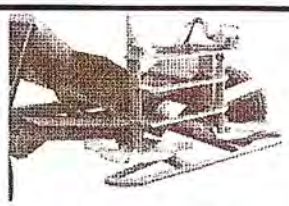
SAM SPREADERS

OPERATORS & PARTS CATALOGUE

Coombridge & Alexander Ltd

AGRICULTURAL MACHINERY MANUFACTURERS



OPERATORS MANUAL (400 mat double acting clutch ram)

Introduction

The SAM Bulk Topdressers have been developed through 35 years experience in manufacturing fertiliser spreading equipment. We manufacture a reliable, ruggedly constructed versatile machine with models to suit a range of farming requirements.

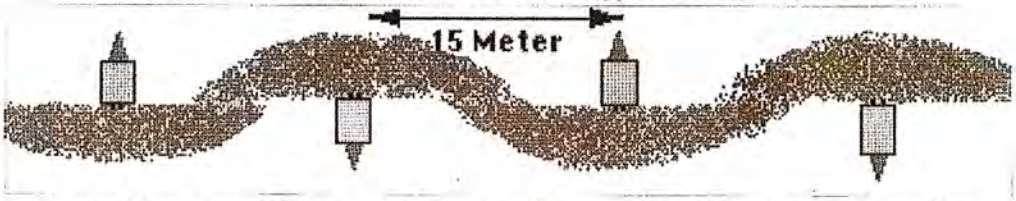
Operation : Back Door Setting / Spreading centres

The sliding door at the back of the bin must first be set to the required sowing rate. With the floor chain speed controlled by the speed of the wheels, the rate is always constant at a given back door setting.

The door settings on the chart are a guide only - all types of manure flow differently and we always recommend spreading the first load into a measured paddock to check the rates carefully. The spreader rate charts printed in this manual are more complete than the chart on the back of the topdresser showing a rate for a wider selection of fertilisers. The spread rates (door settings) are usually very similar for fertilisers of the same density and granule type. Density is measured in tonnes per cubic metre and can vary from N.Z. Urea @ .77 Tonnes per Cubic Metre to Lime @ 1.6 T per Cubic M . We have also included on the chart a selection of BOP Fertilisers with their densities.

Spreading centres are the second important factor to take into account when spreading fertiliser. We suggest on the chart on the back of the bin spreading at 15 metre centres for granulated fert and 10 metres for powdered or very fine granules like lime. We have also shown on our detailed chart spread widths of 17.5 & 20 metres. With rates over 500kg per HT it is sometimes a good option to select a closer spacing with a lower door setting.

Keep to spreading centres to distances suggested on the rate charts



We suggest 15 m to 20 m centres for the twin spinner with granulated product (super urea etc.)
10 m for fine or powdered products (Lime).

The 2.75T Single Axle Twin Spinner bin holds approximately 2.15 cubic m of fert
= 2.6 Tonne super @1.2t/m density, 3.50 Tonne lime @ 1.6t /m density.1.7 Tonne urea @ .8t/m density

The 3.25T Tandem Axle Twin Spinner bin holds approximately 2.5 cubic m of fert
= 3.00 Tonne super @1.2t/m density, 4.00 Tonne lime @ 1.6t /m density. 2 Tonne urea @ .8t/m density

The 4.75T Tandem Axle Twin Spinner bin holds approximately 3.9 cubic m of fert
= 4.75 Tonne super @1.2t/m density, 6.25 Tonne lime @ 1.6t /m density. 3 Tonne urea @ .8t/m density

(Australian Models) 2.0 Tonne Bin holds 1.68 cubic metres = 2 t super = 2.7 t lime = 1.4 t urea
3.0 Tonne Bin holds 2.53 cubic metres = 3 t super = 4.0 t lime = 2.0 t urea

Hydraulics

The standard SAM Topdresser is fitted with two hydraulic motors (OMP32) **running in series**, requiring an external oil flow of 35 litres per minute at 2000 psi. If the hydraulic flow from the tractor is adjustable then wind the flow back to the recommended 35 litres per min. If the two motors are run in series with flows over 35 lit the extra oil flow is automatically bypassed back to the tractor through the built in flow control valve. The higher the bypass flow, the higher the pressure in the system. To keep the pressures as low as possible keep the flow down to the recomended 35 lit per min (If the tractor external hydraulics has a flow of between 24 litre and 34 litre, we can supply alternate motors OMP25).

For tractors with flows in excess of 55 litres per minute where the oil flow cannot be controlled to lower rates (35 lit per min) from the tractor, then the Two motors should be run in parallel.

