MORRIS
Advanced Air Seeding and Tillage Systems

7000 Series
GRANULAR APPLICATOR

OPERATOR'S Manual

Assembly Instructions

N28168-3

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Section 1:
Safety

Section Contents

SAFETY-ALERT SYMBOL

Watch for this symbol. It identifies potential hazards to health or personal safety. It means:

ATTENTION - BE ALERT.
Your Safety is involved.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Three words are used in conjunction with the safety-alert symbol:

DANGER

Tells you that a hazard exists which would result in a high probability of death or serious injury if proper precautions are not taken.

WARNING

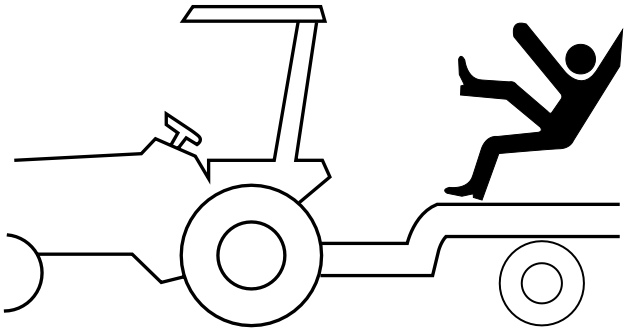
Tells you that a hazard exists which can result in injury or death if proper precautions are not taken.

CAUTION

Tells you to remember safety practices, or directs attention to unsafe practices which could result in personal injury if proper precautions are not taken.

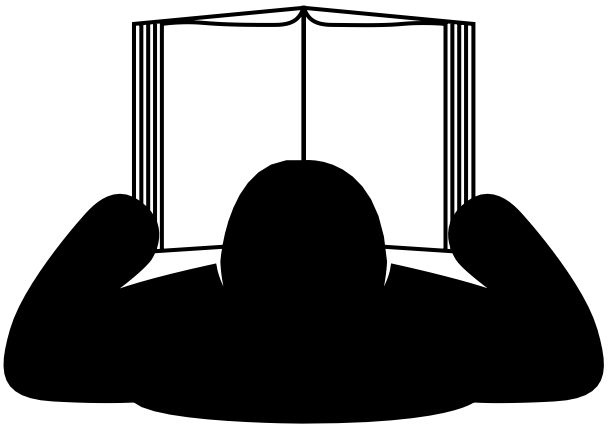
General Operation

- **DO NOT RIDE!!** No one should be allowed to ride on the implement when in motion.
- No one but the operator in the driver's compartment!!
- **Check behind** when backing up.
- **Reduce speed** when working in hilly terrain.
- Never allow anyone within the immediate area when working.
- **Stand clear** when raising or lowering wings.
- **Keep all shields in place**, replace them if removed for service work.
- Always lock auger attachment in raised position.
- Keep hands clear of tank opening when closing lid. Keep lid seal clean to ensure proper sealing.
- **Do Not enter tank unless another person is present.**



Tractor Operation

- Be aware of tractor safety procedure when working with implement.
- Review tractor manuals.
- Secure hitch pin with a retainer and lock drawbar in centre position.



Chemicals

- **Use extreme care** when cleaning, filling or making adjustments.
- **Always read** granular chemical or treated seed labels carefully and always keep label warnings in mind.
- Wear close fitting clothing and appropriate safety equipment for the job.
- **Always wear** safety goggles, breathing apparatus and gloves when handling with granular chemical or treated seed.
- **Do not feed** any treated seed to livestock. Treated seed is poisonous and may cause harm to persons or livestock.
- **Wash exposed skin immediately** - do not leave chemicals on your skin.
- **Properly store** chemicals in original containers with labels intact.
- **Do Not enter tank unless another person is present.**

Danger

Failure to comply may result in death or serious injury.

Read Operator's Manual and decals on **Ammonia** tank before operating Air Drill. Become familiar with all warnings, instructions, and controls.

Always wear gloves and goggles when transferring or handling ammonia.

Always stay clear of hose and valve openings.

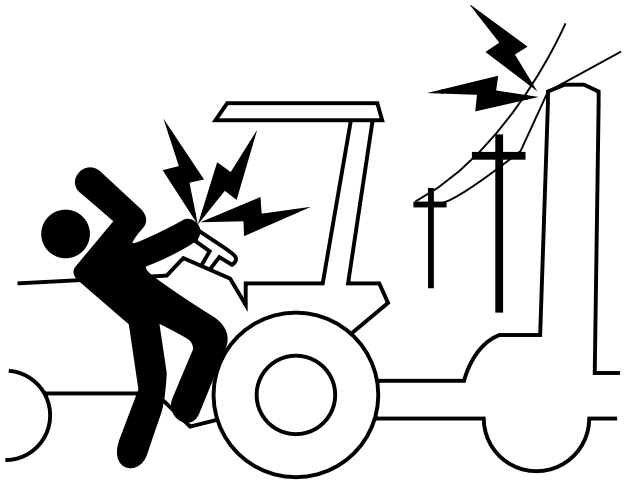
Always be sure pressure is relieved before disconnecting hoses or parts.

Always secure connecting parts and safety chains before towing ammonia trailer.

Always have ample water available in case of exposure to ammonia liquid or gases.

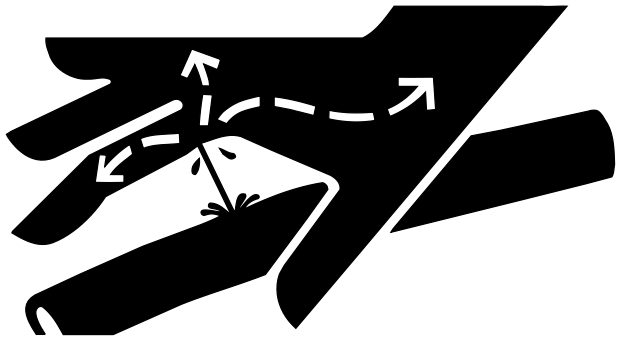
Transporting

- **Be aware** of the height, length and width of implement. Make turns carefully and be aware of obstacles and overhead electrical lines.
- Always travel at a safe speed. Do Not Exceed 20 M.P.H.
- **REDUCE SPEED** with material in Air Cart tanks. **Do Not** Exceed a speed of 10 M.P.H.
- The weight of the implement being towed ***must not exceed 1.5 times*** the weight of towing vehicle.
- Do not transport in poor visibility.
- The slow moving vehicle (SMV) emblem and safety reflectors must be secured on the machine for safe transport.
- Avoid soft surfaces, the additional wing weight on the centre wheels could cause the machine to sink.
- Ensure safety chain is attached correctly.
- Check that wings are firmly seated in transport wing stops, and lock pins installed.
- Secure transport locks on depth control cylinders.



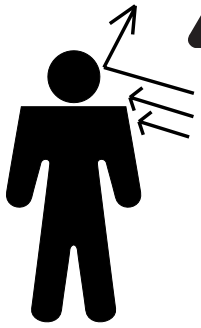
Hydraulics

- **Do not** search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.
- Use cardboard or wood to detect leaks - never your hands.
- Double check that all is clear before operating hydraulics.
- **Never** remove hydraulic hoses or ends with machine elevated. Relieve hydraulic pressure before disconnecting hydraulic hoses or ends.
- Maintain proper hydraulic fluid levels.
- Keep all connectors clean for positive connections.
- Ensure all fittings and hoses are in good condition.
- Do not stand under wings.



Maintenance

- **Shut tractor off** before making any adjustments or lubricating the machine.
- **Block** machine securely to prevent any movement during servicing.
- Wear close fitting clothing and appropriate safety equipment for the job.
- **Always wear** safety goggles, breathing apparatus and gloves when working on seeder filled with granular chemical or treated seed.
- **Do not feed** any treated seed to livestock. Treated seed is poisonous and may cause harm to persons or livestock.
- **Do not** search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.
- **To prevent personal injury**, do not walk within radius of raised cultivator wings. Always ensure wing rests are locked and in place.
- Do not modify the machine.



Caution

Care should be taken when working near the Air Cart while the fan is running. Product blowing out of the system could cause personal injury.

Caution

Keep service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment.

Storage

- Store implement away from areas of main activity.
- Level implement and block up securely to relieve pressure on jack.
- Do not allow children to play on or around implement.

Decals

⚠ WARNING

Personal injury or property damage may result from loss of control.

- **Always use large enough tractor with sufficient braking capacity.**
  - ➢ **Weight of fully loaded implement should not be more than 1.5 times weight of tractor.**
- **Maximum recommended towing speed is 20 mph (32 km/h).**
- **Use flashing amber warning lights and SMV emblem when on public roads, except where prohibited by law.**
- **Refer to tractor and implement Operator's Manuals for weights and further information.**

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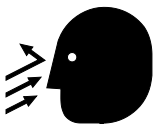

⚠ CAUTION

To avoid injury, do not open lids while fan is operating. Air gust may contain dust and particles.

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IMPORTANT

BEFORE FILLING TANK

- ENSURE PROPER SLIDER CLEARANCE IS SET FOR EACH METER WHEEL
- ENSURE TANK CLEANOUT DOOR IS FULLY CLOSED.

BEFORE APPLYING PRODUCT

- SET RATE ACCORDING TO THE PROCEDURE AND RATE CHART DESCRIBED IN THE OPERATORS MANUAL.
- TAKE A SAMPLE AND ADJUST THE RATE, IF NECESSARY.

AIR LEAKS AFFECT METERING ACCURACY

- ENSURE ALL SEALS ARE PROPERLY POSITIONED AND ALL LIDS ARE TIGHTLY CLOSED.

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IMPORTANT

PREVENT CORROSION

CLEAN THE METERING BODY (INCLUDING AIR PASSAGES) AND THE COLLECTOR BODY WITH MILD SOAPY WATER AND RINSE. WHEN DRY A LIGHT COATING OF DIESEL FUEL OR WD-40 SHOULD BE APPLIED BEFORE STORAGE.

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Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Notes

Section 2: Specifications

Section Contents

7130 & 7180 Tank Models

7030 Granular Applicator

Specifications and Options

Fits on Air Seeder Model	7130	7180
Capacity	30 cu. ft.	30 cu. ft.
Meter shut-off	Electric	Electric
Zapper clutch	Standard	Standard
Working width	26 ft. to 64 ft.	26 ft. to 64 ft.
Hopper Screens	Optional	Optional
Metering System - Ground Driven	Standard	Standard
Number Secondary Runs	14 to 30	14 to 30
Primary Hose - Diameter	2 1/2"	2 1/2"
Secondary Hose - Diameter	15/16"	15/16"
Tank Walk-Way	Standard	Standard
Easy Clean Out System	Standard	Standard
Monitor - (Shaft Motion and Bin Level)	Quick couples to Air Seeder Monitor Standard	Quick couples to Air Seeder Monitor Standard

7240 & 7300Tank Models

7040 Granular Applicator

Specifications and Options

Fits On Air Seeder Model	7240	7300
Capacity	40 cu. ft.	40 cu. ft.
Meter shut-off	Electric	Electric
Zapper clutch	Standard	Standard
Working width	26 ft. to 64 ft.	26 ft. to 64 ft.
Hopper Screen	Optional	Optional
Metering System - Ground Driven	Standard	Standard
Number Secondary Runs	14 to 30	14 to 30
Primary Hose - Diameter	2 1/2"	2 1/2"
Secondary Hose - Diameter	15/16"	15/16"
Tank Walk-Way	Standard	Standard
Easy Clean Out System	Standard	Standard
Monitor - (Shaft Motion and Bin Level)	Quick couples to Air Seeder Monitor Standard	Quick couples to Air Seeder Monitor Standard

Notes

Section 3: Checklist

Section Contents

SAFETY-ALERT SYMBOL

Watch for this symbol. It identifies potential hazards to health or personal safety. It points out safety precautions. It means:

ATTENTION - BE ALERT.

Your safety is involved.

Manuals

Note: Owner Verification Form must be completed and submitted to Morris Industries within 30 days of delivery date.

Warranty Void if Not Registered

Parts Manual Order Part Number N28169

Checklist

Please read the Operator's Manual carefully and become a "SAFE" operator.

Adopt a good lubrication and maintenance program.

General

____Check if assembled correctly.

____Proper chain tension.

____Check hose connections

____Ensure cleanout door and tank lid are connected correctly.

Lubrication - Grease

____Metering Drive

____Axle Pivots

____Auger Pivots

Lubrication - Oil

____Drive chains

Tire Pressure

____See maintenance, section 6

Transport

____Tighten wheel bolts.

____Check hose connections.

OWNER REFERENCE

Model: _____

Serial No: _____

Dealer: _____

Town: _____ State: _____

Phone: _____

OWNER/OPERATOR: _____

Date: _____

TAKE SAFETY SERIOUSLY.

DO NOT TAKE

Notes

Section 4: Introduction

Section Contents

Introduction

This Operator's Manual has been carefully prepared to provide the necessary information regarding the operation and adjustments, so that you may obtain maximum service and satisfaction from your new MORRIS 7000 Series Granular Applicator.

To protect your investment, study your manual before starting or operating in the field. Learn how to operate and service your 7000 Series Granular Applicator correctly, failure to do so could result in personal injury or equipment damage.

If you should find that you require information not covered in this manual, contact your local MORRIS Dealer. The Dealer will be glad to answer any questions that may arise regarding the operation of your MORRIS 7000 Series Granular Applicator.

MORRIS Dealers are kept informed on the best methods of servicing and are equipped to provide prompt efficient service if needed.

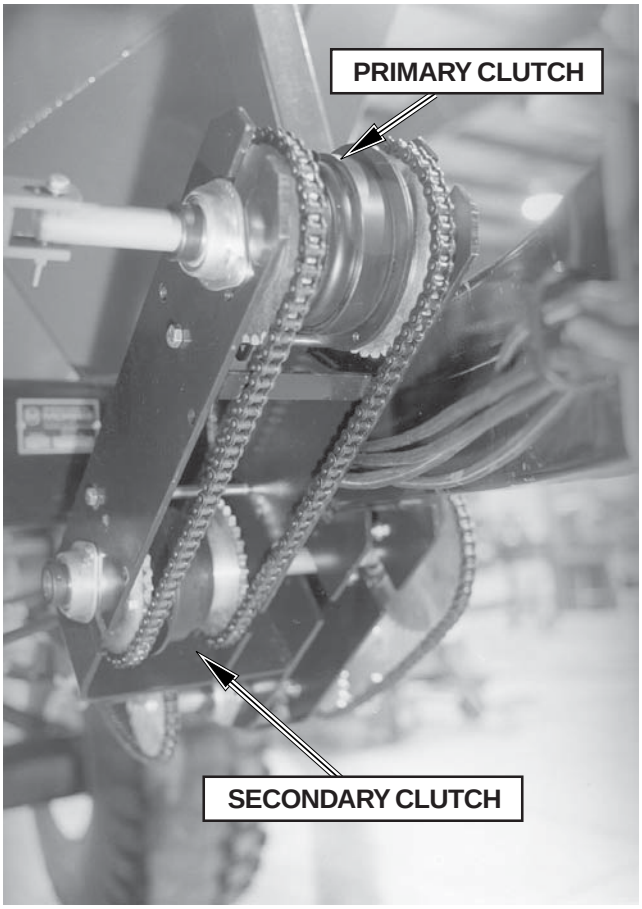
Occasionally, your 7000 Series Granular Applicator may require replacement parts. Your Dealer will be able to supply you with the necessary replacement parts. If the Dealer does not have the necessary part, the MORRIS Factory will supply the Dealer with it promptly.

Your MORRIS 7000 Series Granular Applicator is designed to give satisfaction even under difficult conditions. A small amount of time and effort spent in protecting it against rust, wear and replacing worn parts will increase the life and trade-in value.

Keep this book handy for ready reference at all times. It is the policy of Morris Industries Ltd. to improve its products whenever it is possible to do so. The Company reserves the right to make changes or add improvements at any time without incurring any obligation to make such changes on machines sold previously.

Introduction - continued

The tank has it's own metering system and metering drive. Included with the unit is a sample collector box that an operator can use to confirm metering rates. The meter drive is positive, convenient, simple to set and is ground driven through an electric clutch. The metering system incorporates spiral fluted wheels. The size of the metering wheel is matched to the number of outlets on the secondary divider giving the best in accuracy. The spiral fluted metering wheels combined with the muti-range transmission allows a full range of products to be metered without having to change the metering wheels.



All Clay and limestone based granular chemicals and fine seeds such as mustard and Canola can be metered by the applicators metering system.

IMPORTANT: Products such as fertilizer and /or coarse grains such as wheat, barley etc. CANNOT be metered by the granular metering system.

High quality 2 1/2" diameter hose is standard equipment for the distribution system. The patented flat fan divider, which is matched in size to the metering wheel, combined with the excellent deflectors, ensures final accurate distribution of the product.

The standard Zapper Clutch gives instantaneous rate increases or decreases of chemical application.

Notes

Section 5: Operation

Section Contents

Section Contents - continued

CAUTION

BE ALERT

SAFETY FIRST

REFER TO SECTION 3 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Application

The Morris 7000 Series Granular Applicator can be used for applying all forms of granular chemical plus fine seeds such as Canola, alfalfa or clover.

Tractor

Tires

- Proper ballast and tire pressure are required when pulling heavy implements.
- Consult your tractor operator's manual and follow all recommended procedures.

Hydraulics

- Wipe all hydraulic fittings and couplers with a clean cloth to avoid contaminating the system.
- Check that hydraulic reservoir is filled to the proper level.

Drawbar

- Centre and pin in a fixed position for easier hitching and greater stability.

Do not permit smoking, sparks or an open flame where combustible fuels are being used. Keep the work area well ventilated.

Do not search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.

General Operation

The Morris 7000 Series Granular Applicator can be used for applying all forms of granular chemical plus fine seeds such as Canola, alfalfa or clover. The unit when combined with the 7000 Series Air Seeder allows a number of application options.

1. Granular chemicals or fine seeds can be applied alone.
2. Fine seeds can be broadcast and fertilizer can be banded simultaneously.
3. Undercover crop such as clover can be broadcast and seed and fertilizer applied in one operation.
4. Granular chemicals can be applied and fertilizer can be banded simultaneously.
5. Granular chemicals can be broadcast and seed and fertilizer alone, or seed and fertilizer together can be applied in a single pass.

In all of these options the amount of air required to carry the material varies with the amount being applied and the ground speed of the unit.

In certain applications horsepower requirement for the fan can be dramatically reduced. This helps to optimize the tractors fuel efficiency while reducing the air volume requirements for the system.

In application (1) above optimum efficiency can be simply attained by inserting the blank off plates (supplied) at the primary hose coupler(s) on the rear of the cultivator.

The hoses to be blanked off would be the ones carrying no product, in this case the seed and fertilizer hoses.

Similarly in application (6) the hoses to be blanked off are the ones that would normally be carrying the granular chemical. In this case it is strongly recommended that the Granular Tank be empty of all product.

When changing the application option to either 2, 3, 4 or 5 ensure the blank off plates are **removed** from the primary hose coupler(s).

IMPORTANT

Products such as fertilizer and or coarse grains such as wheat, barley etc. *cannot* be metered by the granular metering system.

Operating Overlap

The granular deflectors are spaced across the cultivator for the maximum coverage for that particular size of machine.

For correct chemical coverage it is required that the chemical spread patterns overlap. To ensure this, there is a specific distance the machine must be run over the first pass on the second pass.

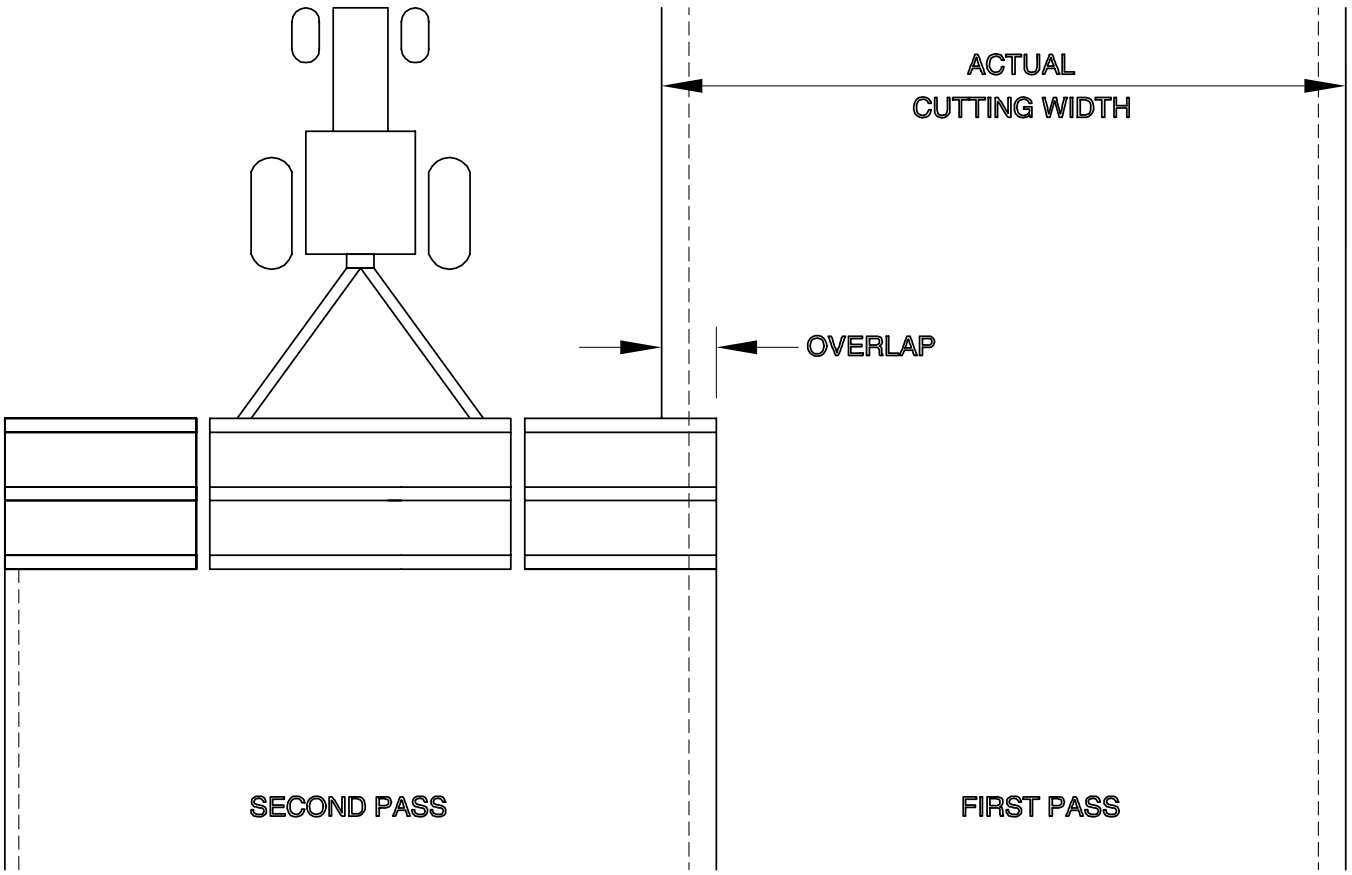
For example, from the tables on page 5.9 the working overlap for a 35 ft. machine is 16". So on the second pass the cultivator must overlap the first pass by 16" to ensure the correct chemical coverage.

Note: The application rate of the Air Seeder will be doubled in the overlap area required by the Granular Applicator.

IMPORTANT: The Maxim Air Drill **DOES NOT** have any operating overlap.

The granular deflectors are spaced on the Maxim Air Drill to provide no overlap in seeding or zero-till applications.

IMPORTANT: The Maxim Air Drill **DOES NOT** have any operating overlap.



Metering System

The 7000 series Granular Applicator uses a combination of metering wheels and spacers shown below. The metering wheels are individually sized to correspond with the number of outlets at the connected secondary divider. A spacer is installed, depending on the size of wheel, to make up the distance between the metering wheel and the body.

It should be noted that although the system looks identical to the one in the Air Seeder it is not. The metering wheels, in this case, are manufactured to extremely high tolerances to ensure that the fine granular product is metered to the highest degree of accuracy.

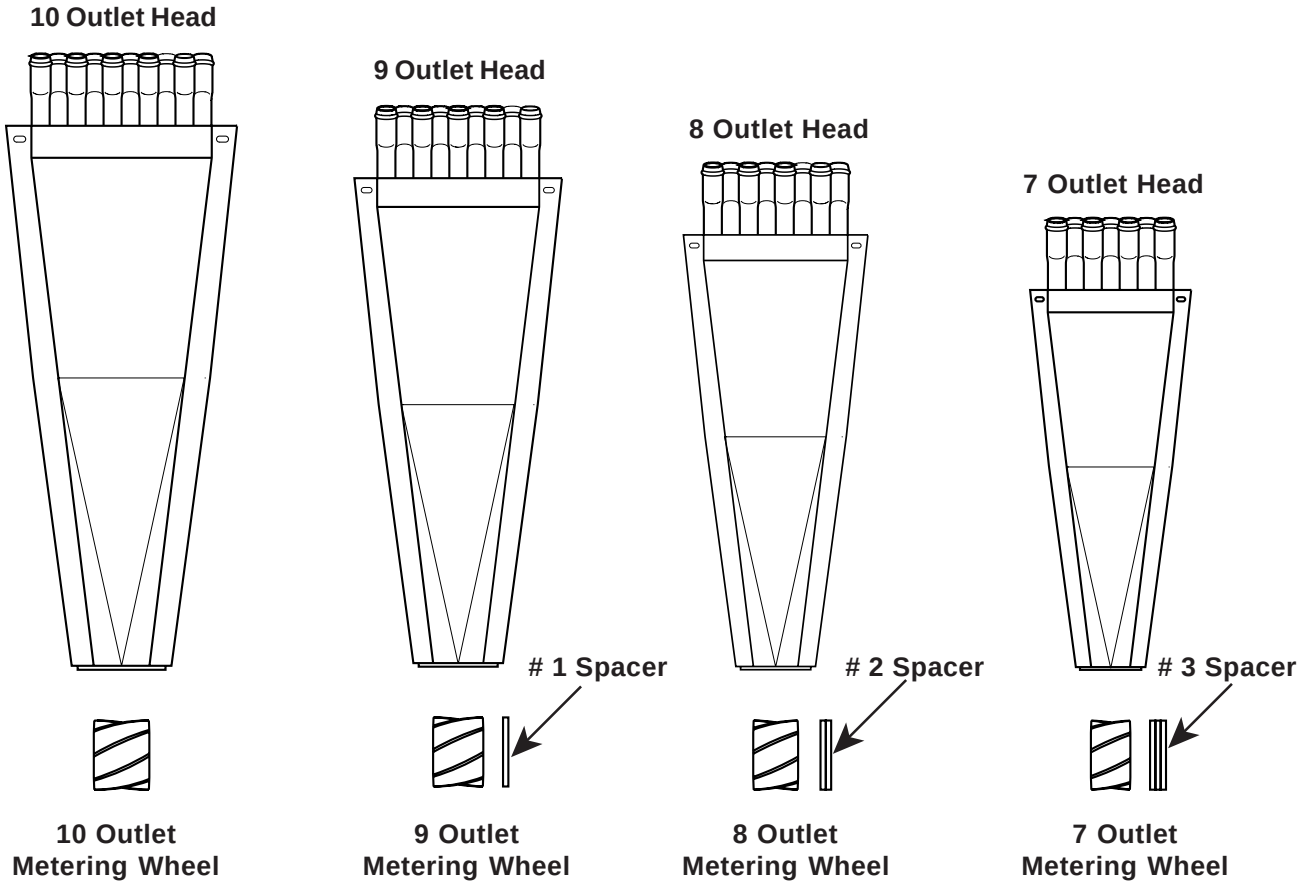
The 7000 Series Granular Applicator can meter all types of granular chemical both clay and limestone based, Canola, mustard, alfalfa and clover without any internal metering adjustments.

Different rates are easily obtained by interchanging the quick change sprockets supplied with the Air Seeder.

Note: Before putting product in the tank ensure that:

(a) The cleanout doors are fully closed and sealed.

(b) The plastic bag covering the fan is removed.



Filling Tank

The 7000 Series Granular Applicator comes in two sizes:

(1) 7030 Granular Applicator fits the 7130 and 7180 Air Seeders. It has a capacity of 30 cu. ft. which translates to 2464 lbs. of Treflan or 1071 lbs. of Avadex.

(2) 7040 Granular Applicator fits the 7240 and 7300 Air Seeders. It has a capacity of 40 cu. ft. which translates to 3286 lbs. of Treflan or 1429 lbs. of Avadex.

- Open the tank lid or remove lid when using mini bulk bags.
- Remove the screen, check the tank for debris, replace the screen.
- If using auger, run auger slowly. Granular product will not auger at high auger speeds.

Warning! Ensure that all auger and tank screens are in place. Always use screen to filter when filling.

- Remove the plastic bag covering fan.
- Once tank is filled, clean lid seal and ensure lid seal is positioned correctly. Ensure all auger and tank screens are in place.
- After a rain or dew the fan should be run for 2 minutes to purge the moisture from the system before operation.
- Check lids for air leaks with your hands once the Air Seeder fan is operational. Pull up on the corner of a lid, if air escapes, tighten lid latch. (See *"Tank Lid Adjustment"* in Maintenance Section)
- Check metering body for air leaks.

The Granular Tank *MUST BE EMPTIED* at the end of each operating day.

This prevents possible condensation forming inside the tank which can cause problems in metering should the chemical or seed become moist and cake together.

The Fertilizing Banding Kit *CANNOT be used* with the Granular Applicator. When a Granular Applicator is installed the banding kit must be removed.

Important: When the 7040 Granular Applicator is filled with Treflan or Heritage (4400 lbs.) the 7240 Tow Between Air Seeder *FRONT TANK* should only be filled 1/2 full.

Note: Before putting product in the tank ensure that:

(a) The cleanout doors are fully closed and sealed.

(b) The plastic bag covering the fan is removed.

⚠ Warning

Do not enter tank unless another person is present.

Metering Rate Adjustment

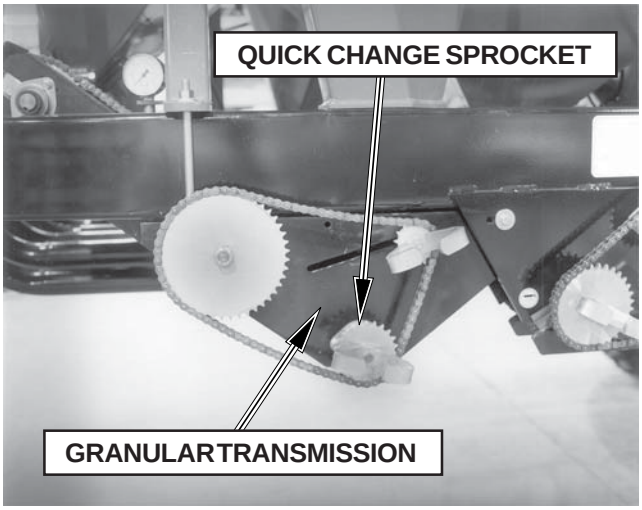
The metering rate adjustment is the same as the Air Seeder. The rate varies with the speed of the metering wheels. A new rate is achieved by changing a sprocket on the Posi-Drive Transmission for the Granular Applicator.

