Teagle

XT24 & 48

Fertiliser Spreader

Instruction Book & Parts List

XT24 - from Serial No: 3385

XT48 - from Serial No: 5217

Serial No: _ _ _ _ _ _ _ _ _ _ _ _ _

SAFETY FIRST!

1.**READ THE INSTRUCTION BOOK THOROUGHLY** before attempting to operate or carry out any maintenance on the machine. If you do not understand any part of this manual, ask your dealer for assistance.

2.**ALWAYS CARRY OUT SAFE MAINTENANCE.** Never clean, adjust or maintain the machine until the engine has been stopped, the machine come to rest, the PTO disengaged and the key removed.

3.**NEVER WORK UNDER A MACHINE RAISED ON THE 3-POINT LINKAGE** unless it is securely supported.

4. **NEVER OPERATE THE MACHINE WITH <u>ANY</u> PARTS OR GUARDS MISSING.** Check that all guards including the PTO shaft guards are in good condition and in place before operating the machine.

5 **OPERATE SAFELY.** Before starting work, check that there are no persons or animals in the immediate vicinity of the machine or tractor. Always maintain full control of the tractor and machine. Ensure that you know how to stop the tractor and machine quickly in case of emergency.

6. **SECURE THE PTO GUARD BY MEANS OF CHECK CHAINS** to suitable points on the tractor and machine to prevent the outer plastic shield from rotating.

7. **NEVER STAND BETWEEN THE MACHINE AND THE TRACTOR WHEELS.**

8. **DO NOT WEAR LOOSE OR RAGGED CLOTHING**

9. **BEWARE OF DUST.** Under dusty conditions, keep the cab windows and doors closed. The use of a dust mask conforming to EN149 is strongly recommended.

10. **BEWARE OF HIGH NOISE LEVELS**. Some tractor/implement combinations give noise levels in excess of 90dB at the operator's ear. Under such circumstances, ear defenders should be worn. Keep cab windows and doors closed to reduce noise level.

Throughout this handbook, the term `tractor' is used to refer to the power source used to drive the machine. It does not necessarily refer to a conventional agricultural tractor.

HEALTH AND SAFETY AT WORK

Our equipment is designed so as to conform with current Health & Safety Regulations and therefore poses no significant hazard to health when properly used. Nevertheless, in the interests of all concerned, it is essential that equipment of our manufacture is used in accordance with the instructions that are supplied or are available from our Technical Staff.

Legislation requires that all operators are instructed in the safe operation, cleaning and maintenance of equipment and machines. This handbook forms part of that instruction and it must be read and understood before fitting the machine onto the tractor or attempting to use it.

Your supplier is responsible for carrying out any necessary pre-delivery inspection, fitting the machine onto the tractor and test running. The supplier must also give instruction in the safe use, maintenance and adjustment of the machine.

In the interests of safety, please ensure that the instructions referred to above are brought to the attention of all you employees who are to use the equipment. We recommend that the use of this equipment is restricted to capable trained operatives. Persons under the age of sixteen should not operate the machine and should be kept away from where it is being used.

WARRANTY

The standard warranty is for 12 calendar months against faulty materials and workmanship. Components supplied as part of the original machine, but manufactured by another company, e.g. PTO shafts, wheels etc., are subject to the original manufacturer's conditions and warranty.

Where repairs are carried out under warranty:

a) Claims for the fitting of non original parts will not be considered unless prior agreement has been obtained.

b) The repairer must be advised that the work is to be the subject of a warranty claim beforehand.

c) Any claim must be submitted within four weeks of the repair.

d) The damaged parts must be retained for inspection and returned carriage paid if required.

The right to withdraw warranty is reserved if:

a) Non-original parts are fitted.

b) The machine has been abused, badly maintained or used for purposes other than that for which it was designed.

EC Declaration of Conformity

conforming to EEC Directive 2006/42/EC

Teagle Machinery Ltd.
Blackwater
Truro
Cornwall
TR4 8HQ
United Kingdom

declares in sole responsibility that the

XT Twin Spindle Broadcaster

to which this certificate applies
conforms to the essential Health and Safety requirements of
EEC Directive 2006/42/EC & 2004/108/EC.

To effect correct application of the essential
Health and Safety requirements stated in
the EEC Directives, the following harmonised standards were consulted:

BS EN ISO 12100-1
BS EN ISO 12100-2
BS EN ISO 13857:2008
BS EN 13739-1

Signed:
Duncan Wilson *(Engineering Director)*

Dated: 31st January , 2010

Person authorised to compile Technical File
Duncan Wilson,
Teagle Machinery
Blackwater,
Truro
Cornwall
TR4 8HQ
United Kingdom

Machine Serial No. . . . . .

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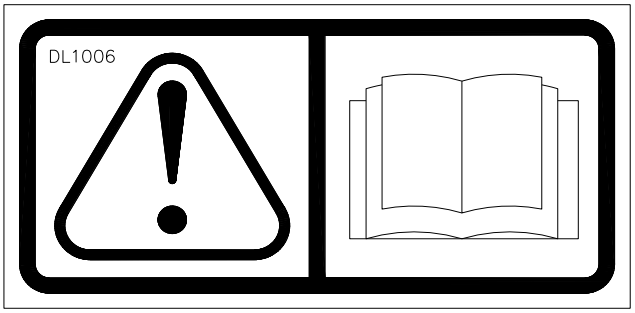
SPECIFICATIONS

Specifications	XT24	XT48
Capacity	675 litres (675 kg)	1350 litres (1350 kg)
Loading Height	1.17m	1.28m
Width	1.20m	1.92m
Length	1.05m	1.29m
Laden Weight	860 kg	1621 kg

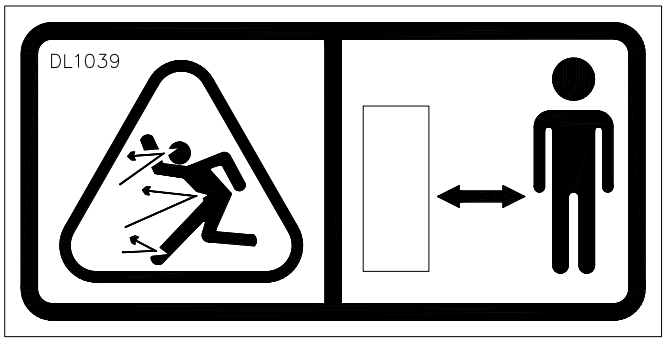
EXPLANATION OF PICTOGRAMS

Danger moving parts.

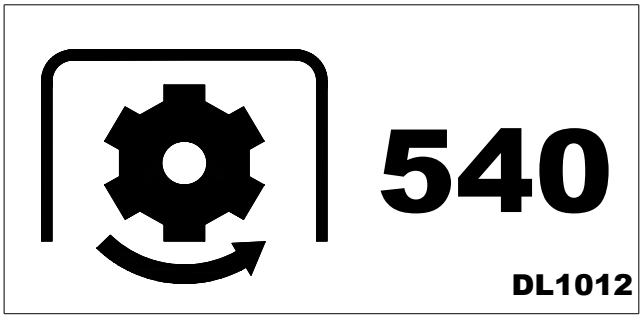
Allow machine to stop before any maintenance operation is carried out.



Please read instruction book before using the machine.



Beware thrown objects, keep your distance



Frequency and direction of rotation of PTO input shaft

SAFETY

In addition to the standard safety guidelines listed at the beginning of this hand book, the following special safety items apply to the XT range of broadcasters.

1. Never place your hands near the agitators or climb into the hopper when the machine is running.
2. Do not let anyone stand or sit on the machine.
3. Make sure that everyone is well clear of the machine before starting.
4. Never stand near, or let others stand near, the rotors when the machine is running.
5. Never place your hand over any hydraulic leak as oil under pressure may be forced into the bloodstream.
6. Many of the materials to be spread contain or are coated with chemicals. It is recommended that the operator follow the handling instructions supplied with the product to be spread.
7. When loading the machine ensure that the weight and lifting techniques used by the operator are not likely to cause injury.
8. Stability of the tractor / machine combination when fully laden must be considered when selecting the tractor to be used. Instability can lead to accidents particularly on sloping ground.

LEFT AND RIGHT HAND

Throughout this Handbook and Parts List, the terms Right and Left Hand apply to the machine when viewed from behind, looking towards the rear of the tractor.

IDENTIFICATION NUMBERS

When ordering spare parts, always quote the model number and serial number where it is known.

ASSEMBLY

When the machine is delivered, some items may require assembly before it is ready to use.

1. Remove all binding wire and packaging.
2. If the machine has a manually operated shutter,

fit the control rod guide and shutter control rod onto the front of the machine.

3. Unbolt the round metal guard from the front of gearbox. Fit the non shear bolt end of the PTO shaft to the gearbox and ensure the clamp bolt is tightened fully. Refit the metal guard.

GREASING AND GENERAL MAINTENANCE

GREASING

Use a good quality grease similar to Castrolease CL or Mobilplex 46. The greasing points are as follows:

1.	PTO Shaft - 3 nipples	Daily
2.	Shutter operating indicator	Daily
3.	PTO Shaft sliding members	Daily
4.	Rotor shaft bearings	Weekly
5.	Push/pull arm	Oil daily
6.	PTO Shaft locking plunger	Oil weekly

GEARBOX OIL LEVEL

With the machine on level ground, the gearbox oil level should reach the top plug on the front face of the gearbox casing. Top up as necessary using a medium grade or SAE90.EP oil.

Drain and refill the gearbox after the first season of work to remove any residual fine metal particles.

VANES

To ensure that an accurate spread pattern is obtained, it is essential that the rotor vanes are kept in good condition. Wear, giving a rippled appearance on the faces of the vanes, will reduce the fertiliser speed and cause a poor spread pattern. Replacement parts should be fitted as necessary.

AGITATORS

The position and state of the agitators has a very considerable influence on the amount of material flowing through the shutter aperture. It is thus most important that these are correctly fitted and maintained in good condition. They should be located at a height of
approximately 10-12mm. (3/8"-1/2") above the shutter. Only one agitator per spindle should be fitted.

Special agitators are available for powders and other difficult fertilisers. Table 1 below is aimed to assist in the selection of the correct agitator

Material	Agitator	Part No.
Prilled or granular fertiliser	Standard knife	MB2254
Urea	Standard knife	MB2254
Powders	Powder agitator	MB2119
Seeds	Standard knife	MB2254
Calcified Seaweed	Powder agitator	MB2119

Table 1. Agitator Type

SHUTTERS

In the event of the shutters ever being removed, it is vital that they are replaced in the correct positions. The longest side of each shutter should be nearest to the centre of the machine.

Should the shutters open unequally, release the locknuts and reposition the adjustment plate relative to the control rod.

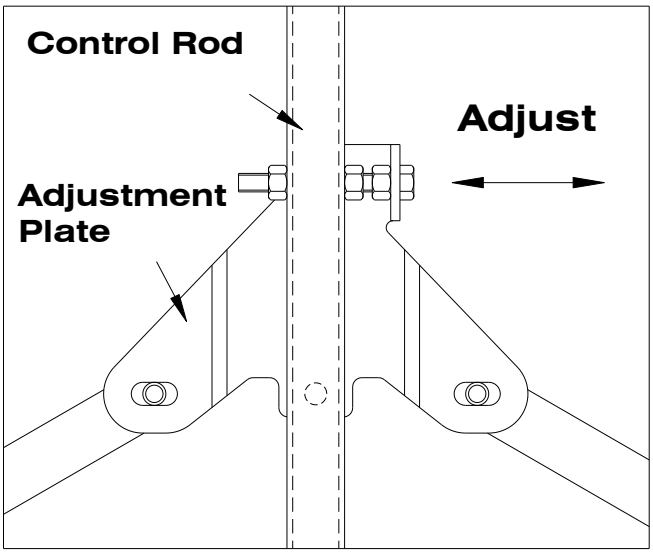


Fig.1 Shutter opening adjustment

CHECKING THE SCRAPER SPACING

Before loading the machine it is advised that the scraper above the vanes is checked for correct spacing to avoid interference when the machine is in use

The space between the scraper and cone above the vane is optimal at **1mm** before the machine is loaded, as the machine is loaded the distance will be reduced until it is at its maximum capacity.

