Ensure the attached registration / warranty validation card has been completed.
- e) Place owners' copy of warranty in safe place off the drill.
- f) Check that the dealer's copy of the warranty has been returned to the manufacturer
- g) Contact your dealer if you have any further queries.

4 Disclaimer

Drilling with Taege® seed drills in conditions normally outside the germination tolerances of the seed concerned cannot be expected to give satisfactory results. The drill is not recommended for heavy cereal residue, maize stover or pumpkin vines. Discs are available but not needed for normal pasture renovation. Fertilizer, insecticide and other such particulates metered through this drill should be granulated. Seed may or may not be granulated.

Every attempt has been made to ensure the correctness of information and diagrams in this manual. Consequently, Taege Engineering Ltd will not be responsible for any damage or consequential loss arising out of misinterpretation of, or failure to follow, recommended practices and procedures. Nor will Taege Engineering Ltd be liable for any damage caused by, or arising out of modification or misuse of its product. Taege Engineering Ltd reserves the right to change technical details and prices without prior notice.

5 Main Features of the Drill Including Optional Extras

5.1 Three Drills for the Price of One – Why?

Taege® *M Series* Heavy Duty Seed Drills (240 through 360 series) are purpose built for direct drilling, reduced tillage and traditional cultivation. There are Farmers' as well as Contractors' models.

5.2 Size, Mobility and Versatility

M series drills presently come in a three sizes 2.4m (8'), 3.0m (10') and 3.6m (12'). End-tow attachment points are available as an optional extra for 300 and 360 models, providing for safe and efficient road transport as well as improved off-road access to difficult areas through narrow gates, along narrow tracks and across small bridges. Less than 10 minutes are required to change a drill from end-tow to the working position. Sprung and un-sprung end-tow half axle kits are available as optional extras, with and without mudguards and tail lights. End-tow immediately solves your over wide problems. Light and reflector kits are available as optional extras for drills towed along the road in the normal working position.

Drills are "open plan" which makes them uncluttered and easy to work on. They are simple to maintain and easily repaired in the field with a minimum of tools. The majority of parts are standard off-the-shelf items, readily available from your local engineer / dealer / agent, and not expensive. Frames are painted or galvanized as an optional extra. Single- or double-box options are available for under-sowing crops or applying fertilizer through either the front or rear box. Boxes are made of mild steel. Stainless steel boxes are not an option, at this stage.

Sowing depth control is achieved using delimiter blocks fitted around the shaft of each double-acting wheel-lift rams. Double acting ram kits are fitted as standard equipment. Tractor hydraulics should be operated on float control to allow the drill to penetrate properly and for the land wheels to follow the contour independently of the main frame of the drill. As part of this package, a floating axle land wheel option is provided for rough ground, including a built in locking pin for end tow transport.

Leading tynes take the drilling width out around the floatation land wheels allowing you to get in close to fences and border dykes. Narrow tine spacing (4.75" / 121mm) greatly improves early seedling establishment and ground cover compared with wider spacing, doing away with the need for cross drilling. Ground cover is further enhanced by the banding effect provided by active tynes combined with using covering harrows. Seed and/or fertilizer can be broadcast, by setting the delimiter blocks so that the drill tips just clear the ground, or just touch and act as a harrow in the working position.

5.3 Superior Drill Performance over a Wide Range of Conditions

A wide variety of soil types, moisture and trash conditions can be tolerated. Average drilling speeds of between 9 and 12 km/hr can be achieved on most soil types including undulating terrain where there are no stones, including compacted soils. Reduced speed on stony soils and rough terrain is advised, to between 3 and 6 km/hr.

Improved wear, residue flow, contour following, penetration and tilth has been achieved over a very wide range of conditions using the Taege® 12mm horizontal S tyne configuration combined with the Taege® "knife-edge" modified tee-boot of cast Ni-hard fitted with a tungsten tile on the leading edge.

"Laid back" positioning of the S tynes makes them very active, allowing them to ride over and pass around obstacles rather than catching on or rooting them up. This gives excellent tilth, generating a superior microclimate for seed to germinate and grow in, even under the hardest of conditions, while at the same time reducing wear and breakages on the drill. These features markedly improve the performance of your drill on stony as well as soft ground, including sidling on steep hills. Traditional heavy-duty vertically mounted tynes lack these features.

The robust fully welded frame supports three working tool bars mounted with 600mm of stagger to further enhance the above mentioned operational features, aided by floatation tyres mounted on long radius arms for better than average contour following and ground clearance.

Contractor's models with additional webbing and thick-walled RHS tool carriers are designed for particularly rough conditions.