Refer to the rate charts for desired application rate and sprocket selection.

Note: The Rate Charts should only be used as a guide. Even though actual product was used to determine the chart variation in product size, density, shape, tire pressure and wheel sinkage are all factors that influence the meter rate.

- Loosen metering chain on posi-drive transmission, by loosening the idler.
- Spin off the wing nut and remove the rate change sprocket.
- Install the desired rate change sprocket and tighten the wing nut.
- Tighten the chain by adjusting the idler.

Note: Do not over tighten chain, just take slack out of chain.



Rate Calibration

The practice of doing a rate calibration is strongly recommended as it will confirm the actual amounts of product being put onto the ground.

The following procedure is one that should be followed for every rate calibration or change of product.

For all Granular Chemicals and Fine Seeds it is recommended to take a larger sample, typically, to take a sample for a 1/2 acre or 1 acre.

The sample collector only holds product sample for 1/4 acre. The collector **must be** emptied into a larger container for accurate samples.

Note: The fan must not be running when a rate check is performed.

Note: For samples greater than 1/4 acre, empty rate check box into a larger container, then collect additional samples as required. Remember to subtract the weight of the container used from the total sample weight.

Rate Calibration - Continued

For a 1/2 acre sample for a 31 ft. wide cultivator on 12” spacing with a 7180 Air Seeder.

- From the table on page 5-12 the spread width for a 31 ft. 12” spacing 8900 is 360 inches (30 ft).
- Turns required for 1/2 acre sample = 77.44 turns from the chart on page 5-10.

Rate = lbs/acre = 1/2 acre sample weight (lbs.) x 2

For a 1 acre sample for a 31 ft. wide cultivator on 12” spacing.

- The number of crank turns required for 1 acre is the number of turns required for 1/2 acre for a specific spread width x 2 (See above)
- Turns required for 1 acre = 77.44 x 2

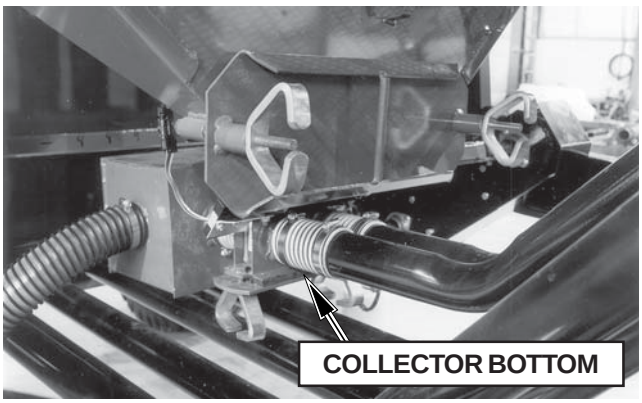
Rate = lbs/acre = 1 acre sample weight (lbs.) x 1

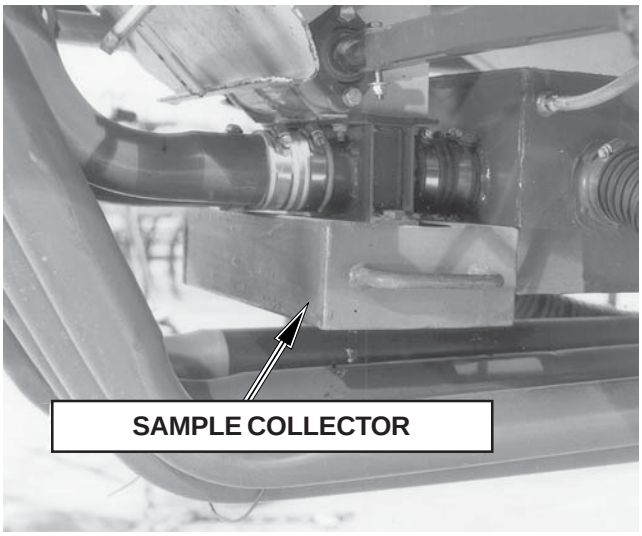
Calibration Procedure

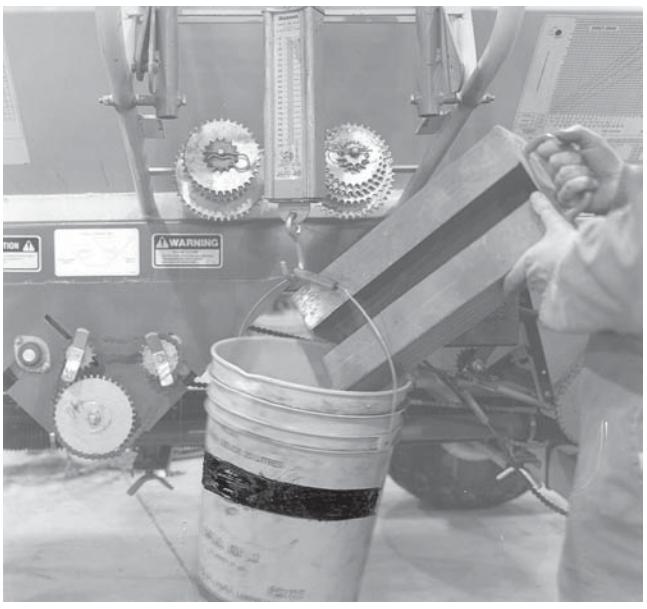
- Remove the Wing Nuts.
- Remove the bottom of the collector.
- Check that the desired rate change sprocket is installed in the transmission. (See Rate Charts)
- Engage the Granular Primary Clutch as indicated by the switch in the tractor cab.
- Turn the crank until material begins to fall through the collector body.
- Slide rate check box on the collector body.
- Turn crank in the direction of the arrow (counter clockwise) the required number of turns for the overall granular spread width. See *Working Width* tables.

Note: Incorrect rates will occur if crank is rotated Clockwise.

- Weigh the sample by pouring the contents of the rate check box into a larger container such as a 5 gallon pail.
- Check this rate against the rate required. If a different rate is required then increase or decrease the size of the rate change sprocket. Increasing the sprocket size will increase the rate and vice versa.
- Replace the bottom of the collector.







Imperial Rate Calibration Chart

Calibration Chart based on 1/2 of an Acre.

See rear of book for Metric Calibration Chart.

W = Machine Spread Width (inches)

F = Optional Mechanical Acre Tally Factor = 56/R

R = Crank Rotation - turns
for 1/2 Acre = 31,626/W for 7130 with 16.5 x 16.1 All Weather Tires.
for 1/2 Acre = 27,877.5/W for 7180 with 16.5 x 16.1 All Weather Tires.
for 1/2 Acre = 22,134.7/W for 7180 with 18.4x 26 All Weather Tires.
for 1/2 Acre = 20,907/W for 7240 & 7300 with 23.1 x 26 All Weather Tires.
for 1/2 Acre = 19,008/W for 7240 & 7300 with 23.1 x 26 Rice Tires.

D = Distance required for 1/2 Acre (Feet) = 261,360/W

7000 Series Granular Applicator
IMPERIAL RATE CALIBRATION CHART

SPREAD WIDTH	AIRSEEDER MODEL					DISTANCE [D]	SPREAD WIDTH	AIRSEEDER MODEL					DISTANCE [D]
	7130	7180		7240/7300				7130	7180		7240/7300		
	Tire 16.5 x 16.1	Tire 21.5 x 16.1	Tire 18.4 x 26	Tire 23.1 x 26	Rice Tire 23.1 x 26			Tire 16.5 x 16.1	Tire 21.5 x 16.1	Tire 18.4 x 26	Tire 23.1 x 26	Rice Tire 23.1 x 26	
(ins)	[R]	[R]	[R]	[R]	[R]	(ft)	(ins)	[R]	[R]	[R]	[R]	[R]	(ft)
315	100.40	88.50	70.27	66.37	60.34	829.7	490	64.54	56.89	45.17	42.67	38.79	533.4
323	97.91	86.31	68.53	64.73	58.85	809.2	492	64.28	56.66	44.99	42.49	38.63	531.2
324	97.61	86.04	68.32	64.53	58.67	806.7	498	63.51	55.98	44.45	41.98	38.17	524.8
330	95.84	84.48	67.07	63.35	57.60	792.0	504	62.75	55.31	43.92	41.48	37.71	518.6
336	94.13	82.97	65.88	62.22	56.57	777.9	510	62.01	54.66	43.40	40.99	37.27	512.5
338	93.57	82.48	65.49	61.86	56.24	773.3	516	61.29	54.03	42.90	40.52	36.84	506.5
342	92.47	81.51	64.72	61.13	55.58	764.2	520	60.82	53.61	42.57	40.21	36.55	502.6
343	92.20	81.28	64.53	60.95	55.42	762.0	522	60.59	53.41	42.40	40.05	36.41	500.7
348	90.88	80.11	63.61	60.08	54.62	751.0	525	60.24	53.10	42.16	39.82	36.21	497.8
352	89.85	79.20	62.88	59.39	54.00	742.5	528	59.90	52.80	41.92	39.60	36.00	495.0
354	89.34	78.75	62.53	59.06	53.69	738.3	534	59.22	52.21	41.45	39.15	35.60	489.4
360	87.85	77.44	61.49	58.08	52.80	726.0	536	59.00	52.01	41.30	39.01	35.46	487.6
366	86.41	76.17	60.48	57.12	51.93	714.1	540	58.57	51.63	40.99	38.72	35.20	484.0
372	85.02	74.94	59.50	56.20	51.10	702.6	546	57.92	51.06	40.54	38.29	34.81	478.7
375	84.34	74.34	59.03	55.75	50.69	697.0	552	57.29	50.50	40.10	37.88	34.43	473.5
378	83.67	73.75	58.56	55.31	50.29	691.4	558	56.68	49.96	39.67	37.47	34.06	468.4
382	82.79	72.98	57.94	54.73	49.76	684.2	564	56.07	49.43	39.25	37.07	33.70	463.4
384	82.36	72.60	57.64	54.45	49.50	680.6	570	55.48	48.91	38.83	36.68	33.35	458.5
387	81.72	72.03	57.20	54.02	49.12	675.3	575	55.00	48.48	38.50	36.36	33.06	454.5
390	81.09	71.48	56.76	53.61	48.74	670.2	576	54.91	48.40	38.43	36.30	33.00	453.8
392	80.68	71.12	56.47	53.33	48.49	666.7	582	54.34	47.90	38.03	35.92	32.66	449.1
396	79.86	70.40	55.90	52.80	48.00	660.0	588	53.79	47.41	37.64	35.56	32.33	444.5
402	78.67	69.35	55.06	52.01	47.28	650.1	592	53.42	47.09	37.39	35.32	32.11	441.5
408	77.51	68.33	54.25	51.24	46.59	640.6	594	53.24	46.93	37.26	35.20	32.00	440.0
412	76.76	67.66	53.73	50.75	46.14	634.4	600	52.71	46.46	36.89	34.85	31.68	435.6
414	76.39	67.34	53.47	50.50	45.91	631.3	606	52.19	46.00	36.53	34.50	31.37	431.3
420	75.30	66.38	52.70	49.78	45.26	622.3	612	51.68	45.55	36.17	34.16	31.06	427.1
421	75.12	66.22	52.58	49.66	45.15	620.8	613	51.59	45.48	36.11	34.11	31.01	426.4
426	74.24	65.44	51.96	49.08	44.62	613.5	618	51.17	45.11	35.82	33.83	30.76	422.9
432	73.21	64.53	51.24	48.40	44.00	605.0	624	50.68	44.68	35.47	33.50	30.46	418.8
434	72.87	64.23	51.00	48.17	43.80	602.2	625	50.60	44.60	35.42	33.45	30.41	418.2
438	72.21	63.65	50.54	47.73	43.40	596.7	630	50.20	44.25	35.13	33.19	30.17	414.9
441	71.71	63.21	50.19	47.41	43.10	592.7	636	49.73	43.83	34.80	32.87	29.89	410.9
444	71.23	62.79	49.85	47.09	42.81	588.6	642	49.26	43.42	34.48	32.57	29.61	407.1
447	70.75	62.37	49.52	46.77	42.52	584.7	648	48.81	43.02	34.16	32.26	29.33	403.3
450	70.28	61.95	49.19	46.46	42.24	580.8	654	48.36	42.63	33.85	31.97	29.06	399.6
456	69.36	61.13	48.54	45.85	41.68	573.2	660	47.92	42.24	33.54	31.68	28.80	396.0
460	68.75	60.60	48.12	45.45	41.32	568.2	662	47.77	42.11	33.44	31.58	28.71	394.8
462	68.45	60.34	47.91	45.25	41.14	565.7	666	47.49	41.86	33.24	31.39	28.54	392.4
466	67.87	59.82	47.50	44.86	40.79	560.9	672	47.06	41.48	32.94	31.11	28.29	388.9
468	67.58	59.57	47.30	44.67	40.62	558.5	675	46.85	41.30	32.79	30.97	28.16	387.2
470	67.29	59.31	47.10	44.48	40.44	556.1	678	46.65	41.12	32.65	30.84	28.04	385.5
472	67.00	59.06	46.90	44.29	40.27	553.7	682	46.37	40.88	32.46	30.66	27.87	383.2
474	66.72	58.81	46.70	44.11	40.10	551.4	684	46.24	40.76	32.36	30.57	27.79	382.1
480	65.89	58.08	46.11	43.56	39.60	544.5	690	45.83	40.40	32.08	30.30	27.55	378.8
484	65.34	57.60	45.73	43.20	39.27	540.0	696	45.44	40.05	31.80	30.04	27.31	375.5
486	65.07	57.36	45.54	43.02	39.11	537.8	702	45.05	39.71	31.53	29.78	27.08	372.3

Working Width and Deflector Spacing Tables

Concept 2000 - 12 inch spacing

Concept 2000 with 12 inch spacing						
Machine		Number of Deflectors	Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size					
23 - 27	23'	* * * * *	280	* * * * *	* * * * *	* * * * *
	25'	* * * * *	304	* * * * *	* * * * *	* * * * *
	27'	14	328	23.00	322.00	6.00
29 - 33	29'	15	352	23.00	345.00	7.00
	31'	15	376	24.50	367.50	8.50
	33'	17	400	23.00	391.00	9.00
26 - 30	26'	14	316	22.00	308.00	8.00
	28	14	340	23.75	332.50	7.50
	30'	15	364	23.75	356.25	7.75
32 - 36	32'	17	388	22.50	382.50	5.50
	34'	17	412	23.75	403.75	8.25
	36'	19	436	22.50	427.50	8.50
38 - 42	38'	19	460	23.75	451.25	8.75
	40'	19	484	25.00	475.00	9.00
	42'	21	508	23.75	498.75	9.25
44 -48	44'	23	532	22.75	523.25	8.75
	46'	23	556	23.75	546.25	9.75
	48'	23	580	24.75	569.25	10.75
50 - 54	50'	26	604	23.00	598.00	6.00
	52'	26	628	23.75	617.50	10.50
	54'	26	652	24.75	643.50	8.50
56 - 58	56'	28	676	23.75	665.00	11.00
	58'	28	700	24.75	693.00	7.00
	60'	28	724	25.5	714	10.00

* Based on using 16” wide sweeps.

Working Overlap will **increase** with **wider** sweeps and **decrease** with **narrower** sweeps.

To determine working overlap with different sweeps use the formula’s below:

Actual Cutting Width = Spacing x Number of Shanks + (Sweep Width - Spacing)

Working Overlap = Actual Cutting Width - Overall Spread Width

Working Width and Deflector Spacing Tables

8900 - 12 inch spacing

8900 with 12 inch spacing					
Machine		Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size				
25 - 35	29'	352.0	22.50	338.00	14.00
	31'	376.00	24.00	360.00	16.00
	33'	400.00	25.50	382.00	18.00
	35'	424.00	24.00	408.00	16.00
31 - 41	31'	376.00	24.00	360.00	16.00
	33'	400.00	25.50	382.00	18.00
	35'	424.00	24.00	408.00	16.00
	37'	448.00	25.50	434.00	14.00
	39'	472.00	24.00	456.00	16.00
	41'	496.00	25.50	484.00	12.00
43 - 47	43'	520.00	24.00	504.00	16.00
	45'	544.00	25.00	525.00	19.00
	47'	568.00	24.00	552.00	16.00
49 - 59	49'	592.50	25.00	575.00	17.00
	51'	616.00	24.00	600.00	16.00
	53'	640.00	25.00	625.00	15.00
	55'	664.00	24.00	648.00	16.00
	57'	688.00	25.00	675.00	13.00
	59'	712.00	24.00	696.00	16.00

* Based on using 16” wide sweeps.

Working Overlap will **increase** with **wider** sweeps and **decrease** with **narrower** sweeps.

To determine working overlap with different sweeps use the formula’s below:

Actual Cutting Width = Spacing x Number of Shanks + (Sweep Width - Spacing)

Working Overlap = Actual Cutting Width - Overall Spread Width

Working Width and Deflector Spacing Tables

Magnum - 12 inch spacing

Magnum III Series Chisel Plow						
Machine		Number of Deflectors	Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size					
	25'	* * * * *	304.00	* * * * *	* * * * *	* * * * *
	27'	14	328.00	22.50	315.00	13.00
	29'	14	352.00	24.25	339.50	12.50
CP-831	31'	16	376.00	22.75	364.00	12.00
	33'	16	400.00	24.25	388.00	12.00
	35'	18	424.00	23.00	414.00	12.00
	37'	18	448.00	24.25	436.50	11.50
CP-840	40'	20	484.00	23.50	470.00	14.00
	42'	20	508.00	24.75	495.00	13.00
CP-843	43'	22	520.00	23.00	506.00	14.00
	45'	22	544.00	24.25	533.50	10.50
	47'	22	568.00	25.25	555.50	12.50
CP-850	50'	24	604.00	24.75	594.00	10.00

Magnum I and Magnum II Series Chisel Plow					
Machine		Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size				
CP-725	27'	328.00	22.50	315.00	13.00
	29'	352.00	24.00	336.00	16.00
CP-731	31'	376.00	24.00	360.00	16.00
	33'	400.00	24.00	484.00	16.00
	35'	424.00	24.00	408.00	16.00
	37'	448.00	24.00	432.00	16.00
CP-740	40'	484.00	23.50	470.00	14.00
	42'	508.00	24.50	490.00	18.00
CP-745	45'	544.00	24.00	528.00	16.00
CP-750	50'	604.00	24.00	588.00	16.00

* Based on using 16” wide sweeps.

Working Overlap will **increase** with **wider** sweeps and **decrease** with **narrower** sweeps.

To determine working overlap with different sweeps use the formula’s below:

Actual Cutting Width = Spacing x Number of Shanks + (Sweep Width - Spacing)

Working Overlap = Actual Cutting Width - Overall Spread Width

Working Width and Deflector Spacing Tables

Concept 2000 - 10 inch spacing

Concept 2000 with 10 inch spacing						
Machine		Number of Deflectors	Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size					
23 - 27	24'	* * * * *	294	* * * * *	* * * * *	* * * * *
	26'	14	314	22.00	308.00	6.00
	27.5'	14	334	23.25	325.50	8.50
29 - 33	31'	15	374	24.50	367.50	6.50
	32.5'	16	394	24.25	388.00	6.00
	34'	16	414	25.00	400.00	14.00
26 - 30	27.5'	14	334	23.00	322	12.00
	29'	15	354	23.00	345.00	9.00
	31'	15	374	24.50	367.50	6.50
32 - 36	34'	17	414	24.00	408.00	6.00
	36'	18	434	23.75	427.50	6.50
	37.5'	20	454	22.25	445.00	9.00
38 - 42	41'	20	494	24.25	485.00	9.00
	42.5'	20	514	25.25	505.00	9.00
	44'	22	534	24.00	528.00	6.00
44 - 48	47.5'	23	574	24.50	564.50	10.50
	49'	24	594	24.25	582.00	12.00
	51'	24	614	25.25	606.00	8.00
50 - 54	54'	28	654	23.00	644.00	10.00
	56'	28	674	23.75	665.00	9.00
	57.5'	28	694	24.50	686.00	8.00
56 - 58	61'	30	734	24.25	727.50	6.50
	62.5'	30	754	24.75	742.50	11.5
	64'	30	774	25.5	765.00	9.00

* Based on using 14” wide sweeps.

Working Overlap will **increase** with **wider** sweeps and **decrease** with **narrower** sweeps.

To determine working overlap with different sweeps use the formula’s below:

Actual Cutting Width = Spacing x Number of Shanks + (Sweep Width - Spacing)

Working Overlap = Actual Cutting Width - Overall Spread Width

Working Width and Deflector Spacing Tables

Concept 2000 - 9 inch spacing

Concept 2000 with 9 inch spacing						
Machine		Number of Deflectors	Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size					
23 - 27	23.5'	* * * * *	282	* * * * *	* * * * *	* * * * *
	25'	* * * * *	300	* * * * *	* * * * *	* * * * *
	27.5'	14	318	22.00	308.00	10.00
29 - 33	29.5'	15	354	23.00	345.00	9.00
	31'	15	372	24.25	363.75	8.25
	32.5'	15	390	25.25	378.75	11.25
26 - 30	26.5'	14	318	22.00	308.00	10.00
	28	14	336	23.50	329.00	7.00
	29.5'	14	354	24.75	346.50	7.50
32 - 36	32.5'	16	390	24.00	384.00	6.00
	34'	17	408	23.50	399.50	8.50
	35.5'	17	426	24.50	416.50	9.50
38 - 42	38.5'	18	462	25.25	454.50	7.5
	40'	20	480	23.50	470.00	10.00
	41.5'	21	498	23.25	488.25	9.75
44 - 48	44.5'	23	534	22.75	523.25	10.75
	46'	23	552	23.75	546.25	5.75
	47.5'	23	570	24.50	563.50	6.50
50 - 54	50.5'	26	606	23.00	598.00	8.00
	52'	26	624	23.75	617.50	6.50
	53.5'	26	642	24.50	637.00	5.00
56 - 58	56.5'	28	678	24.00	672.00	6.00
	58'	28	696	24.50	686.00	10.00
	59.5'	28	714	25.25	707.00	7.00

* Based on using 12” wide sweeps.

Working Overlap will **increase** with **wider** sweeps and **decrease** with **narrower** sweeps.

To determine working overlap with different sweeps use the formula’s below:

Actual Cutting Width = Spacing x Number of Shanks + (Sweep Width - Spacing)

Working Overlap = Actual Cutting Width - Overall Spread Width

Working Width and Deflector Spacing Tables

8900 & 9000 - 9 inch spacing

8900 & 9000 with 9 inch spacing					
Machine		Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size				
25 - 35	29'	336	21.50	323	13
	31'	372	24.00	360	12
	33'	390	25.00	375	15
	35'	408	22.75	387	21
31 - 41	31'	372	24.00	360	12
	33'	390	25.00	375	15
	35'	408	22.75	387	21
	37'	444	24.75	421	23
	39'	462	23.50	447	15
	41'	480	24.50	466	14
43 - 47	43'	516	24.00	504	12
	45'	534	24.75	520	14
	47'	552	25.50	536	16
49 - 59	49'	585	25.00	575	10
	51'	603	23.75	594	9
	53'	621	24.25	613	15
	55'	657	24.00	648	9
	57'	675	24.50	662	13
	59'	693	25.25	682	11

* Based on using 12” wide sweeps.
Working Overlap will **INCREASE** with **WIDER** sweeps and **DECREASE** with **NARROWER** sweeps.

Challenger L2 Series Cultivator

Challenger L2 Series Cultivator					
Machine		Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Range	Size				
L225	29'	355	24.50	343	12
L233	33'	403	24.50	392	11
	37'	451	24.50	441	10
L242	42'	499	24.50	490	9
L249	49'	579	23.50	570	9

* Based on using 11” wide sweeps.
Working Overlap will **INCREASE** with **WIDER** sweeps and **DECREASE** with **NARROWER** sweeps.

Working Width and Deflector Spacing Tables

Maxim Air Drill

Maxim Air Drill						
Machine		Number of Deflectors	Actual Cutting Width (Inches)	Deflector Spacing (Inches)	Overall Spread Width (Inches)	Working Overlap (Inches)
Size	Trip Spacing					
29 Foot	7 1/2"	15	352.50	23.50	352.50	0.00
	10"	15	360.00	24.00	360.00	0.00
	12"	15	348.00	23.25	348.00	0.00
34 Foot	7 1/2"	17	412.50	24.25	412.50	0.00
	10"	17	420.00	24.75	420.00	0.00
	12"	17	420.00	24.75	420.00	0.00
39 Foot	7 1/2"	19	472.50	24.75	472.50	0.00
	10"	19	460.00	24.25	460.00	0.00
	12"	19	468.00	24.5	468.00	0.00
40 Foot	10"	19	460.00	25.25	460.00	0.00
41 Foot	12"	19	468.00	25.5	468.00	0.00
49 Foot	7 1/2"	23	592.50	26.00	592.50	0.00
	10"	23	600.00	26.25	600.00	0.00
	12"	23	588.00	25.75	588.00	0.00
55 Foot	10"	27	660.00	24.5	660.00	0.00
	12"	27	660.00	24.5	660.00	0.00
60 Foot	10"	30	720.00	24	720.00	0.00
	12"	30	732.00	24.5	732.00	0.00

The granular deflectors are spaced on the Maxim Air Drill to provide no overlap in seeding or zero-till applications.

IMPORTANT: The Maxim Air Drill **DOES NOT** have any operating overlap.

Alternative Rate Calibration

An alternate rate calibration method takes into account wheel sink-age and variations in tire circumference.

- All steps in the calibration procedure are the same except that a specific distance is marked out. Instead of turning the calibration crank, the metering drive clutch is engaged and a seeder is pulled through that distance.
- The sample collected will be for 1/2 acre. The distance to pull the unit is listed under “D” in the *“Calibration Chart”* in Operation Section.

Fan Speeds/Pressures

Adequate air volume is necessary at all times to carry the product in the air stream. Air volume can be controlled by adjusting hydraulic oil flow on hydraulic fan drive models or adjusting engine speed on engine fan drive models.

Note: It is recommended that after a rain or dew the fan be run two to three minutes to expel any moisture in the system.

Air volume hence air pressure requirements will vary with:

(a) Ground speed.
(b) Metering rate.
(c) Number of primary runs.
(d) Width of machine.
(e) Density and size of material.

The Table below lists initial fan pressures for certain products. **These pressures are critical and should be adhered to at all times.**

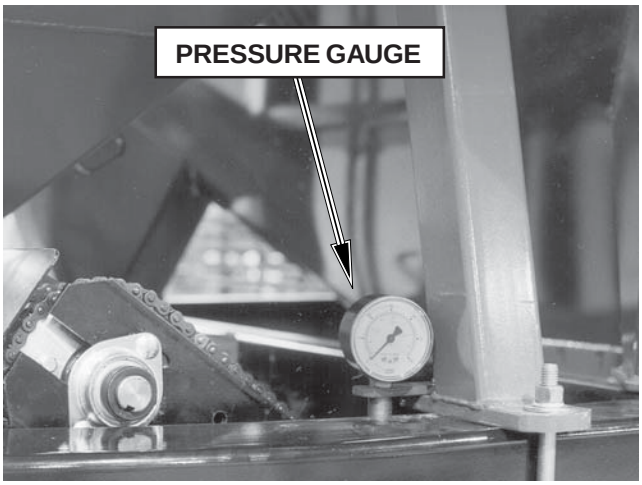
The pressure gauge is located on the Left Hand Side of the unit bolted to the support leg of the granular tank. Readings are given in Inches of Water.

Note: If the fan speed is adjusted be sure to adjust the monitor fan alarm setting accordingly. (See Air Seeder Manual)

To **increase** the pressure increase the fan speed.

To **decrease** the pressure decrease the fan speed.

Note: For High Rates in any situation the fan must be run at full RPM (See *General Operation*)

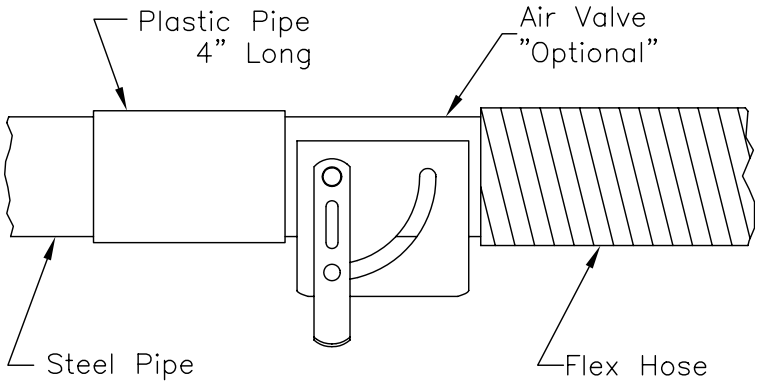


Pressure Requirements	
Low Rates Avadex 5 lb/ac. Treflan 10 lb/ac.	**Pressure = 13"-17"**
Normal Rates Avadex 12 lb/ac. Treflan 20 lb/ac.	**Pressure = 13"-17"**
High Rates Avadex 20 lb/ac. Treflan 35 lb/ac.	**Pressure = 18"-22"**

Air Valve - Optional

An optional air valve is available, which is used to turn on/off the air supply to the granular tank.

- Open valve fully when granular tank is in use.
- Close valve completely when granular tank is not in use.