The scraper is located just above the cone in a stationary position on either side of the machine, 1 per set of vanes. See Fig 2

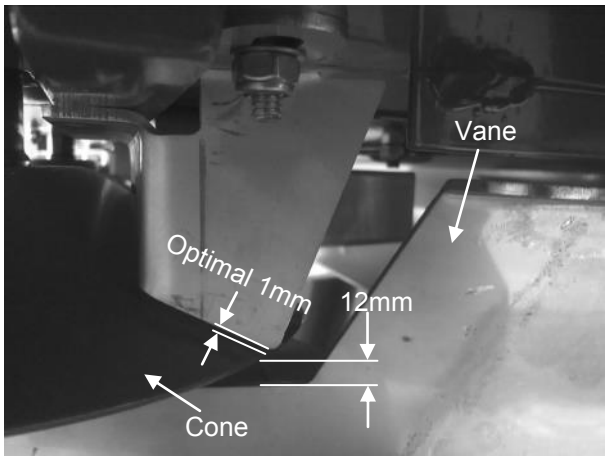


Fig 2. Scraper Layout

To allow room for the scrapers there should be a space between the cone and the underside of the mainframe, this should be a minimum of 22 mm. See Fig 3

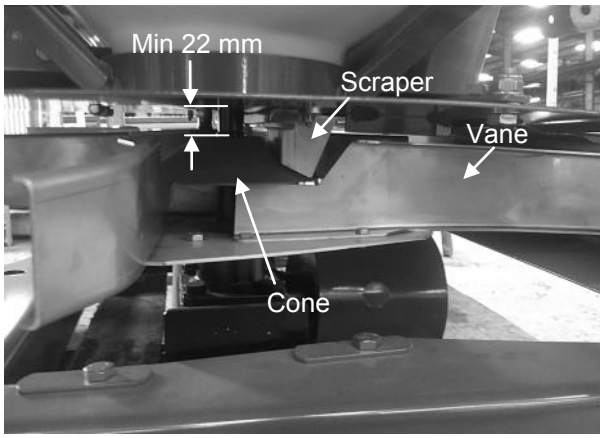


Fig 3. Scraper Location and Height

GEARBOX
After prolonged service, the gearbox may require attention internally, in which case the following notes apply.

To dismantle the gearbox, drain the oil and remove the input and output shaft assemblies. The main shaft and bearings etc. are removed through the left hand cover.

The input shaft, output shafts and main shaft assembly are sealed units and are serviced as assemblies. They may be dismantled by grinding out the welds and unscrewing the gears in the case of individual component failure, but it is recommended that this be carried out by Teagle Machinery due to the need for special equipment.

REFITTING THE GEARBOX

Assembly is the reversal of the above. Fit the main shaft first, ensuring that it is fully seated. Next fit the input shaft followed by the left hand and finally the right hand output shaft. The shafts should be individually adjusted in the slots so that the backlash can just be detected between each of the gears. Note that the output shafts must be synchronised such that the rotor vanes do not foul each other. When assembly is complete, check that the gears turn freely and fill with oil as instructed under 'Oil Level'.

Refit the gearbox in the machine such that the shafts are as central as possible in the holes in the hopper support plate. Note that the rotor assemblies must be removed from their shafts to enable the gearbox to pass up between the mainframe horizontal members. When the gearbox is in place, adjust its vertical position by means of packing washers such that the cones in the centres of the rotors run to within 2mm (1mm optimal) of the profiled scraper plates bolted onto the bottom of the hopper support plate. Rotate the rotors a full turn to check that the scraper does not rub on the cone and that the rotors rotate freely.

Failure to ensure that the scraper adjustment is correct will lead to fertiliser being carried around on the top of the cone which will adversely affect the spread pattern. Ensure there is sufficient clearance between all 4 rotor vanes and the return tip of the scraper of approximately 12mm (see fig 2).

The blade of the knife agitator should clear the base plate by 12mm.

The height of the agitator can be reset by removing the bolt and choosing a different height hole to secure it to the shaft, it is important that both agitators are set to the correct height so that the same flow rate is achieved through both rotors.

SHEARBOLT
A shearbolt is fitted at the tractor end of the PTO shaft. This should only fail under circumstances of exceptional overload. In the event of this occurring, replace the broken bolt with a replacement of the correct grade as shown in the Parts List.

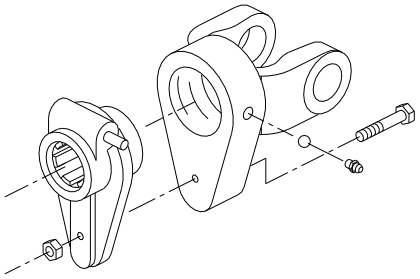


Fig.4 P.T.O. Shear bolt assembly

CLEANING

The XT Broadcaster hopper can be released from the frame without the use of tools to make cleaning easier. To assist cleaning displace the hopper sufficiently to allow thorough washing down of the machine to remove all traces of fertiliser.

Do not attempt to lift hopper from the frame manually due to it's size and mass. The hopper can be removed using suitable lifting equipment hooked under the upper rim.

After cleaning and before reassembly, cover all metal surfaces with anti-rust fluid, or if this is not available, use oil.

The Broadcaster must NEVER be stored unless it has been thoroughly cleaned. Most fertilisers contain acid, which quickly forms rust if not washed off. If the machine is cleaned properly, it will continue to give trouble-free service for many years.

Always store the hopper away from direct sunlight, as the plastic is affected by ultra-violet radiation. This applies particularly in tropical countries where the ultra-violet rays are more intense.

FITTING THE MACHINE ONTO THE TRACTOR

Fit the machine onto the tractor in the usual manner and fit the stabilisers or tighten the check chains.
Ensure that the PTO does not `bottom' by at least 30mm. (1"). Shorten as necessary. Check that the PTO shaft has at least 100mm. (4") still engaged when the spreader is lowered. The latter is particularly important when the tractor PTO is higher than normal.

The position of the handle for the manual shutter mechanism can be adjusted by altering the location of

the control rod guide. If the handle is incorrectly positioned it may be uncomfortable for the operator to use.

If the machine is fitted with a hydraulic shutter, the hoses must be connected into a double acting spool valve. If a hydraulic tilt system is fitted, the hose from the tilt ram must be connected into a single acting spool valve.

For normal use the height of the rotor should be 750mm. (30") above the ground or the growing crop, whichever is the highest. This height should be regarded as an initial setting and should be adjusted immediately upon entering work, such that the extremity of spread reaches, or overlaps, the previous wheel mark. This is vital in the interests of obtaining an accurate spread pattern.

The XT44, XT46 and XT48 incorporate extra linkage positions which will give approximately 250mm. (10") of additional height. The lower links are attached to a pair of removable brackets which fit into the bottoms of the front uprights and may be removed when not in use. These plates are not supplied with XT22 and XT24 machines, but they are available to special order. When hitching up and uncoupling the machine from the high lift position, the machine should be parked upon pallets or other firm support to give sufficient height. When using the high lift points for the first time, check PTO shaft lengths in both the raised and lowered positions as they may be different from those required for normal use.

With the machine at its normal working height, the top of the hopper must be parallel to the ground from side to side. This setting should be made with the tractor on a firm flat surface and should be checked using either a steel tape or piece of wood. If the machine is not parallel to the ground, the spreading pattern will be seriously affected.

FOR PRILLED FERTILISERS AND SEEDS the top link length should be adjusted such that the machine is parallel with the ground when at it's normal working height (ref. Fig. 5).

FOR GRANULAR FERTILISER AND UREA the top link length should be adjusted such that the rear of the hopper is 75mm. (3") higher than the front (ref. Fig. 6)

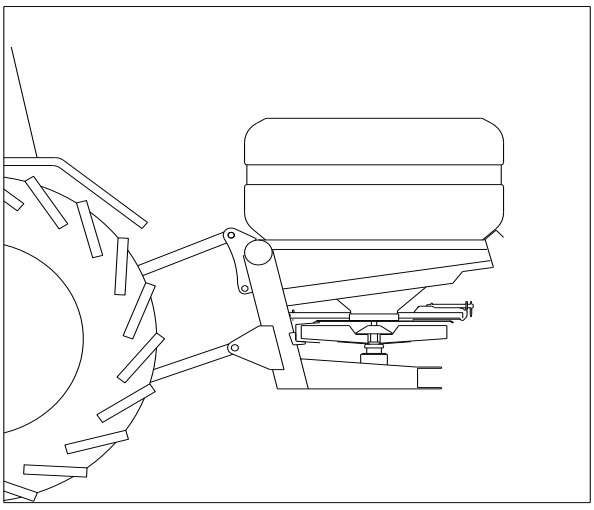


Fig. 5 Setting for Prill & Seeds

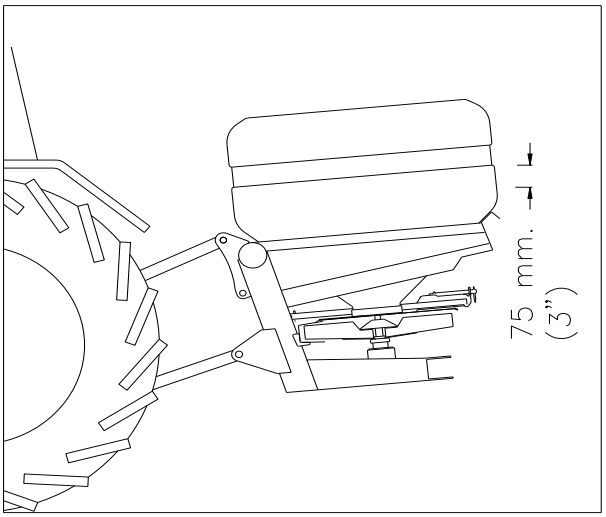


Fig. 6 Setting for Granular Fertiliser and Urea

SPREAD PATTERNS & SPREADING INSTRUCTIONS

THE BASIC CONCEPT

A fertiliser spread pattern is a graphical representation of different concentrations across a spread width. Fig.5 shows how the height of the graph represents the amount of fertiliser in each area relative to the tractor

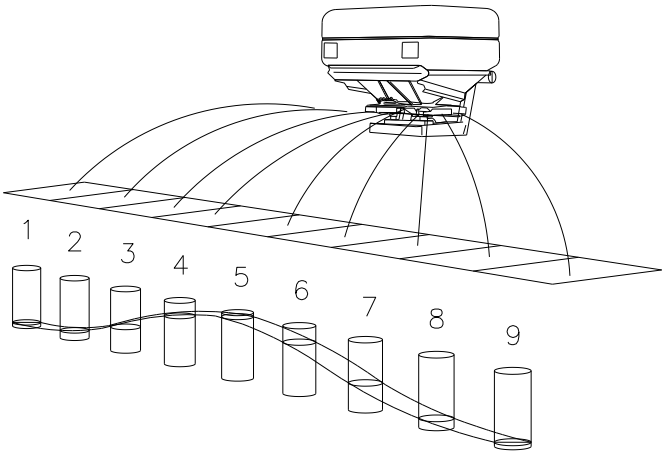


Fig.7 The Spread Pattern

THE TEAGLE SYSTEM

The Teagle spread pattern has been developed such that when two adjacent bouts overlap fully, the graph of the total spread pattern is a straight line. This concept is illustrated in Fig. 8.