Two motors to be run in parallel. This option would give the discs more torque and run the spinners at lower pressures but the topdresser would then only operate with a minimum of 55 lit. flow. To change to a parallel system requires a 3/16" and a 6mm Allen key and half an hour labour. (See separate instruction sheet if required) The preset spinner speed must also be reset as per instruction sheet.

Coupling the Hydraulics

The live hose (red end) must be coupled to a high pressure outlet point on the tractors external system This take off point can be fitted to an existing double acting valve already fitted for loaders, feedwagons, rams etc or a new fitting can be installed.

The return hose (yellow end) must be coupled into the same double acting bank using the quick release coupling supplied.

(400 mat double acting clutch ram)

To operate clutch follow the instructions on the shaded label on the front of the machine.The feed conveyor has an in out clutch (incorporating a ram) that is activated automatically from the tractor seat when the hydraulic spinners are started.

To start the spinners and engage the clutch. Pressurise red hose and the clutch is in gear and the spinners are turning.

To stop the spinners and put the clutch out of gear move the hydraulic lever to pressurise the yellow hose for one second then place the lever back to neutral.

The hydraulic twin spinner must be coupled correctly to the tractor hydraulics system. Contact either your local agent or the manufacturer if there is any doubt. The adjustable flow control valve on the hydraulic motor valve block controls the spinner speed. This is preset in the factory .

(Danfoss OMP32 motor in seriess = wind all the way in then 1-5/8 turns out for 850 RPM)

(Danfoss OMP32 motors in parallel = wind all the way in then 2-1/4 turns out for 850 RPM)

If coupling hydraulics to a **John Deere tractor** (30,40,or 50 series) the oil in the live hose may need to be restricted with a needle valve, to a flow less than the charge pump capacity. On late model John Deere tractors with built in flow controls, leave the topdressers flow control valve (Black Knob)on the topdresser motor set as per above, and then adjust the tractors built in flow control down to 35 lit per min and leave set in this position Mark position if necessary. If there is any pulsing in the hydraulics please phone for a simple remedy.

Check with Coombridge & Alexander Ltd if unsure.

Always ensure tractor oils are kept in top condition. Beware when changing machine from one tractor to another unless they use the same hydraulic oils (pump oil out of hoses into a tin). If the hydraulic system is coupled correctly when new it will return excellent results. Beware of the traps and always consult an expert if in doubt.

General Safe Use of a SAM topdresser involves following several safe work practices (also listed in this handbook in the machinery risk assessment page) including:

!!! TURN OFF TRACTOR BEFORE REMOVING GUARDS OR SERVICING !!!
!!! READ ALL WARNING LABELS ON THE MACHINE !!!
!!! NEVER USE YOUR HANDS TO CHECK FOR OIL LEAKS !!!
!!! STAY AT LEAST 15 METERS CLEAR OF THE SPINNERS WHEN OPERATING !!!
!!! DON'T RIDE ON THE TOPDRESSER !!!
!!! DON'T USE THE MACHINE IN STEEP AREAS WHERE THERE IS A RISK TO THE OPERATOR OF A ROLLOVER OCCURRING !!!

General Maintenance

1. Check the hydraulic system before each use for signs of leaks or wear. To locate small leaks, use a small piece of cardboard paper or wood. **!!! NEVER USE YOUR HANDS !!!**
2. All roller chains should be kept well oiled especially when the machine is placed in storage for any period of time.
3. Tyre pressure for the 11.5 x 15 .3 tyres should be between 35-45 p.s.i.
4. After initial 10 hours use check all bolts are tight, including the wheel nuts.
5. **Grease every five hours** all nipples in the 5 cast deadeyes and the four high speed spinner bearings. Don't spare the grease gun.
6. **Grease every ten hours** all nipples and grease points on front floor adjuster slides, front screw jack, clutch pivot pin and side plates, jockey wheel, back door screw jack has two grease positions, all hubs, and nipples on the pivot points on tandem axles
7. Floor conveyor tension to be an even curve from front to rear with 40mm sag below the chassis.
8. To guard against corrosive effects of fertilisers, apply used oil mixed with a little diesel around the spinners and deflector plates. **Not!!!** onto the rubber floor mat and rubber skirts.
9. Check (by lifting up on the spinner) that there is not to much play in the spinner bearings . Tension spinner bearings by undoing the grub screw in the large nylock nut and tightening this nut to take out any play in the bearings. Re-tighten the grub screw.

Good maintenance along the lines already mentioned will keep your machine in top working order for years to come. Always ensure the mesh grill inside the bin remains in place for all sowing rates below 1/2 ton to the acre. If the mesh grill is left out and rocks catch between the back door and the floor mat serious damage can occur. The Machines guarantee is invalid if mesh screen is not used.