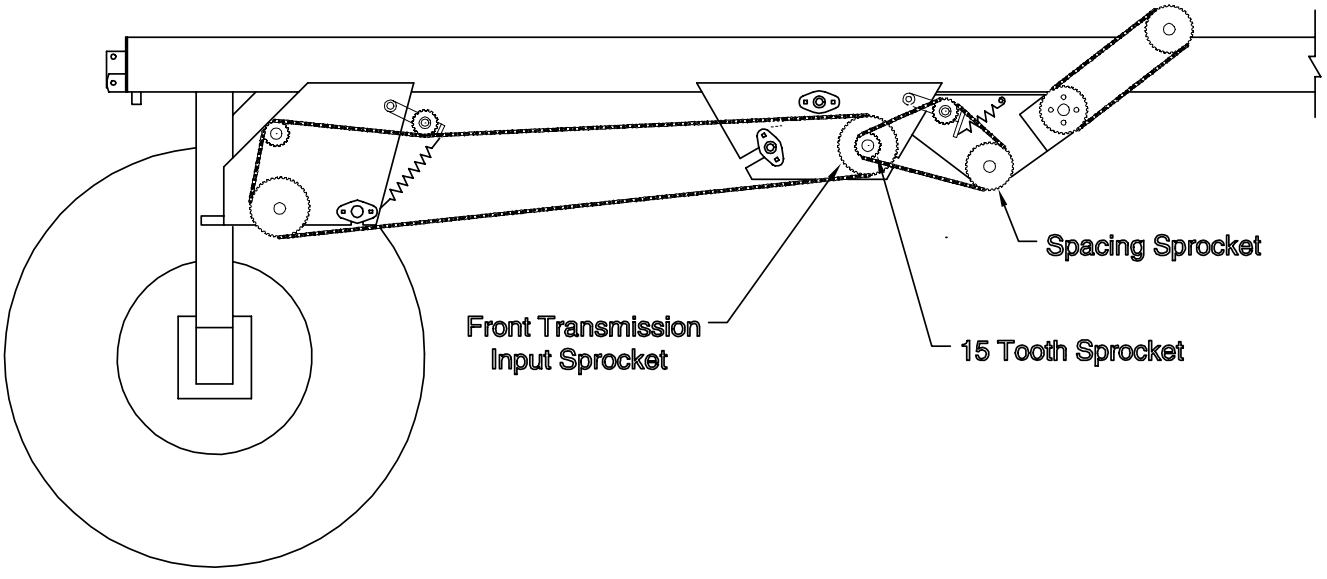
Rate Charts

The Rate Chart applies to all spacings listed below:

Note: Spacing sprocket refers to the machine trip spacing.

Check that the correct spacing sprocket is installed on the machine. This sprocket is located on the Granular Transmission input shaft.

Spacing Sprocket	
Trip Spacing	**Spacing Sprocket**
7 1/2"	18 teeth
8"	20 teeth
9"	22 teeth
10"	26 teeth
12"	30 teeth



Rate Chart - continued

The charts should only be used as a guide. Specific Rates can be achieved by using the rate check method as outlined under *"Rate Calibration"*.

There are two charts: (1) Low Range

(2) High Range

If a higher rate between 12 and 46 lbs. of product per acre is desired then use the **High Range Chart**.

If a lower rate between 5 and 20 lbs. of product per acre is desired then use the **Low Range Chart**.

See charts for specific rates for specific products.

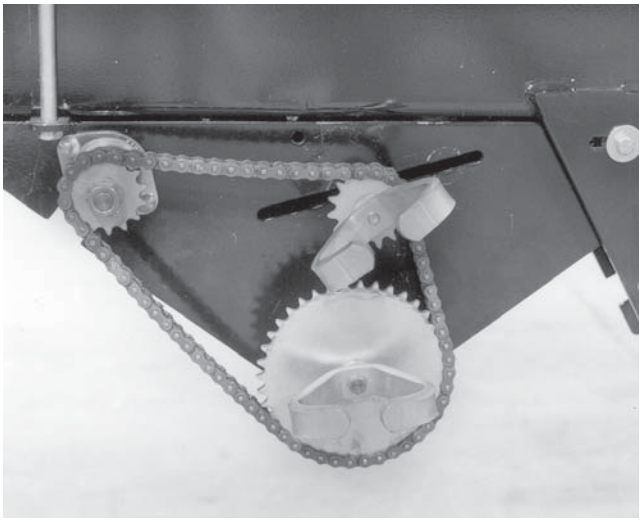
Engaging the High Range on the granular Posi-Drive Transmission is simply a matter of changing the range sprocket and chain to a 15 tooth sprocket and a 72 link chain (36" long). Similarly the Low Range engagement is simply a matter of changing the Range Sprocket and chain to a 45 tooth sprocket and 86 link chain (43" long).

LOW RANGE - 45 TOOTH SPROCKET

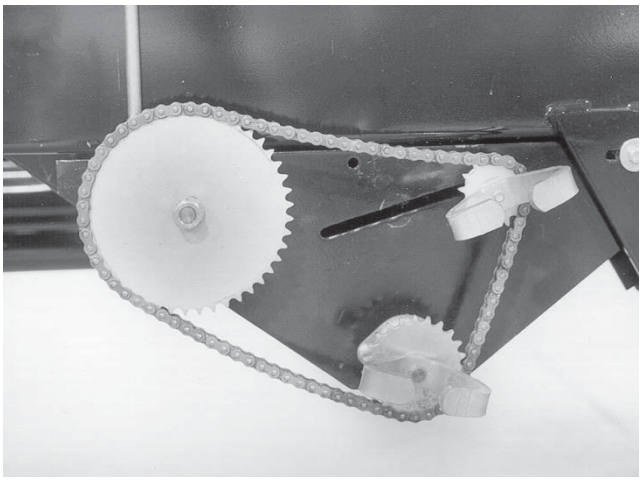
HIGH RANGE - 15 TOOTH SPROCKET

Once the range has been selected and the **correct range** sprocket installed, then a rate change sprocket can be easily determined from the specific rate chart.

The charts should only be used as a guide. Specific rates can be achieved using the rate check method as outlined under *"Rate Calibration"* in Operation Section.



High Range



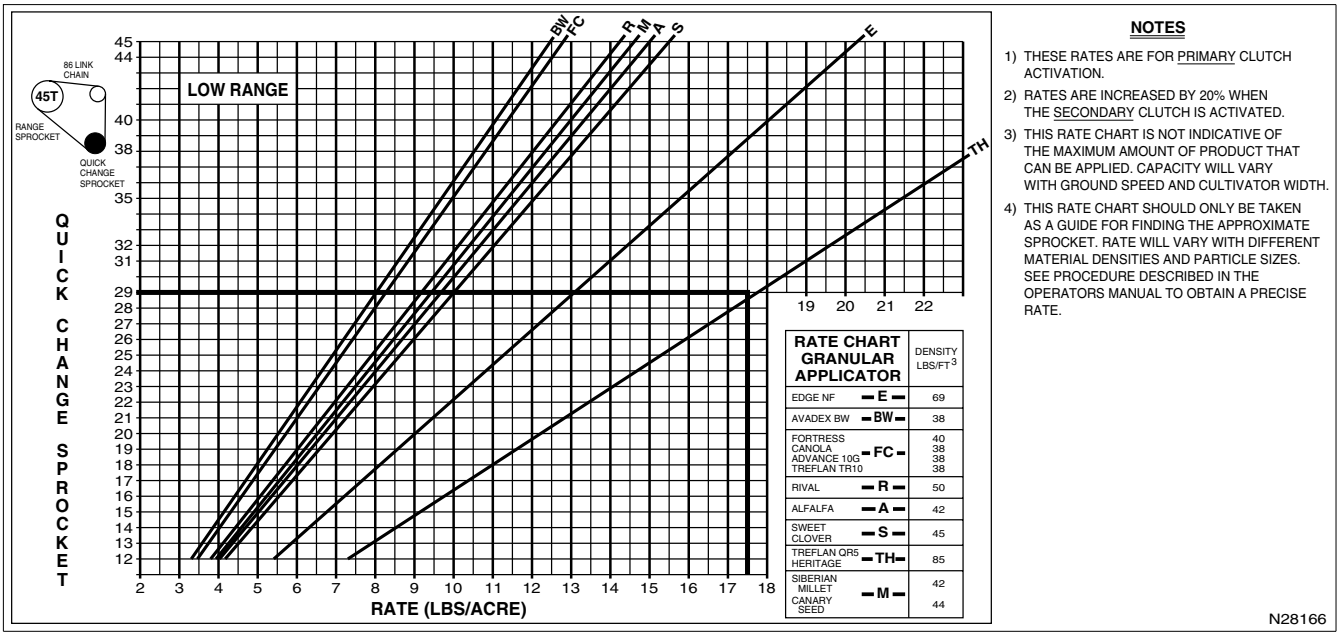
Low Range

Rate Chart - continued

To determine a herbicide/seed rate from the chart.

For example if a rate of 17.5 lbs. per acre for Treflan is wanted then:

- Go to the desired rate along the bottom line of the chart.
- Go straight up from that point to where that line is intersected by the graph line of the particular product being metered.
- At this intersection go straight across to the vertical line of the graph. This will give the sprocket size required to give the particular rate chosen. In this case for a rate of 17.5 lbs. of Treflan per acre a 29 tooth sprocket is required.
- Change the Quick Sprocket, if necessary, and repeat the rate check to confirm the meter rate.

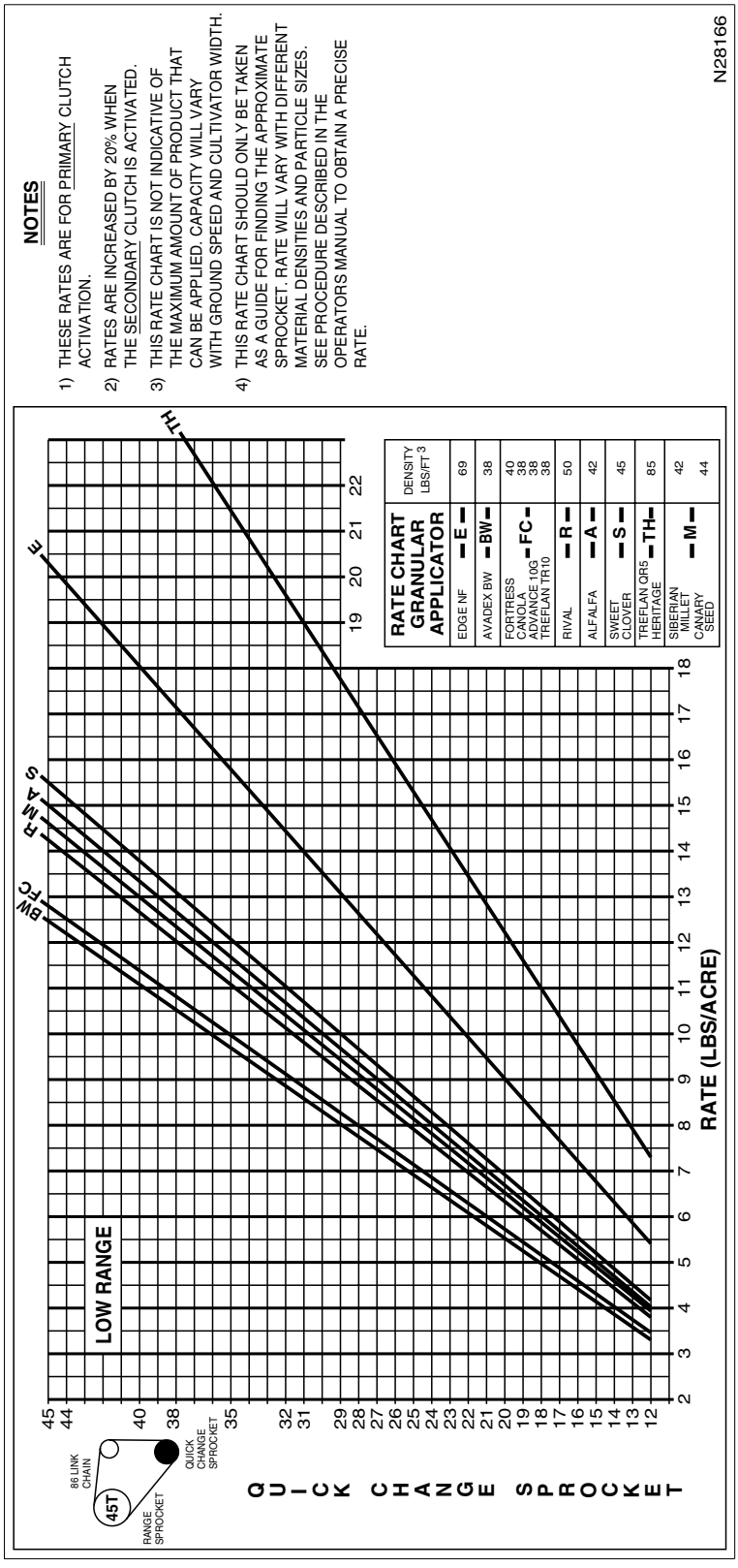


NOTES

1) THESE RATES ARE FOR PRIMARY CLUTCH ACTIVATION.
2) RATES ARE INCREASED BY 20% WHEN THE SECONDARY CLUTCH IS ACTIVATED.
3) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.
4) THIS RATE CHART SHOULD ONLY BE TAKEN AS A GUIDE FOR FINDING THE APPROXIMATE SPROCKET. RATE WILL VARY WITH DIFFERENT MATERIAL DENSITIES AND PARTICLE SIZES. SEE PROCEDURE DESCRIBED IN THE OPERATORS MANUAL TO OBTAIN A PRECISE RATE.

N28166

Rate Charts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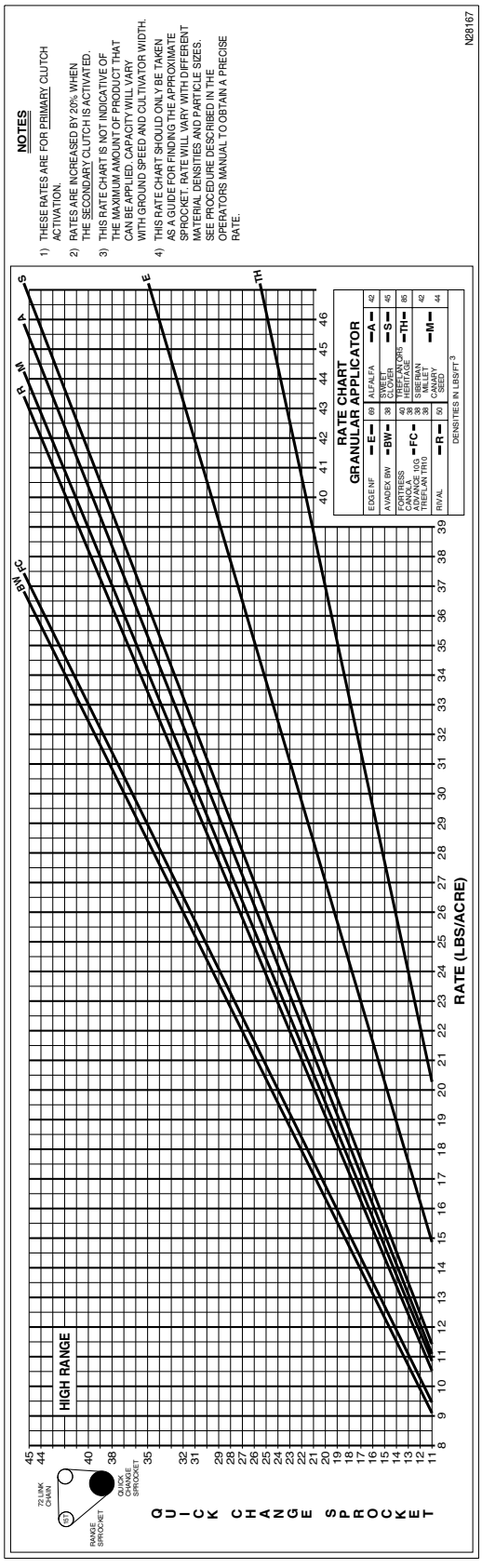
N28166
RATE CHART GRANULAR APPLICATOR
DENSITY LBS/FT3
EDGE NF —E— 69
AVADEX BW —BW— 38
FORTRESS 40
CANOLA 38
ADVANCE 10G —FC— 38
TREFLAN TR10 38
RIVAL —R— 50
ALFALFA —A— 42
SWEET CLOVER —S— 45
TREFLAN QR5 —TH— 85
HERITAGE 85
SIBERIAN 42
MILLET —M— 44
CANARY SEED 44
LOW RANGE
HIGH RANGE
QUICK CHANGE SPROCKET
RATE (LBS/ACRE)
86 LINK CHAIN
45T
RANGE SPROCKET
QUICK CHANGE SPROCKET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N28167
RATE CHART GRANULAR APPLICATOR
EDGE NF —E— 69
AVADEX BW —BW— 38
FORTRESS 40
CANOLA 38
ADVANCE 10G —FC— 38
TREFLAN TR10 38
RIVAL —R— 50
ALFALFA —A— 42
SWEET CLOVER —S— 45
TREFLAN QR5 —TH— 85
HERITAGE 85
SIBERIAN 42
MILLET —M— 44
CANARY SEED 44
DENSITIES IN LBS/FT3
HIGH RANGE
QUICK CHANGE SPROCKET
RATE (LBS/ACRE)
72 LINK CHAIN
RANGE SPROCKET
QUICK CHANGE SPROCKET

Deflector Adjustment

The deflectors are all located across the cultivator at a specific distance from one to the other.

This distance can vary from 22 1/2" - 25 1/2" depending on the model of machine. See tables on pages 5-11 and 5-17.

For an optimum spread pattern and distribution accuracy the height of the deflector from the ground surface, at the specific operating depth, **must equal** the distance between the deflectors.

The height of the deflectors must be set at the *deflector spacing* (s) plus the *working depth* (d). This *distance* (D), **"D" = d + s** is measure from the ground surface to the deflector plate when all the cultivator shovels are sitting on a level surface.

Each deflector is adjusted both horizontally and vertically.

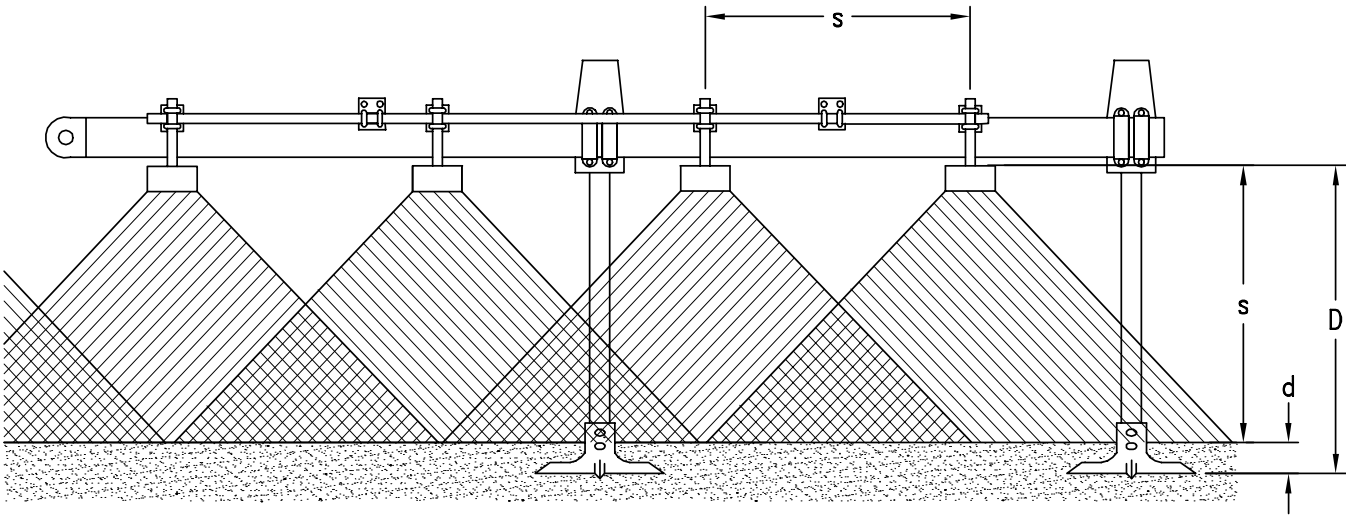
When adjustments are being made to the deflector it is very important that the deflector is square to the mounting tube. Ensure this by cutting two blocks of wood the identical size for the required adjustment.

Place the two blocks on either side of the deflector. Push the deflectors up against the blocks. Tighten the deflector U-bolts. Repeat this procedure for all deflectors.

See Section 9 for specific dimensions for particular cultivators.

Note: The distance between deflectors must be equal across entire machine.

Deflector spacing and height are very important. These dimensions determine the accuracy of chemical spread pattern. The deflector spacing for each model and size of cultivator that MORRIS currently markets is given on pages 5-11 to 5-17.



Zapper Clutch

The Applicator comes with two clutches installed in the transmission. One clutch is the main clutch, the other is a Zapper Clutch.

Both clutches are engaged or disengaged from a switch in the tractor cab.

1. The Zapper Clutch, when engaged, will instantly increase the Applicator's meter rate by 20%. This is ideal for applying extra chemical in low spots.
2. Similarly if the Zapper Clutch is engaged and meter rate set with it engaged, then a 20% instant decrease is possible. This is particularly useful for applying less chemical on hill knolls.

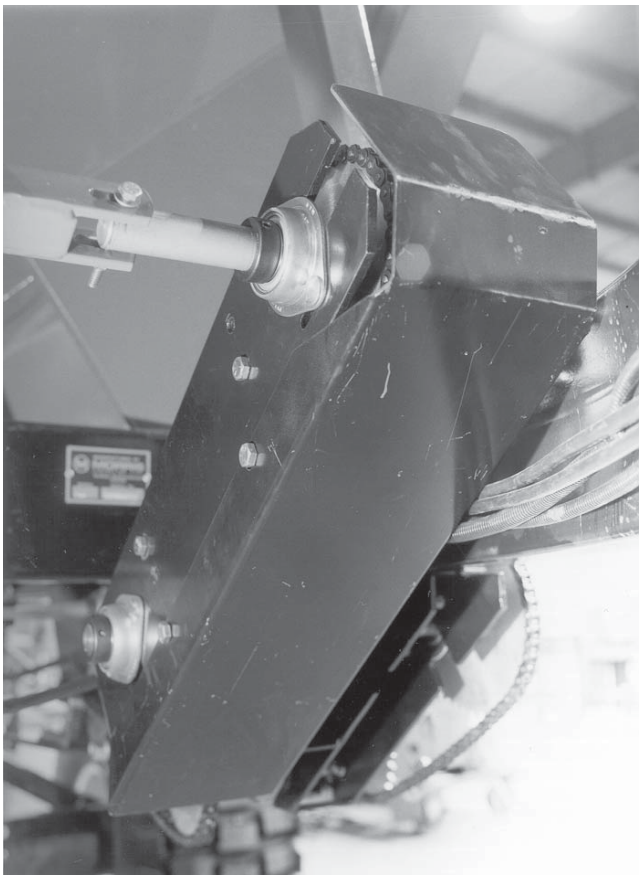
   To **engage** the Zapper Clutch simply switch the rocker switch in the cab to **SECONDARY.**

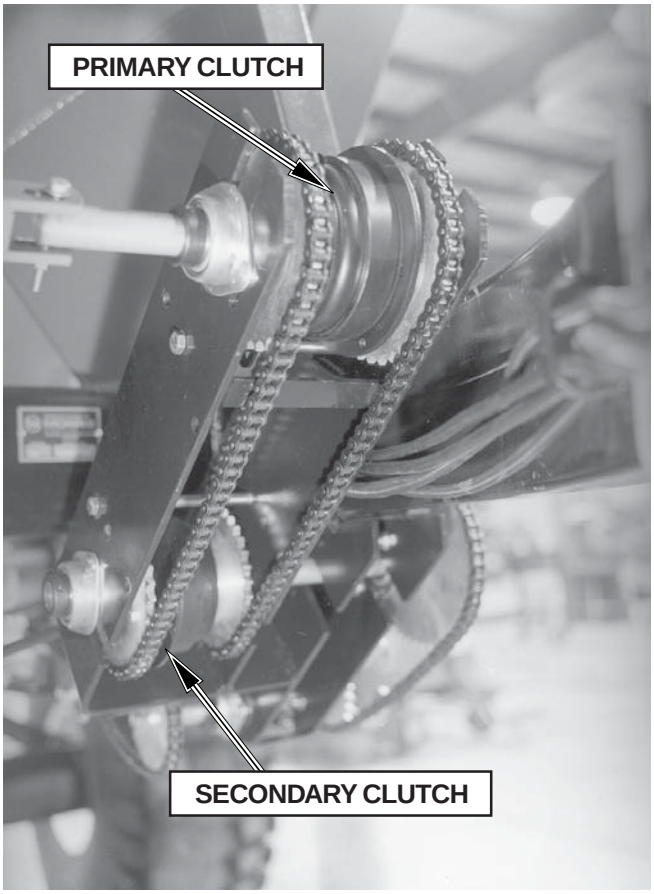
   To **disengage** the Zapper Clutch simply switch the unit to **PRIMARY.**

   The centre position disconnects both clutches so no product will be metered.

Note: The Rate Charts have been calibrated using the *PRIMARY CLUTCH.*

A sample must be taken and weighed if the product is to be applied with the Zapper Clutch *ENGAGED* as in case 2 above.

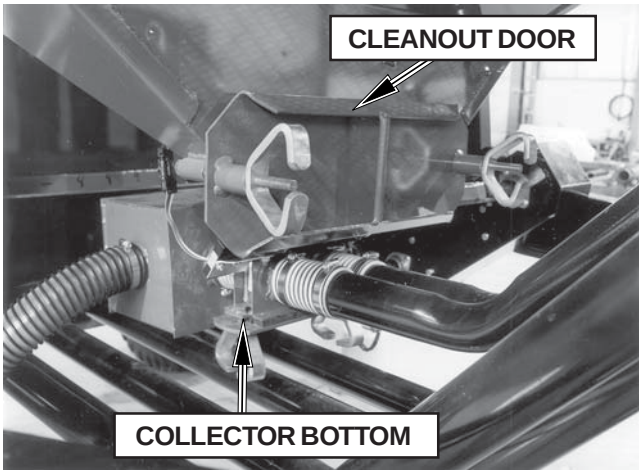




Unloading and Cleanout

To empty the Applicator Tank:

- Position auger under the tank to be emptied.
- Start auger. Run auger slow. The granular product will not auger at high auger speeds.
- Loosen front cleanout door on metering body.
- Regulate flow from the tank by loosening or tightening front cleanout door as required.
- Once all material stops flowing, remove cleanout door completely and brush out remaining material in the corners.

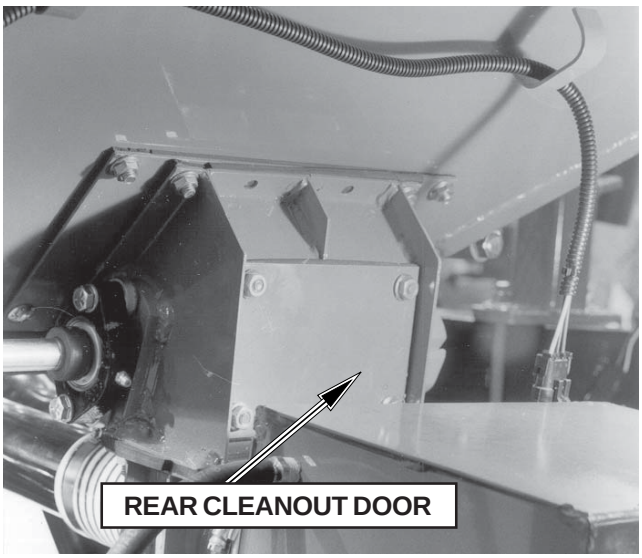


For complete cleanout:

- Remove the collector bottom.
- Remove the front cleanout door.
- Run fan.
- Wash the tank interior thoroughly to remove any chemical traces.
- Remove rear cleanout door then either blow or wash out any remaining material in the openings.
- Reinstall the collector bottom, front and rear cleanout doors.

DANGER

Keep all Shields in place. Keep hands, feet and clothing away from auger intake, failure to do so will result in serious injury or death.



Notes

Section 6: Maintenance

Section Contents

SAFETY-ALERT SYMBOL

Watch for this symbol. It identifies potential hazards to health or personal safety. It points out safety precautions. It means:

ATTENTION - BE ALERT.
Your safety is involved.

General

This section deals with two goals, maximum life and dependable operation. Adopt a regular maintenance and lubrication program. Care and sufficient lubrication is the best insurance against delays.

Safety

- Always shut off the tractor and remove key before dismounting.
- Guard against hydraulic high pressure leaks with hand and face protection.
- Never work under the Implement unless it is in the down position or transport lock pins are in place and secured with hair pins. Do not depend on the hydraulic system to support the frame.
- Always wear safety goggles, breathing apparatus and gloves when working on seeder filled with chemical. Follow manufactures recommended safety procedures when working with chemicals or treated seeds.
- Do not feed left over treated seed to livestock, treated seed is poisonous and may cause harm to persons or livestock.

Securely support any machine elements that must be raised for service work.

Caution

Keep service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment.

Tighten Bolts

- Before operating the Air Cart.
- After the first two hours of operation.
- Check tightness periodically thereafter.
- Use Bolt Torque Chart for correct values on various bolts.
- Note dashes on hex heads to determine correct grade.

Note: DO NOT use the values in the Bolt Torque Chart if a different torque value or tightening procedure is given for a specific application.

- Fasteners should be replaced with the same or higher grade. If higher grade is used, only tighten to the strength of the original.

Bolt Torque Chart

Grade 5 Bolt Marking		Bolt Size	Grade 8 Bolt Marking	
Nm	lb. ft.		lb. ft.	Nm
11	8	**1/4**	12	16
23	17	**5/16**	24	33
41	30	**3/8**	45	61
68	50	**7/16**	70	95
102	75	**1/2**	105	142
149	110	**9/16**	155	210
203	150	**5/8**	210	285
366	270	**3/4**	375	508
536	395	**7/8**	610	827
800	590	**1**	910	1234
1150	850	**1-1/8**	1350	1850
1650	1200	**1-1/4**	1950	2600
2150	1550	**1-3/8**	2550	3400
2850	2100	**1-1/2**	3350	4550

Tires

- Inspect tires and wheels daily for tread wear, side wall abrasions, damaged rims or missing lug bolts and nuts. Replace if necessary.
- Tighten wheel bolts - refer to Bolt Torque Chart.
- Check tire pressure daily, when tires are cold.
- Correct tire pressure is important.
- Do not inflate tire above the recommended pressure.

Tire replacement requires trained personnel and proper equipment.

Lubrication

Greasing pivot points prevents wear and helps restrict dirt from entering. However, once dirt does enter a bearing, it combines with the lubricant and becomes an abrasive grinding paste, more destructive than grit alone.

- Apply new lubricant frequently during operation to flush out old contaminated lubricant.
- Use a good grade of **lithium based grease**.
- Use a good grade of machine oil.
- Clean grease fittings and lubricator gun before applying lubricant.