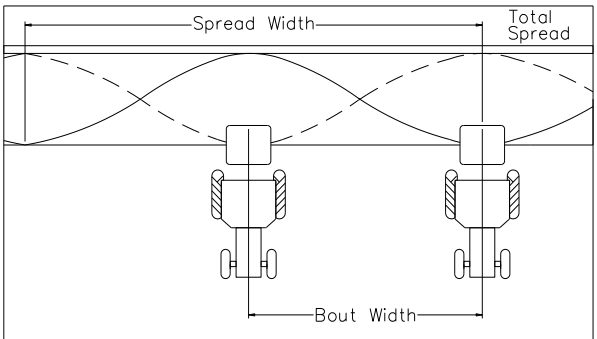


Fig.8 The Teagle Spreading System

Using the Teagle system makes it easier to drive to the correct bout width by watching the extremity of the spread and matching it to the previous wheel mark

The Teagle twin rotor spreaders have contra- rotating rotors which give a fully overlapping spread pattern as the diagram in Fig. 9 shows. The overlapping of the spread by normal driving gives a total of four layers of spread.

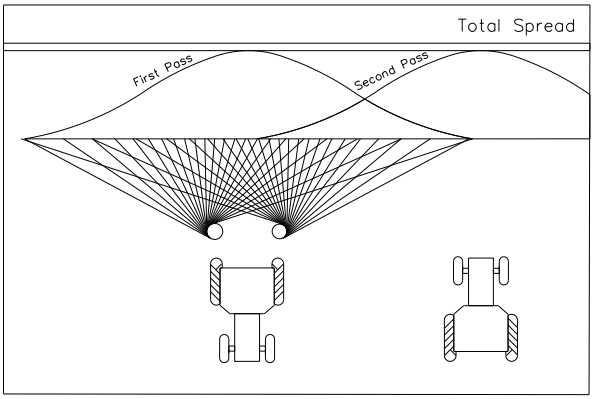


Fig.9 The Teagle Contra Rotating Rotors

Variations between the spreading characteristics of one fertiliser and those of another will affect the spread pattern of a single rotor. The result will be a sideways shift in the peak. Since the two rotors rotate in opposite directions however, the amounts spread to either side will be identical and, with overlap, the overall spread pattern will remain symmetrical. Fig.10 shows this concept.

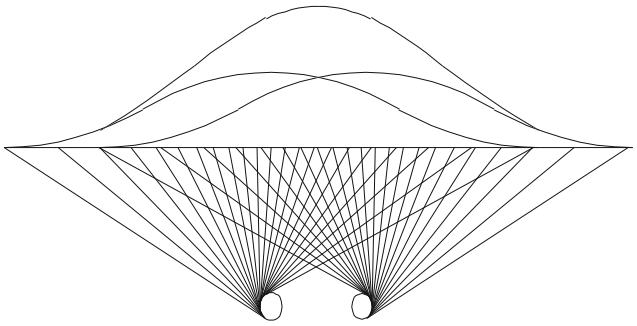


Fig.10 Twin Overlapping Rotors

SPREADING INSTRUCTIONS

SPREADING SYSTEM

As explained previously, always drive so that the extremity of the spread pattern just reaches the previous wheel mark.

Although the XT Twin Spindle Spreader will give an equal spread to both sides, wind will always have an adverse effect upon the spread pattern and spreading under excessively high wind conditions is not recommended.

SHUTTER OPENING

The shutter adjustment screw is situated at the rear of the machine. Turn the screw so that the pointer moves rearward as far as it will go and check that its rear face is aligned with zero when both shutters are fully closed.

To set the shutter opening, determine from the spreading charts the scale reading to give the desired spread rate and simply turn the adjustment screw until the pointer rear face is aligned with the correct scale reading. The fact that the machine has two shutters has already been taken into account in the shutter linkage and spreading charts, no further allowance should be made.

If possible, set the shutter opening before filling the machine. Check that the shutter linkage operates freely and that both shutters open by exactly the same amount.

When operating the shutter manually, always move the control quickly and positively to ensure that the shutter is moved fully in either direction. When using the hydraulic remote system, ensure that the hydraulic ram is operated over its full stroke otherwise the shutters may not open or close fully.

TRANSPORT

Always disengage the PTO when travelling any significant distance with fertiliser in the hopper. Unless spreading is actually in progress, continuous agitation of the fertiliser at the bottom of the hopper will cause the formation of powder, with consequent caking. This only applies during transport, turning at the headlands with the PTO engaged is not a problem.

SPREADING THE FIELD BOUNDARY

The XT broadcasters are fitted with a tilt mechanism so that the spread towards the boundary can be made more intense. The spread on the field side will be wider than normal. With the machine tilted, it is necessary to drive closer than usual to the hedge. The concept is shown in Fig. 11.

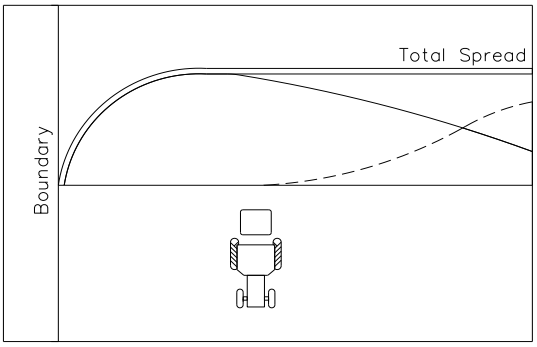


Fig. 11 Spreading the Headland
Using the Tilt Method

OPERATING THE MECHANICAL TILT MECHANISM

To operate the mechanical tilt mechanism, lower the machine onto the ground and pull on the rope to disengage the locking bar. Raise the machine on the linkage allowing the machine to tilt to one side, then release the rope. To return to normal working, lower the machine onto the ground allowing the locking bar to latch in, then raise the machine again.

OPERATING THE HYDRAULIC TILT MECHANISM

Where the hydraulic tilt is fitted, simply operate the hydraulic ram to remove the weight of the machine from the locking bar, pull the rope and lower the ram, thus allowing the machine to tilt. To return to normal working, pressurise the ram to lift the machine and allow the locking bar to drop into place. Release the ram pressure, thus ensuring that the system is mechanically locked.

GRAIN & GRASS SEEDS

XT Broadcasters can be used very effectively to sow grain and grass seeds. When broadcasting seeds or grain, first roll the land, then sow the seed and cultivate using a spring tine harrow. If the ground is too soft during the sowing operation, wheel marks may show in the growing crop. The depth of cultivation will be dependant upon the seeds being sown.

SMALL SEEDS

Seeds such as Rape and Kale may easily be sown with the XT Broadcaster. The method normally used to sow small seeds is to mix them with a quantity of fertilizer, then use the sowing chart for fertiliser to calculate the setting required.

OBTAINING AN ACCURATE ASSESSMENT OF SPREAD RATE

Imperial Table per Acre	Bout Width			
	12’	24’	32’	40’
Factor at 4mph	62 (618)	31 (313)	23 (234)	19 (191)
Factor at 5mph	49 (493)	25 (250)	19 (187)	15 (152)
Factor at 6mph	41 (411)	21 (208)	16 (156)	13 (127)
Factor at 8mph	31 (308)	16 (156)	12 (117)	9 (95)

Table 2. Calibration Factors
(Figures in brackets represent the number of seconds it takes to cover an acre.)

Metric Table per Hectare	Bout Width			
	3.7m	7.3m	9.75m	12m
Factor at 6 kph	163 (1628)	83 (825)	62 (617)	50 (502)
Factor at 7 kph	139 (1393)	71 (706)	53 (529)	43 (430)
Factor at 8 kph	122 (1217)	62 (617)	46 (462)	38 (375)
Factor at 10 kph	98 (976)	49 (494)	37 (370)	30 (301)
Factor at 12 kph	81 (812)	41 (411)	31 (308)	25 (250)

Table 3. Calibration Factors
(Figures in brackets represent the number of seconds it takes to cover a Hectare.)

Use a plastic sheet and hang it under the machine so that the quantity of fertiliser or seed that passes through the feed system is caught. See that the sheet is clear of the revolving spinner plates. Weigh the quantity of seeds or fertilizer caught in ten seconds, then multiply the weight by the factor as determined from Table 3. This will give the quantity spread per acre/hectare.

If seeds are being calibrated using the above method, only pass them through the spreader once as each time they pass through, they will flow at a faster rate.

Multiplication Factor X amount caught = spread rate per acre

CHOICE OF FERTILISERS

The Teagle XT Twin Spindle Spreader is an extremely accurate machine, but as with any broadcaster, it is important that only good quality, reputable fertilizers are used.

Avoid brands which have a wide variation in particle size. The larger particles will travel further and will tend to get thrown to the outside of the bout whilst there will be a concentration of small particles nearer the machine. If the different chemical constituents are in widely differing sizes of granules, it will clearly be impossible to get an even spread of chemicals across the field. Fertilizers having large, evenly sized particles are easier to sow accurately at a good bout width and are less prone to the effects of side winds.

Fertilizers consisting of low density irregularly shaped particles - such as urea - are difficult to spread. These may necessitate a narrower than normal bout of width, so that overlapping to the previous wheel mark is achieved.

TRAILER DRAWBAR

XT Broadcasters are fitted with trailer drawbars. These are intended for towing light trailers and should not be used to tow heavy trailers such as those normally used on a tractor pick-up hitch.

INSTRUCTIONS FOR READING THE GRAPHS

1. Determine the spread rate, e.g. 150 Kg. of prills per acre (371 kg per Hectare).
2. Decide on a speed which is practical and which coincides with a PTO speed of 540 rpm., say 5 mph (8 kph).
3. Determine the bout width which is to be used, say 32ft (9.75m).
4. Choose the axis along the bottom of the graph which corresponds with the chosen bout width and draw a vertical line at 150Kg/acre (371 kg/ Hectare) until it Intersects the horizontal line at 5 mph (8 kph)., as shown in Fig. 10.
5. Extend this point obliquely upwards to the left to determine the shutter setting in mm., approximately 52mm in this example (Fig. 12).

During periods of high humidity, it may be necessary to increase the settings slightly. This particularly applies to prilled nitrogen.

If it becomes necessary to use a bout width for which there is no corresponding axis at the bottom of the graph, then the shutter setting must be changed accordingly. In the above example, if it was found necessary to spread at a bout width of 36ft., then the new setting would be:-

For Imperial

$\frac{52}{32} \times 36 = 59\text{mm}$

For Metric

$\frac{52}{9.75} \times 10.97 = 59\text{mm}$

Due to the variability between fertilizers, the spreading chart can only be used as a guide. When an accurate spread rate is required, it is recommended that the plastic sheet calibration method is adopted.

Note that in the case of the grain and the grass seed charts, the only spread widths shown are 26ft (8 metres) and 16ft. (5 metres) respectively. These will normally suffice, but in the event of wider or narrower bout widths being operated, the above formula should be used to determine the corrected shutter setting to take into account the bout width change.