The standard quick-shift fold away trailing front drawbar, which comes standard with all M-Series drills, is easily removed to provide for three-point linkage attachment. These drawbars are easily stored in the vertical "fold away" position to simplify shipping, facilitate end-tow and save shed space. The heavy-duty rear roller-come-harrow draw bar option allows farmers to complete multiple operations in one pass.

The floating axle option for the drive land wheel (standard on Contractor's models) eliminates the risk of wheel slippage while drilling into seriously compacted soils and/or over very broken terrain. Floating axle assemblies can be fitted after-market.

5.4 Soft Foam Metering

All drills are fitted with the entirely new Taeye Snap-Lock® Soft Foam Metering System which is suited to seeds of all sizes ranging from mustard and rape up to peas and beans. Traditional seed combinations as well as single seed mixes and granulated fertilizer and/or insecticide may be sown using sponges provided. Seed sponges are open cell and usually white, while fertilizer sponges are closed cell and mostly grey or black in colour. Power harrows, disk and roller seed and fertilizer box options are available.

Seed and fertilizer roller assemblies are interchangeable between front and rear boxes on double box drills. Fertilizer rollers can be used reliably for cereals and other large seeds, but not for grass and smaller seeds.

Soft Foam metering provides 100% seed out with no seed damage. The two opposing tangential rows of rotating sponges delicately and reliably fold and meter particulates (seeds etc.) into collector trays from where they fall freely into well prepared ground behind the S tyne fitted with a Nihard boot faced with a tungsten tile, by passing down flexible delivery hoses.

Angle iron bars located above the sponges prevent most seeds / products from bridging and prevents wear on moving parts. Agitators are not usually needed, but may be fitted under special circumstances as an optional extra, to cope with especially difficult-to-sow seeds (prairie grass, for example). Small seed inserts with individual compartments are available as an optional extra to give very low seeding rates and to sow more than one species / cultivar of comparable seed size and weight during a single pass.

Sponges may be replaced either as complete units including new cores, or separately as a sponge-only outer glued to existing cores using contact adhesive (usually Ados). Six mm grub screws secure the cores to the stainless steel tube drive shaft. Seed and fertilizer sponges can be removed in 30 seconds by opening the snap locks to empty boxes and provide easy storage of components away from vermin. Plastic storage tubes are available as an optional extra.

5.5 Seed Hose and Fertilizer Roller Configuration

Fertilizer / fertilizer rollers are usually fitted to the front box (nearest the tractor), particularly while sowing small seeds via the rear box hosed up to deliver seed to the rear pipe on the knife boot. This configuration tends to keep the weight of fertilizer forward on the drill and allows 50Kg bags to be placed on the lid of the rear box while filling. Alternatively, this roller and hose configuration can be reversed so that fertilizer is primarily feed out of the rear box feeding into the front pipe of the boot.

On double-box drills, under most soil conditions an ideal sowing depth (i.e. 1 – 2 cm) can be achieved for small seeds by passing them down the rear hose attached to the boot. This also helps to position fertilizer separately under the seed by feeding it down the pipe nearest the boot.

The reverse applies for cereals and other large seeds which need to be sown deeper (up to 5 cm), and under some circumstances where small seeds need to be sown into very hard / stony / compacted soils where penetration can be limited and/or deep sowing is required to place seed on moist soil.

Two types of hose are available; plastic hose is standard and heavy-duty rubber hose is an optional extra.

5.6 Simple Calibration

Seeding / application rates are controlled simply using a single lever on a variable speed gearbox linked to a two-speed quick-change sprocket and chain assembly (i.e. one gearbox and chain assembly per seed/fertilizer box).

The low-speed setting is for small seeds (e.g. brassica and up to 20 Kg of grass mixes) and the high-speed setting for sowing higher rates of grass mixes, and cereals. An additional sprocket change is needed on the end of the seed box, to sow peas and beans.

While shifting the speed adjustment lever attached to the gear box, the jockey wheel must be clear of the land wheel and calibration handle turned slowly to allow the fingers in the gear box to mesh, or permanent damage may occur otherwise.

5.7 Easy-to-Clean Boxes

Boxes are easy to clean, by simply unclipping four or five Taege Snap Locks® (depending on drilling width) then removing the complete roller assemblies. For a single box, this requires less than a minute. Larger volumes of seed / fertilizer can be bucketed out of the boxes easily before opening the rollers, by first unscrewing and removing the baffles (two thumb nuts per baffle) then lifting out the inserts and box dividers through the remaining seed / fertilizer, thereafter leaving the box completely free of internal obstructions. Gone are the days of spending hours vacuuming and scraping out boxes.

Boxes can be easily sealed with non-acid silicone and additional sets of rollers procured as optional extras for pure seed applications.