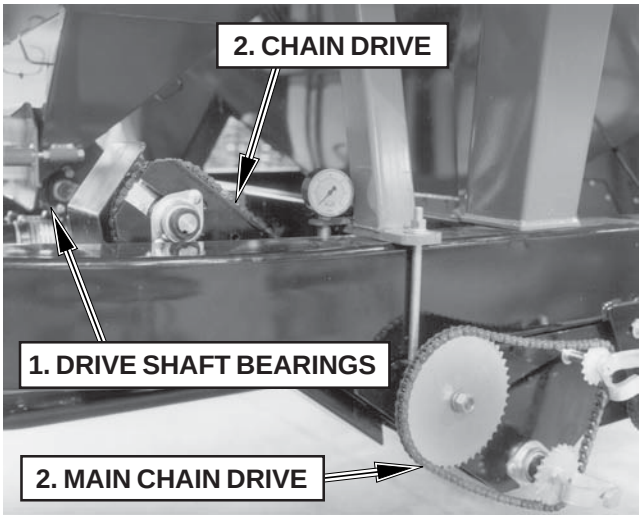
Refer to the photo below for grease fitting locations.

1. Drive shaft bearings

- Grease every 50 hours.

2. Drive chains

- Oil every 50 hours.



Daily Maintenance

(Every 10 Hours)

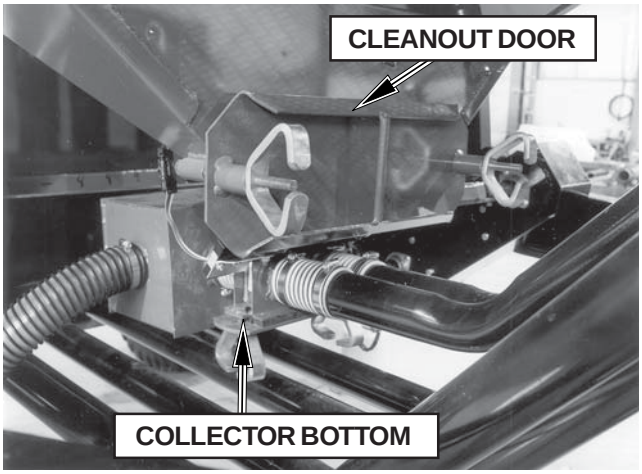
- Check for and remove any water in primary collectors after rainy weather. Remove both front and rear cleanout doors and collector bottom to drain water from the tanks and collectors.
- Reinstall collector bottoms and cleanout doors.

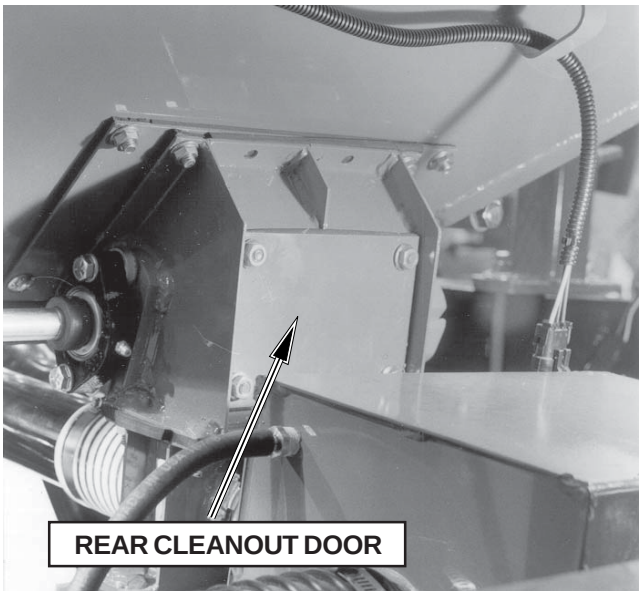
Important: Care must be taken when reinstalling collector bottoms to prevent damage to the inside of the collector.

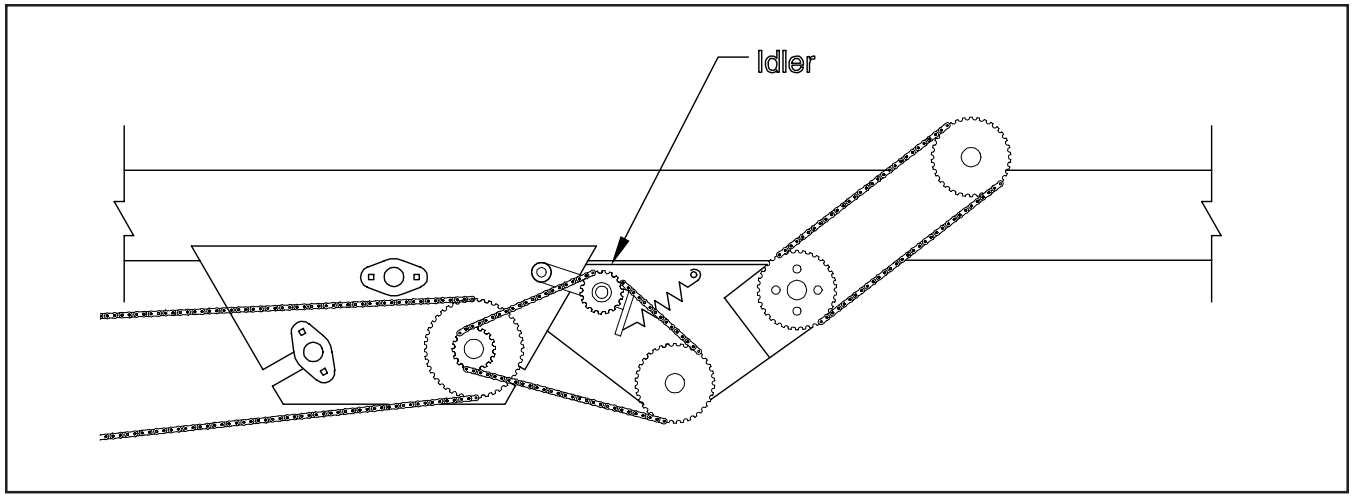
- Assure fan screen is clear of debris.

Note: Start fan and run for 3 - 5 minutes prior to loading machine to get rid of accumulated moisture.

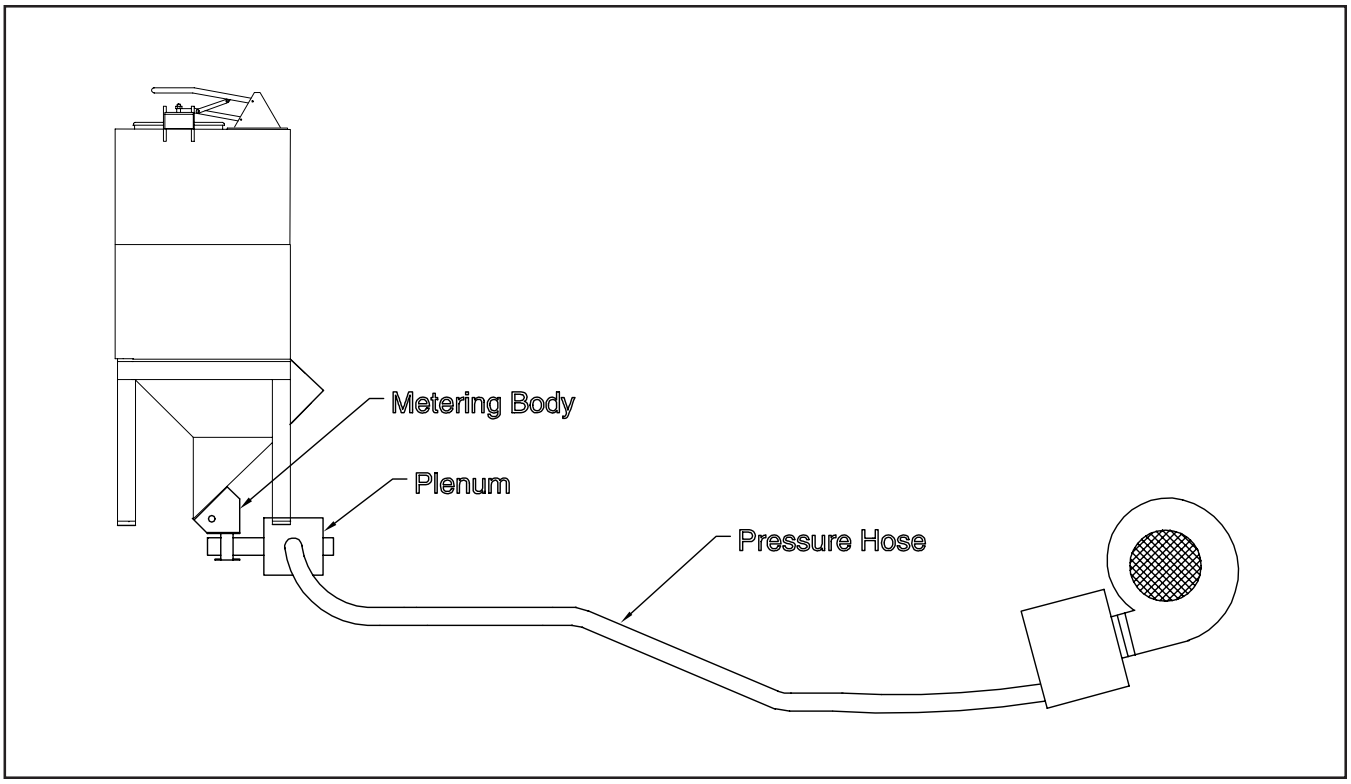
- Check lid seals for damage, and that they are sitting properly on the steel rings.
- Check tank pressure hoses for leaks, cracks or plugging.
- Check plenum and metering body for leaks.
- Check that cleanout doors are sealed.
- Check that all monitor sensor wires are properly routed and retained.
- Check for plugged hoses.
- Check for free movement of spring loaded chain tension idlers.
- Assure drive chains are cleared of debris.







Daily Maintenance - continued



Air System Maintenance

- Regularly check that all hoses are free from kinks or blockages.
- Keep fan inlet screen clear and free from debris.
- Place a plastic bag over the fan when the unit is not in use. This helps prevent moisture from entering the system.
- Check periodically and at the end of each season for air leaks at hose connections.
- Check periodically and at the end of each season for air leaks at the following:
  1. Lid Seals.
  2. Metering body to tank interface.
  3. Collector to metering body interface.
  4. Fan to plenum.
  5. Plenum to collector.
  6. Cleanout doors.
  7. Couplers between seeder and cultivator.

⚠ Caution

Care should be taken when working near the Air Seeder while the fan is running. Product blowing out of the system could cause personal injury.

Note: There must not be any air leaks from the tank. Air leakage causes air turbulence in the tank which can result in inaccurate metering rates.

Air Delivery System

General

The air delivery system of all Air Carts is extremely important for the proper metering of product to the openers. The metering system on all pressurized Air Carts is sensitive to air leaks. **Loss of tank air pressure could affect feed rates, which could become erratic or even stop.**

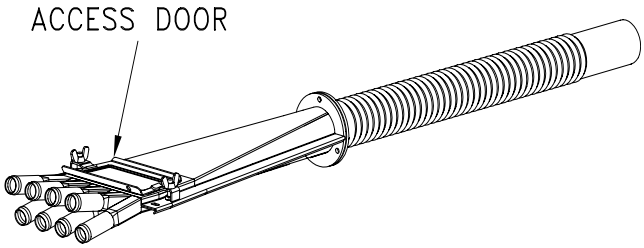
Caution

Care should be taken when working near the Air Cart while the fan is running. Product blowing out of the system could cause personal injury.

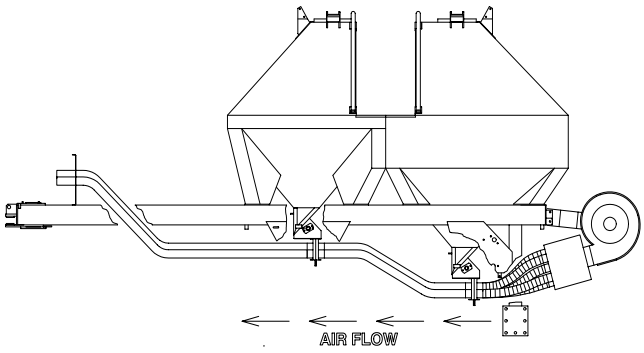
- Regularly check that all hoses are free from kinks or blockages throughout the day. To check for blockages raise seeding tool out of the ground and with the fan running turn crank a couple of turns. Equal amounts of material should be deposited under each boot if not check the following for blockage:
  1. Seed openers and secondary hoses.
  2. Divider heads by removing access doors.
  3. Primary hoses and collectors.
  4. Metering wheels for damage to key-way and the flutes of the wheel.
- Keep fan inlet screen clear and free from debris.
- Place a plastic bag over the fan when the unit is not in use. This helps prevent moisture from entering the system.
- Check periodically and at the end of each season for air leaks at hose connections.
- Check periodically and at the end of each season for air leaks at the following:
  1. Tank Lid Seals.
  2. Metering body shaft seals.
  3. Metering body to tank seals.
  4. Collector to metering body seals.
  5. Fan to plenum.
  6. Plenum to collector.
  7. Clean-out doors, for leaks and loss of seal memory.
  8. Collector door seals.
  9. Diverter Valves.
  10. Couplers between seeder and cultivator.
  11. Access Doors on Divider Heads.

Note: There must not be any air leaks from the tank. This air leakage causes air turbulence in the tank which can result in inaccurate metering rates.

- Once a year check for wear of primary and secondary hoses.



Note: Extended life can be obtained if the hoses are rotated 1/4 turn once a year.



Air Delivery System - continued

Tank Lids

The lid seal is probably the area that sees the most abuse due to the activity associated with filling the tanks.

With each fill the lid seals should be inspected for cuts, abrasions, debris in the seal and ensure the seal is positioned properly on the steel rim around the tank opening.

Tank Lid Adjustment

Check Tank Lid tension on *all tanks* at beginning of each season and periodically during season for air leaks. The following checks and adjustments must be made to prevent air leaks from occurring:

- Check for any foreign material embedded into seal. Clean out foreign material from seal surface.
- Check seal for cuts and abrasions. If seal is cut or severely worn, then replace seal.
- Ensure seal is positioned properly on steel rim around tank opening.
- Use a 0 - 100 lb. spring scale to check the tank lid opening force. With the lid closed place one end of the scale *one inch* from the end of the tank lid lever. Pull straight up on the scale and note the maximum force it takes to open the lid. The force needed to open the lid ***must be greater than 65 lbs.*** Adjust the lid latch adjusting bolt as necessary. The lid latch should close with a ***snap.*** This will ensure that the lid is sufficiently tight and prevent any leaks.
- Re-check for leaks. If lids still leak turn down bolt one or two more turns. Re-check for leaks.

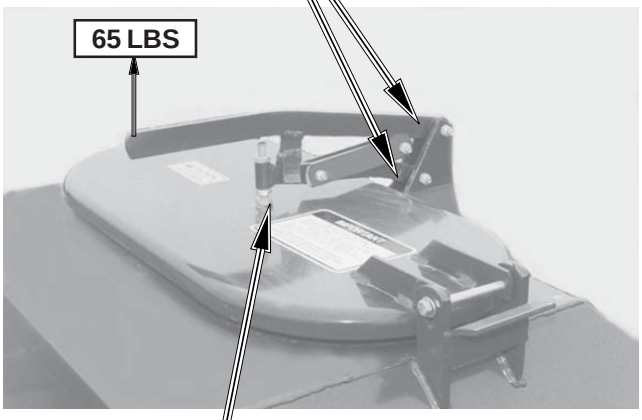
Note: This bolt should be loose enough to allow lid to float in the slot.

Important

It is imperative that no air leaks occur in the Air Cart tank as even the smallest air leak from the lid will lead to material bridging in the tank thereby causing misses in the field.

Note: When Air Cart is not in use, leave lid latches loose to help maintain resilience of the seals.

These bolts and lock nuts must be tightened to maintain a friction fit so the lid latch stays stationary when in open position.



Adjust the lid latch adjusting bolt to obtain a force *greater than 65 lbs* **to open the lid.**

Air Delivery System - continued

Air Leak Check

It is ***imperative that no air leaks occur*** in the Air Cart tank. Any air leaks could cause loss of tank air pressure affecting feed rates, which could become erratic or stop.

To prevent this from occurring, it is strongly recommended that a pressure test be conducted prior to seeding time. This can be performed very easily and simply by completing the following steps:

- Clean fan impeller and adjust tank lids.
- Disconnect the 2 1/2" diameter primary hoses from the rear of the cultivator at the primary hose coupler(s) by loosening the four 3/8" bolts.
- Install the blank off plate that is supplied with the Air Cart at each coupler and retighten the 3/8" bolts. If the blank off plates are not readily at hand a piece of cardboard can be used in its place.
- Once the blank off plates have been installed, start the fan and run at 4,500 rpm.

Check the following areas for air leaks:

1. Tank lid seals.
2. Metering body shaft seals.
3. Metering body to tank seals.
4. Collector to metering body seals.
5. Fan to plenum and plenum to collector.
6. Clean-out doors, for leaks and loss of seal memory.
7. Collector door seals.
8. Diverter valves and double shoot mounting plates.
9. Tanks union plate.
10. Tank site glasses.

Air leaks can be detected by spraying a soapy water solution onto the seal area. If bubbling of soap occurs, the seal has a leak. Another method is to use your hand to feel for any air movement around the seal. This method requires a calm day, as the wind can make it difficult to detect a small leak.

- If any of the above areas leak, remove the parts and replace the seal. Ensure upon reassembly that the parts are tightened sufficiently to prevent air leakage.
- Remove the blank off plates before using the Air Cart.

Once the pressure test is complete, check the following areas for air leaks:

11. Couplers between seeder and cultivator.
12. Access doors on divider heads.

Important

It is imperative that no air leaks occur in the Air Cart tank, as even the smallest air leak will lead to material bridging in the tank, thereby causing misses in the field.

Note: When Air Cart is not in use leave lid latches and clean-out doors loose to help maintain resilience of the seals.

Air Delivery System - continued

Fan

Debris can build up on the fan screen and blades causing reduced output of the fan. The lack of air flow even at higher fan speeds will cause material plugging of the air system.

The build up of material during operation can be by the following:

1. Fan rpm will increase without increasing oil flow to orbit motor.
2. Air Cart distribution system plugging from a lack of air flow (Increasing fan rpm has little or no effect).

Fan Screen

- Assure fan screen is clear of debris. Check periodically through the day.

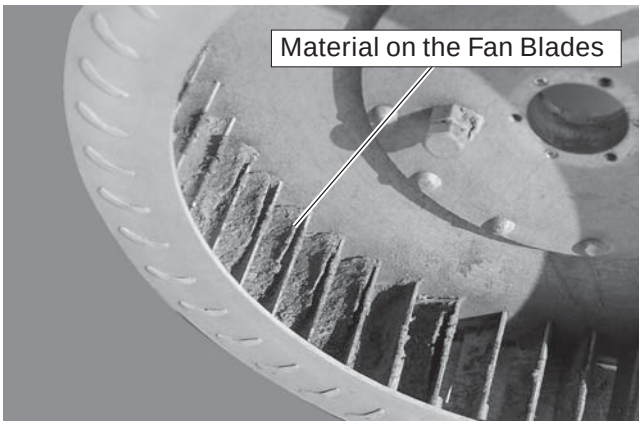
Fan Impeller

The fan blades may become plugged under high humidity/dusty conditions/high insect counts.

Under severe conditions the fan blades should be inspected daily and cleaned as required.

Under normal conditions the fan should be inspected and cleaned at least once a season.

- Care should be taken in cleaning all fan blades thoroughly to restore the fans peak performance.
- Ensure that the balance clips located on the fan blades are not removed, as this will put the fan out of balance.



Note: Material build up on the fan blades could cause the fan to be out of balance. The added vibration of the out of balance impeller will reduce the life of the fan components.

Storage

To prevent water entering the air system, cover the fan intake with a plastic bag, whenever the seeder is not in use.

Note: Be sure to remove fan cover prior to starting fan. Serious damage could result to the fan.

Hydraulics

Refer to Section 1 regarding hydraulic safety.

- Inspect hydraulic system for leaks, damaged hoses and loose fittings.
- Damaged Hoses and hydraulic tubing can only be repaired by replacement. DO NOT ATTEMPT REPAIRS WITH TAPE OR CEMENTS. High pressure will burst such repairs and cause system failure and possible injury.
- Leaking cylinders - install a new seal kit.
- Fittings - use Teflon seal tape on all NPT hydraulic joints. **Do not use Teflon tape on JIC ends.**
- Hydraulic Hose Connections - when connecting the hoses to the cylinders, tubing, etc. always use one wrench to keep the hose from twisting and another wrench to tighten the union. Excessive twisting will shorten hose life.
- Keep fittings and couplers clean.
- Check the Tractor Manual for proper filter replacement schedule.

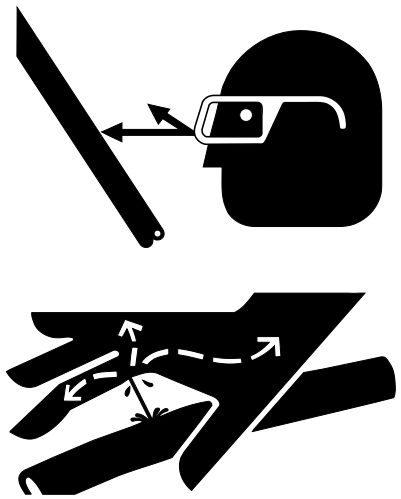
Refer to the Trouble Shooting Section.

MORRIS Industries Ltd.

Contact your nearest Dealer for genuine repair parts. Dealers carry ample stocks and are backed by the manufacture and regional associations.

Dirt in the hydraulic system could damage O-rings, causing leakage, pressure loss and total system failure.

Note: Extreme care must be taken to maintain a clean hydraulic system. Use only new hydraulic fluid when filling reservoir.



Warning

HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

- **Relieve pressure on hydraulic system before servicing or disconnecting hoses.**
- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**
- **Keep all components in good repair.**

Notes

Section 7: Storage

Section Contents

Preparing for Storage

General

- To insure longer life and satisfactory operation, store the 7000 Series Granular Applicator in a shed.
- If building storage is impossible, store away from areas of main activity on firm, dry ground.
- Clean machine thoroughly.
- Inspect all parts for wear or damage.
- Avoid delays - if parts are required, order at the end of the season.
- Lubricate grease fittings. (Refer to Lubricating Section).
- Tighten all bolts to proper specifications (Refer to Bolt Torque Chart).
- To prevent corrosion, clean the tank and metering system thoroughly and wash with a mild soapy water solution. Rinse with water and dry thoroughly. **Refer to Metering Body Storage.**
- A light coating of diesel fuel or WD-40 should be applied to all metal metering system components before storage.
- Avoid lubricant contact with grain and fertilizer tubes.
- Relieve tension on tank lids.
- Loosen clean-out doors.
- Remove all chains and store in clean oil.
- Relieve pressure from hydraulic system.
- Raise frame, block up and relieve weight from the tires.
- Cover tires with canvass to protect them from the elements when stored outside.
- Paint any surfaces that have become worn.

DO NOT ALLOW CHILDREN TO PLAY

ON OR AROUND THE MACHINE.

MORRIS PAINT

Spray Cans:

Part Number	Description
W-4647	Red MORRIS Spray Can
W-4648	Blue MORRIS Spray Can
N31087	White MORRIS Spray Can

Litre Cans:

Part Number	Description
Z-10	Red MORRIS Paint/Litre
Z-11	Blue MORRIS Paint/Litre

Preparing for Storage - continued

Metering Body Storage

It is extremely important that the metering system is thoroughly cleaned before storing for any length of time.

The following procedure should be followed for both tanks:

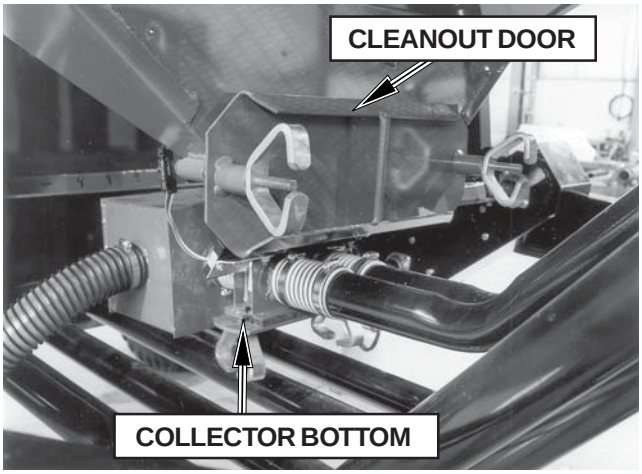
- Empty tanks. (Refer to Unloading Tanks)
- Remove the collector bottom.
- Remove the front cleanout door.
- Run fan.
- Remove rear cleanout door then either blow or wash out any remaining material in the openings.
- Wash the interior of tanks and metering system with soapy water. Wash the collector.
- Rinse with cold water and let the unit air dry.
- Coat metal parts with diesel fuel.

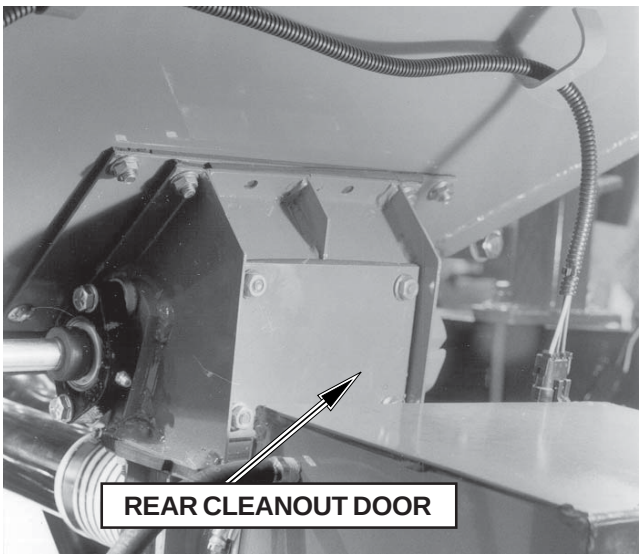
Note: Diesel fuel will not harm metering wheels.

- Reinstall the collector bottom, front and rear cleanout doors.
- Start the fan and operate for 5 minutes to dry out any remaining moisture in the system.
- Leave clean-out doors loose to help prevent condensation building up inside the tank.
- Leave lid latches loose to help maintain resilience of the seals.

Important

At no time should corrosive fertilizer or similar materials be allowed to remain in the tank or metering body cavity.

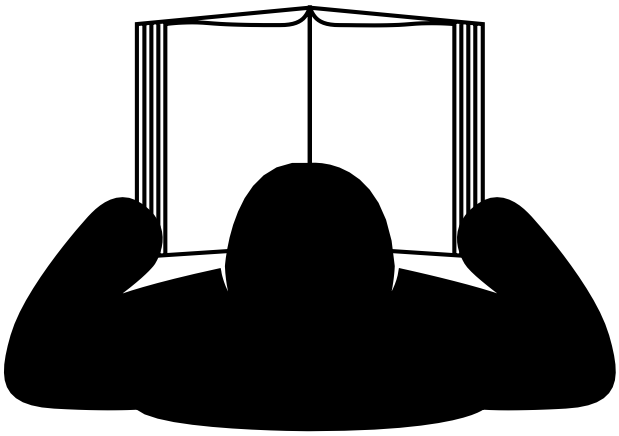




Removing From Storage

General

- Review Operator's Manual.
- Check tire pressure (Refer to Tire Pressure List)
- Clean machine thoroughly.
- Tighten lid latches.
- Lubricate and install chains.
- Spray internal parts or the metering body with WD-40 to loosen any corrosion buildup.
- Check for leaks. (Refer to Maintenance Section)
- Lubricate grease fittings. (Refer to Lubricating Section).
- Tighten all bolts to proper specifications (Refer to Bolt Torque Chart).



Monitor

Familiarize yourself with all monitor functions. Ensure all monitor *"settings"* are correctly set for the Air Cart/ Seeding Tool combination. Recognize and correct alarm conditions as indicated on the machine. See Monitor Section for more details.

Check all wire harness connections for corrosion and use a dielectric spray to clean. Inspect all sensors for proper gap. See Monitor Section for more details.

Clutch

Check friction plates for corrosion and buff with a wire wheel if necessary. Check the resistance of the clutch. See Maintenance Section for more details.

Auger

Inspect all augers used in handling the products for seeding. Run augers to clean out any debris inside auger so it does not get transferred to the tank.

Section 8: Troubleshooting

Section Contents

Troubleshooting

Problem	Cause	Correction
General		
Delivery hoses plugged.	Insufficient air flow.	Clean fan impeller blades. Clean fan intake screen. Increase fan rpm.
	Hose sag.	Shorten hoses or add additional supports.
	Hose obstruction.	Remove obstruction from hose.
	Air delivery hose partly off manifold.	Reinstall hose properly on manifold.
	Kinked hoses.	Straighten hoses and properly secure them to framework.
	Obstruction in divider head.	Remove access door and clear obstruction from appropriate outlets - be sure to use appropriate screens when filling.
	Exceeding machine's delivery capabilities.	Reduce ground speed and speed up fan.
	Poorly mounted hoses.	Reroute hoses.
Material not being metered out.	Material caked up in tank.	Remove material and completely clean out the tank.
	Excessively wet material in tank.	Remove wet material and use reasonably dry material.
	Coupler bolt sheared	Replace with Grade 8 bolt.
	Metering clutch not engaged.	Engage switch in tractor cab.
	Metering Clutch slipping.	See *"Clutch Slipping"* below.
	Main drive chain not installed.	Install drive chain properly on Drive Sprocket.
	Drive chain or chains broken.	Install new chain. Ensure connecting link is installed correctly. Curved part of spring clip should face the direction of chain travel.
	Massive air leak in tank, resulting in material being blown up out of the metering cup.	Repair the air leak. See "Air Leaks" in Maintenance Section. See "Tank Lid Adjustment" in Maintenance Section.
	Key sheared on metering wheel.	Change metering wheel and check for cause of metering wheel shearing.

Problem	Cause	Correction
Material not being accurately metered out of the metering body.	Air delivery hoses loose, cracked or pulled off.	Tighten the hoses, replace cracked hoses or install hoses pulled off their respective locations.
	Metering Clutch slipping.	See *"Clutch Slipping"* below.
	Inlet screen to fan blocked off.	Clean off material that is blocking the fan screen.
	Material caked up above one or more of the metering cups.	Clean out caked up material.
	Excessively damp material in tank.	Use reasonably dry, fresh material only.
	Foreign obstruction in tank above metering wheels.	Remove obstruction, and always fill tanks through the screen.
	Caked up metering wheels on some or all of the metering cups.	Clean out the metering cups and wheels.
	Damaged metering wheels.	Replace broken metering wheels.
	Metering wheels mismatched to secondary outlet.	Install correct wheels to head. 1 3/4" wide wheel for 7 outlet head. 2" wide wheel for 8 outlet head. 2 1/4" wide wheel for 9 outlet head. 2 1/2" wide wheel for 10 outlet head. Be sure appropriate spacers are also used.
	Incorrect spacing sprocket.	Install correct sprocket on back of transmission. See Maintenance Section.
	Crank rotated wrong way when taking sample.	Crank must be rotated counter clockwise.
	Air Leak in System.	Adjust lids and doors as necessary. Replace damaged seals. See Maintenance Section.
	Zapper Clutch engaged.	Engage main clutch or take sample with Zapper Clutch engaged.