Notes

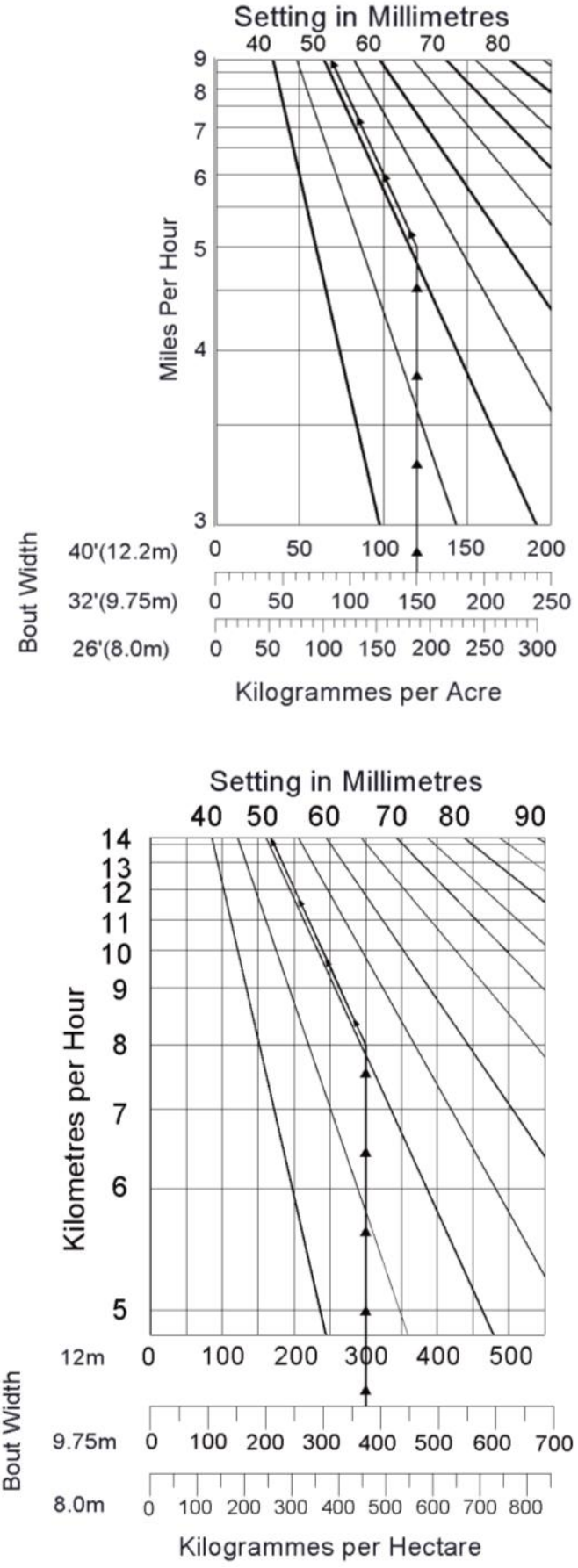
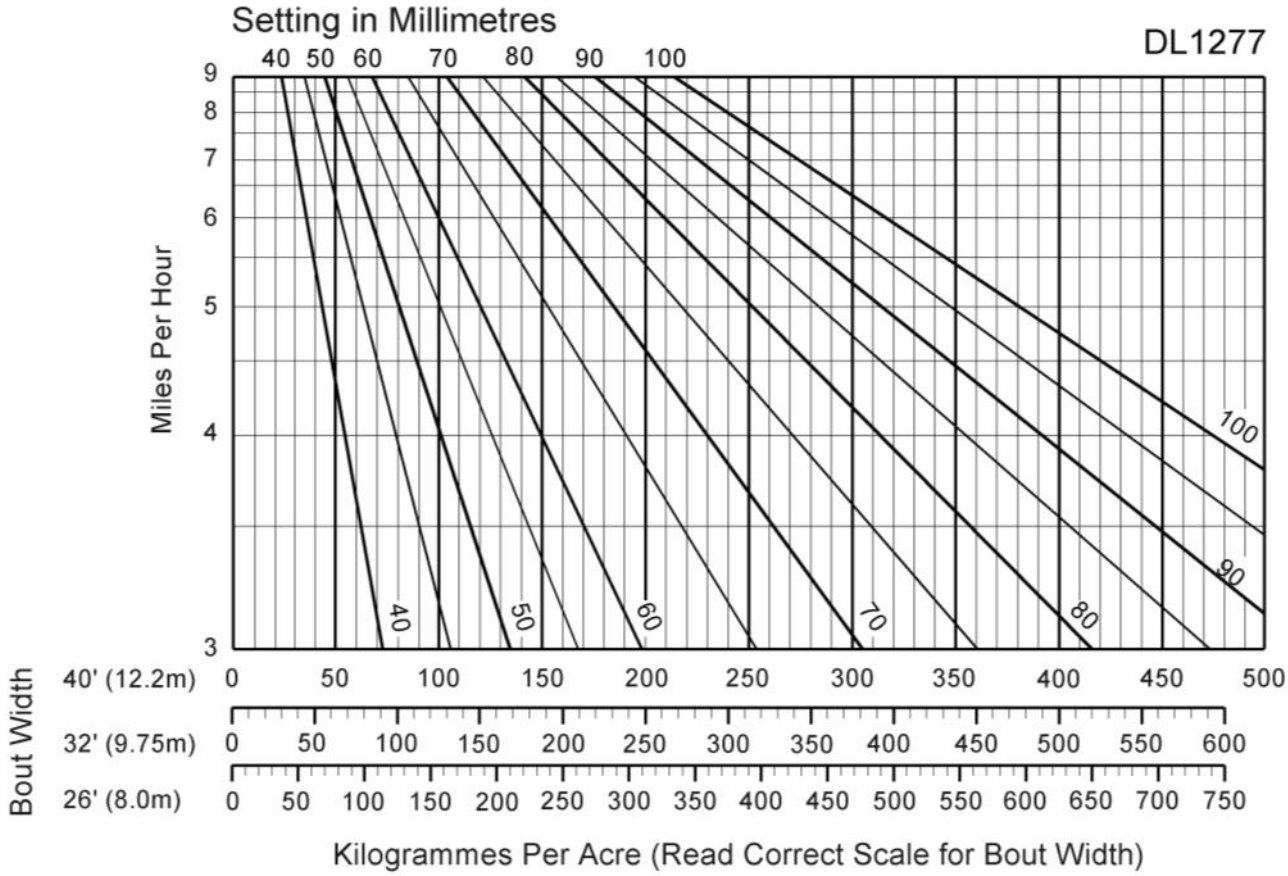
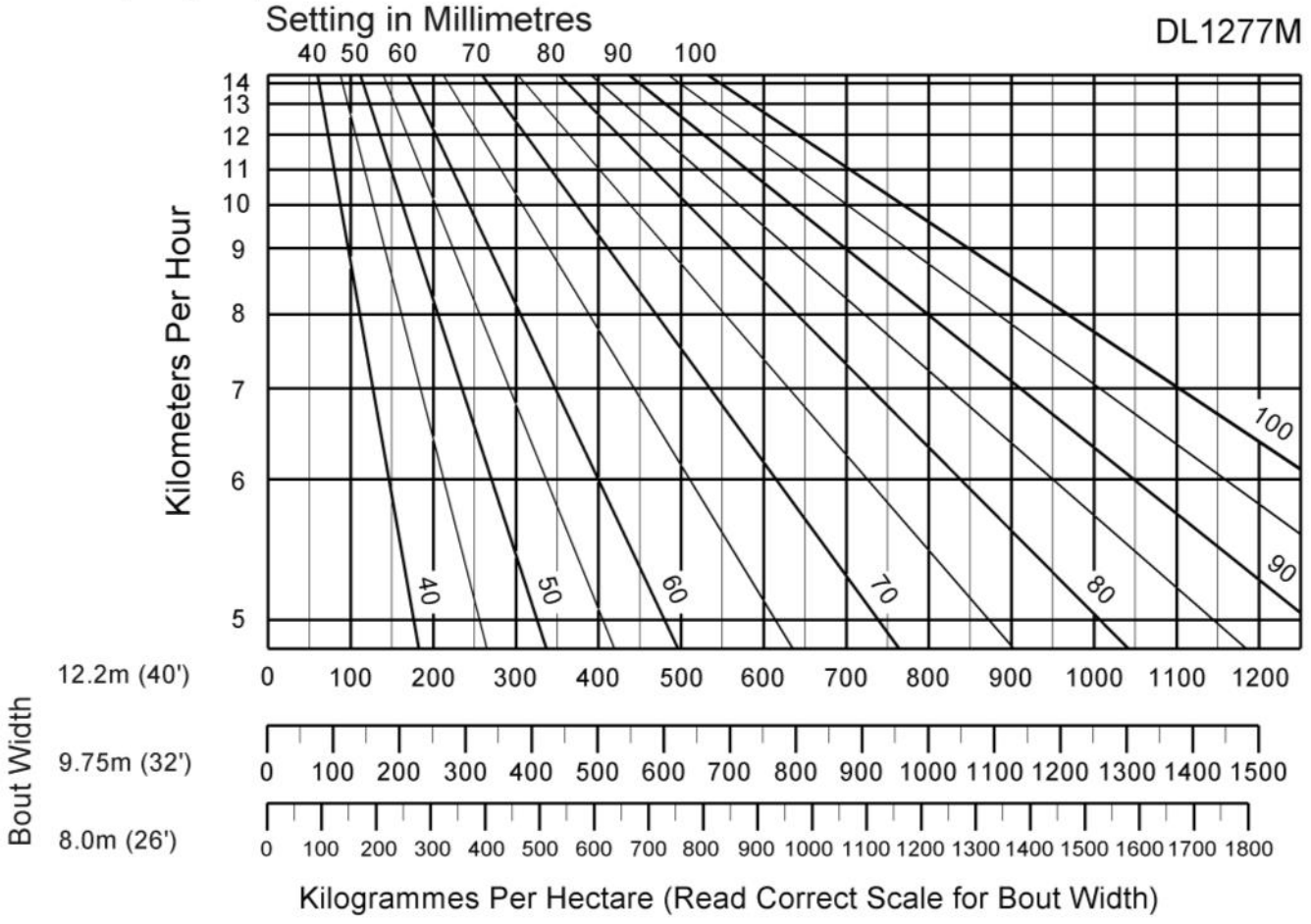


Fig.12 Reading the Graph

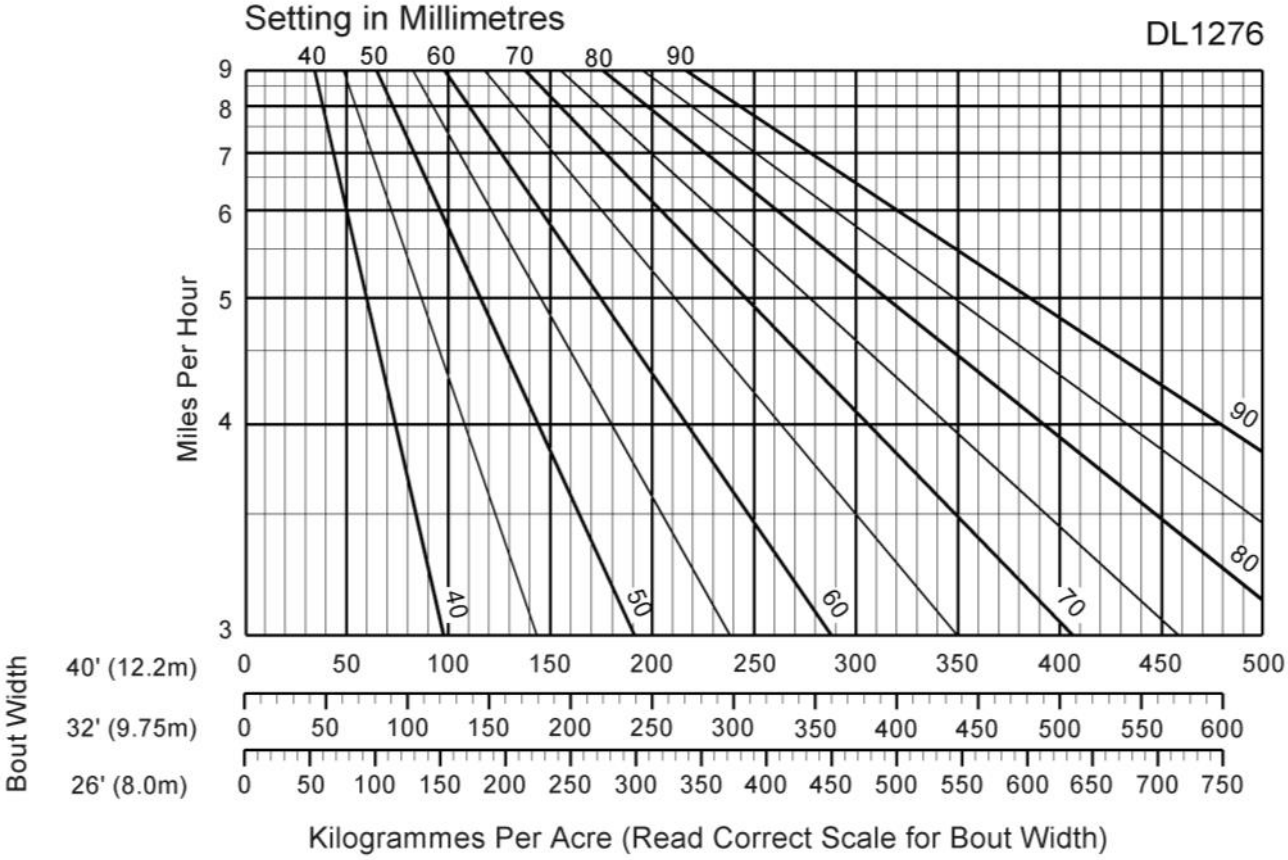
XT22, 24, 44, 46 & 48 Guide For Granular Fertiliser