HEALTH & SAFETY MACHINERY RISK ASSESSMENT

SAM Tractor Drawn Bulk Topdressers

A hazard identification, risk assessment and risk control procedure has been carried out on a representative example of a SAM topdresser and where found necessary the appropiate risk control measures have been incorporated in the product specifications. The operators manual contains the necessary information, and safety warnings are applied to the machine where necessary.

What is a hazard? A hazard is any situation that may cause injury or illness.

Risk Assessment Rating : Measures the probable frequency of an accident against the potential severity.

		Severity Potential			
		Fatality	Major injury	Minor injury	Negligible Injury
		4	3	2	1
Very Likely	4	16	12	8	4
Likely	3	12	9	6	3
Unlikely	2	8	6	4	2
Highly Unlikely	1	4	3	2	1
Probable Frequency					

Hazard:	Potential Risk Source:	Fre	Sev	Rating	Safety Measure:
Damage to limbs crushing, abrasions	Moving Chains, Moving Gears.	1	2	2	Warning labels / Instruction Book / Guards Gears and chains can only move with machine in motion
Entanglement,drawing in, trapping	Moving Vee Belts	1	2	2	Warning labels / Instruction Book / Guards
Damage to fingers / eyes through high pressure fluid ejection	Hydraulic Oil Pressure Leaks	2	2	4	Warning in Instruction Book /Adequate pressure ratings for all components
Instability under varying conditions	Machine Roll Over	2	4	8	Warning in Instruction Book/ Adequate weight on hitch /Adequate wheel track
Slipping tripping or falling	Riding on Machine	2	2	4	Warning in Instruction Book
Damage to fingers / eyes through ejection of material	Rotating Spinner discs	1	1	1	Warning in Instruction Book / Pipe frame around discs / Rotation direction
Stopping requirements	Using too small a tractor to tow spreader	3	3	9	Aggregate Trailer Mass (ATM) should not be more than : 1.5 x Tractor Mass (4WD); 1.0 x Tractor Mass (2WD). See Instruction Book
All the above hazards	Lack of information				Operators manual with safety and operating information

Spread Rates

The spread rate chart (actual size) is fixed beside the back door of the topdresser. The operator only has to select the rate per hectare from the white boxes for the type of fertiliser being spread (on this chart either Lime Super or Urea) and set the top of the back door level with the selected box. The side scale 1- 20 represents centimetres open of the door. A more detailed Spread chart is included in the Operators Manual.

Door Height	Lime 10m Centres Density 1.6 t/cu.m	Super 15m Centres Density 1.1 t/cu.m	Urea 15m Centres Density .77 t/cu.m	Door Height
20	3350	1374	905	20
19	3183	1305	860	19
18	3015	1236	815	18
17	2848	1168	769	17
16	2680	1099	724	16
15	2513	1030	679	15
14	2345	962	634	14
13	2178	893	588	13
12	2010	824	543	12
11	1843	756	498	11
10	1675	687	453	10
9	1508	618	407	9
8	1340	550	362	8
7	1173	481	317	7
6	1005	412	272	6
5	838	343	226	5
4	670	275	181	4
3	503	206	136	3
2	335	137	91	2
1	168	69	45	1
Door Height	Lime 10m Centres	Super 15m Centres	Urea 15m Centres	Door Height

Spreading Tables

Set top of door to centre of box with rate required. All rates in KG per Hectare

More Detailed Spread Tables in the Instruction Book

SPREADING TABLES

400 Wide Mat or Low Speed 800 Wide Mat

Spread Widths In Metres Centre to Centre

All Rates In Kilograms Per Hectare. Door Settings 1 to 20 (Read from Ruler Level/Top of the Back Door). Check Fertiliser Densities with Manufacturer