Troubleshooting

Problem	Cause	Correction
Material flowing thru system when unit is stationary and the fan running.	Damaged metering wheel.	Replace metering wheel.
	Pressurization hose inside tank disconnected or broken.	Install or replace pressurization hose.
Material not being divided in distribution head.	Head partially blocked.	Remove blockage and reinstall hose.
	Kinked hose running to shank	Straighten or replace hose.
	Damaged distribution section on head.	Replace head with new one.
	Bent or damaged diffuser pipe.	Straighten or replace diffuser pipe.
	Secondary hose length.	See “Secondary Hose” in Operation Section.
Clutch slipping.	Low power supply.	Ensure good connections at the power supply. Battery voltage must be 12V.
	Metering drive torque load too high.	See Maintenance Section.
	Corroded, rusty, dirty clutch.	Clean and inspect clutch.
	Faulty clutch.	Replace clutch.
Hydraulic fan will not turn	Selector valve in wrong position.	Switch the selector to fan position.
	Hydraulic hoses not connected properly to tractor.	Reverse hydraulic hoses.
	Insufficient oil folw.	Perform flow test.
Fan turning too slow	Flow to hydraulic motor.	Increase flow control setting.
	Low hydraulic pressure.	Check hydraulic pressure min. 2100 psi.

Section 9: Assembly

Section Contents

Section Contents - continued

CAUTION

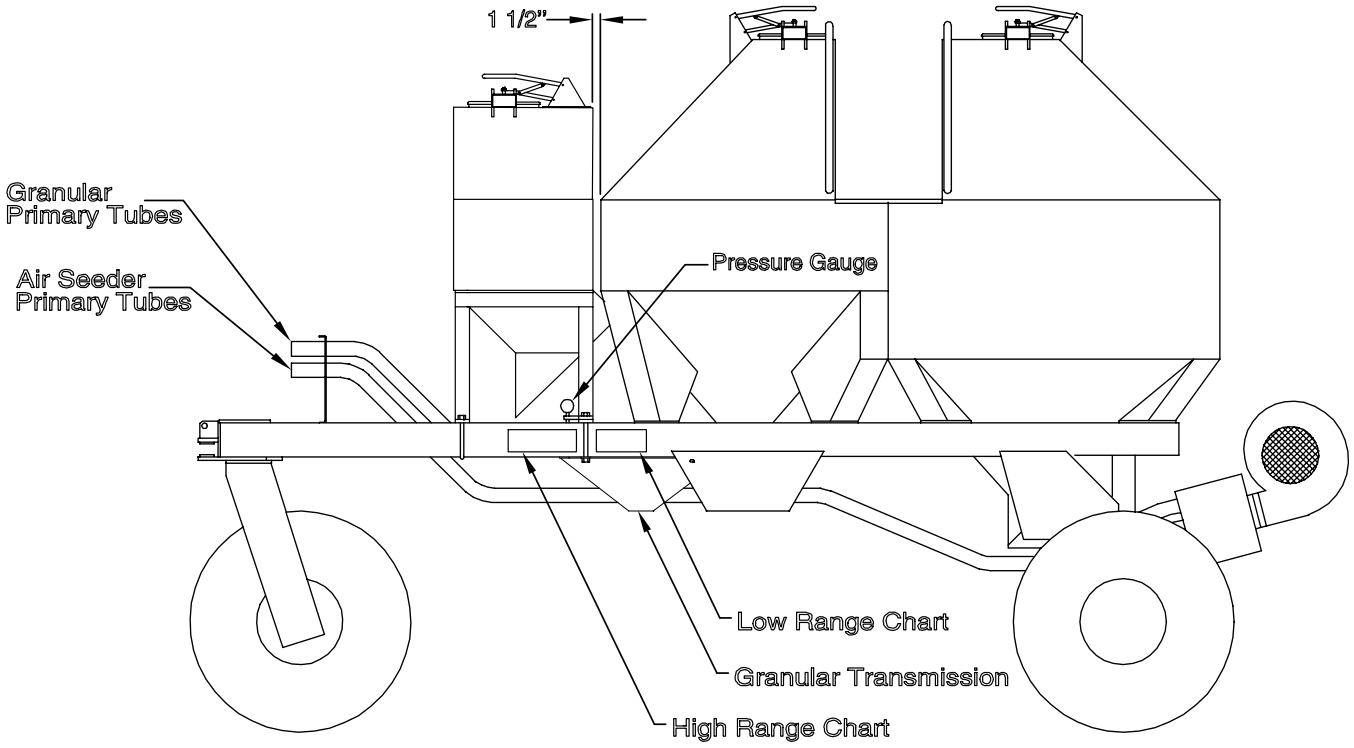
BE ALERT

SAFETY FIRST

REFER TO SECTION 3 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Tank Placement

- Place the granular tank on the frame.
- Ensure there is a **1 1/2" gap** between the front Air Seeder Tank and the Granular Tank.
- Use the U-bolts supplied to hold the tank to the frame.
- The Left Hand Rear Leg uses 1/2" bolts, securing transmission to the frame. See Transmission Installation.
- Install Rate Chart Decals as shown.



Metering Body

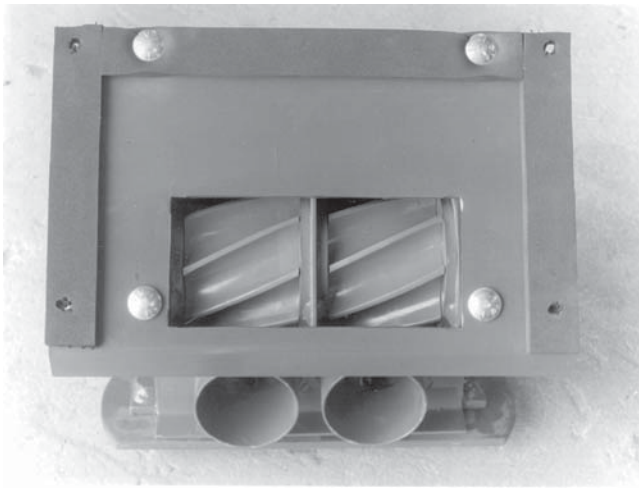
- Attach the collector door to the collector body.
- Attach the collector body assembly to the metering body.

Note: Ensure AIRFLOW arrows are pointing to the front of the Air Seeder.

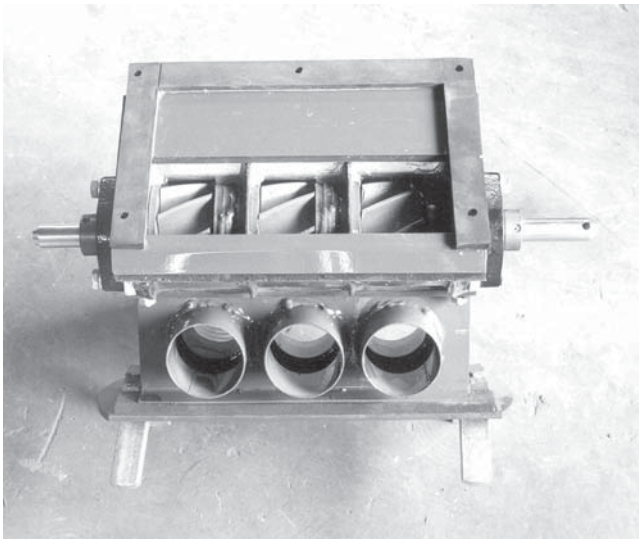
- Attach the adaptor plate to the metering body using 5/16” carriage head bolts.
- Before mounting the metering body to the tank check the metering wheel width to ensure it matches to the Applicator’s Divider Heads.

Match Divider Head & Metering Wheel	
Divider Head	**Metering Wheel**
7 Outlet	1 3/4" wide
8 Outlet	2" wide
9 Outlet	2 1/4" wide
10 Outlet	2 1/2" wide

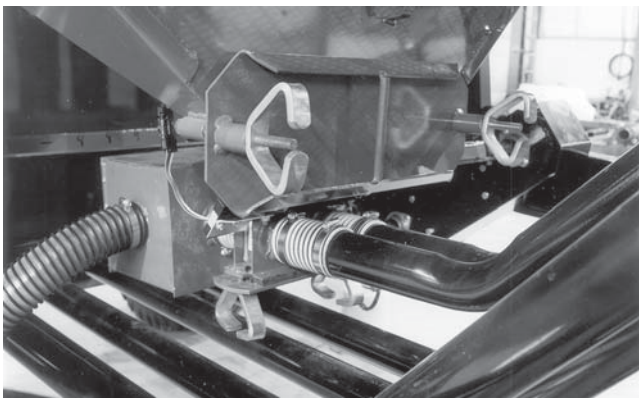
- Install the metering body to the tank using 5/16” carriage head bolts.
- Install the cleanout door.



Two (2) Primaries



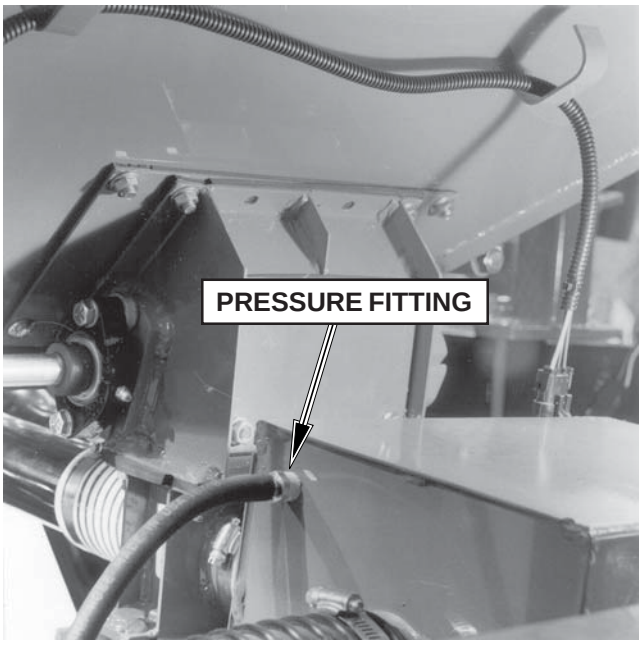
Three (3) Primaries

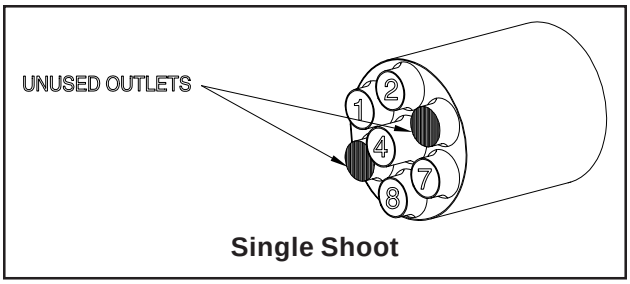


Plenum

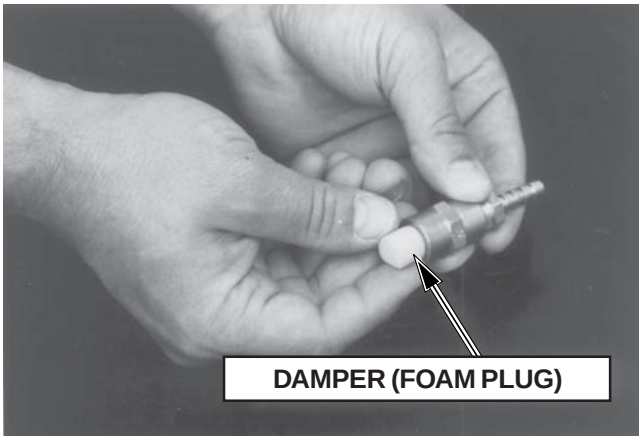
- Install the pressure gauge fitting into the plenum. **Apply silicone to the Fitting.**
- Connect the applicator plenum to the metering body using the 3” cut 2 1/2” diameter hose.
- Install the damper **(Foam Plug)** into the pressure gauge fitting.
- Install the pressure gauge hose, and gauge to the tank bolt. See Transmission Installation.
- Check the Air Seeder plenum attached to the fan for two unused outlets. The two outlets must be opposite each other for balanced air volumes.

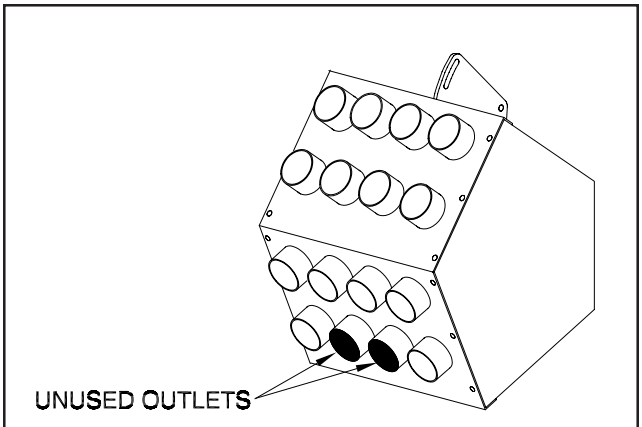
Note: If there is only one unused outlet then the plenum must be upgraded to the next size.



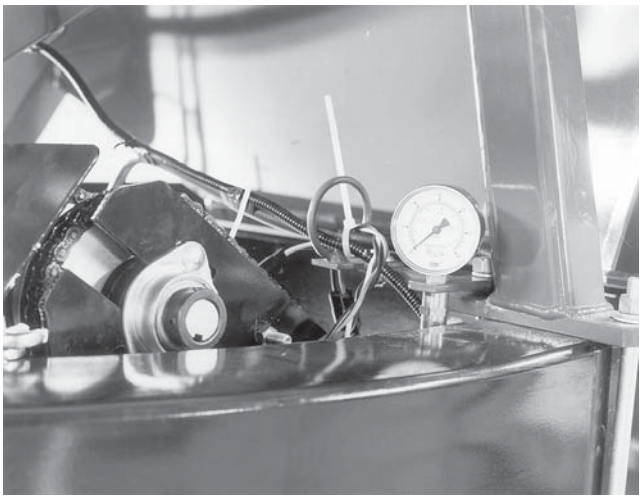


Single Shoot





Double Shoot



Primary Hose Installation

Tow Behind

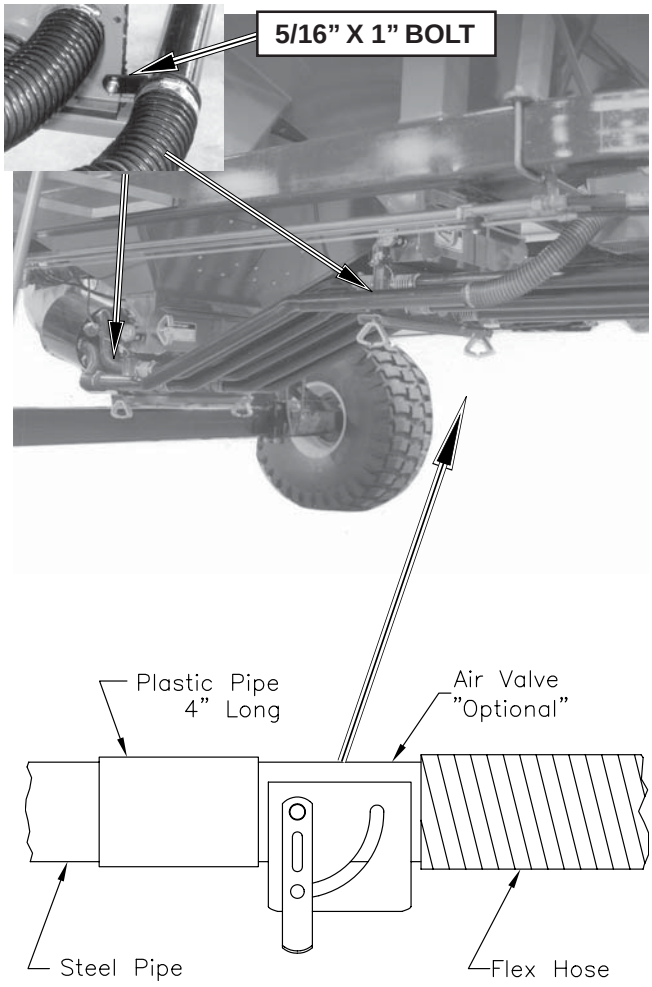
1. Mount the steel delivery tubes to each side of the collectors.

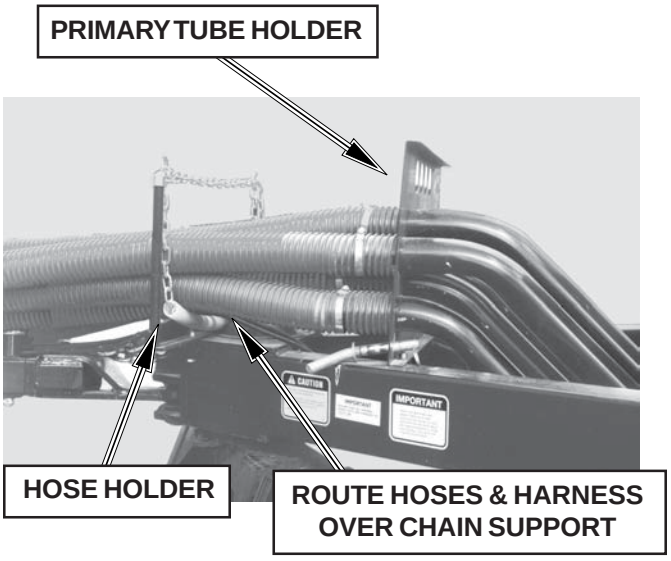
Note: Longer portion of pipe is to front.

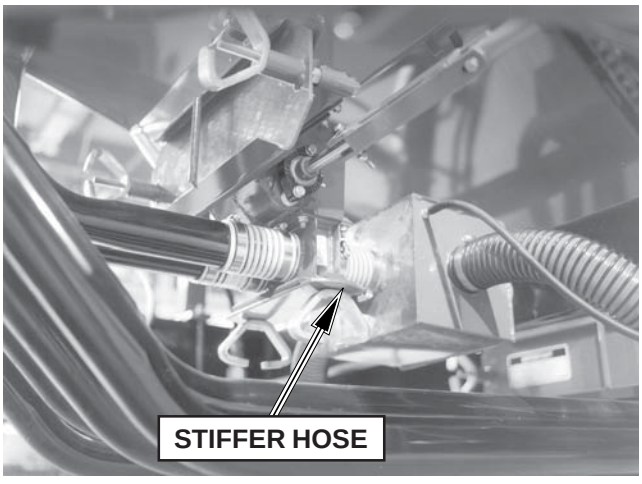
2. Attach the optional air valves (if so equipped) to the steel delivery tubes with 4" cut lengths of plastic pipe and hose clamps.
3. Cut the 2 1/2" diameter flex hose to specific lengths to fit:
   (a) From the steel pipe/air valve to the Air Seeder plenum.
   (b) From steel pipe to the Granular Applicator plenum.
4. Install the 4" cut lengths of 2 1/2" diameter plastic pipe onto the lower end of the granular steel primary tubes.
5. Insert the bare end of the granular steel primary tubes into the tube holder.

   Use the **Two Top Left Hand Side Holes** of the tube holder for "two primary" run Applicators up to 40 feet.

   Use all **Three Top Holes** of the tube holder for "three primary" run Applicators over 40 feet.
6. Connect the steel primary tubes to the metering body collector by sliding the 4" cut lengths of plastic pipe onto the ports.







Primary Hose Installation - Continued

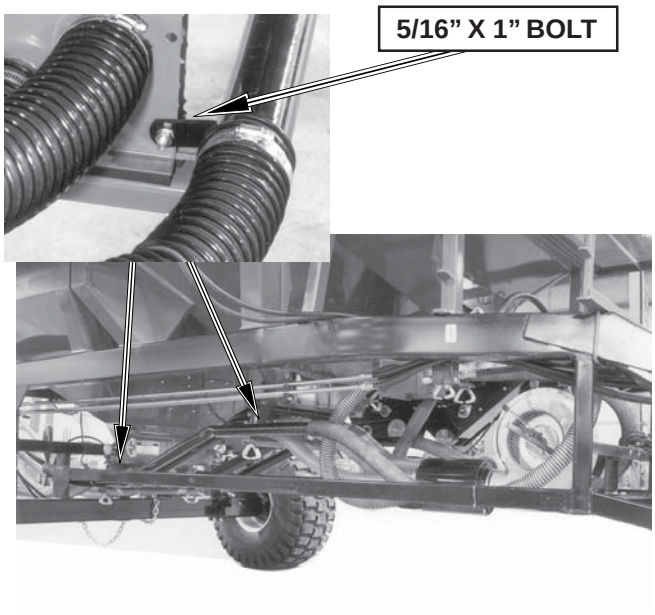
Tow Between

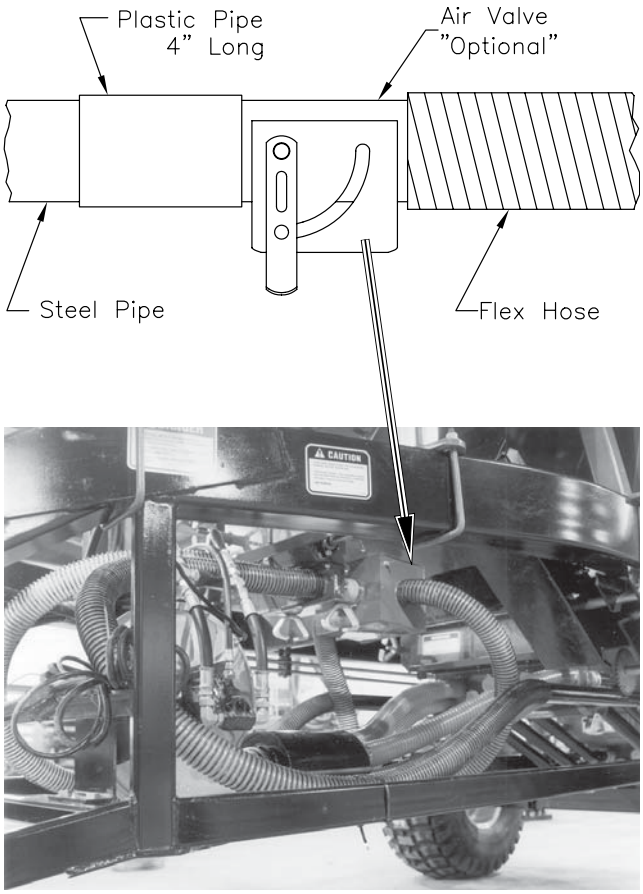
1. Mount the steel delivery tubes to each side of the collectors.

- Two Pipes - 1 left and 1 right.
- Three Pipes - 2 left and 1 right.

Note: Longer portion of pipe is to front.

2. Cut the 2 1/2” diameter flex hose to specific lengths to fit:
   (a) From the Air Seeder plenum to the Granular Applicator plenum.
   (b) From Granular Applicator collector to the steel pipes.
3. Secure 2 1/2” diameter flex hose with tie straps.





Transmission Installation

1. Insert the rear of the Applicator Transmission between the two front transmission plates on the Air Seeder.
2. Insert the 3/8” x 8” bolt through both transmissions and install the idler assembly. (See diagram)
3. On the **7030** install the 1/2” x 8” bolts, 1/2” flatwashers, lockwashers and nuts through the rear tank leg and the front of the Applicator Transmission.

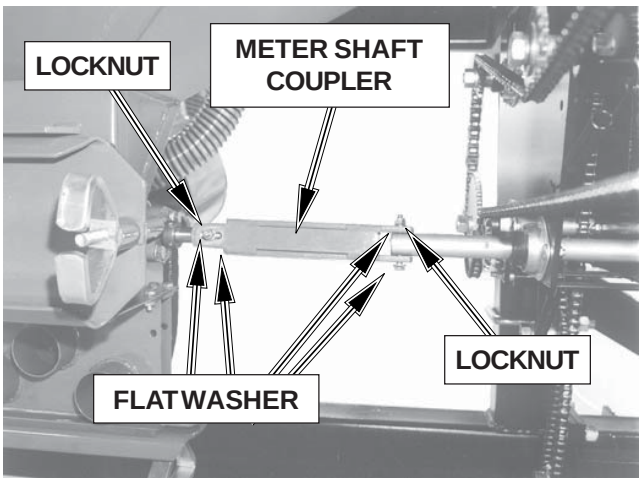
   On the **7040** install the 1/2” x 10” bolts, 1/2” flatwashers, lockwashers and nuts through the rear tank leg and the front of the Applicator Transmission.
4. Remove the nut and lockwasher from the input sprocket (40 tooth 7130) (35 tooth 7180) (26 tooth for 7240 & 7300 with All Weather Tires) (24 tooth for 7240 & 7300 with Rice Tires).

   Install the 7/8” long spacer, drive pin, and a 15 tooth sprocket. (See diagram)

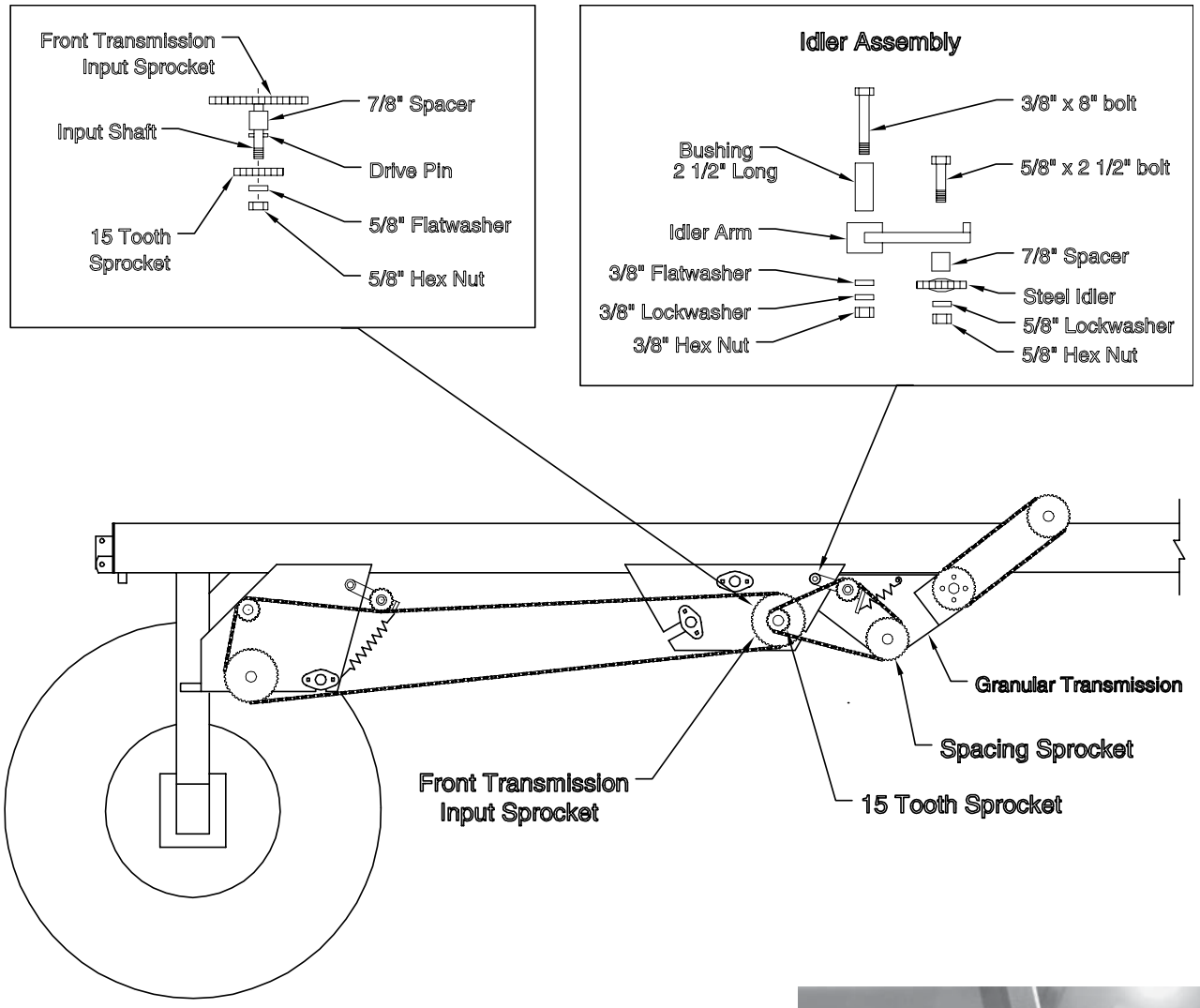
   Re-install the nut and lockwasher.
5. Install the necessary spacing sprocket on the rear of the granular transmission. (See diagram)
6. Install the main drive chain 41” long chain.
7. Connect idler spring to the idler and the 3/8” hole in the top of the transmission plate.
8. Install the metershaft coupler using the GR.8 1/4” x 2 1/4” bolts, flatwashers and locknuts.

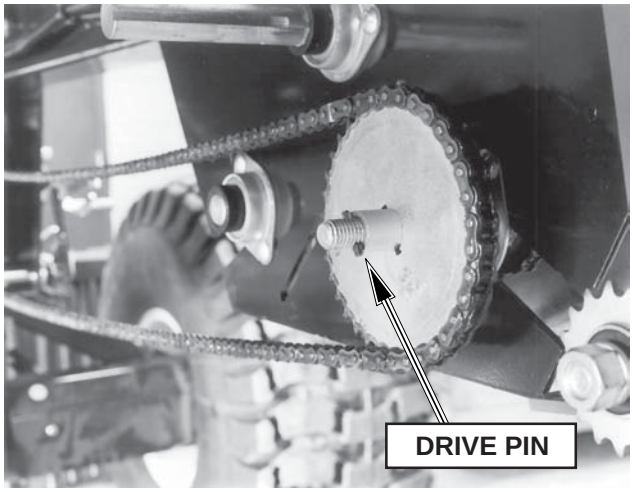
Spacing Sprocket	
Trip Spacing	**Spacing Sprocket**
7 1/2"	18 teeth
8"	20 teeth
9"	22 teeth
10"	26 teeth
12"	30 teeth

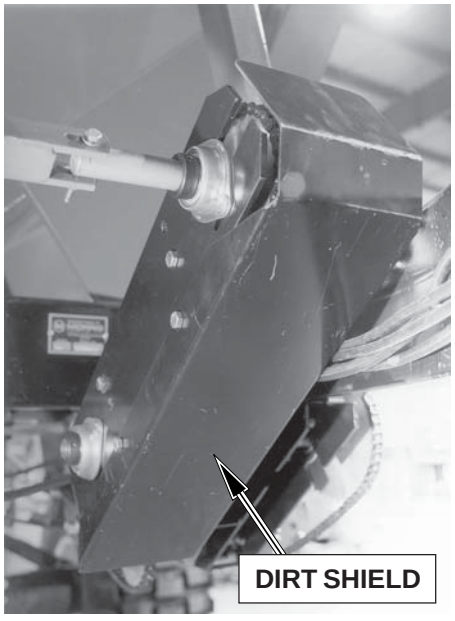
Note: The spacing sprocket refers to the trip spacing on the cultivator.