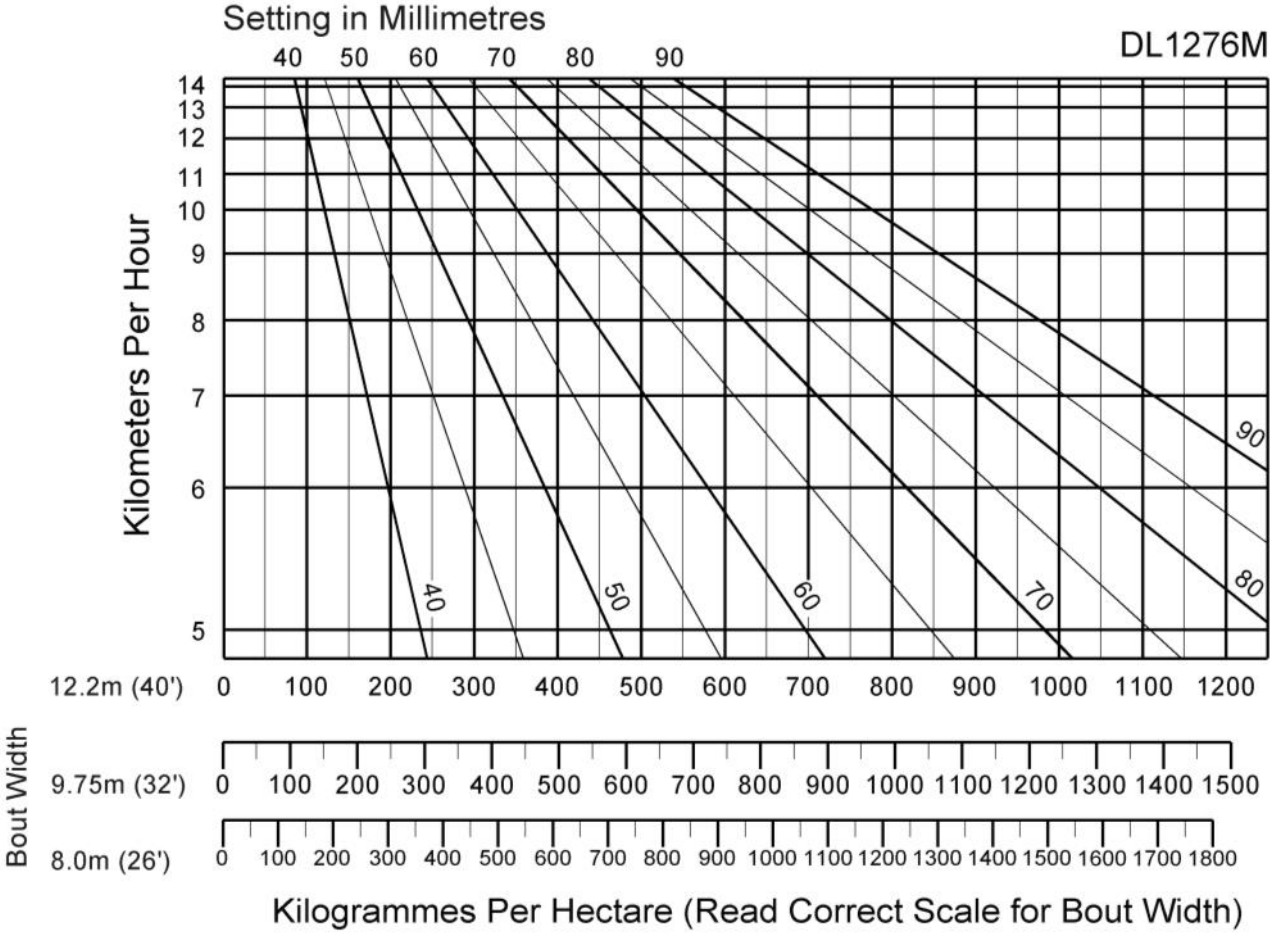
XT 22, 24, 44, 46 & 48 Guide For Granular Fertiliser



XT22, 24, 44, 46 & 48 Guide For Prills



XT 22, 24, 44, 46 & 48 Guide For Prills

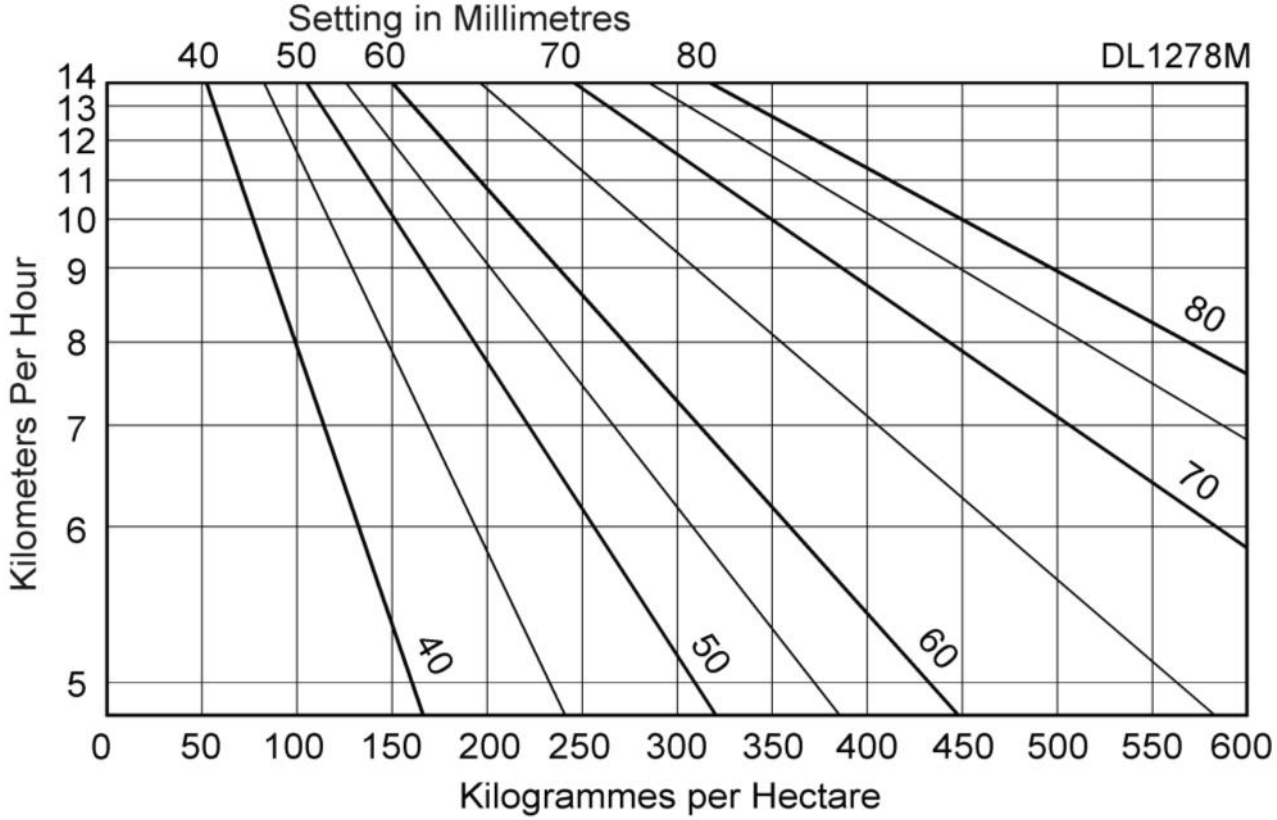


XT22 / 24 / 44 / 46 & 48 Guide for Wheat & Barley

Bout width 8m. (26 ft.)

XT22 / 24 / 44 / 46 & 48 Guide for Wheat & Barley

Bout width 8m. (26 ft.)

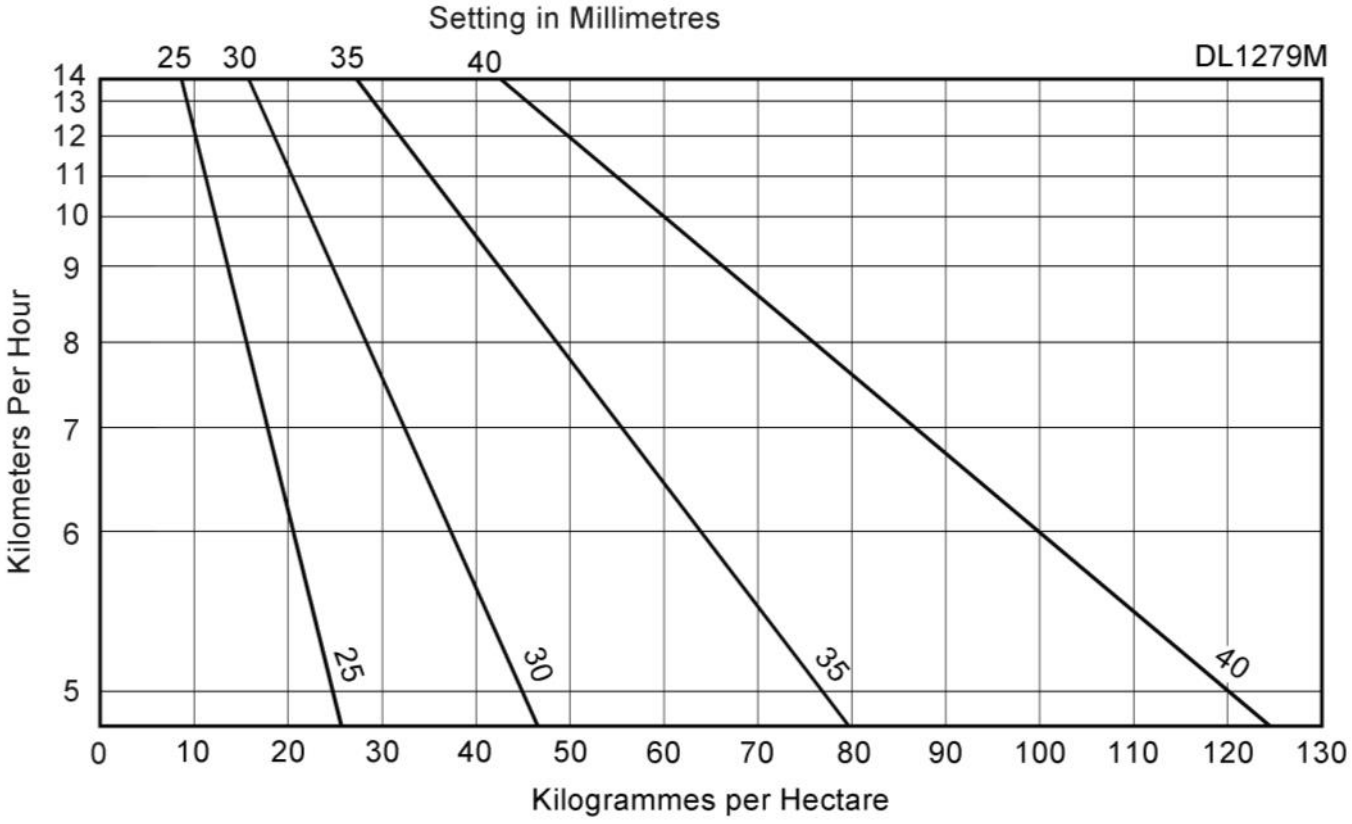


XT22 / 24 / 44 / 46 & 48 Guide For Grass Seeds

Bout width 5m. (16ft.)