5.8 Reliable Manual Drive

Units are powered through a 250mm pneumatic jockey wheel driven off the left hand land wheel and automatically disengage whenever the drill is lifted out of the ground. One-bolt adjustment of the jockey wheel immediately turns the drill into a broadcast unit.

5.9 Wheel Scrapers

Wheel scrapers are an optional extra, used to prevent the build up of residue on land wheels, which in turn affects drilling depth and jockey wheel performance particularly under moist conditions and on areas freshly grazed by cattle.

5.10 Disc Openers

Disc openers are optional extra, either tractor or drill mounted; used primarily for heavy stubble, but also in light “fluffy” soils and where there is a fertility veneer. They are not required for normal operation (in fact strongly discouraged), and never recommended as an aid for coulter penetration, even under the hardest and roughest of conditions – a major positive feature of your drill.

Usually the drill will operate successfully without discs into most stubble paddocks which have been properly under cut, cleanly raked and baled; especially on warm days, when drilled at 9 to 14km km/hr particularly straight after the header. Where there are stones, the same result should

be achievable at slower speeds 3 to 6 km/hr (depending on conditions). The harder the soil, the more active the tyne. Active tynes walk straw through the system with minimal blockage. Improved stubble clearance can be achieved by drilling across drill lines for the previous crop at between 45 and 90⁰ angles. This also helps to smooth out wheel marks from the combine as well as other machinery.

Should blockages occur while drilling stubble, residue will fall away naturally and cleanly in most instances as the drill is lifted out of the ground. This is made possible through the horizontal tyne configuration combined with the rotating leg assembly on land wheels. **DO NOT BACK UP!** Tynes will break if you do, whenever they are subjected to reverse flex, as with any tyne drill / cultivator.

5.11 Extra Wide Tread Plates and Front Loading Options

Standard 400mm wide tread plates may be up-graded as an optional extra to 700mm wide, where additional working space is required. With this option, an additional safety jack stand is supplied which fits into one or other of the rear end-tow mounts to stop the drill from tipping backwards.

5.12 Full-Width Calibration Trays

Two half calibration trays are provided to cover the full width of your drill.

5.13 Collector Tray

Seed collection trays are usually fixed. They may be raised or lowered relative to the positioning of seed and fertilizer sponges by adjusting the height of the spacer blocks they are mounted on and the length of the central supporting bolt.

Operation and Maintenance

5.14 Storage and Preparing the Seed Drill for Operation

Important:

- Sponges / sponge mounting shafts should not be left in the drill. They must be removed and either placed in the seed box such that they are not resting on anything which may deform them or preferably, stored in separate containers made from PVC down pipe capped at both ends to guard against vermin. At least one set of fertilizer sponges must also be removed from the drill and stored likewise to prevent fertilizer sponges from becoming imprinted where they touch if left locked in the drill, which may cause an uneven surface to develop and irregular metering.
- Drills should always be left resting on the ground with the full weight of the drill supported on the tynes and the front jack stand. A rear jack stand must be used wherever the standard 400mm wide rear tread plate has been up-graded to the 700mm wide option.
- The drill should be washed out periodically with a high-pressure water hose and left open to dry. This helps stop rusting and prevent residue build up along working surfaces, especially where sponges come in contact with metal.
- Chains should be kept clean and lubricated with good quality chain oil.

5.15 Achieving a Safe Storage Position

A safe storage position for the drill is best achieved by:

- (a) Taking all but one delimiter block off each axle ram (and placing them on the gearbox support shafts for safe keeping), then;
- (b) Allowing the full weight of the drill to settle evenly on the tynes before disconnecting the drill from the tractor, by letting the hydraulic rams on the drill settle naturally while the tractor hydraulics are fully lowered in the float option,.

This applies to both single and double acting ram (hydraulic hose) options. It also helps to avoid leaving the hydraulic system pressurized on the drill, which makes it difficult to re-connect hydraulic couplings to the tractor next time the drill is to be used, particularly when the isolation valve (tap) situated either on the tractor end of the hydraulic line, or at the Tee union on the drill has not been turned off.

If the drill has been stored incorrectly, lower the front drawbar from the stored (upright) to the working position, fit the top link into position then connect the drill to a tractor and lower the drill onto the ground before proceeding further. If the drill is to be worked on in the fully raised position, additional delimiter blocks must be placed on the wheel rams and extra jack stands or blocks place front and rear on both the left and the right side of the main drill frame to support the weight of the drill in a stable position front and rear.

While connecting the drill to a tractor, use the drill drawbar top link rather than the jack stand to align the drawbar height of the drill with that of the tractor. If the hydraulic lines have been left pressurized, loosen the female connectors on the drill hoses and bleed off excess oil. Do not hit the end of the female hydraulic couplings on these hoses to release oil pressure since it will most probably cause permanent damage.