Transmission Installation - Continued







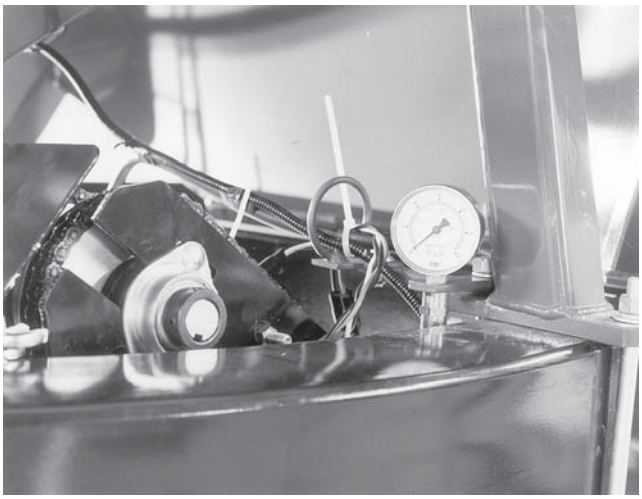
Clutch Harness

1. Connect the cable to the two clutches on the Applicator.

   The **Top Clutch** is the **PRIMARY clutch.** The cable is marked **PRIMARY.**

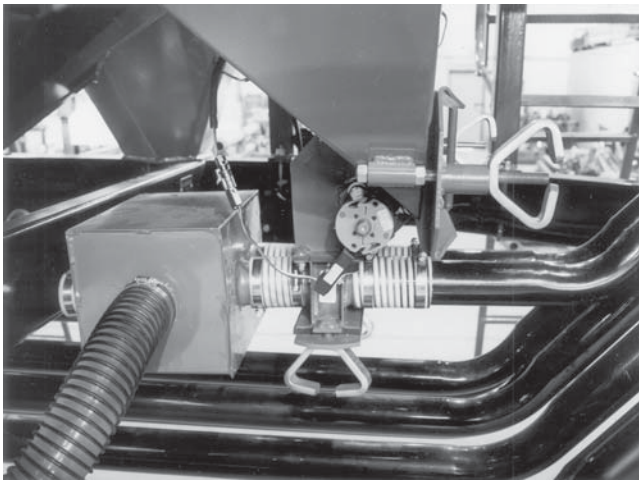
   The **Bottom Clutch** is the **ZAPPER** or **SECONDARY clutch.** The cable is marked **SECONDARY.**

2. Run the harness along the left-hand Air Seeder hitch pole and mount the brylite coupler to the quick coupler mounting plate.
3. Run the extension harness along the left-hand side of the cultivator main frame to the tractor hitch avoiding any pinch points or areas where the cable could be snagged.
5. Route the cable from the control box to the rear of the tractor avoiding any pinch points.
6. **Mark all brylite plugs** with coloured electrician's tape to ensure the correct harnesses will be connected.



Monitor Connections

- Locate wires in Air Seeder wire harness at front of Air Seeder.
- Connect the Bin Level Wires marked AB and ABG to the bin sensor on the Granular Tank.
- Connect shaft sensor as shown. Connect the wires marked AS and ASG to the sensor.
- Re-program Monitor as outlined in the '7000 Series Air Seeder' manual, under *"System Installation"* .



Walkway & Stair Installation

1. Install the walkway platform to the Applicator Tank using 3/8” x 1 1/4” bolts, lockwashers and nuts.

   The stairs can be mounted on the Right or Left side depending on operator’s preference. (See Page 9-12)

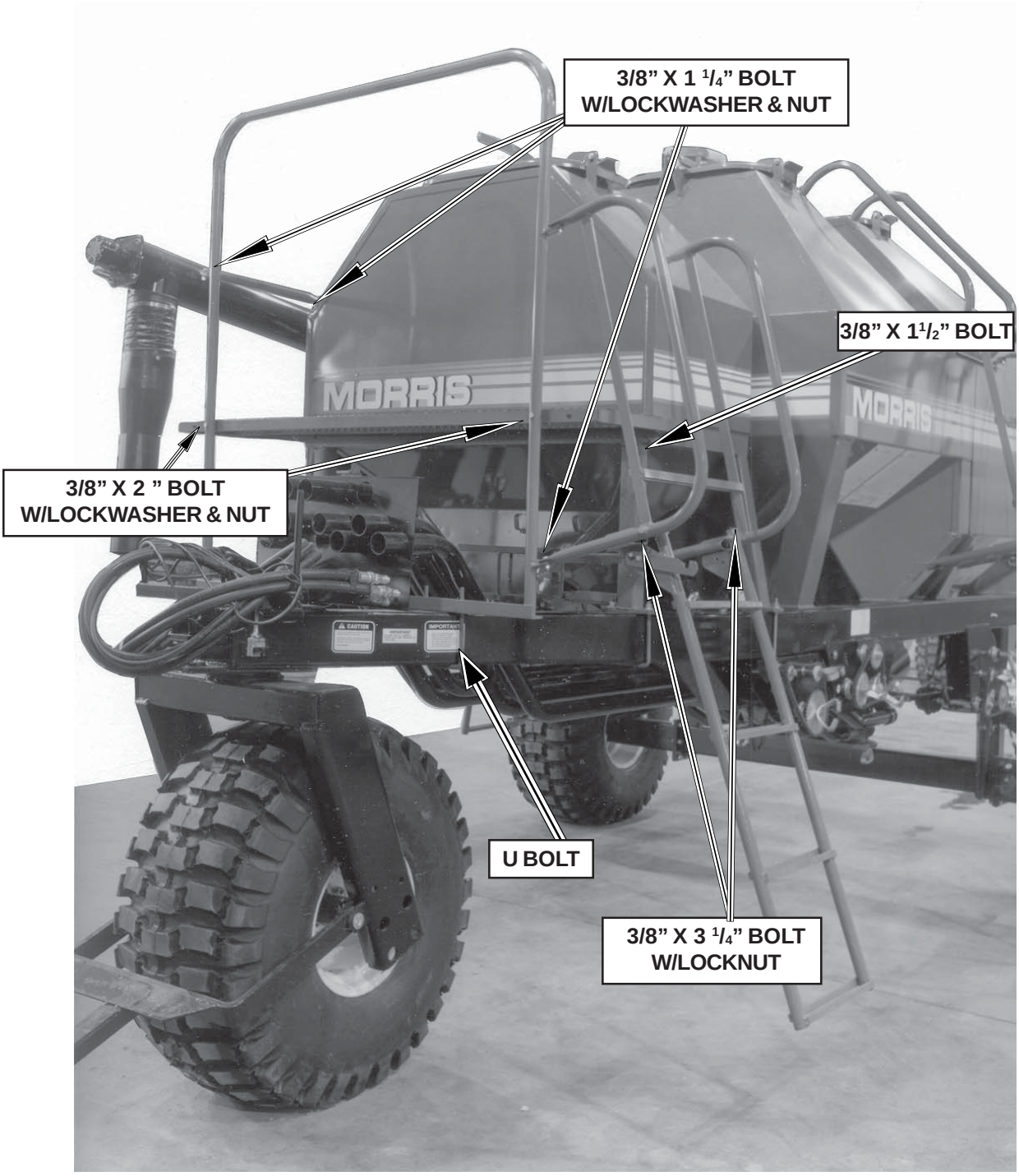
2. Install the front handrail to the Air Seeder frame using 3/8” U-bolts, flatwasher, lockwasher and nut.
3. Attach the walkway platform to the front handrail using 3/8” x 2” bolts, lockwahers and nuts.
4. Attach the side hand rail to the tank and front hand rail.
5. Pre-assemble the latch assembly to the stair as shown.
6. Mount the stairs to the walkway platform using two 3/8” x 3 1/4” bolts and locknuts.
7. Attach the Sample Collector Bracket to Air Seeder frame with two - 3/8” U-Bolts and locknuts.

Sample Collector Bracket

Note: Ensure the nuts are not tightened fully. This ensures the stairs can rotate freely up and down.

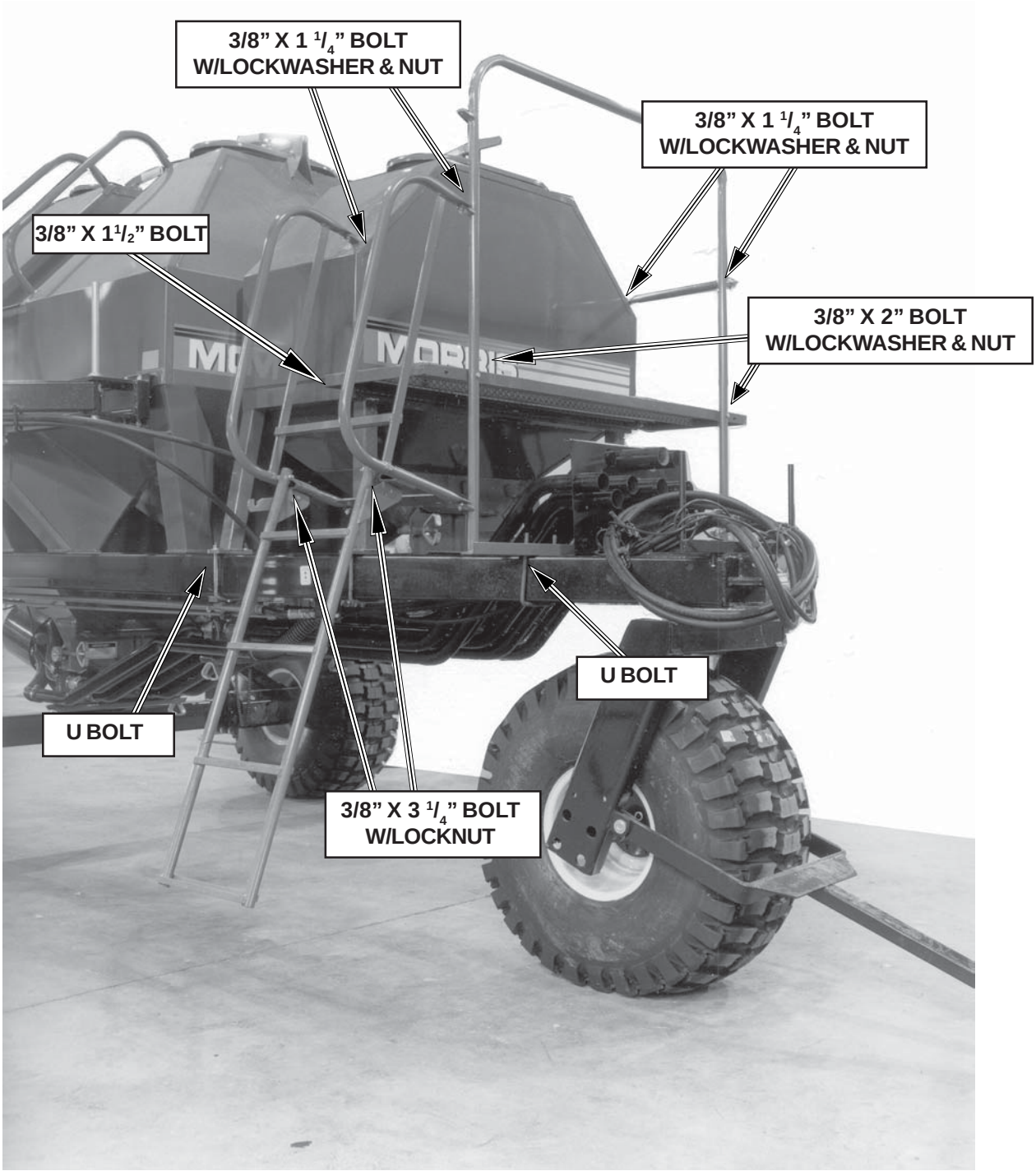
Walkway & Stair Installation - Continued

Stairs Installed on Left Side



Walkway & Stair Installation - Continued

Stairs Installed on Right Side



Air System Installation to the Cultivator

Mount the Primary run quick coupler to the rear bar near the centre line of the cultivator. Mount the granular Divider Heads to the cultivator frame. Lay outs for specific machines are shown in the *"Deflector and Secondary Head Locations"* Section.

If the machine being set up is not one of the models shown on page 9-20 and 9-76 then use and illustration that closely resembles the unit and follow the general guidelines for hose routing.

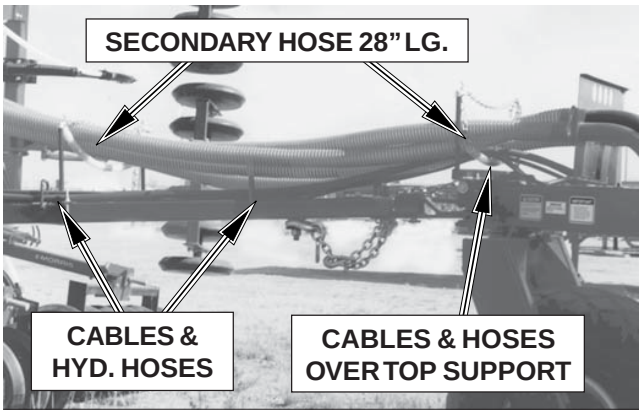
1. Measure and cut the 2 1/2" diameter primary hose to the required lenghts between the Quick Coupler and the Divider Heads. The OUTER HEADS should have the hose installed first, then the INNER HEAD. Finally measure and cut the primary hose to the required length between the Air Seeder and the Quick Coupler.

   Run the Hoses between the Air Seeder and cultivator with sufficient sag to allow for sharp turns without the hoses stretching and pulling off the steel primary tubes. See photo below.

2. **IMPORTANT: Make sure Divider Head outlets match with Metering Wheel size ie. 7 outlet head to 7 run metering wheel, etc.**

3. Run hoses with a minimum amount of sag. Hoses should be straight as possible but not too tight. If there is more than one Divider Head on one side of the cultivator, tie primary hoses together with tie straps.

   On long runs of primary hose it may be necessary to add additional supports to prevent excess sagging of the hose.



Hoses with correct amount of sag

Air System Installation to the Cultivator - continued

There are some basic rules that should be followed. These are listed below:

- Always cut the 2 1/2” diameter primary hose for the long runs first.
- Ensure that the 2 1/2” diameter primary hose from the divider runs as level as possible.
- Ensure that the secondary hoses 1” diameter do not run higher than 3” above the height of the divider head.
- Always ensure a 12” straight section of hose enters the deflector.
- Avoid sharp bends in any of the hoses.
- Check for pinch points and clearances when folding in and out of transport.
- If long runs of primary hose are required, it may be necessary to add additional supports to prevent excessive sagging. (Use the same support that is used to support the flat fan divider)
- Quick coupler blank off plates are provided to blank off the entrance to the hoses when the Air Seeder is disconnected from the cultivator. These blank off plates should be stored in a place that is readily accessible.

Important: Check that when unit is folded into transport that hoses do not interfere with the Wing-Lift mechanism and there are no KINKS in any of the hoses.

Important

Hot water is the only acceptable lubricant for the installation of the 2 1/2" Black Coupler Hose.

WD-40 or any other lubricant (i.e. liquid detergent) will have a negative effect on the chemical stability of the hose, resulting in the degradation and failure of the hose due to Environmental Stress Cracking.

Deflector Installation

Deflector spacing and height are very important. These dimensions determine the accuracy of chemical spread pattern. The deflector spacing is given in the following pages for each model and size of cultivator that MORRIS currently markets.

All the cultivator shovels must sit on a level surface. The height of the deflectors must be set at the deflector spacing (s) plus the working depth (d). This distance, “D” = d + s is measured from the ground surface to the deflector plate.

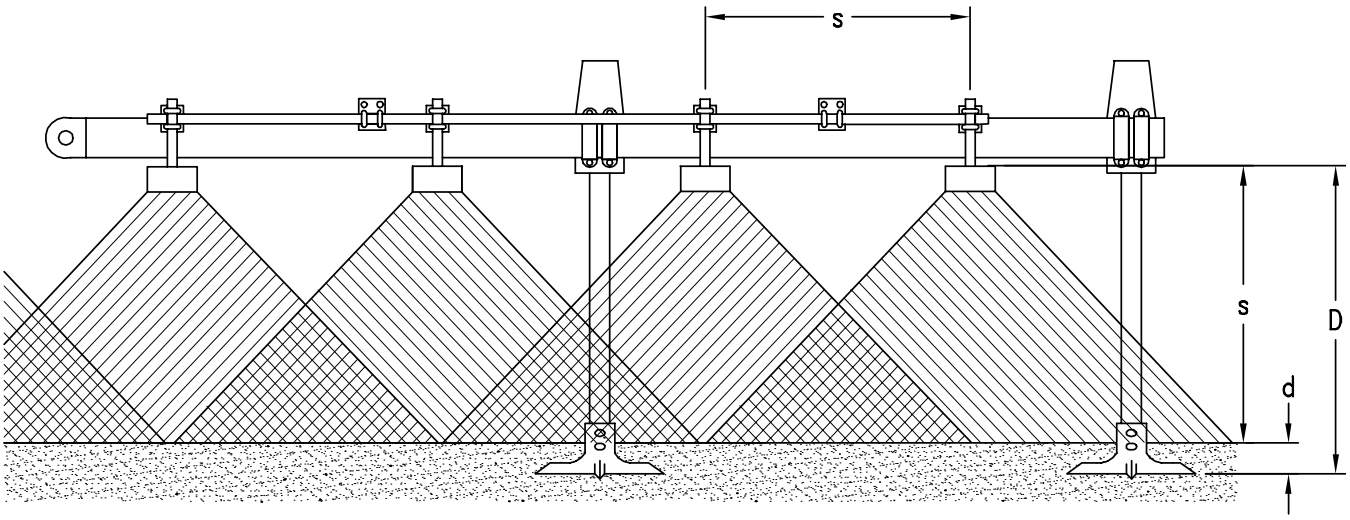
The deflectors must also be set square to the frame. If the deflectors are not set properly this will result in a poor product Spread-Uniformity.

To ensure the deflector is mounted correctly:

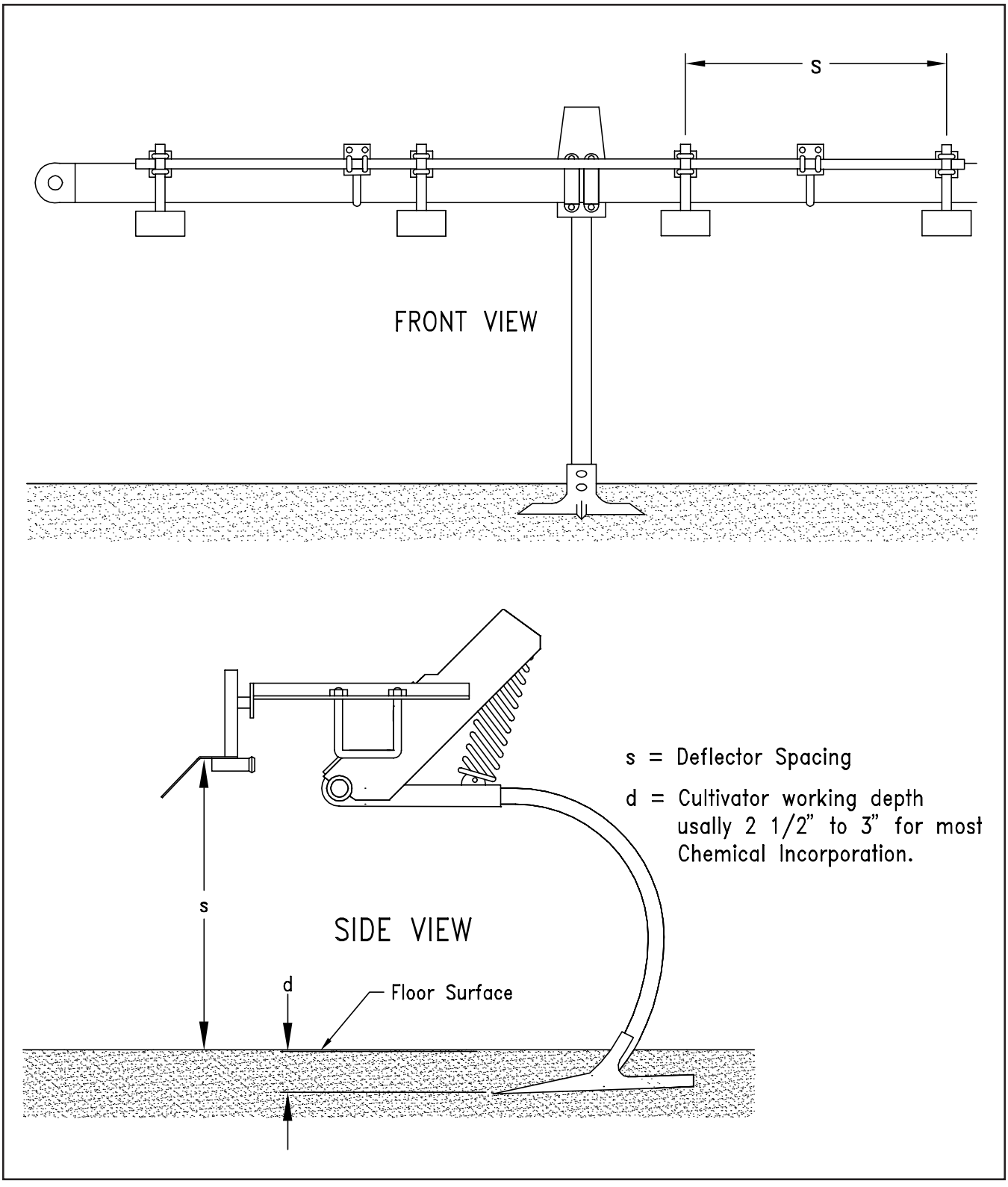
1. Determine the height of the deflector from the 3/4” mounting bar.
2. Cut 2 pieces of wood the identical size that matches the distance in step 1.
3. Place the two blocks of wood on the top of the deflector.
4. Push the deflector up so the blocks of wood contact the mounting bar.
5. Tighten the U-bolts holding the deflector to the mounting bar.

Use the following diagrams on page 9-18 to 9-45 as a guide to mount the deflectors for particular cultivator models.

Install the deflector mounting bracket to the front bar of the cultivator. the deflector mounting bracket ***must*** be mounted to the ***top*** of the front bar for all models.



Deflector Installation - Continued



Secondary Hose Installation

The lengths of the 15/16" diameter hoses are **very important.**

For Accurate distribution the secondary hoses have to be arranged by length symmetrically about the centre line.

See page 9-19 for specific hose lengths for different divider heads.

The **longest** hoses **have to be** in the **centre** of the divider head. These hoses would normally feed the deflectors furthest away from the head. The following pages indicate the outlet and its matching deflector for various models that MORRIS manufactures.

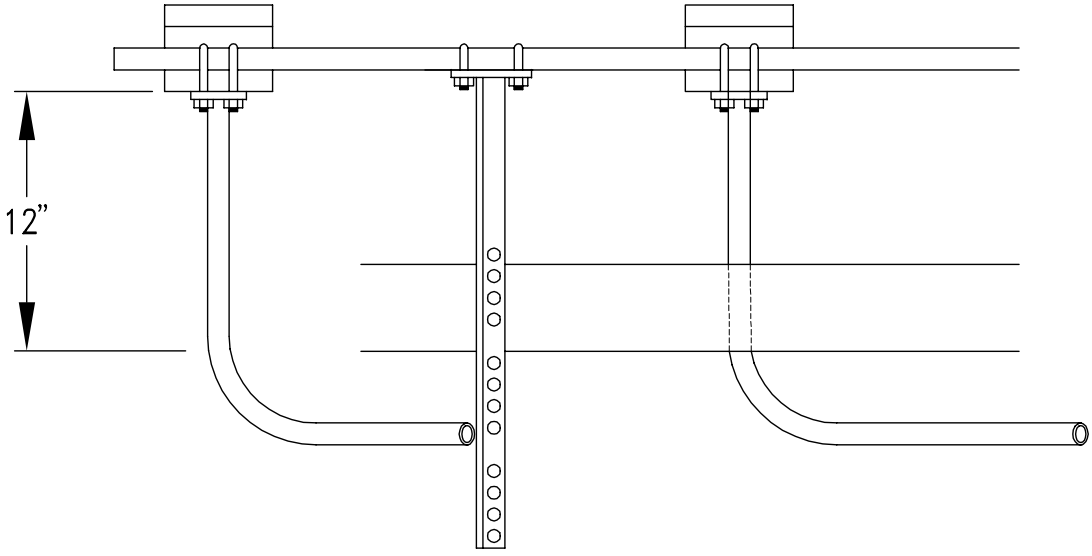
Hoses may have to be looped to ensure correct installation.

There must be a straight length of hose entering each deflector (12" preferred).

Note: The Maxim Air Drill and CONCEPT 2000 has its own specific secondary hose lengths which are shown for each machine size.

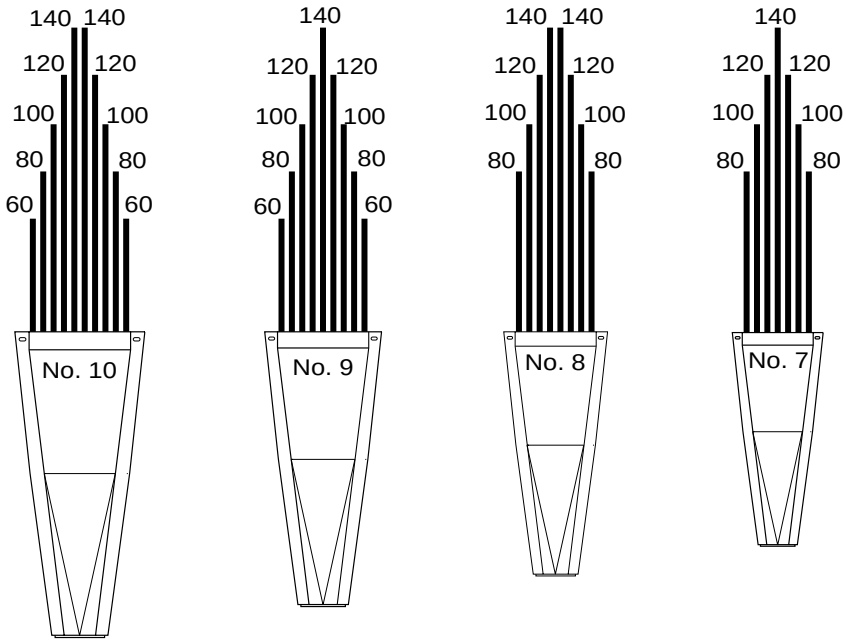
Important

If the hose is not installed correctly the distribution uniformity will be adversely affected.



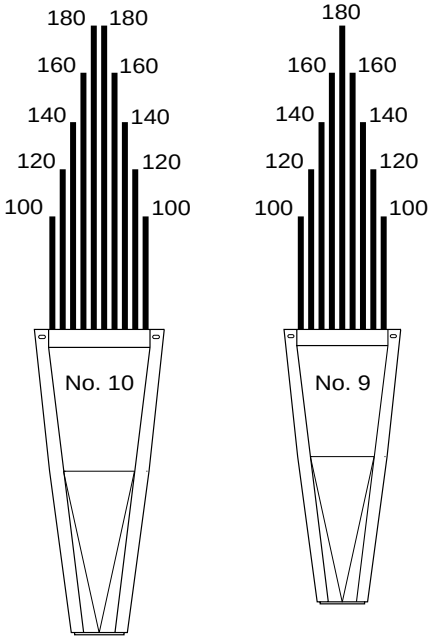
Hose Lengths - Magnum II, 8900, 9000 and Challenger II

Except Wing Frames of 55'-59' 8900 & 9000 Floating Hitch Cultivators.



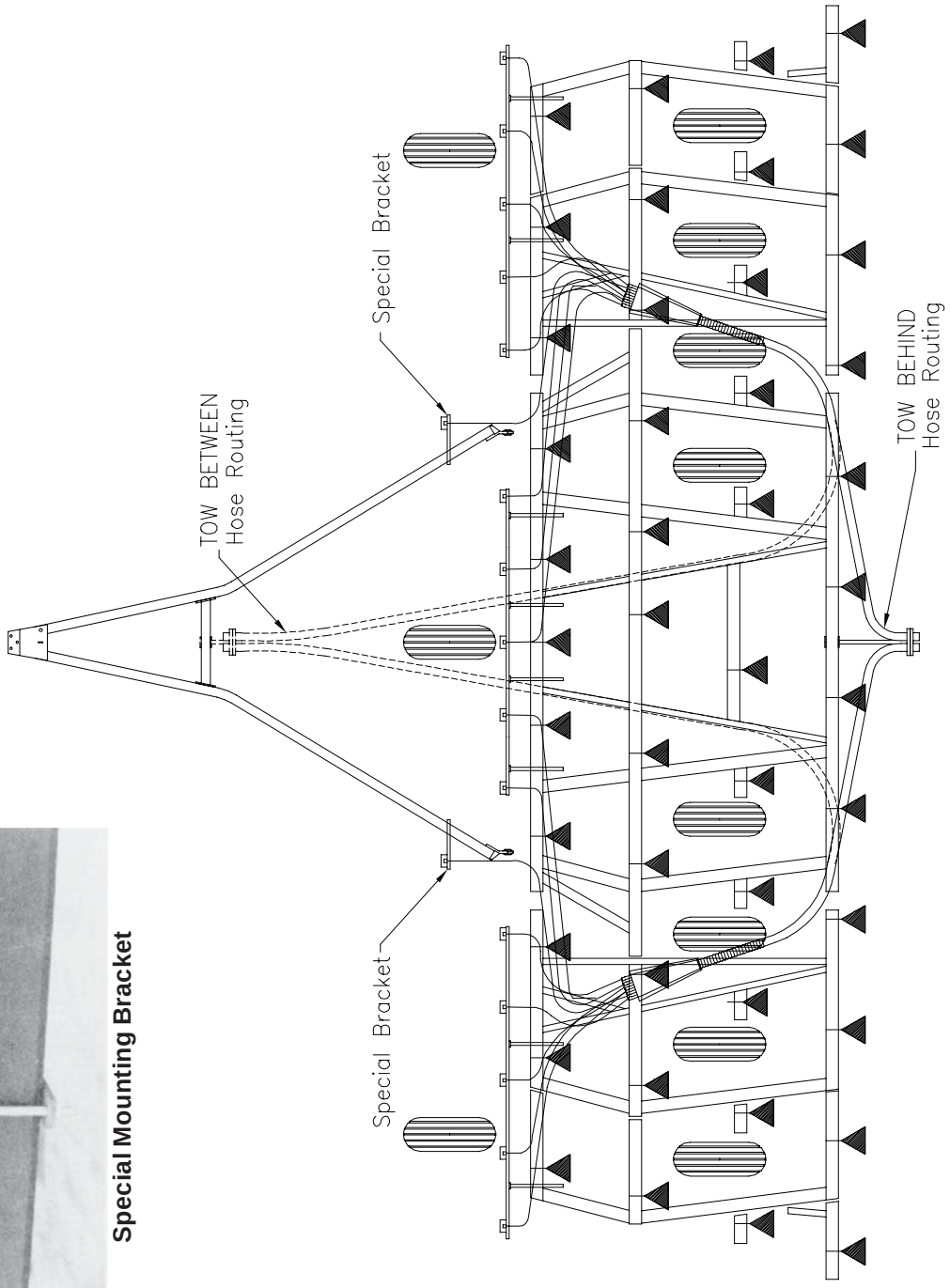
Secondary Hose lengths for 8900/9000 5 Frame Machines

Wing Frames of 55'-59' 8900 & 9000 Floating Hitch Cultivators.