XT22 / 24 / 44 / 46 & 48 Guide for Grass Seeds

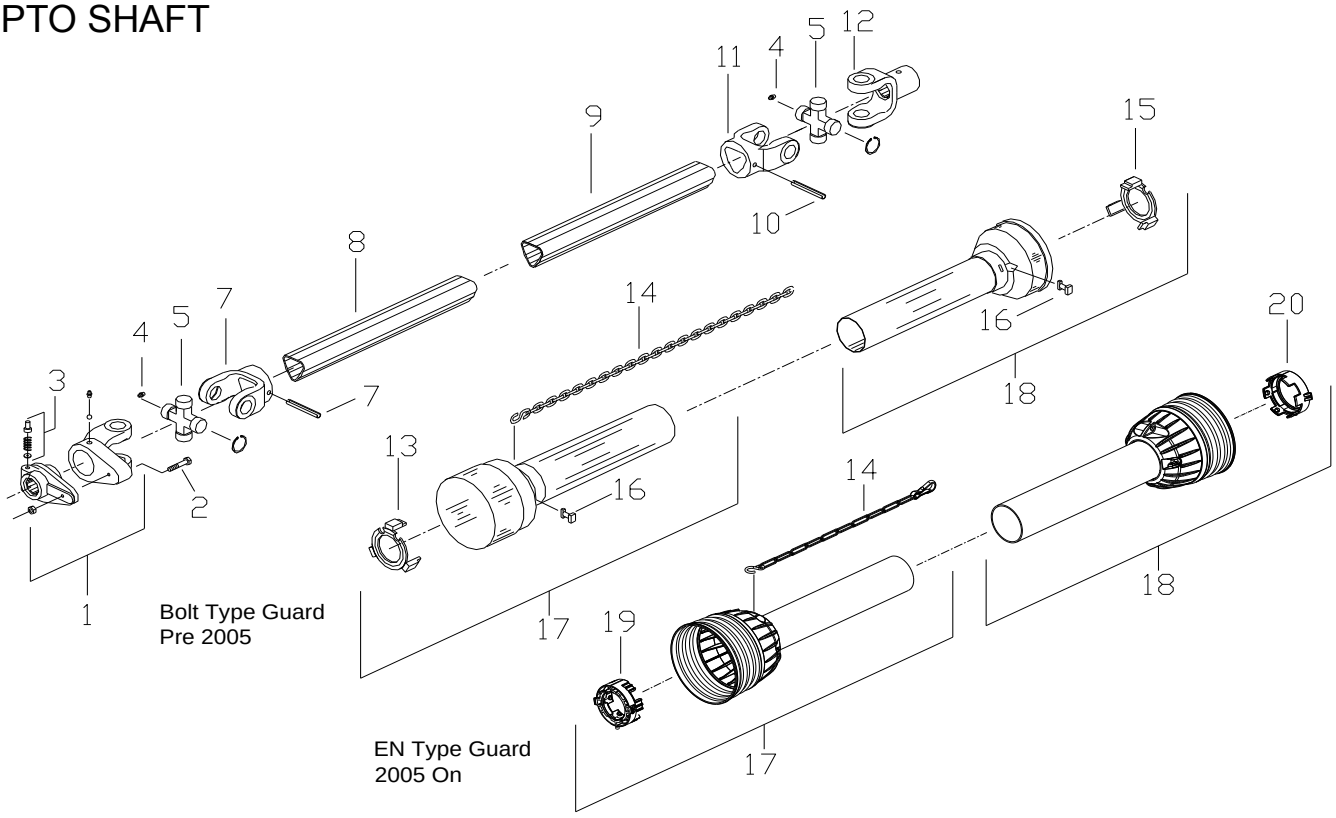
Bout width 5m. (16ft.)



FAULT FINDING CHART

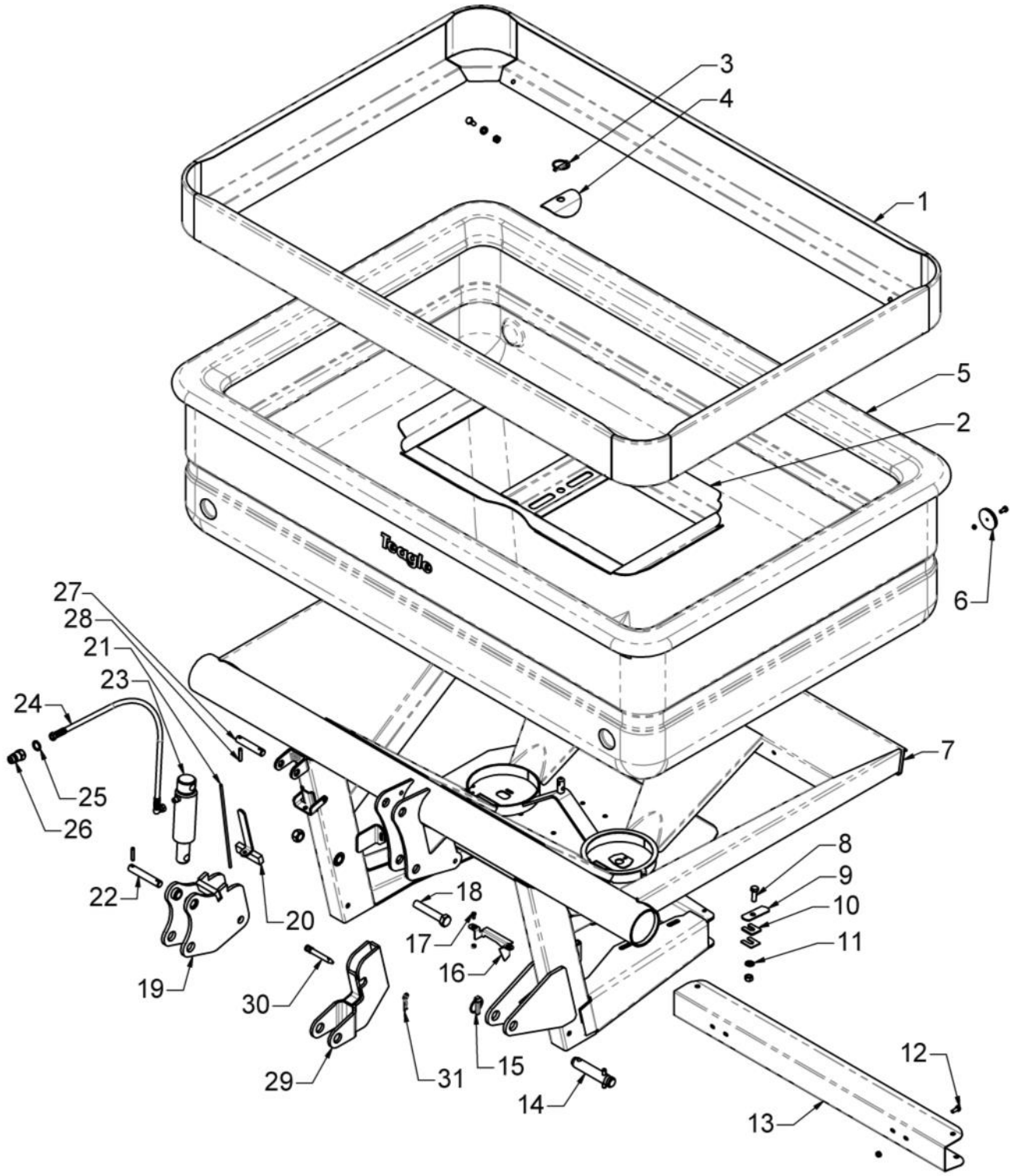
Symptom	Fault	Possible Solutions
Spread rate low.	Agitator worn.	Replace agitator.
	Agitator Incorrectly fitted.	Reposition on shaft according to instructions.
Machine spreads unequally.	Any of the above on one rotor only.	See solution above.
	Shutters opening unequally.	Adjust shutter opening.
Agitators wrap around shaft repeatedly.	Lumpy or contaminated fertiliser.	Fit low level screen.
Material stops spreading.	Material bridges in hopper.	Check agitator condition and that it is securely attached to the shaft.
		Agitator type incorrect for material being spread.
		Rotors left running too long with the shutter closed causing material to shatter and compact.
	Water thrown up by tractor wheels runs down hopper causing material to cake.	Fit hopper cover so that water runs down cover and drips onto ground.
Spread pattern too narrow or too wide.	Rotor speed incorrect.	Check machine is operated at 540 rpm.
		Check tractor PTO shaft rotates at 540 rpm for the engine rpm indicated by the tractor manufacturer.
	Machine height above crop incorrect.	The rotor must be 750mm (30") above the top of the crop.
Spread pattern too narrow.	Slope of hopper set incorrectly for the material being spread	Consult instructions in book and try tilting machine up at rear.
	Vanes worn.	Inspect vanes for rippling, replace if necessary.
	Gap between scraper plate and cones too large.	Reduce gap to within 2mm by adjusting position of scraper plate.
Spread pattern too wide.	Slope of hopper set incorrectly for the material being spread.	Consult instructions in book and try levelling or tilting machine down at rear.
Material thrown onto tractor.	Gap between scraper plates and cones too large.	Reduce gap to within 2mm by adjusting position of scraper plate.
PTO shaft shear bolt breaks.	Shear bolt breaks in use.	Check rotors are free to rotate and that the gear train is intact.
		Check correct grade of bolt is fitted.
	Shear bolt breaks when engaging rotors.	Check that PTO shaft is engaged at low engine revs and engages smoothly.
Rotors do not turn.	Shear bolt broken.	Replace with correct grade of bolt.
	Gear box failed.	Check output shafts rotate when input shaft is turned. Fit replacement parts if necessary.