	Urea Density 0.77 t/cubic m			Sulphate of Ammonia Density 1.0 t/cubic m			DAP Nitrophoska Blue Density 1.1 t/cubic m			Superphosphate Triple Super/Salt Density 1.2 t/cubic m			Serpentine Super Density 1.3 t/cubic m			Dolomite Density 1.4 t/cubic m			React Rock (Sechura) Density 1.5 t/cubic m			Lime Density 1.6 t/cubic m		
	15	17.5	20	12.5	15	17.5	15	17.5	20	15	17.5	20	15	17.5	20	15	17.5	20	10		N/A	10	N/A	
	Spread Width in M			Spread Width in M			Spread Width in M			Spread Width in M			Spread Width in M			Spread Width in M			Spread Width in M			Spread Width in M		
20	905	776	679	1499	1249	1071	1374	1178	1030	1499	1285	1124	1624	1392	1218	1954	1675	1466	3141			3350		20
19	860	737	645	1424	1186	1017	1305	1119	979	1424	1220	1068	1542	1322	1157	1857	1591	1392	2984			3183		19
18	815	698	611	1349	1124	963	1236	1060	927	1349	1156	1012	1461	1253	1096	1759	1508	1319	2827			3015		18
17	769	659	577	1274	1062	910	1168	1001	876	1274	1092	955	1380	1183	1035	1661	1424	1246	2670			2848		17
16	724	621	543	1199	999	856	1099	942	824	1199	1028	899	1299	1113	974	1563	1340	1173	2513			2680		16
15	679	582	509	1124	937	803	1030	883	773	1124	963	843	1218	1044	913	1466	1256	1099	2356			2513		15
14	634	543	475	1049	874	749	962	824	721	1049	899	787	1137	974	852	1368	1173	1026	2198			2345		14
13	588	504	441	974	812	696	893	765	670	974	835	731	1055	905	792	1270	1089	953	2041			2178		13
12	543	465	407	899	749	642	824	707	618	899	771	674	974	835	731	1173	1005	879	1884			2010		12
11	498	427	373	824	687	589	756	648	567	824	707	618	893	765	670	1075	921	806	1727			1843		11
10	453	388	339	749	624	535	687	589	515	749	642	562	812	696	609	977	838	733	1570			1675		10
9	407	349	305	674	562	482	618	530	464	674	578	506	731	626	548	879	754	660	1413			1508		9
8	362	310	272	599	500	428	550	471	412	599	514	450	649	557	487	782	670	586	1256			1340		8
7	317	272	238	525	437	375	481	412	361	525	450	393	568	487	426	684	586	513	1099			1173		7
6	272	233	204	450	375	321	412	353	309	450	385	337	487	418	365	586	503	440	942			1005		6
5	226	194	170	375	312	268	343	294	258	375	321	281	406	348	304	489	419	366	785			838		5
4	181	155	136	300	250	214	275	236	206	300	257	225	325	278	244	391	335	293	628			670		4
3	136	116	102	225	187	161	206	177	155	225	193	169	244	209	183	293	251	220	471			503		3
2	91	78	68	150	125	107	137	118	103	150	128	112	162	139	122	195	168	147	314			335		2
1	45	39	34	75	62	54	69	59	52	75	64	56	81	70	61	98	84	73	157			168		1
Door Settings																								Door Settings

Door Setting Instructions

Step 1. Select the product to be spread at the top of the chart e.g. Superphosphate with a density of 1.2 tonnes per cubic metre

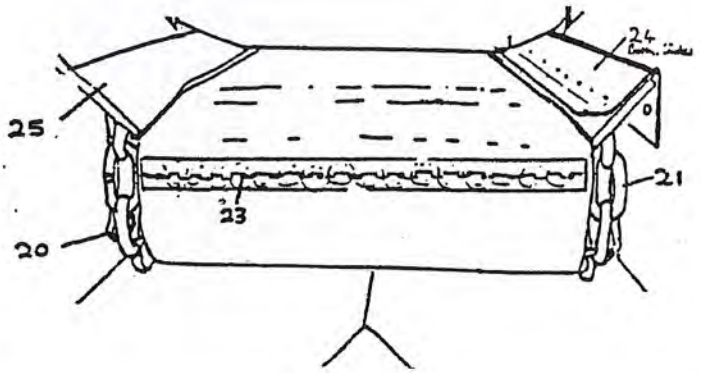
Step 2. Select the spread width for the product either 15,17.5, or 20 metre centres e.g. 15 metre centres

Step 3. Follow this column down to select spreading rate required in kilograms per hectare e.g. 300 kg/h

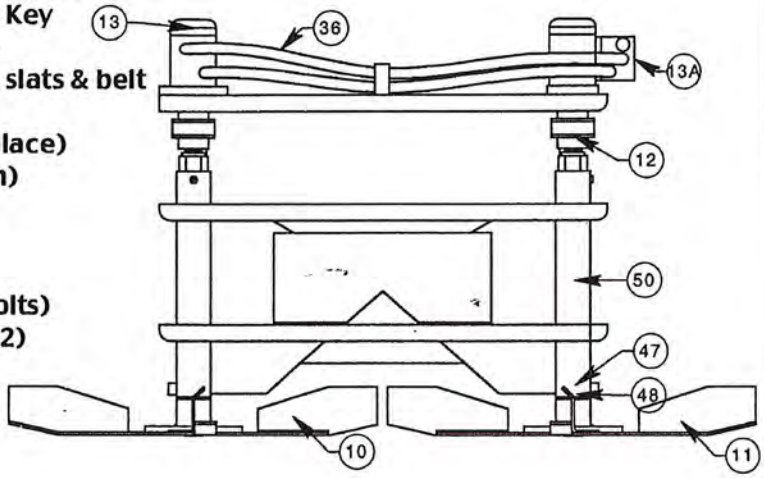
Step 4. Now Follow row across to find door height setting on left or right columns e.g. no. 4 Set door height