Once the jack stand (front left side) is locked into position on the main frame it should be adjusted so as to support the weight of the drill on the leading side forcing the rear weight of the drill to rest on the rear set of tynes. This will prevent the drill from rocking backward.

Where a double wide (700mm) tread plate has been fitted in place of a standard 400mm wide plate, care should be taken to ensure a rear safety jack stand is also fitted and locked into the tow hitch point on the rear draw bar. This rear safety jack once properly adjusted will take the rear weight of the drill, thereby preventing it from rocking back on the rear tynes (while people work on the drill).

5.16 Removing and Fitting End Tow

Where the drill has been stored / transported on the end tow, **remove the end tow assembly by:**

- a) Firstly bring it out into a clear level area with sufficient room around the drill to disconnect the end-tow vehicle and end-tow assembly, and connect a tractor to the drill side on, once it is in the working position.
- b) Chock the end tow wheels front and back to prevent the drill from rolling forward or back.
- c) Remove any strops used to hold the land wheels up in the transport position.
- d) Fit the front jack in to the jack stand mount located on the front left side of the to the main drill frame.
- e) Adjust the height of the jack stand to take the weight of the drill off the end tow drawbar off the drawbar hitch on the towing vehicle.
- f) Disconnect the towing vehicle and move it forward out of the way.
- g) Disconnect the top link from where it attaches to the end-tow drawbar and leave it to hang free on the drill.
- h) Remove the locking pin securing the end tow draw bar to the main drill frame.
- i) Extract the end tow draw bar from its mounting on the drill and store it clear of the drill after making sure the two locking pins just removed have been placed back in the appropriate drawbar holes for safe storage.
- j) Support the weight of the main drawbar by hand in the upright position and remove the retaining (top link) pin.
- k) Lower the main drill drawbar into its working position and allow it to rest freely on top of the right hand end-tow wheel.

- l) Take the ratchet top link from where it was left hanging on the drill chassis after disconnecting it from the end tow drawbar and connect it to the main drawbar of the drill using existing pins.
- m) Back the tractor into position and connect it to the drill using the top link ratchet adjuster to match the drill drawbar height with that of the tractor. Make sure (i) the drawbar pin is locked into position using a retaining lynch pin, and (ii) that drawbar safety chains are in place between the tractor and the drill. Safety chains should be attached to the drill using the two mounting eyes located either side of the drill drawbar.
- n) Connect hydraulic hose (hoses) between the drill and the tractor then fully raise the drill on its land wheels into the transport position ... **ONLY AFTER DOUBLE CHECKING THAT NEITHER OF THE LAND WHEELS ARE STILL PHYSICALLY LOCKED / STROPPED IN THE TRANSPORT POSITION, OTHERWISE PERMANENT DAMAGE MAY OCCUR.**
- o) With the drill in the fully raised transport position resting on the land wheels and connected to the tractor, go to the rear side of the drill, remove the half axle locking pin then extract the end-tow (half) axle from its carrier frame on the rear side of the drill. Either store this axle clear of the drill or turn it 180⁰ and slide it back into its carrier frame and lock it in place with the retaining bolt. Care must be taken while fitting the retaining bolt, to ensure that the head of the pin and locator bush is on the side farthest from the drill gearbox (i.e. the leading edge of the drill when it is in the end tow position). This way, the locking collar on the retaining bolt will pull in properly against the half axle limiting its movement within the half axle carrier frame.
- p) Return to the front side of the drill, approaching it from the right side of the drill. Using the ratchet extend the drawbar top link just enough to lift the second end tow wheel clear the ground, but not so high that the top of the tyre fouls on the drill drawbar. Remove the retaining bolt from this half axle, extract the axle with the wheel still attached and either store it clear of the drill or secure it in the second carrier situated on the left side of the rear harrow / roller drawbar. Where the tractor drawbar is lower than average, it may be necessary to raise the front side of the drill slightly on the drill jack stand to enable the second end tow wheel to come free easily.
- q) Remove the locking pin from the floating land wheel axle housing, when it is fitted (see land wheel axle assembly on right side of drill) and store it appropriately.

To fit the end tow assembly, reverse the procedure. Once the end tow wheels / half axles have been fitted, raise the land wheels into the transport position using the double acting rams (double hose kit) option (where fitted). With a single acting ram (single hose kit), lift the land wheels into the transport position by locking the tractor hydraulics in the fully down position on float and lowering the drill jack stand until the end-tow drawbar just touches the ground.