PTO SHAFT



Ref.	Description	BYPY.	Comer (EG Transmissions)	Long Shaft BYPY.	Qty.
	Shaft complete	PTO1319	PTO8005	PTO1320	1
	Tractor end half c/w guard	PTO2518	PTO1976	PTO2519	1
	Implement end half c/w guard	PTO2522	PTO1977	PTO2524	1
1	Quick release yoke assembly	PTO2517	PTO1978	PTO2517	1
2	Shear bolt M6 x 40 8.8	FAS9608	FAS9608	FAS9608	1
	Locknut M6	FAS2330	FAS2330	FAS2330	1
3	Replacement push-pin set	PTO2305	PTO1979	PTO2305	1
4	Grease nipple M8 x 1 x 45	BRG5049	BRG5049	BRG5049	2
5	Cross journal including circlips	PTO2526	PTO2526	PTO2526	2
6	Outer yoke	PTO2597	PTO1980	PTO2597	1
7	Spring pin 8 x 50	FAS4131	FAS4134	FAS4131	1
8	Outer tube	PTO2599	PTO2599	PTO2602	1
9	Inner tube	PTO2598	PTO2598	PTO2601	1
10	Spring pin 8 x45	FAS4198	FAS4198	FAS4198	1
11	Inner yoke	PTO2596	PTO1981	PTO2596	1
12	Plain hole yoke	PTO2528	PTO2528	PTO2528	1
13	Outer guard bearing ring	PTO2535	PTO1984	PTO2535	1
14	Anchor chain	MB0592	MB0592	MB0592	2
15	Inner guard bearing ring	PTO2536	PTO1986	PTO2536	1
16	Guard bolt	- - - - - - -	- - - - - - -	PTO1930	6
17	Outer half guard c/w chain	PTO2541	PTO1983	PTO2543	1
18	Inner half guard c/w chain	PTO2542	PTO1985	PTO2544	1
19	Outer guard bearing Ring	- - - - - - -	PTO2760	- - - - - - -	1
20	Inner guard bearing Ring	- - - - - - -	PTO2761	- - - - - - -	1

MAINFRAME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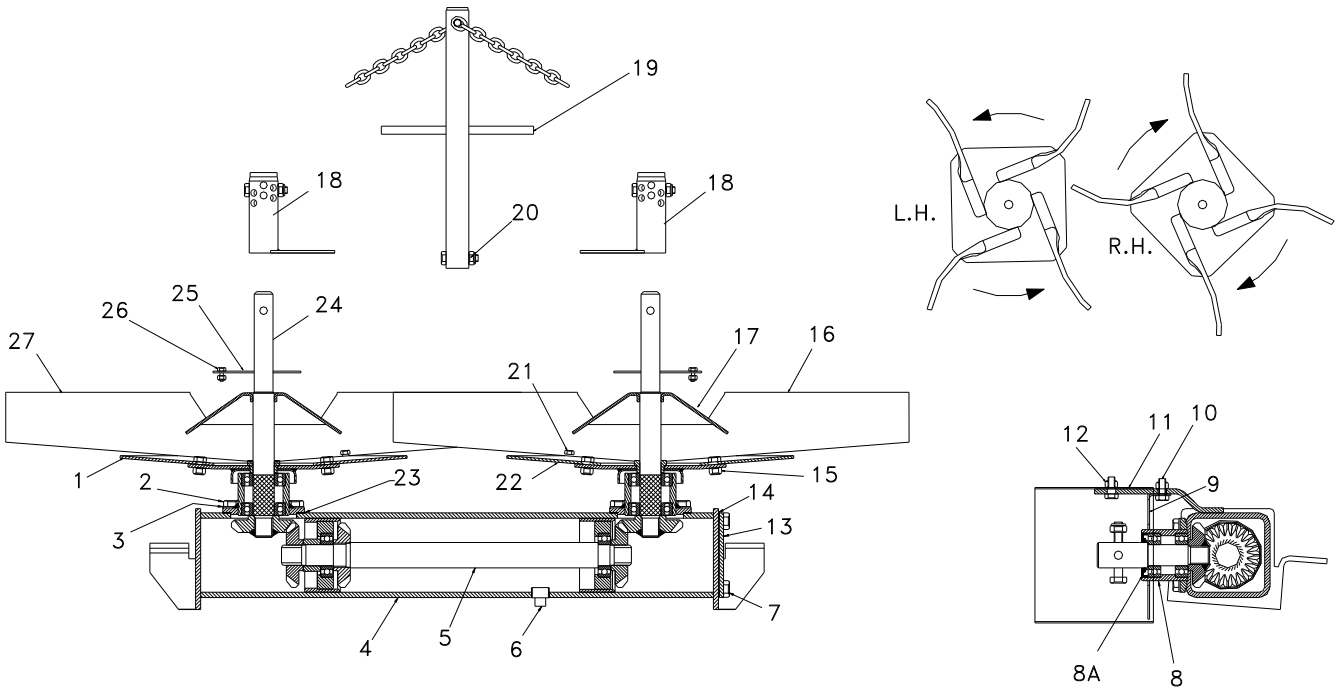
MAINFRAME

Ref.	Description	XT24	XT48	Qty
1	Hopper extension kit	MB3014	MB3122	
	Hopper extension	MB3015	MB3123	1
	Setscrew M10 x 25 stainless	FAS2654S	FAS2654S	4
	Washer 35 x 10 x 1.5 stainless	FAS4811S	FAS4811S	4
	Lock nut M10 stainless	FAS2333S	FAS2333S	4
2	Low level sieve	MB3004	MB3106	1
3	Lynch Pin 8 mm	FAS6102	FAS6102	1
4	Hopper retaining plate	MB2225	MB2225	1
5	Hopper	MB3013	MB3118	1
6	Reflector	- - - - - -	MB3875	2
	Machine screw M4 x 20 stainless	- - - - - -	FAS2491S	2
	Lock nut M4 stainless	- - - - - -	FAS2329S	2
	M4 Plain Washer S/S	- - - - - -	FAS2340S	2
7	Mainframe	MB3001	MB3119	1
8	Setscrew M12 x 30 stainless	FAS2678S	FAS2678S	4
	Lock nut M12 stainless	FAS2334S	FAS2334S	4
9	Slot cover	MB2239	MB2239	4
10	Gearbox spacer 4 mm	MB2241	MB2241	4
	Gearbox spacer 2 mm	MB2242	MB2242	4
11	Plain washer stainless	FAS2345S	FAS2345S	4
12	Setscrew M8 x 20 stainless	FAS2627S	FAS2627S	2
	Lock nut M8 stainless	FAS2332S	FAS2332S	2
13	Front guard	MB2233	MB2233	1
14	Lift pin	MB2106	MB2502	2
15	Lynch pin 11 mm	FAS6105	FAS6105	2
16	Scraper plate - left hand	MB2237	MB2237	1
	Scraper plate - right hand	MB2238	MB2238	1
17	Setscrew M6 x 16 stainless	FAS2202S	FAS2202S	4
	Lock nut M6 stainless	FAS2330S	FAS2330S	4
	M6 Plain washer stainless	FAS2342S	FAS2342S	8
18	Bolt M16 x 90	FAS9713P	- - - - - -	1
	Lock nut M16	FAS2335	- - - - - -	1
	Bolt M20 x 110	- - - - - -	FAS2133P	1
	Lock nut M20	- - - - - -	FAS2336	1
19	Tilt bracket	- - - - - -	- - - - - -	1
	Tilt bracket - manual tilt only	MB3017	MB3120	1
	Tilt bracket - hydraulic tilt only	MB3003	MB3121	1
20	Tilt Latch	MB2226	MB2226	1
21	Rope	MB2522	MB2522	1
29	High lift leg	Optional	MB3104	2
30	Pin	Optional	FAS6267P	2
31	"R" Pin	Optional	FAS6003P	2

Optional extras

	Hydraulic tilt kit complete (comprising items 19, 22-27)	MB3019	MB3124	1
22	Pin - tilt bracket	MB2243	TRM0738	1
23	Tilt ram	CYL1005	CYL1005	1
24	Hydraulic hose	HYD2128	HYD2128	1
25	Bonded seal ½" BSP	HYD4204	HYD4204	1
26	Male quick release coupling	HYD1901	HYD1901	1
27	Pin - mainframe	MB2244	MB2244	1
28	Spring tension pin M8 x 40	FAS4131S	FAS4131S	4
29	High lift leg	MB3011	MB3104	2
30	Pin	FAS6261P	FAS6267P	2
31	"R" Pin	FAS6003P	FAS6003P	2

GEARBOX & ROTORS



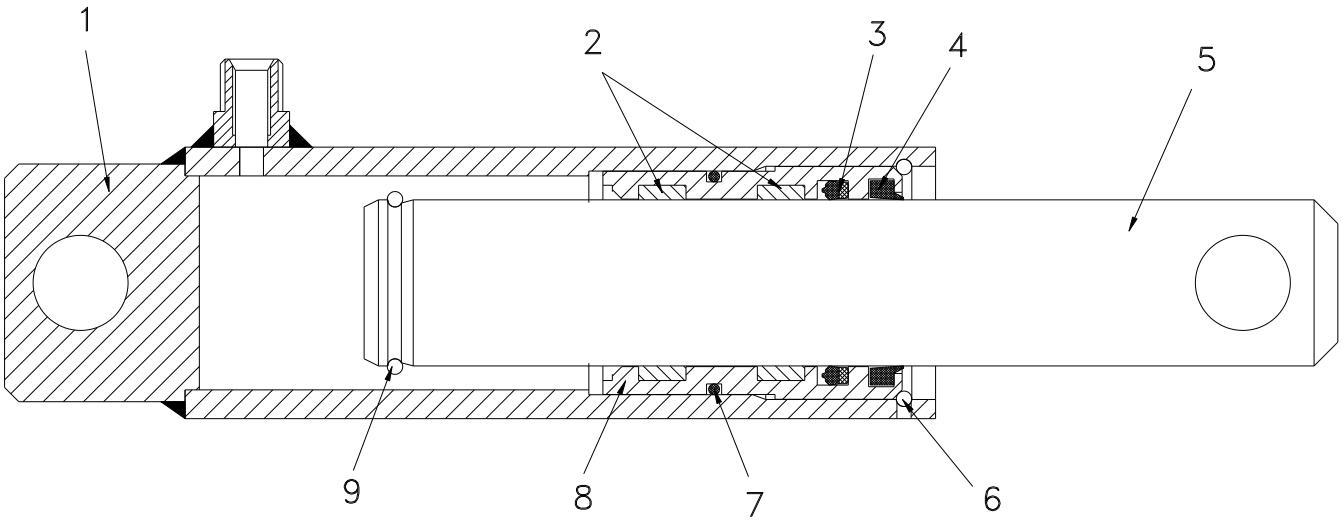
Ref.	Description	Part No.	Qty
	Gearbox Complete less PTO guard, vanes, discs, cones and agitators	MB2270	1
1	Rotor disc R.H.	MB2228	1
2	Bolt M10 x 20 (input and output housings)	FAS2652P	12
3	Plain washer M10 (input and output housings)	FAS2344P	12
4	Gearbox casing	MB2267	1
5	Cross shaft assembly	MB2274	1
6	Plug (drain and level)	HYD1458	2
7	Bolt M8 x 16 stainless	FAS2625S	4
8	Input shaft assembly c/w bearing housing	MB2269	1
8A	Seal only	BRG3040	1
9	PTO guard back plate	MB2944	1
10	Setscrew M8 x 20 stainless	FAS2627S	1
	Locknut M8 stainless	FAS2332S	1
11	PTO guard	MB2236	1
12	Plain washer M8 stainless	FAS2343S	1
	Locknut M8 stainless	FAS2332S	1
13	End plate	MB2083	1
14	Gasket end plate	MB2084	1
15	Bolt M8 x 16 stainless	FAS2625S	8
	Locknut M8 stainless	FAS2332S	8
	Washer - M8 stainless	FAS2343S	8
16	Vane left-hand rotor, curved tip	MB2229	2
	Vane left hand rotor, fully curved	MB2231	2
17	Cone	MB2234	2
18	Knife agitator c/w bolt	MB2252	2
	Bolt - M8 x 45 stainless	FAS9633S	2
	Locknut M8 stainless	FAS2332S	2
21	Bolt M6 x 12 stainless	FAS2201S	16
	Locknut M6 stainless	FAS2330S	16

Ref.	Description	Part No.	Qty
22	Rotor disc - L.H.	MB2227	1
23	Gasket - output and input housings	MB2278	3
24	Output shaft assembly c/w bearing housing	MB2272	2
25	Sealing plate	MB2240	2
26	Bolt - M6 x 16 stainless	FAS2202S	2
	Plain washer M6 stainless	FAS2342S	4
	Locknut M6 stainless	FAS2330S	2
27	Vane - right hand rotor, curved tip	MB2230	2
	Vane - right hand rotor, fully curved	MB2232	2