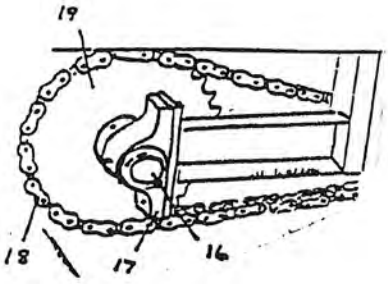
PARTS LIST SAM 400 WIDE MAT TOPDRESSER

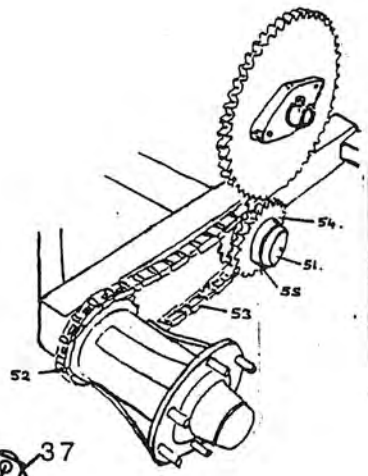
Tyre (Check size on tyre) 290 x 80 x 389
Wheel 15.3" 6 stud
Back Door & Screw Jack.
Set of Labels (4) Rate chart label
Draw bar Towing Eye
Front 1 1/2" Shaft



10. Disc 500mm Flat plate & vanes Left
11. Disc 500mm Flat plate & vanes Right
12. Flexi coupling. (check motor type)
13. Hydraulic motor Danfoss OMP32 or 40
13a. HCV 2197 Hydraulic Valve
16. 1 1/2" Back Shaft 1 Key
17. 1 1/2" Deadeye Bearing (5 per machine)
18. 1" pitch chain (Single 38 outer links & joiner)
18a. 1" pitch chain (Tandem 46 outer links plus joiner)
19. 1" pitch 30 tooth sprocket - 1 1/2" Bore & Key
20. 5 tooth floor sprocket
21. Complete 400 wide double chain (floor) & slats & belt
23. Stainless joiner
24. Stainless Rivets & Washer(to fix skirts in place)
25. 80mm x 10mm Rubber skirt (check length)
26. 11 Tooth 1" Pitch Sprocket - 1 1/2" Bore
27. Roller & Spring
28. 1 1/2" Side Shaft (check length)
29. Shear Plate Assembly (1-3/4 x 1/4" H.T Bolts)
29a. Shear Plate AssembyBolts (6 x 45 Bolts x 2)
30. 48 Tooth Gear
31. 22 Tooth Gear
32. Pin 1"
36. D200 Hose Kit Complete (6 Hoses)
37. Clutch Ram Double Acting 3/4" Eyes
38. 1 1/4" Compression Springs x 2
39. Stub Axle ADR 60mm
40. Seal 70*100*10
41. Inner Bearing 30211
42. Stud & Nut 18mm
43. Hub casting
44. Outer Bearing 30208
45. Hubcap
46. Castle Nut 36mm
47. Bearing 67048/010
48. Seal TC 150 23337 (PR6521)
50. Spinner Tube Assembly Complete
56. 1.5" 2 Bolt Flange Bearing X two

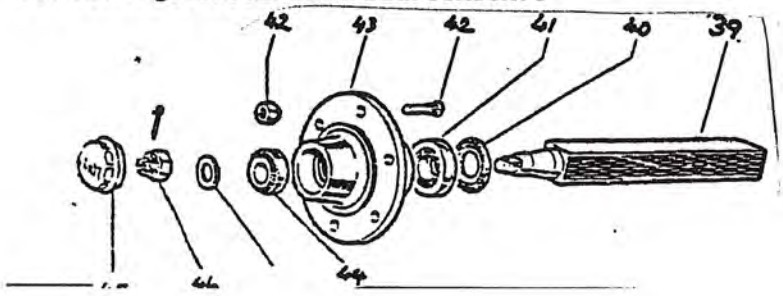


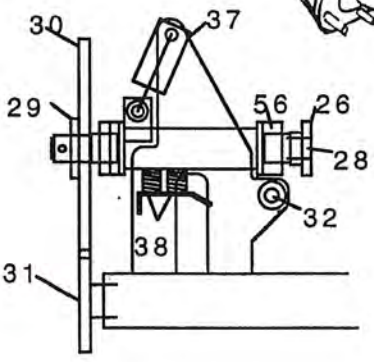




Parts on Tandem Only

51. Hubcap 90mm
52. 14 Tooth Sprocket 5" bore
53. Chain CA550 (16 outer links+crank+joiner)
54. 12t Sprocket & 22 Tooth Gear assembly
55. Bearings 2x 30210 and Seal 60x90x10