This causes the left hand side of the drill to drop while rotating around the end tow wheels as a pivot point. This forces the land wheels to retract up into the transport position where they need to be secured using a strop placed around the axle of the left hand land wheel, tied off to the rear harrow drawbar of the drill, after passing it over the 50mm RHS which supports the seed boxes (Diagram ___). While using this method, it is sometimes necessary for a person to stand on the tongue of the end tow drawbar to help force oil out of the hydraulic rams to hasten their retraction.

Ideally, all drills used regularly on end tow, should be fitted with the optional second set of hydraulic hoses, allowing the land wheels to be easily raised and locked into position with the minimum of fuss.

5.17 Removing and Fitting Sponge & Shaft Assemblies

Seed and fertilizer sponges (55mm diameter) are glued to (___mm) diameter cores located on 19mm stainless shafts running the full width of the drill, held in place by several Taege Snap Locks®. Cores located within the seed and fertilizer sponges are held in place below box outlets using 4mm grub screws, one per core. Once located on the stainless shafts, sponges are inserted into and removed from the drill while still on these shafts, as a complete assembly, as follows;

- a) Lift the wind flaps on either side of the seed/fertilizer boxes and secure them in the raised position using the locking tabs mounted on either side of boxes in the centre. On double box drills, it will be necessary to access the central flaps from the front and the rear of the drill by reaching under respective boxes.
- b) Locate the plain end of the shaft within the spring-loaded retaining block cum bearing on the left side of the drill below the seed / fertilizer boxes.
- c) Apply sufficient even pressure along the shaft to depress the spring in this block enough for the boss on the right hand driven end of this shaft to just clear the end face of the slotted driven shaft on the right side of the drill.
- d) Gently release the shaft pressure on the end spring, allowing the boss to pass over the drive shaft.
- e) Ensure the internal 4mm roll pin is properly seated into the drive shaft by rotating the seed sponge and shaft assembly clockwise until the roll pin located inside the boss is fully seated into the slot on the drive shaft. In this position, there should be no end-play on the seed/fertilizer shafts with no more than 1mm clearance between the face of the boss and the face of the plastic bearing block including the steel retaining circlip, when the roll pin is properly located. **Take care not to rotate shafts counter clockwise or sponges may pick up on and be damaged against the end of the V shaped seed wipers mounted on boxes.**
- f) Fit one Taege Snap Lock® between each bearing including the end bearings and the nylon hanger bearings mounted on the box. Between two and five Snap Locks will be required, depending on drill width. Snap Locks for 19mm diameter shafts have three 6mm identifying holes drilled in them while Snap Locks for 20mm diameter shafts fitted to earlier model drills have only two 6mm diameter holes.
- g) Snap Locks can be put in place using either (i) a “trigger grip” where the index finger is placed under the snap lock half way between the central and outer identifying 6mm holes with the thumb on the top of the stainless shaft and pulling upward and backward. Or (ii) by placing the handle of an adjustable spanner in the same position on the snap lock and levering it upward and backward by rotating the other end of the spanner handle around the edge of the collector tray below.

Snap Locks may be opened by pressing down with a thumb on the topside of the outer extremity at either end, depending on which side is to be opened. The entire snap lock can be removed from the second shaft by grasping the open side of the lock between the thumb and the index finger, holding it firmly and rotating the lock sideways through 90 degrees while applying thumb pressure to the outer end of the lock.

5.18 Checking and Adjusting the Working Position and Clearance of Sponges

Two opposing sponges cover each outlet on the box. Sponges are attached to central cores using a contact adhesive (usually Ados). Cores are held in place on the seed shaft using a 4mm grub screw. Correctly located on the seed shaft, sponges should just cover the two side wipers attached to each outlet on the box. The proximity of sponges to these wipers is most easily seen placing one then the other shaft of sponges into the drill, making sure the drive shaft is properly seated into the driving roll pin on the right hand end, then viewing them across the box opening and adjusting them accordingly. It is easiest if all the grub screws are lined up on respective shafts. Shafts may be rotated by, lifting the Jockey wheel clear of the land wheel, and then rotating the calibration handle.

Seed sponge assemblies when locked in the working position using the Snap Locks should just touch each other; the lower face of the seed boxes; and, the seed wipers. With the lids and wind flaps open, it should not be possible, particularly for small seeds to see light around these “touch points”, viewed from either the underside, or the top side of the drill. These tolerances are less critical for cereals, coarse grains and fertilizer, where gaps of up to 0.5 to 1.0mm are acceptable.

Sponge clearance is adjusted with sponges locked into their working position, by partially slackening off the retaining bolts on the two end-block bearing assemblies as well as the intermediate hanger bearings, then gently easing the bearings nearer to the working surface of the box using a suitable lever (piece of wood or box section) placed on top of the seed collector tray. While doing this, care should be taken not to slacken off the retaining bolts so much that bearing assemblies fall away during adjustment, leaving them to be held in place manually while the retaining bolts are tightened. This can cause un-even adjustment.