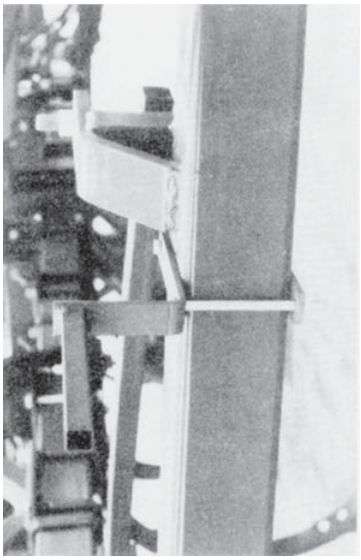


Deflector and Secondary Head Locations

Cultivator Model 8900 & 9000 25'-35'



35' at 9" spacing Shown



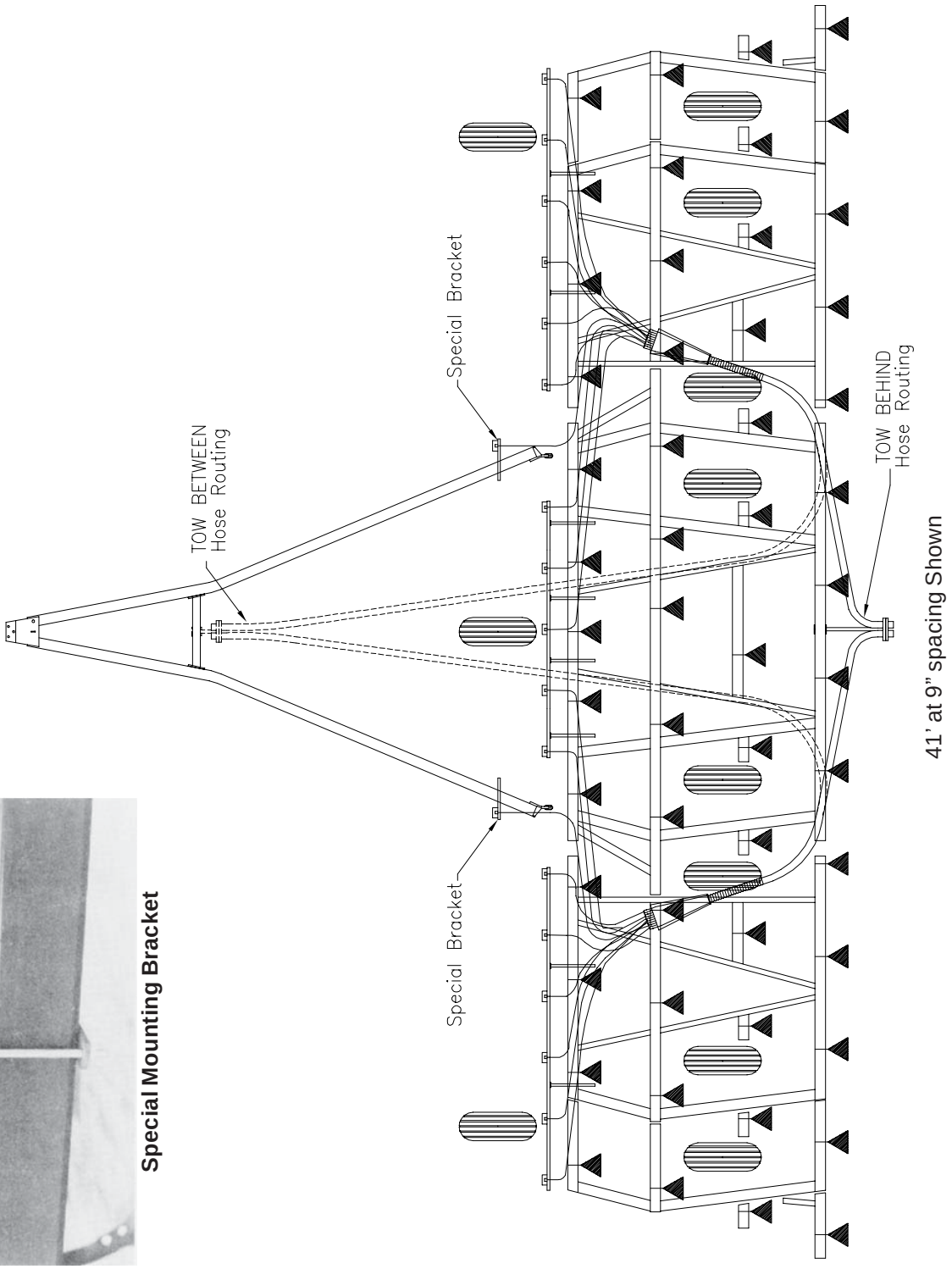
Special Mounting Bracket

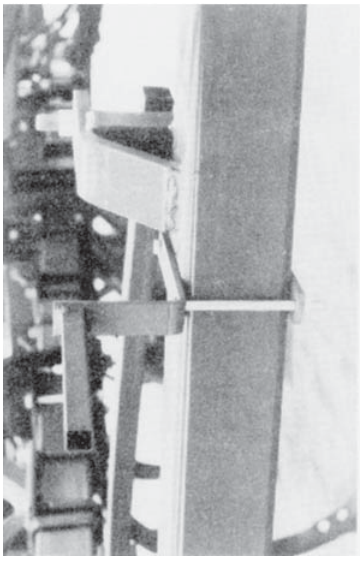
Deflector and Secondary Head Locations

8900 & 9000							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
25-35	25	9	-	-	Main Frame Wing Frame	- -	- -
		12	-	-	Main Frame Wing Frame	- -	- -
	27	9	-	-	Main Frame Wing Frame	- -	- -
		12	-	-	Main Frame Wing Frame	- -	- -
	29	9	15	21.5	Main Frame Wing Frame	131 68	Special Mounting Brackets Required
		12	15	22.5	Main Frame Wing Frame	94 72	Special Mounting Brackets Required
	31	9	15	24	Main Frame Wing Frame	100 76	Special Mounting Brackets Required
		12	15	24	Main Frame Wing Frame	100 76	Special Mounting Brackets Required
	33	9	15	25	Main Frame Wing Frame	106 81	Special Mounting Brackets Required
		12	15	25.5	Main Frame Wing Frame	106 81	Special Mounting Brackets Required
	35	9	17	22.75	Main Frame Wing Frame	100 100	Special Mounting Brackets Required
		12	17	24	Main Frame Wing Frame	100 100	Special Mounting Brackets Required

Deflector and Secondary Head Locations

Cultivator Model 8900 & 9000 31’-41’





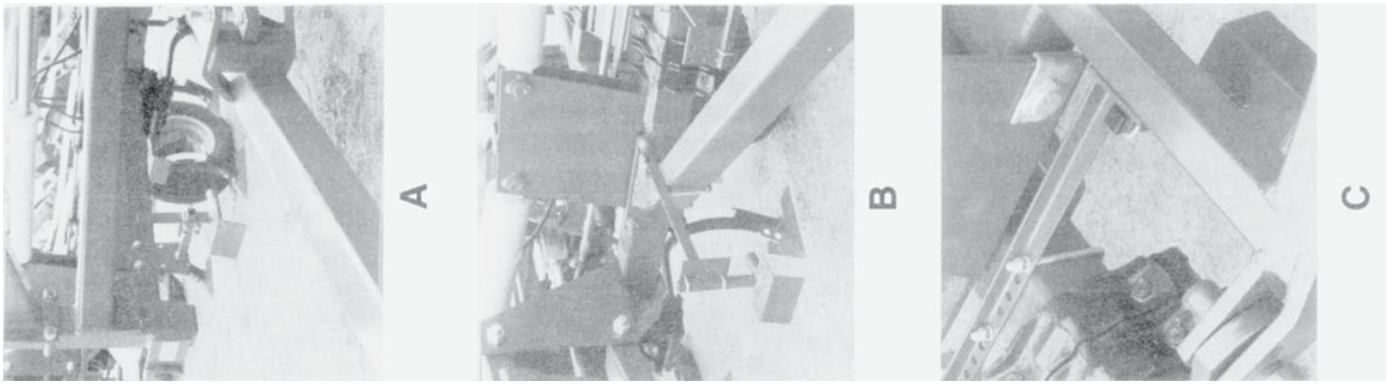
Special Mounting Bracket

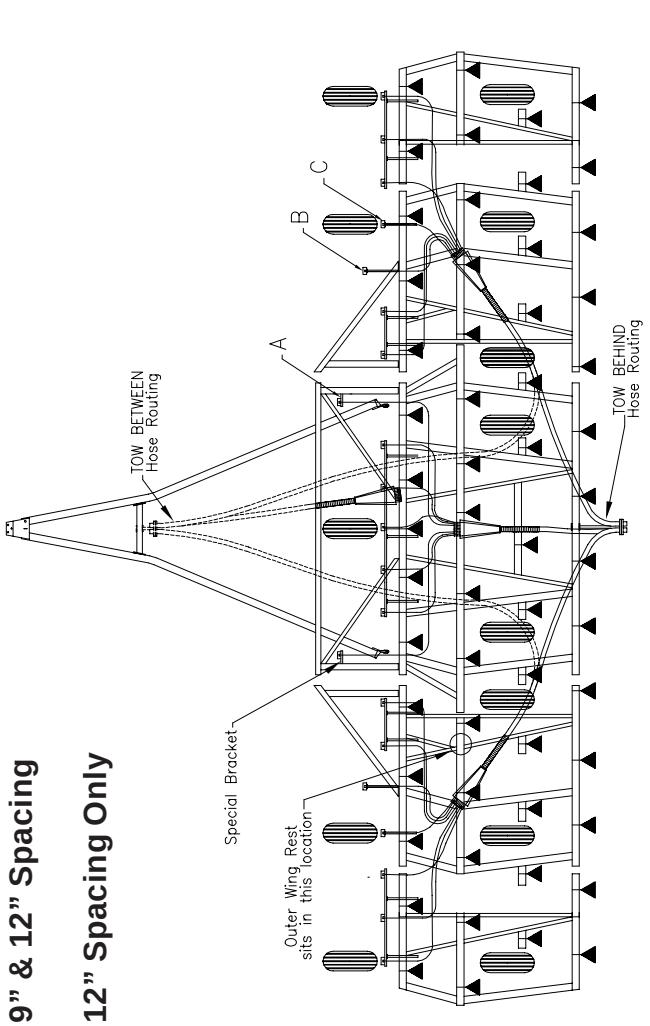
Deflector and Secondary Head Locations

8900 & 9000							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
31-41	31	9	15	24	Main Frame Wing Frame	100 76	Special Mounting Brackets Required
		12	15	24	Main Frame Wing Frame	100 76	Special Mounting Brackets Required
	33	9	15	25	Main Frame Wing Frame	106 81	Special Mounting Brackets Required
		12	15	25.5	Main Frame Wing Frame	106 81	Special Mounting Brackets Required
	35	9	17	22.75	Main Frame Wing Frame	100 100	Special Mounting Brackets Required
		12	17	24	Main Frame Wing Frame	100 100	Special Mounting Brackets Required
	37	9	17	24.75	Main Frame Wing Frame	106 106	Special Mounting Brackets Required
		12	17	25.5	Main Frame Wing Frame	106 106	Special Mounting Brackets Required
	39	9	19	23.5	Main Frame Wing Frame	100 124	Special Mounting Brackets Required
		12	19	24	Main Frame Wing Frame	100 124	Special Mounting Brackets Required
	41	9	19	24.5	Main Frame Wing Frame	106 131	Special Mounting Brackets Required
		12	19	25.5	Main Frame Wing Frame	106 131	Special Mounting Brackets Required

Deflector and Secondary Head Locations

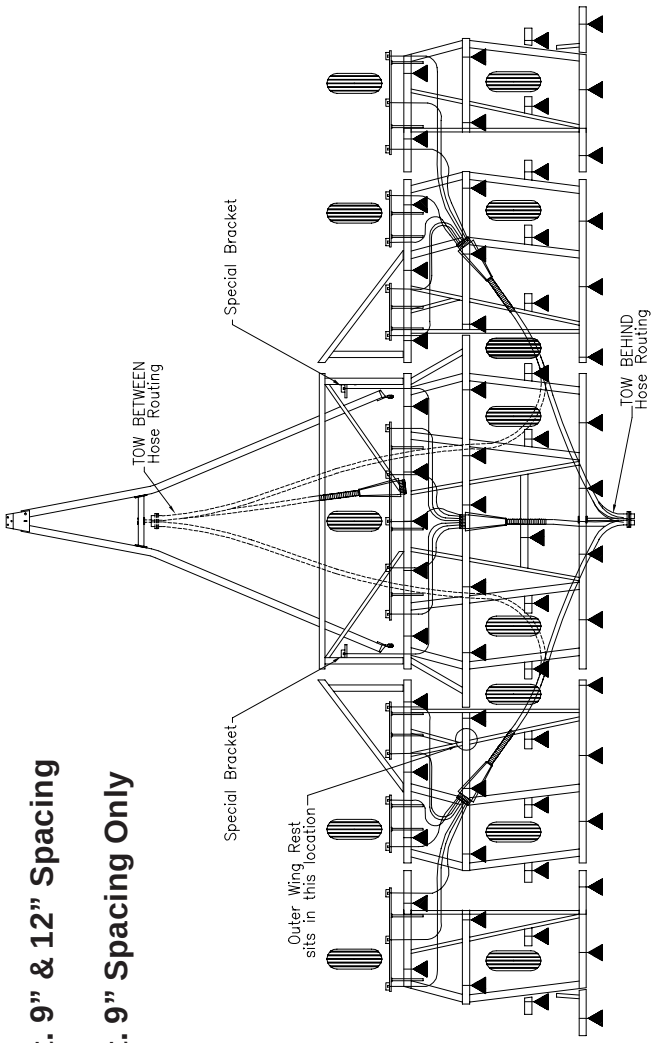
Cultivator Model 8900 & 9000 43’-47’





43 Ft. 9” & 12” Spacing

47 Ft. 12” Spacing Only



45 Ft. 9” & 12” Spacing

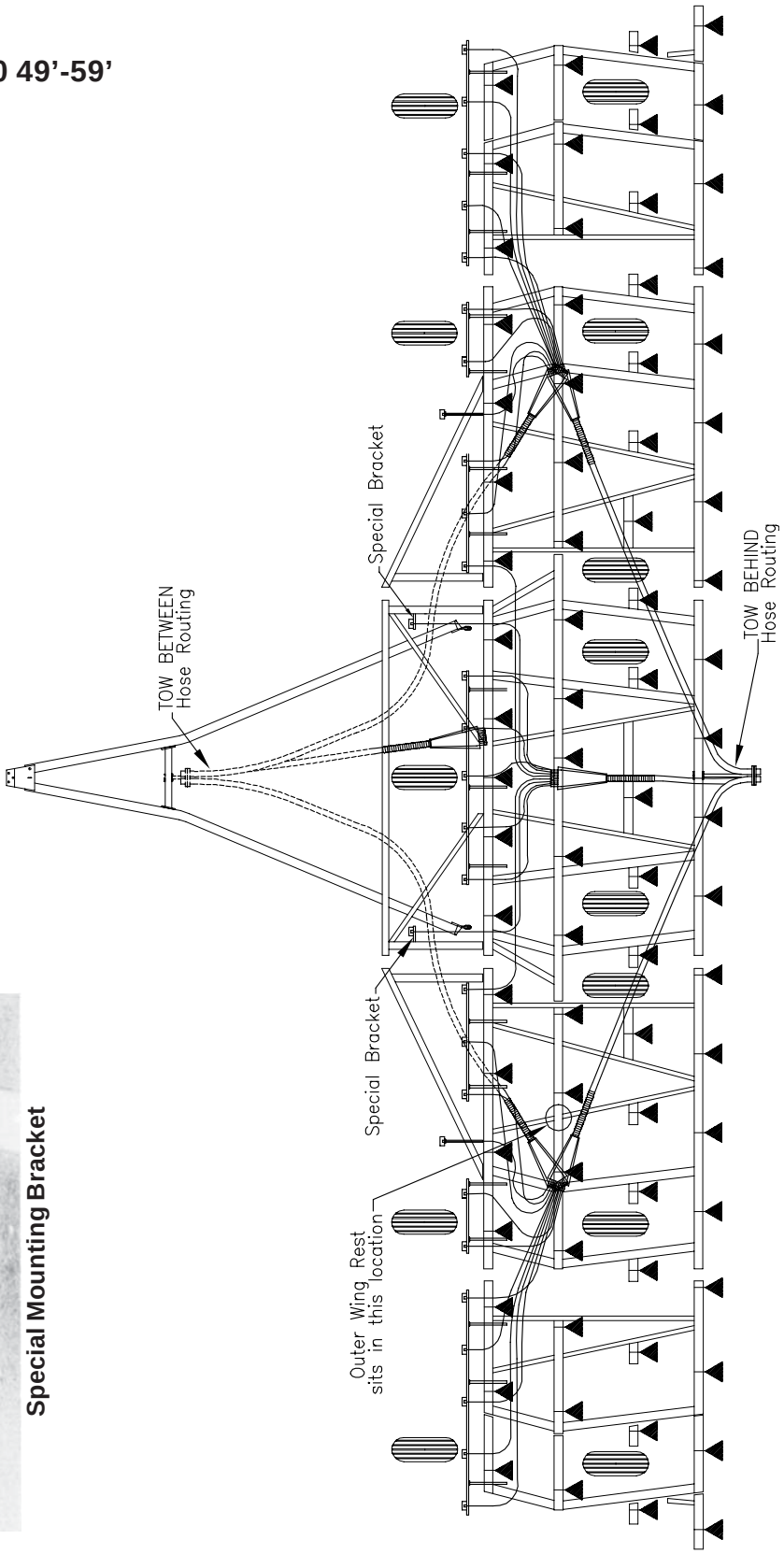
47 Ft. 9” Spacing Only

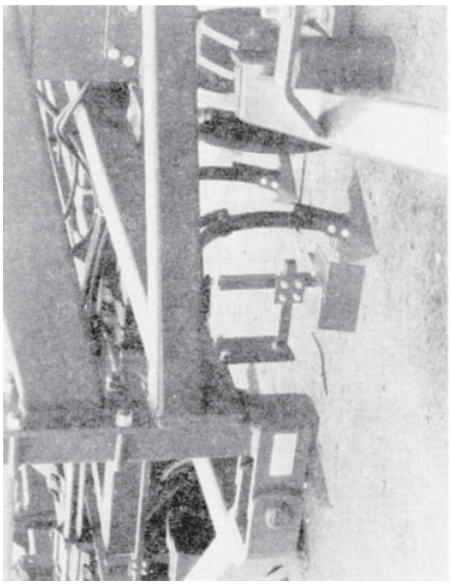
Deflector and Secondary Head Locations

8900 & 9000							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
43-47	43	9	21	24	Main Frame Inner Wing Frame Outer Wing Frame	100 36 52	Special Mounting Brackets Required Plus Two (2) Mounting Brackets
		12	21	24	Main Frame Inner Wing Frame Outer Wing Frame	100 36 52	Special Mounting Brackets Required Plus Two (2) Mounting Brackets
	45	9	21	24.75	Main Frame Inner Wing Frame Outer Wing Frame	104 36 & 36 54	Special Mounting Brackets Required
		12	21	25	Main Frame Inner Wing Frame Outer Wing Frame	104 36 & 36 54	Special Mounting Brackets Required
	47	9	21	25.5	Main Frame Inner Wing Frame Outer Wing Frame	106 36 & 36 55	Special Mounting Brackets Required
		12	23	24	Main Frame Inner Wing Frame Outer Wing Frame	106 36 76	Special Mounting Brackets Required Plus Two (2) Mounting Brackets

Deflector and Secondary Head Locations

Cultivator Model 8900 & 9000 49'-59'





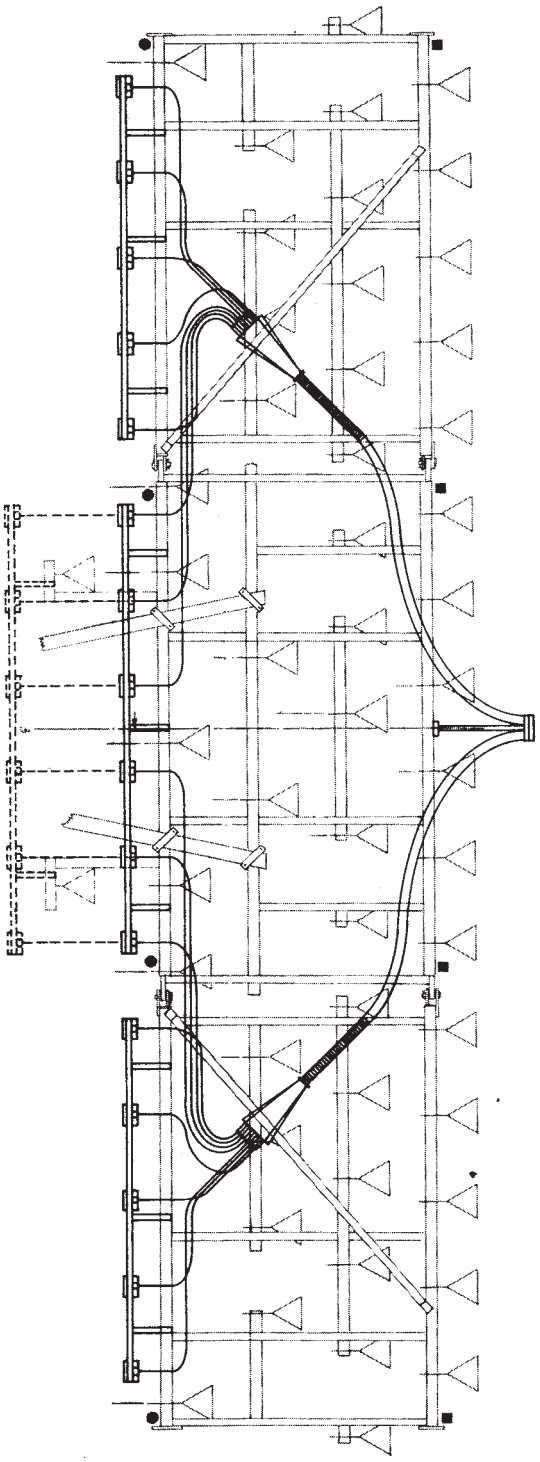
Special Mounting Bracket

Deflector and Secondary Head Locations

8900 & 9000							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
49-59		9	23	25	Main Frame	104	Special Mounting Brackets Required
	49				Inner Wing Frame	54 & 36	
		12	23	25	Outer Wing Frame	-	Use Single Bracket
		9	25	23.75	Main Frame	100	Special Mounting Brackets Required
	51				Inner Wing Frame	54 & 36	
		12	25	24	Outer Wing Frame	52	
		9	25	24.25	Main Frame	104	Special Mounting Brackets Required
	53				Inner Wing Frame	54 & 36	
		12	25	25	Outer Wing Frame	54	
		9	27	24	Main Frame	100	Special Mounting Brackets Required
	55				Inner Wing Frame	54 & 36	
		12	27	24	Outer Wing Frame	76	
		9	27	24.5	Main Frame	104	Special Mounting Brackets Required
	57				Inner Wing Frame	54 & 36	
		12	27	25	Outer Wing Frame	79	
		9	27	25.25	Main Frame	105	Special Mounting Brackets Required
	59				Inner Wing Frame	55 & 36	
		12	29	24	Outer Wing Frame	100	

Deflector and Secondary Head Locations

Cultivator Model Challenger II



33' at 8" Spacing Shown

Deflector and Secondary Head Locations

Challenger II Cultivator							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
L-225	25	8	-	-	Main Frame	-	-
					Wing Frame	-	-
	29	8	14	24.5	Main Frame	127	-
					Wing Frame	78	-
L-233	33	8	16	24.5	Main Frame	127	-
					Wing Frame	102	-
	37	8	18	24.5	Main Frame	127	-
					Wing Frame	127	-
L-242	42	8	20	24.5	Main Frame	176	-
					Wing Frame	29 & 78	-

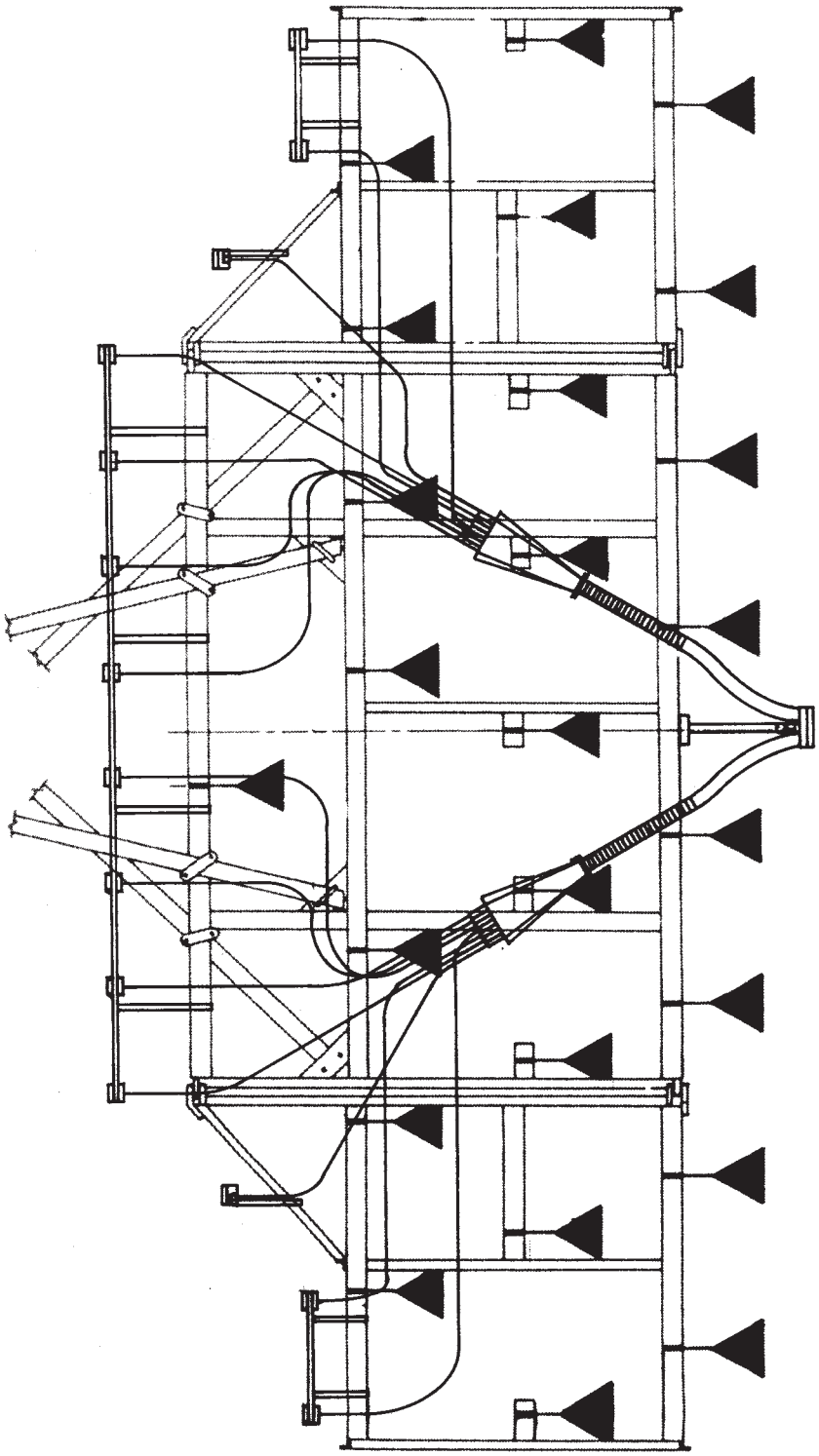
Deflector and Secondary Head Locations

Magnum I & II Chisel Plow

Machine		Shank Spacing (Inches)	Number of Deflectors	Deflector Spacing (Inches)	Mounting Tube	Mounting Tube Length (Inches)	Additional Comments
Range	Size						
CP-725	25	12	-	-	Main Frame	-	-
					Wing Frame	-	-
	27	12	14	22.5	Main Frame	162	See Page 31
					Wing Frame	28	Plus use 1 Single Bracket
	29	12	14	24	Main Frame	170	See Page 31
					Wing Frame	52	
CP-731	31	12	15	24	Main Frame	148	See Page 33
					Wing Frame	28	Plus use 1 Single Bracket
	33	12	16	24	Main Frame	124	See Page 32
					Wing Frame	28 & 52	
	35	12	17	24	Main Frame	148	See Page 33
					Wing Frame	52	Plus use 1 Single Bracket
	37	12	18	24	Main Frame	124	See Page 32
					Wing Frame	28 & 78	
CP-740	40	12	20	23.5	Main Frame	28 & 78 & 28	See Page 34
					Wing Frame	28 & 78	
	42	12	20	24.5	Main Frame	28 & 78 & 28	See Page 34
					Wing Frame	28 & 78	
CP-745	45	12	22	24	Main Frame	170	See Page 35
					Inner Wing Frame	74	
					Outer Wing Frame	28	Plus use 1 Single Bracket
CP-750	50	12	24	24	Main Frame	28 & 78 & 28	See Page 35
					Inner Wing Frame	102	
					Outer Wing Frame	34	Plus use 1 Single Bracket