Optional

19	Powder agitator c/w chains and bolt	MB2257	2
20	Bolt - M8 x 50 stainless	FAS9634S	2
	Nut - M8 stainless	FAS2332S	2

TILT RAM

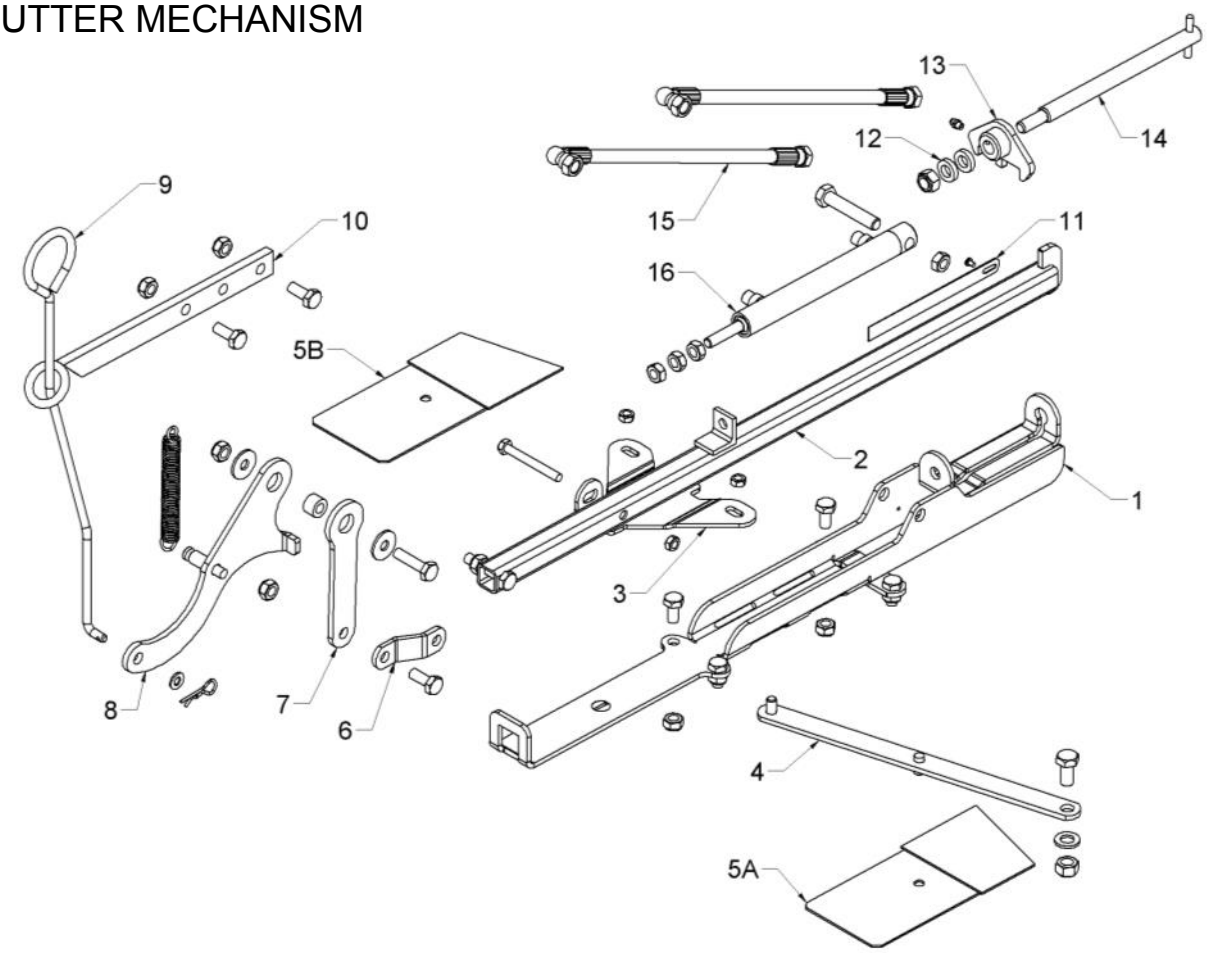


Ref	Description	Part No.	Qty	Ref	Description	Part No.	Qty
	Tilt ram complete	CYL1005	1	3	Rod seal	HYD4493	1
				4	Wiper seal	HYD4521	1
	Seal kit comprising items 2, 3, 4, 6, 7, 8 & 9	HYD4842	1	5	Rod	HYD1007	1
				6	Spring ring	FAS7310	1
				7	'O' Ring	HYD4032	1
1	Cylinder	CYL1006	1	8	Bering & seal housing	CYL1009	1
2	Bearing	HYD4706	2	9	Spring ring	FAS7212	1

DECALS

Description	Part No.	Qty	Description	Part No.	Qty
Teagle (XT24)	DL1339	1	Red Strip	DL1307	1
Teagle (XT48)	DL1367	1	XT24	DL1365	2
Special instructions	DL1282	1	XT48	DL1366	2
Guide for Prills (Imperial)	DL1276	1	Serial number plate - XT24	DL2072	1
Guide for Granular (Imperial)	DL1277	1	Serial number plate - XT48	DL2073	1
Guide for Prills (Metric)	DL1276M	1	PTO speed 540 RPM	DL1012	1
Guide for Granular (Metric)	DL1277M	1	Moving parts in hopper	DL1043	1
Please read instructions	DL1006	1	Thrown objects	DL1039	2
Rivets	FAS9077	2			

SHUTTER MECHANISM

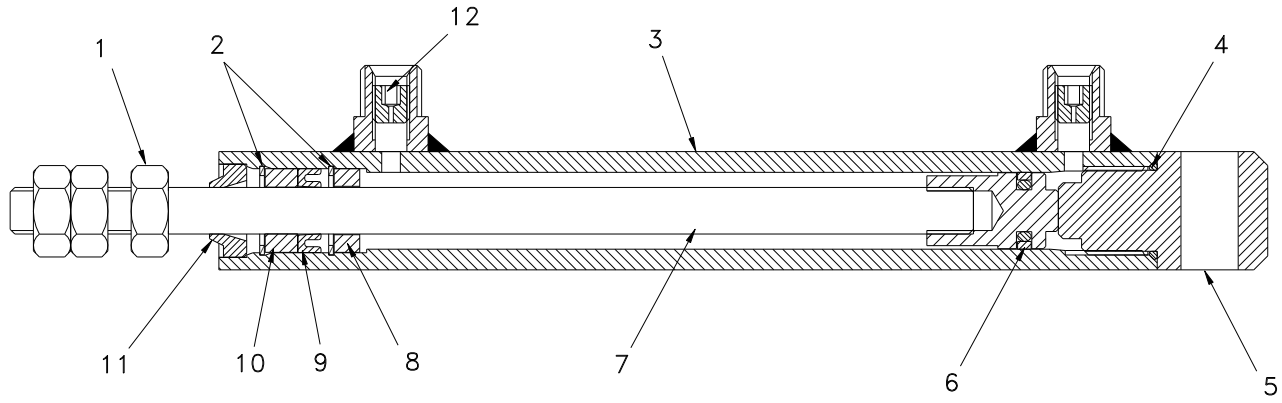


Ref	Description	Part No.	Qty	Associated Components	Parts No.	Qty
1	Shutter control channel	MB2213	1	Setscrew M10 x 20 stainless	FAS2652S	4
				Lock nut M10 stainless	FAS2333S	4
2	Control rod	MB2214	1			
3	Adjustment plate	MB2215	1	Setscrew M8 x 70 stainless	FAS2638S	1
				Plain nut M8 stainless	FAS2302S	3
4	Shutter operating lever	MB2218	2	Setscrew M12 x 25 stainless	FAS2677S	2
				Lock nut M12 stainless	FAS2334S	2
				Plain washer stainless	FAS2345S	2
5A	Shutter - left hand	MB2219	1			
5B	Shutter - right hand	MB2235	1			
6	Connecting link	MB2220	1	Bolt M10 x 50 stainless	FAS9659S	1
				Lock nut M10 stainless	FAS2333S	1
7	Lever	MB2221	1	Setscrew M10 x 25 stainless	FAS2654S	1
				Lock nut M10 stainless	FAS2333S	1
8	Overcentre lever	MB2222	1	Spring	SPR4408	1
				Bolt M10 x 40 stainless	FAS2657S	1
				Locknut M10 stainless	FAS2333S	1
				Bush	MB2223	1
				Plain washer stainless	FAS2344GS	1
9	Shutter control rod	MB2036	1	Plain washer M8 stainless	FAS2343S	1
				R pin 2.5mm	FAS6002	1
10	Control rod guide	MB2614	1	Setscrew M10 x 25 stainless	FAS2654S	2
				Lock nut M10 stainless	FAS2333S	2
11	Shutter opening scale	MB2028	1	Pan head screw M4 x 6 S/S	FAS2422S	2
12	Washer	MB2108	2			
13	Shutter opening indicator	MB2216	1	Grease nipple ¼" BSF	BRG5004	1
14	Shutter adjuster screw	MB2217	1	Lock nut M12 stainless	FAS2334S	1

OPTIONAL EXTRAS

Ref	Description	Part No.	Qty	Associated Components	Parts No.	Qty
	Hydraulic Shutter Kit Comprising of items 15 & 16	MB2266	1			
15	Hydraulic Hose	HYD2016	2	Male quick release coupling	HYD1901	2
				Bonded seal ½" BSP	HYD4204	2
				¼" to ½" BSP M/M Union	HYD1114	2
16	Shutter Operating ram	CYL1010	1	Bolt M12 x 65 stainless	FAS2083S	1
				Lock nut M12 stainless	FAS2334S	1
				Plain nut M10 stainless	FAS2303S	1

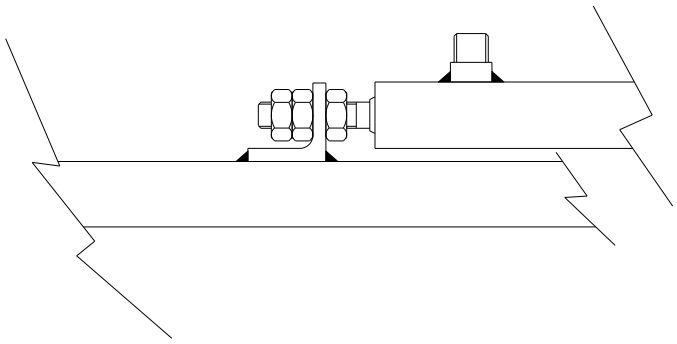
SHUTTER CONTROL RAM



Ref	Description	Part No.	Qty	Ref	Description	Part No.	Qty
	Shutter ram complete	CYL1010	1	5	End plug	CYL1011	1
				6	Piston Seal	HYD4430	1
	Seal kit comprising items 4, 6, 8, & one circlip	HYD4843	1	7	Rod, piston & seal ass'y	CYL1013	1
				8	Buffer collar	CYL1014	1
				9	'U' Packing	HYD4495	1
1	Nut M10 stainless	FAS2303S	3	10	Bearing	CYL1015	1
2	Circlip	FAS7113	2	11	Wiper seal	HYD4520	1
3	Tube	CYL1012	1	12	Restrictor 1mm Dia.	HYD1740	2
4	'O' ring	HYD4033	1				

HYDRAULIC SHUTTER CONTROL RAM FITTING INSTRUCTIONS

1. Remove the Shutter Control Rod MB2036 and the Shutter Control Rod Guide MB2224.
2. Connect the cylinder end of the hydraulic ram onto the Shutter Control channel MB2213 and the Piston Rod onto the vertical lug on the Control Rod MB2214
3. Push the piston rod to the fully closed position and check that the shutters close fully at the same time as the hydraulic cylinder 'bottoms'. If the ram still has travel remaining when the shutters have closed, severe strain can be imposed upon the linkage with consequent damage.
   Adjustment is provided by means of the nuts on the piston rod as shown in the sketch below
4. Connect the hoses onto the ram connections and operate the shutters.
5. Check the system for leaks.



If the locknuts cannot be used, fit one nut only on either side of the lug and apply Loctite onto the threads.

Teagle

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