Replacement sponges may be purchased either as complete units with cores, or only as sponges. Old / damaged sponges can be easily stripping off the central core, and new sponges attached after cleaning the old core with alcohol / Methylated spirits / petrol. While fitting new sponges, care must be taken not to compress the sponge while it is being slid over the central core after contact adhesive has been applied. The best method is to first place the new sponge into a suitably sized receptacle (empty tin or piece of pipe), then rotating the new core down into the central hole using a gentle spiral motion, after applying contact adhesive to the central core.

If the sponges wind seed back into the box rather than feeding it out, remove the end drive block assembly into which the seed / fertilizer sponge assemblies fit. Rotate it 180 degrees then refit ensuring that the driven gear on the end of the seed/fertilizer box (i.e. to which the box sprocket is attached) is forward, nearest the gearbox.

5.19 Calibrating Seeding / Fertilizer Rate

Important: To avoid permanent damage to drill gear boxes, the Jockey wheel should always be first lifted clear of the land wheel and the calibration handle rotated (toward the seed / fertilizer boxes) continuously while the sowing rate lever is adjusting. This ensures the fingers in the gearbox mesh properly.

During calibration collect the seed over the full width of the drill. 40 turns (for a 3.6m drill) and 50 turns (for a 3.0m drill) of the calibration wheel represents 100th of a hectare, ie. If you are wanting a sowing rate of 25kg/ha then you would want to have 250g of seed collected after the 40 or 50 rotations. (In the first instance it is easier to turn the wheel 10 rotations for a 3.0m and 8 rotations for a 3.6m and you should get 50g). When that is achieved then finer tune the calibration by using the 50 or 40 turn method. These calibrations are made after the system has been adequately primed by turning the calibration handle sufficient turns with the gearbox setting wide open, until seed drops freely in the collection tray. Area is measured in units of 100m² using a hubometer supplied standard, and/or a digital meter available as an optional extra.

The coarse setting for sowing rate is adjusted by releasing the tensioner spring on the chain idler on the right hand side of the gearbox and for small seeds, setting the drive chain from the small 12 T gearbox sprocket to large lay shaft 30T sprocket and re-setting the tensioner spring by hooking the tail of the spring under the locator pin. On this setting the drill will sow between 2 kg of brassica when set at 2 and 20 kg of grass - clover mix set on 12 against the fine adjustment, set slackening off the retaining thumb nut and raising or lowering the indicator arm. Zero on the indicator is neutral. The gearbox cannot be worked reliably below

1.5 on the indicator arm, after which there is a risk of it entering neutral. Each graduation on the indicator scale represents approximately a 10% change in sowing rate for respective crops.

For higher rates of pasture mix and cereals, it is necessary to change the chain across so that it drives from the large sprocket to the smaller one. For sowing peas, beans and/or very high rates of fertilizer, the final (48 or 57T) sprocket on the end of the seed / fertilizer box will need to be changed for a 30T sprocket using a shorter drive chain. Both are supplied as optional extras.

5.20 Area Meter

Drills hubometers are calibrated to measure area down to 100m². Reading from the right, the first digit is 100th and the second 10th of a hectare. Twenty-one and ¾ hectares would be read as 2175 on the meter. Hubometers are not interchangeable between different drill sizes; 545 RPK models suit the 240 series drill; 500 RPK the 300 Series and 400 RPK the 360 Series drill. Hubometers cannot be returned to zero and should not be tampered with if the manufacturers warranty is to remain valid.

Taege digital area meters may be purchased as an optional extra, and fitted with the sensor unit bolted just forward of the gearbox and the magnet attached to the calibration wheel. Instructions for mounting and calibrating these units are contained in Annex V.

5.21 Keeping Boxes Clean

Boxes should be regularly washed out with a high-pressure hose once the rollers have been removed; especially fertilizer boxes. Seed should not be left in boxes since it attracts vermin. Residual fertilizer left in boxes hastens corrosion and may build up on boxes along the surface where sponges operate. In time, this may tear the rollers causing permanent damage.

Store the machine under cover to avoid rust on all working parts.

Cleaning – if the machine is not required for some time or at least a week when in use, clean the machine down thoroughly and give special attention to Fertilizer box where corrosion can be a problem. Remove ... wash out .. long term / end of season spray with Kerosine.

Seed and / or fertilizer must not be left in the boxes. Boxes should be cleaned out and washed. Overnight, Snap Locks® should be opened and one set of rollers per box removed. Both sets of rollers should be removed for medium and long-term storage. Rollers should be stored in sealed 50mm plastic tubes (i.e standard 50mm plastic down pipe) to ensure they retain their shape and to protect them from vermin, particularly the seed sponges.