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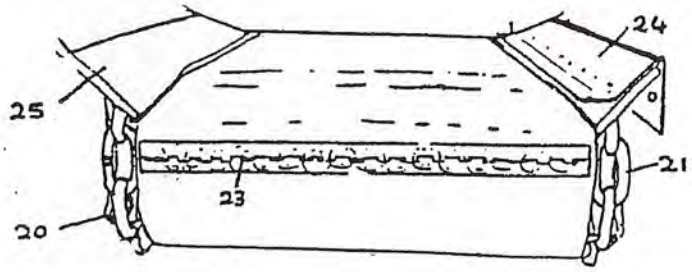

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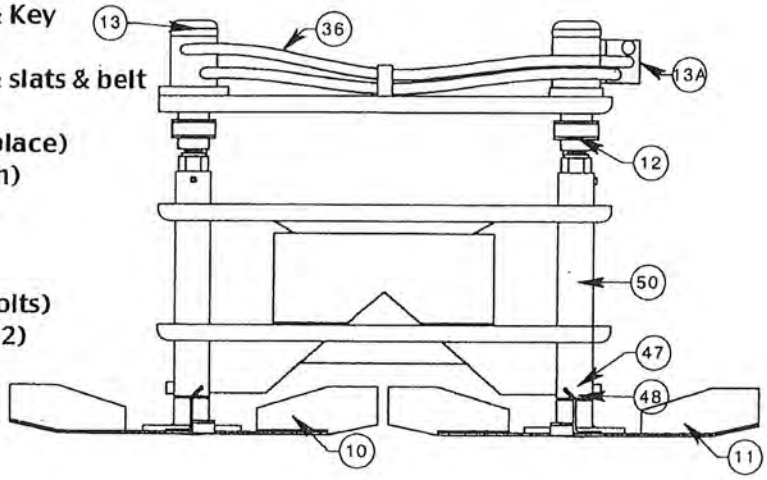

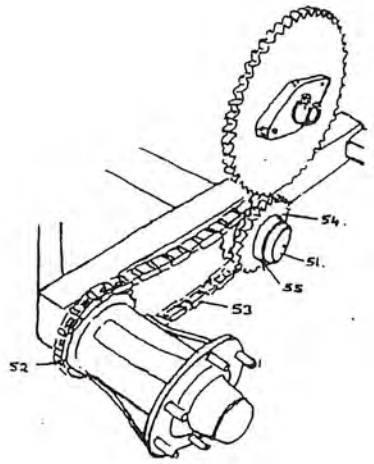

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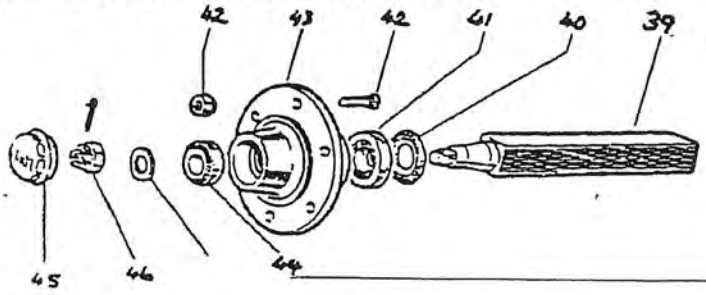
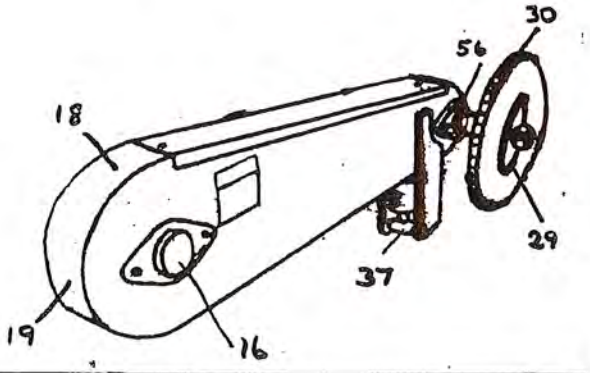




Questions Often asked:

Question : ***What rates will the machine spread at ?***
Answer : From 45 Kg per Ht @ 15 m Centres for urea etc up to 3000 Kg per Ht @ 10 m centres for lime

Question : ***How even is the spread ?***
Answer : Representative machines have been tested using the recognised spread mark test for spreader accuracy. Spread patterns are rated using the term Coefficient of Variation, a measure of the % of fertiliser outside a perfect spread with 0% being perfect. New Zealand Standards recognise a CV under 15% as Being acceptable for nitrogenous fertilisers (DAP urea nitroposka blue etc.), and under 25% for other products (super lime etc.) The SAM Spinners have been tested at 7.1% CV with urea and 8.1% CV with super well within the standards.