5.22 Bolted Connections

All bolts and grub screws should be re-tightened after the first 10 ha of use. There after, tyne and tip bolts should be tightened after every four hours use until they seat in, then daily, and other bolts at regular 30 hr intervals (i.e. every 50 to 100 ha). Nyloc nuts should be replaced or a spring washer added after they have been removed more than once.

5.23 Tynes and Tips

Tips last for between 300 and 800 hectares and usually wear very evenly depending on drilling conditions, after which they must be changed as a complete assembly. Mild steel side plates on the tips may wear sooner and need to be either replaced or built up using hard surfacing. Tips should be removed immediately if the facing tungsten tile becomes dislodged, since if it is noticed in time, it can be replaced and the tip used as normal. Tips may be used until they

become so narrow that they break. It is possible to build up tips, but this is not normally economic.

The base of tips should be level when viewed along each tool bar from the underside of the drill. Tynes occasionally bend or break and have to be replaced. This should be done by unbolting the retaining plates from the tool bar, then replacing the tyne and refitting the retaining bolts using new spring washers. Care should be taken to tightened the retaining bolts evenly, so the tyne seats squarely on the tool bar with the leading bolt lying over the location mark cut vertically into tool bar. Fine adjustment of tyne row-to-row spacing can be achieved without changing the position of the leading bolt by moving the tyne laterally between the two rear bolts on the clamp assembly.

Tips are held in position using 35 x _ mm metric bolts of grade 10.6 hardness and a ---- flange nut. Occasionally flange nuts may not stay tight on the tyne. These may be replaced using a heavy galvanized washer and nylock nut, to give satisfactory results.

Turning repeatedly over a short radius while the drill is still in the ground should be discouraged since it puts undue lateral strain on the tynes and tyne mounts, which over time may push them out of line on the tool shafts.

The drill may tend to drift sideways downhill and one or more tynes may overlap while attempting to drill 50 to 60mm deep along the contour on steep ground when the ground is very hard. For example, when cereals are being sown deeply. The same may happen when harrows and/or a roller are being towed. In these situations, it is always best to strike out the paddock across the contour to minimize sidling. For cereals, lightly surface work the paddock once or twice with a maxi till prior to drilling. This will assist full penetration of the drill boot to the required sowing depth using the standard side plates, without tynes overlapping. Alternatively, specially designed drilling tips may be used with modified side plates to aid deep penetration and tracking under these conditions. Surface working, if practiced using a maxi till grubber should be no more than 40 to 50 mm deep, such that the final drilling depth can lie just below this, around 50 to 60 mm.

.... Tyne spacing – even tightening of bolts

Tungsten tiles can be replaced, the boots built up / re-surfaced and the attached mild steel side-plates hard surfaced and/or replaced.

5.24 Seed Hoses

Heavy black rubber hose sold, as an optional extra should be fitted using a mixture of water and detergent. It is considerably more durable than the grey plastic hose provided standard. However, it does limit the vibrating action of tynes to some extent, and it is more difficult to fit and remove from the collector tray outlets and the pipes welded to the tips. Removal of this hose from pipes attached to the tip assembly is best achieved by first removing the tip assembly from the tyne then forcing four screw drivers down between the rubber hose and steel pipe past the point where it clears the end of the steel pipe and levering out and up while pulling back on the tip. Usually this requires two people.

Seed hoses should be cut to length while the drill is sitting on the ground in the working position, thereby ensuring that there is not excessive slack (droop) for seed to lodge in.

Seed hoses are usually plumbed in a direct line from the tip to the outlet on the seed collector tray below the box. Unless they need to be swapped at the collector tray end with the adjacent

hose to stop them rubbing on the chassis, as with the two hoses nearest to where the angle irons supporting the tread plate are bolted to the end profiles.

5.25 Hydraulic System

Tractor hydraulics must be operated using the float option for optimum penetration and contour following (irrespective of single or double hydraulics hoses being fitted), to ensure that the driving land wheel remains in contact with the ground at all times.

All drills are fitted with double acting rams. The second optional hose kit is fitted simply by (i) replacing the single tee hose mount on the drawbar headstock with a double tee, (ii) removing the breather bung from the second hole in each ram, and then (iii) connecting the three extra hoses, one each between the second headstock tee and the rams and the other between the second headstock tee and the tractor.

After fitting the second set of hoses be sure to double check that hoses are not reversed top to bottom on alternate sides, or serious damage will occur, not covered by warranty.

5.26 Tyre Pressures

Recommended tyre pressures are ___ kp(45psi) for jockey wheel and _____ (18-20 psi) for land wheels. Irregular sowing rates will result if jockey wheel tyre is under inflated. Drills bounce excessively if land wheel tyres are over inflated.

5.27 Lubrication

Grease axle and hydraulic ram pivot points every 25 Ha using a high pressure gr; remainder every 100 Ha. Pump sufficient grease into bearings and bushes until fresh grease becomes visible extruded from the central shaft or around the seal.

Don't lubricate nylon bushes and/or bearings, as this will make an abrasive paste that will accelerate wear. This includes all bearings, bearing hangers and snap locks in the seed and fertilizer boxes.

Chains should be oiled using good quality chain oil.

Gearboxes are maintenance free, apart from checking oil **levels how to do it?**

Lubrication chart – type and frequency – include gearbox

Use a pressure grease gun on the following points daily:-

Wheel hubs – grease how to maintain

5.28 Lift Points and Deck Transport

The drill may be safely lifted by attaching strops to each end of the 75mm RHS bar across the front and the 50mm RHS bar where fitted, incorporated in the rear drawbar. Otherwise, D shackles should be attached to the rear drawbar mounting holes located on the main frame in the end profiles. Care should be taken to pass strops under the horizontal safety handle attached to the rear box.

For deck transport, the drill may be safely stored and stropped down sitting on the deck. To protect the deck, it is best to transport the drill supported on 4 jack stands, one each placed under

the front and rear tool bars just inside the end profiles, such that the tynes are clear of the deck. Straps may be safely placed over and locked onto the 50mm RHS beams forming the top of the drill frame, carrying the pedestals upon which the seed / fertilizer boxes rest.

5.29 Drawbar, Depth Set and Level

Drawbar height adjustment:-

While being towed by your tractor in the working position, you should have the bottom edge of the end plates parallel to the ground. The drawbar height can be adjusted to suit the height of your tractor tractor hitch and the positioning of wheels by:-

- (A) the turnbuckle top link stay can be adjusted
- (B)
- (C) Do not drive off with the jack in the vertical position.

5.30 Wheel Scrapers

Clearance between scrapers and the land wheel tyres should be adjusted after the working depth of the drill has been established, and re-adjusted thereafter for optimal performance each time the sowing depth is changed.

5.31 Jack Stand

Jack Assembly

1. Jack Handle assy – spring roll pin (size)
2. Jack outer
3. Thrust bearing
4. Bearing support collar
5. Jack screw
6. Jack inner

Complete Jack assembly ...

5.32 Jockey Wheel

- setting clearance – broadcasting – how soon begins to drop seed – locking up for calibration.

Tip bolts 8.8 hardness supplied 10 on contractors models combined with flange nuts
--- otherwise nylocks Use spring washer if the do not hold.

Replace with the same brand of tyne to ensure even sowing depth – degree of curvature
... make sure retaining bolts evenly tightened.

5.33 Roller Chain and Chain Tensioners

Calibration

Careful calibration is important particularly for small seeds. The feed mechanism should be adjusted according to the required setting and the sowing rate can be checked by the following method:

Calibration – calibration charts - Include scales section Have to set blank charts which operator completes or rough guide for:

Seeds: (a) Temperate Small Seeds – Range 1 (b) Temperate Cereals – Range 2 (c) Peas and other Large Seeds – Range 3

Fertilizer and Other Particulates: granulated

(Photo Insert)

Warning:

- **Before adjusting the gearbox always ensure that the jockey wheel is clear of the driving wheel and free to rotate. This is achieved either by adjusting the height of the drill above the ground, or locking the jockey wheel in the fully lifted position using a locking bar as shown below (Photo); and**
- **Be sure to rotate calibration wheel while adjusting sowing rate via the quadrant indicator arm (Photo).**

Failure to do this may result in permanent damage to the gearbox.

5.34 Area Meter

- a) Manual Hub Meter - 540, 500 and 400 RPK
- b) Taege® Digital Area Meter Calibration given in annex V

5.35 Covering Harrows and Rollers

Cambridge roller / tyre roller / chain harrows / railway iron – light and heavy.

5.36 Seasonal Storage

6 Fault Finding and Remedial Action

Indicator arm / boxes not square / grub screws loose / chain idler off line / sponges not properly adjusted / not enough snap-locks on stainless tube / tines bent – back of leg or within circle – not tighten evenly / drilling too fast – tyres too tight / jockey wheel tyre not fully inflated / no

outer bearing box on boxes / boss on sprocket fouling on seed box / always take out sponges and systematically check where system binding up / central bushes on radius arm binding up / seed back into box – bearing block back to front

7 Work Sheets

(couple of lined pages for notes)