Question : ***What is the capacity of the machine ?***
Answer : The 2.75T Single Axle Twin Spinner bin holds approximately 2.15 cubic m of fert.
= 2.6 Tonne super @1.2 t/m density, = 3.50 Tonne lime @ 1.6 t/m density.
= 1.7 Tonne urea @ .8t/m density
The 3.25T Tandem Axle Twin Spinner bin holds approximately 2.5 cubic m of fert
= 3.00 Tonne super @1.2 t/m density, = 4.00 Tonne lime @ 1.6t /m density.
= 2 Tonne urea @ .8 t/m density
The 4.75T Tandem Axle Twin Spinner bin holds approximately 3.9 cubic m of fert.
= 4.75 Tonne super @1.2t/m density, = 6.25 Tonne lime @ 1.t/m density.
= 3 Tonne urea @ .8t/m density
(Australian Models) 2.0 Tonne Bin holds 1.68 cubic metres = 2 t super = 2.7 t lime = 1.4 t urea
3.0 Tonne Bin holds 2.53 cubic metres = 3 t super = 4.0 t lime = 2.0 t urea

Question : ***How does the automatic clutch work ?***
Answer : As the hydraulic spinners are started (Red hose pressurised) oil also opens a hydraulic ram inside the clutch assembly which engages the two gears to start the floor mat. When the spinners are stopped (Yellow hose pressurised for two seconds) and the lever returned to neutral, the two gears are automatically disengaged stopping the floor mat. The system works perfectly engaging and disengaging on the move.

Question : What is the expected life of the gears ?
Answer : As they are only engaging at low pressure the will last for many thousands of tonnes

Question : ***What oil flow is required ?***
Answer : The standard SAM Topdresser is fitted with a hydraulic motor (OMP32) requiring a minimum external oil flow of 35 litres per minute at 2000 psi. Any oil flow greater than 35 lit see instructions Hydraulics . If the tractor external hydraulics has a flow of between 24 litre and 34 litre we can supply an alternate motor (OMP25). If the flow is over 55 Lit see the section on running the motors in parallel.

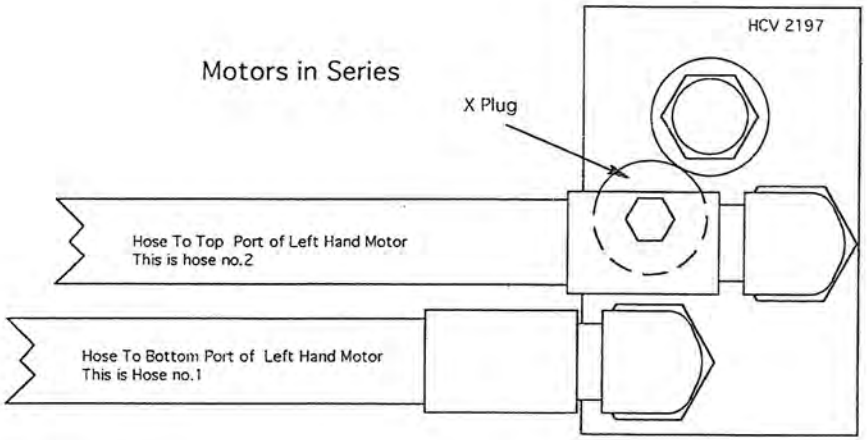
Question : ***What paint treatment does the machine receive ?***
Answer : Chassis - Blast to Sa 2.5 Paint Devshield 236 (2 pot) Paint E Line 929 (2 pot)
Bin - Blast to Sa 2.5 Paint cathacoat zinc 232 then as above.

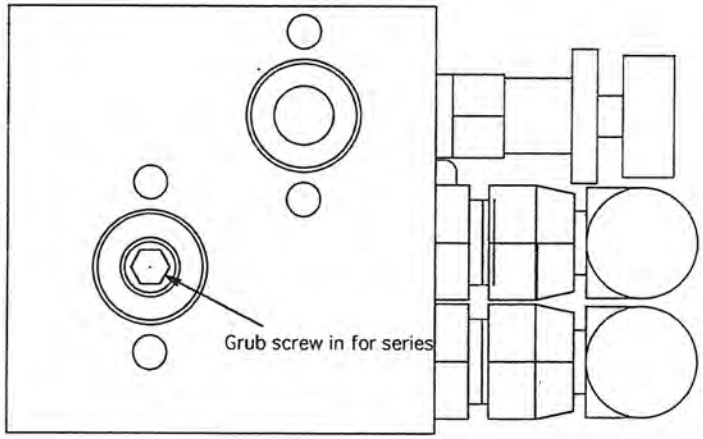
Question : How tight should I have the floor chain / mat assembly ?
Answer : The chain should return 40mm below the chassis.

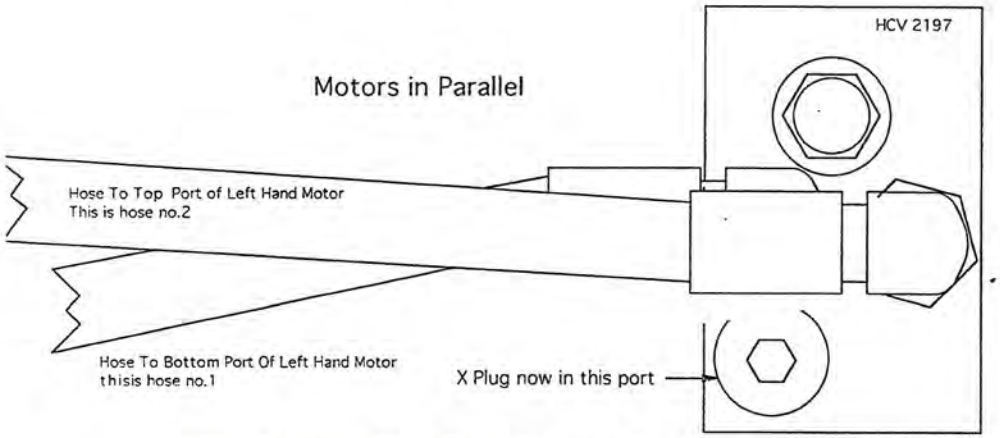
Question : ***Are there different tyre options ?***
Answer : Yes the standard tyres are 11.5 * 80 * 15.3 * 12ply but other sizes both wider and larger in diameter are available

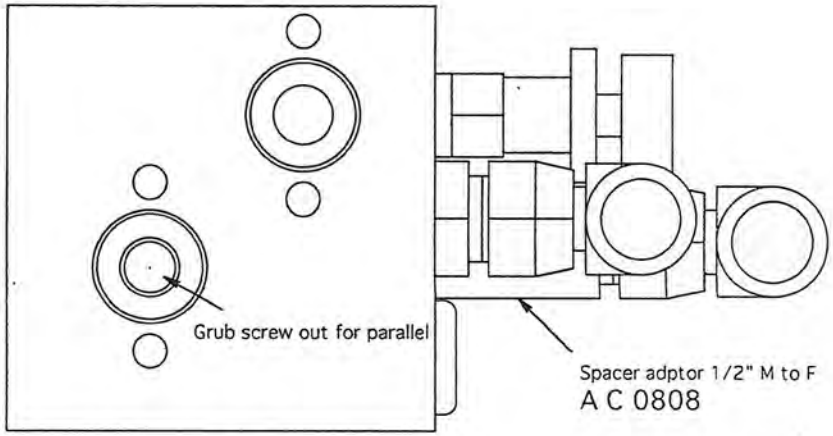
Question : ***Are the spinners spinning in the correct direction ?***
Answer : Looking down on the disks from a position behind the machine, the right hand disc should be turning clockwise with the left disc turning anti-clockwise.

Question : ***How can I stop lumps of urea blocking the back door ?***
Answer : Lay a sheet of chicken wire over the mesh grill. The type with 1/2" holes so that only the granules of urea will fall through and not the lumps.









To Change The Two Motors From Series to Run in Parallel (with H Compensator from May 2003)

1. Remove the four allen head cap screws with a 6mm allen key. These screws hold the alloy block onto the RH motor.
2. Carefully remove the block away from the motor (watch the two O rings) and with an 1/4" allen key remove the grub screw from inside the lower of the two holes. (See dia above for grubscrew) Hint!! If this grubscrew is tight give it a hard tap with a punch or similar to free up.
3. Bolt the block back onto the motor (watch the two O rings are in place)
4. Remove the two hoses that run between the two motors at the block end only. Remove the plug from the parallel pressure port (marked on the drawing as X Plug) and put the plug back into the pressure series port below it. The allen key size is 3/16".
5. The hose marked hose no.1 now goes to the port marked parallel pressure (this is the port where you just removed the X plug.)
6. The hose marked no.2 goes back onto its original port (marked Motor Return). A spacer male to female adaptor may be required to space the hose out from the no.1 hose see drawing.

Test run to ensure there are no leaks. The motors are now set up to run in parallel. The spinner speed must be reset on the alloy block to give a speed of approx 850 RPM. This setting should be : wind all the way in then 2.25 turns out for parallel. (1-5/8 for series)