Deflector and Secondary Head Locations

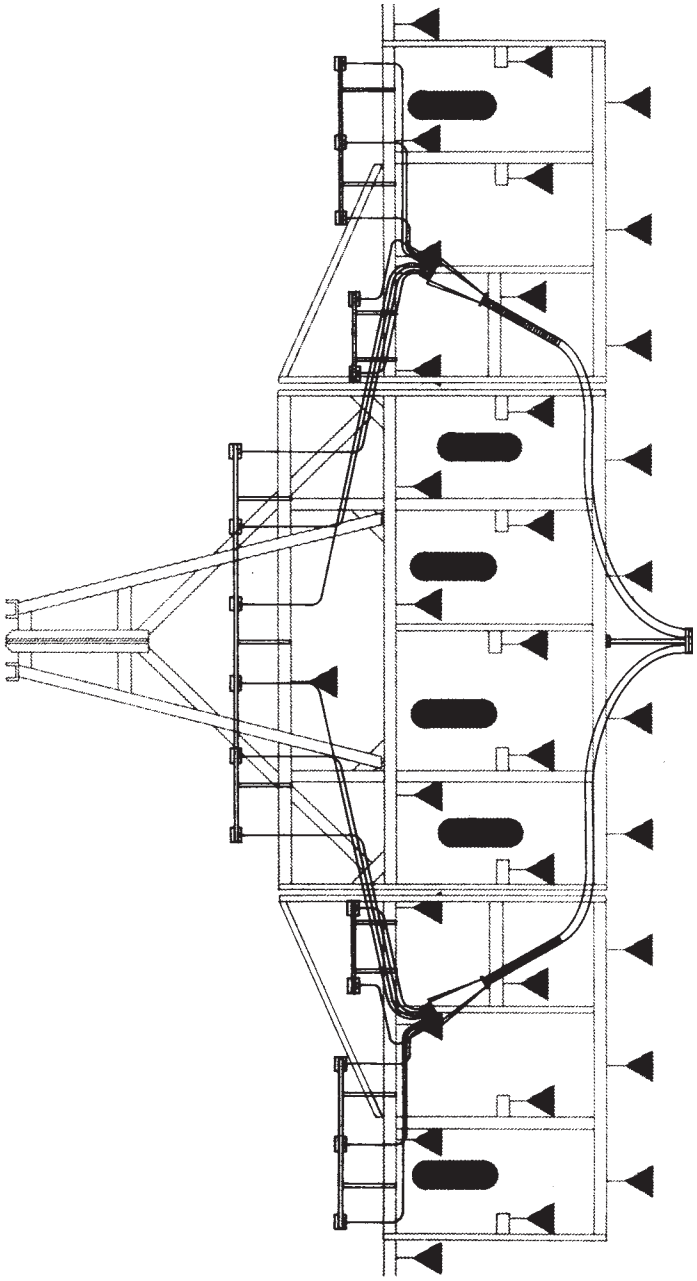
Chisel Plow Model CP-725 (27’ & 29’)



27’ at 12” Spacing Shown

Deflector and Secondary Head Locations

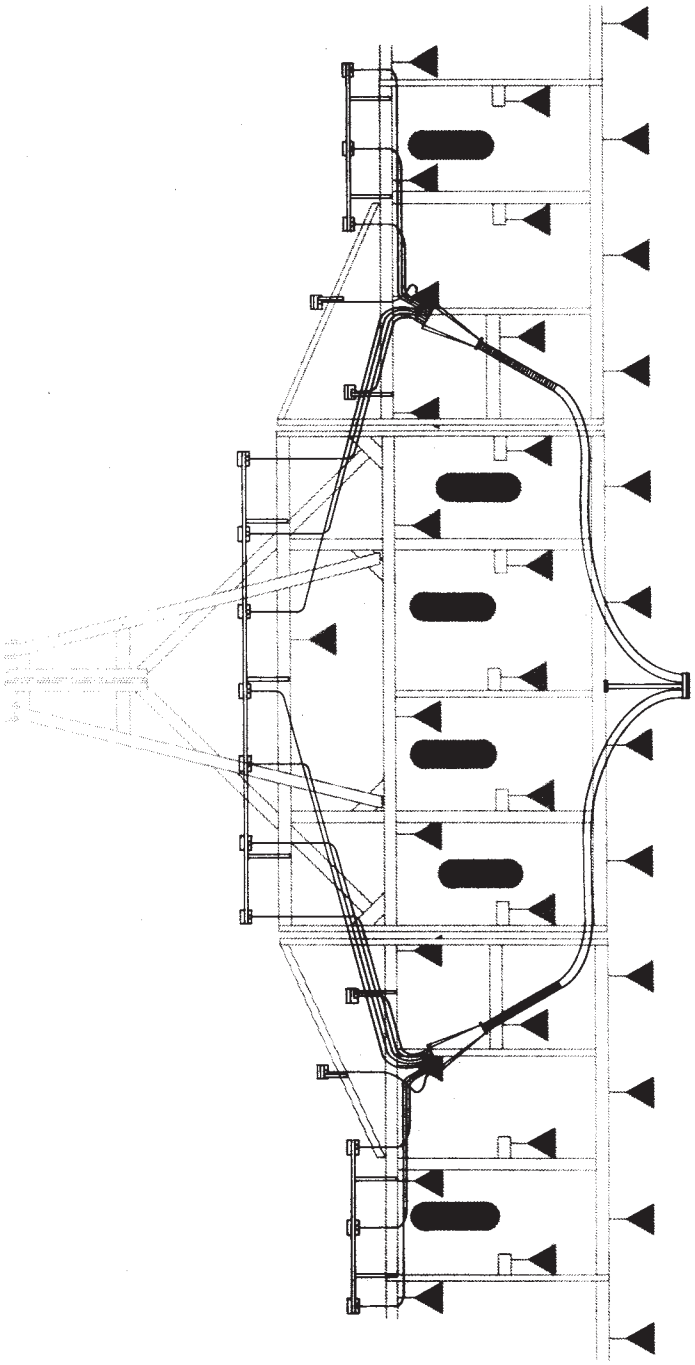
Chisel Plow Model CP-731 (33’ & 37’)



35’ at 12” Spacing Shown

Deflector and Secondary Head Locations

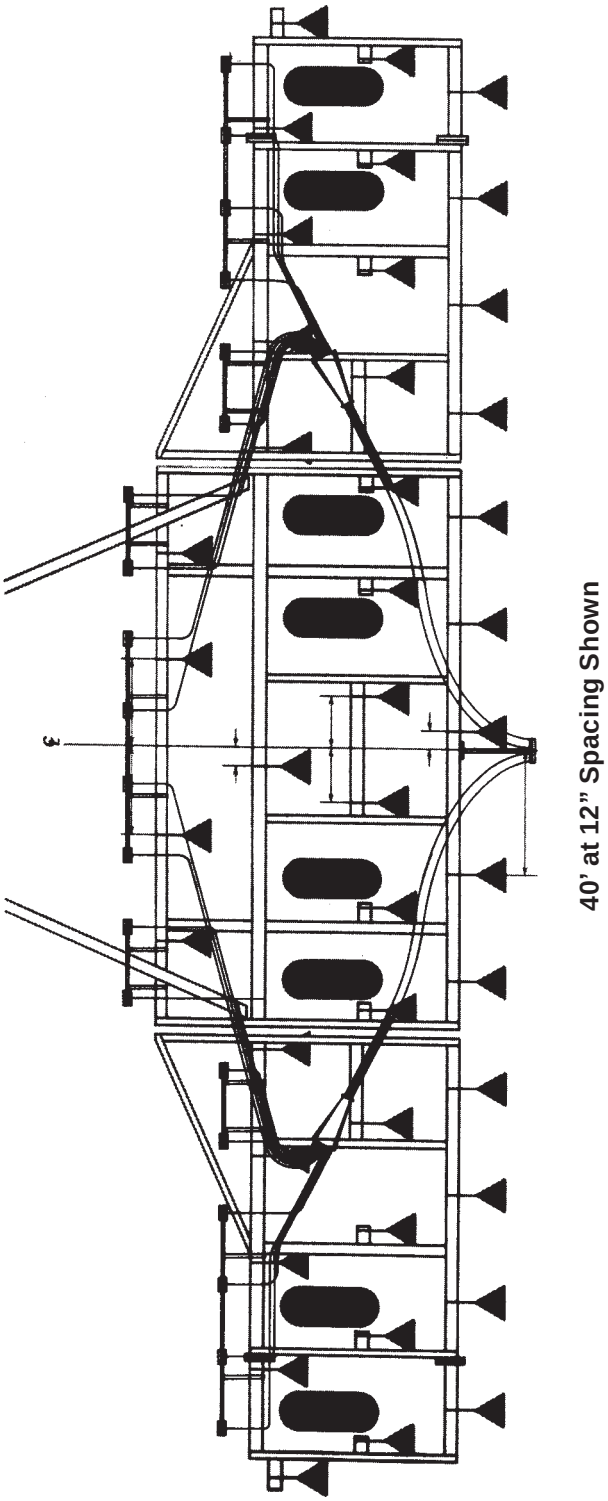
Chisel Plow Model CP-731 (31’ & 35’)



35’ at 12” Spacing Shown

Deflector and Secondary Head Locations

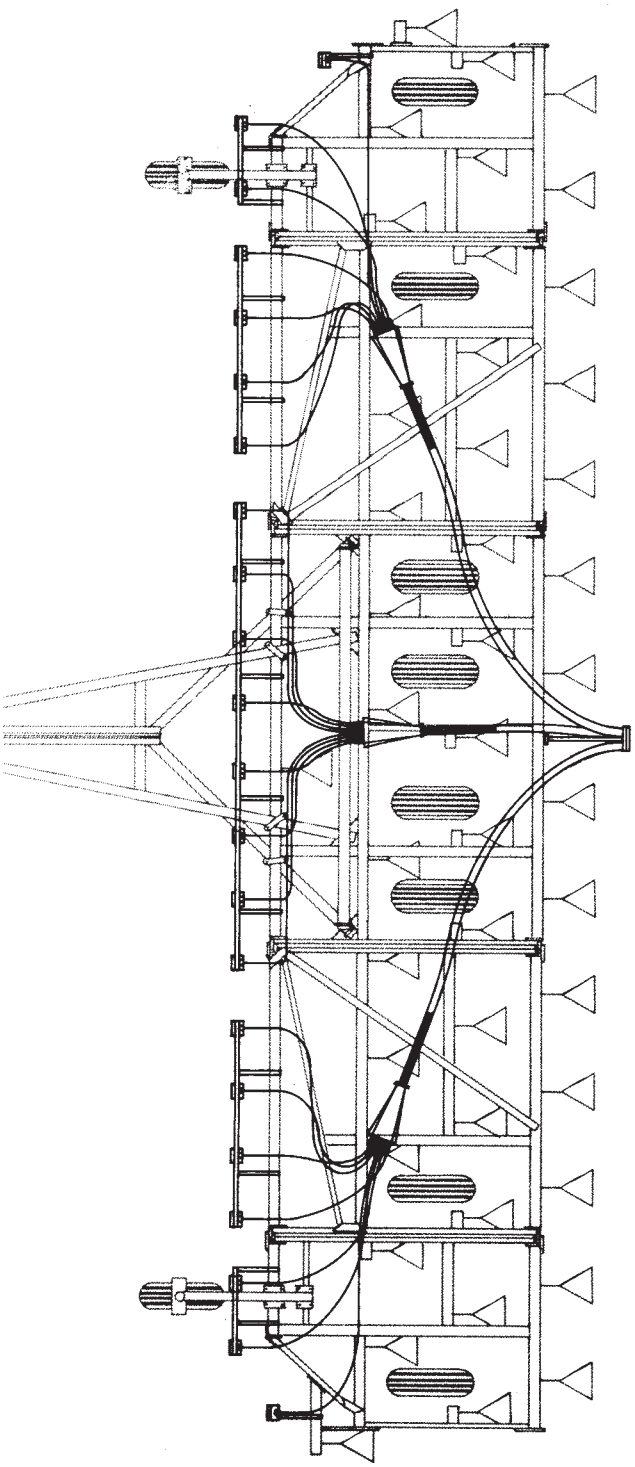
Chisel Plow Model CP-740 (40’ & 42’)



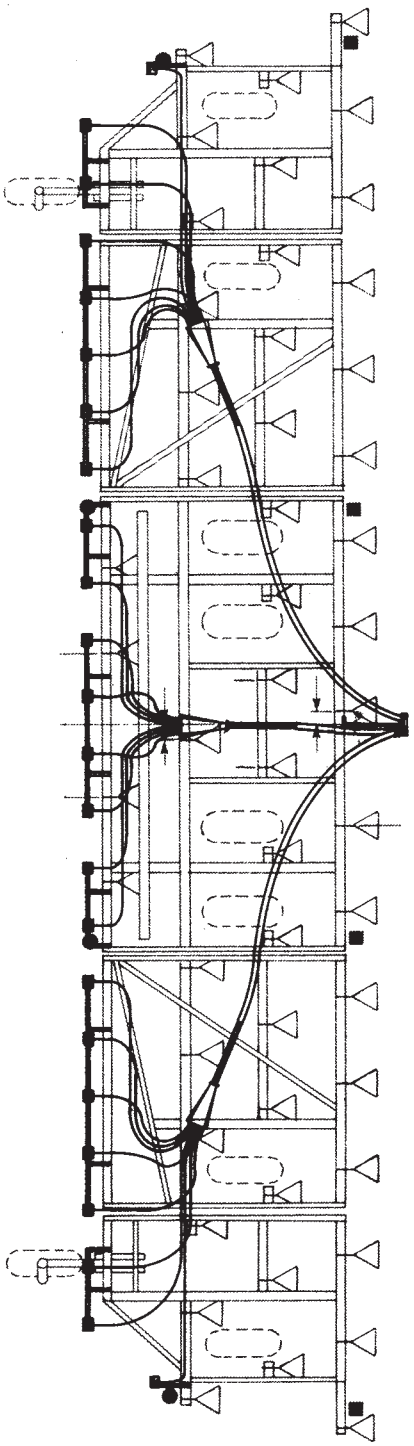
40’ at 12” Spacing Shown

Deflector and Secondary Head Locations

Chisel Plow Model CP-745



Chisel Plow Model CP-750



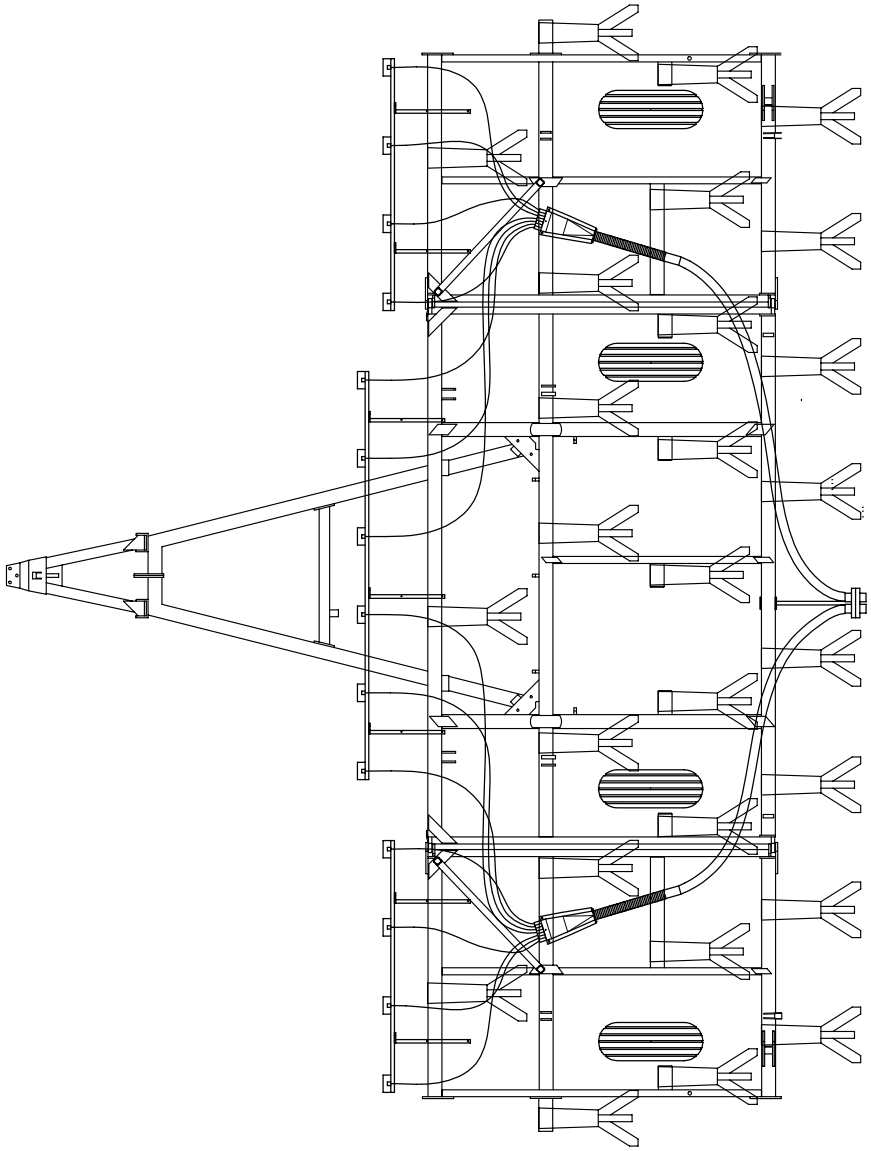
Deflector and Secondary Head Locations

Magnum III Chisel Plow							
Machine		**Shank Spacing (Inches)**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
Range	Size						
CP-825	25	12	-	-	Main Frame	-	-
					Wing Frame	-	-
	27	12	14	22.5	Main Frame	118	See Page 37
					Wing Frame	73	-
	29	12	14	24.25	Main Frame	122	See Page 37
					Wing Frame	78	-
CP-831	31	12	16	22.75	Main Frame	119	See Page 38
					Wing Frame	96	-
	33	12	16	24	Main Frame	126	See Page 38
					Wing Frame	102	-
	35	12	18	23	Main Frame	148	See Page 38
					Wing Frame	120	-
	37	12	18	24.25	Main Frame	126	See Page 38
					Wing Frame	126	-
CP-840	40	12	20	23.5	Main Frame	32 & 29 & 32	Plus use 2 Special Mounting Brackets
					Wing Frame	123	See Page 39
	42	12	20	24.75	Main Frame	30 & 30 & 30	Plus use 2 Special Mounting Brackets
					Wing Frame	129	See Page 39
CP-843	43	12	22	23	Main Frame	28	Plus use 2 Single Brackets and 2 Special Mounting Brackets
					Inner Wing	97	See Page 40
					Outer Wing	51	-
	45	12	22	24.25	Main Frame	30	Plus use 2 Single Brackets and 2 Special Mounting Brackets
					Inner Wing	102	See Page 40
					Outer Wing	54	-
	47	12	22	25.25	Main Frame	30	Plus use 2 Single Brackets and 2 Special Mounting Brackets
					Inner Wing	80	See Page 40
					Outer Wing	80	-
CP-850	50	12	24	24.75	Main Frame	34 & 22 & 34	Plus use 2 Special Mounting Brackets
					Inner Wing	80	See Page 41
					Outer Wing	80	-

Deflector and Secondary Head Locations

Magnum III Chisel Plow

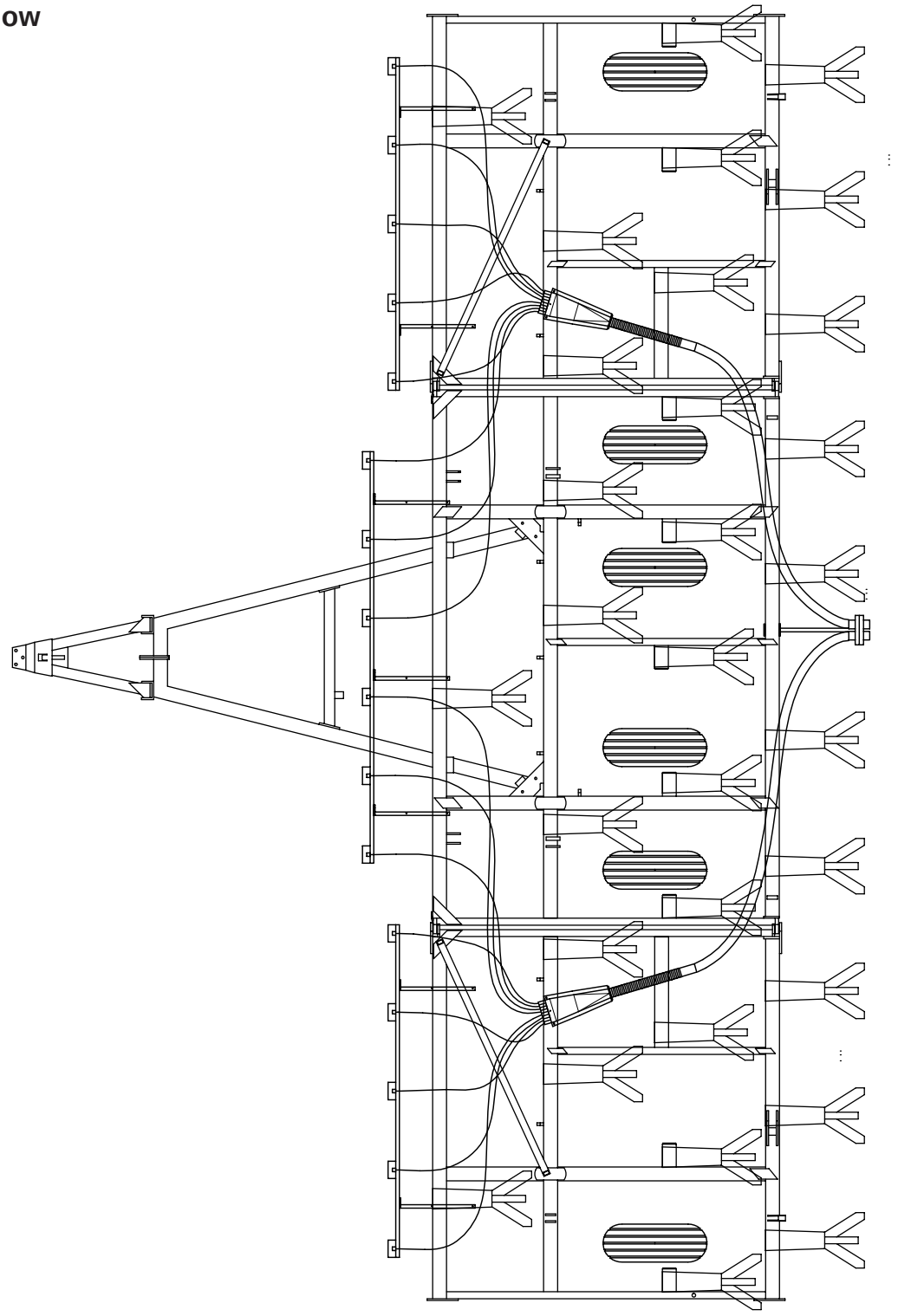
Model CP-825



Deflector and Secondary Head Locations

Magnum III Chisel Plow

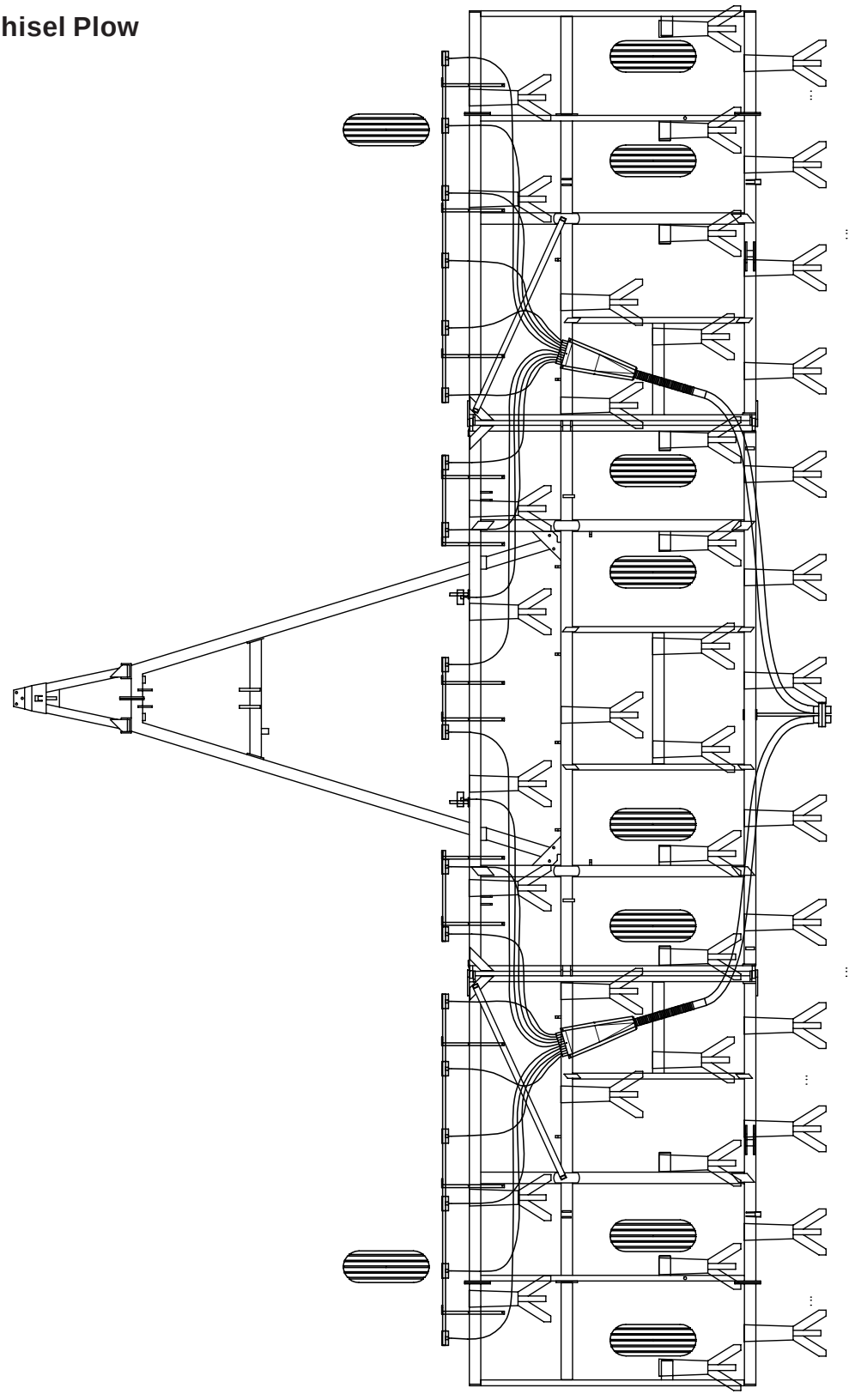
Model CP-831



Deflector and Secondary Head Locations

Magnum III Chisel Plow

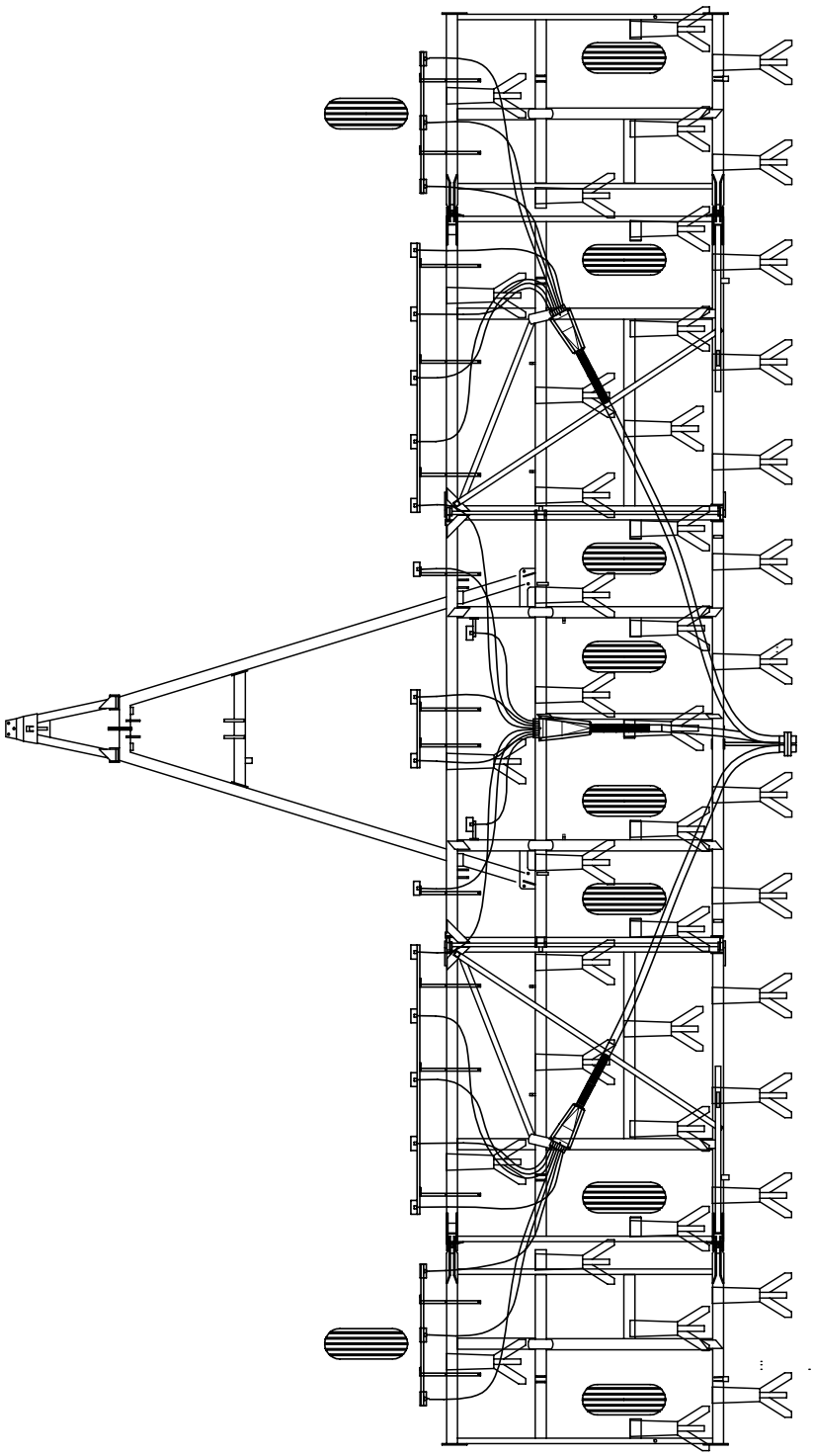
Model CP-840



Deflector and Secondary Head Locations

Magnum III Chisel Plow

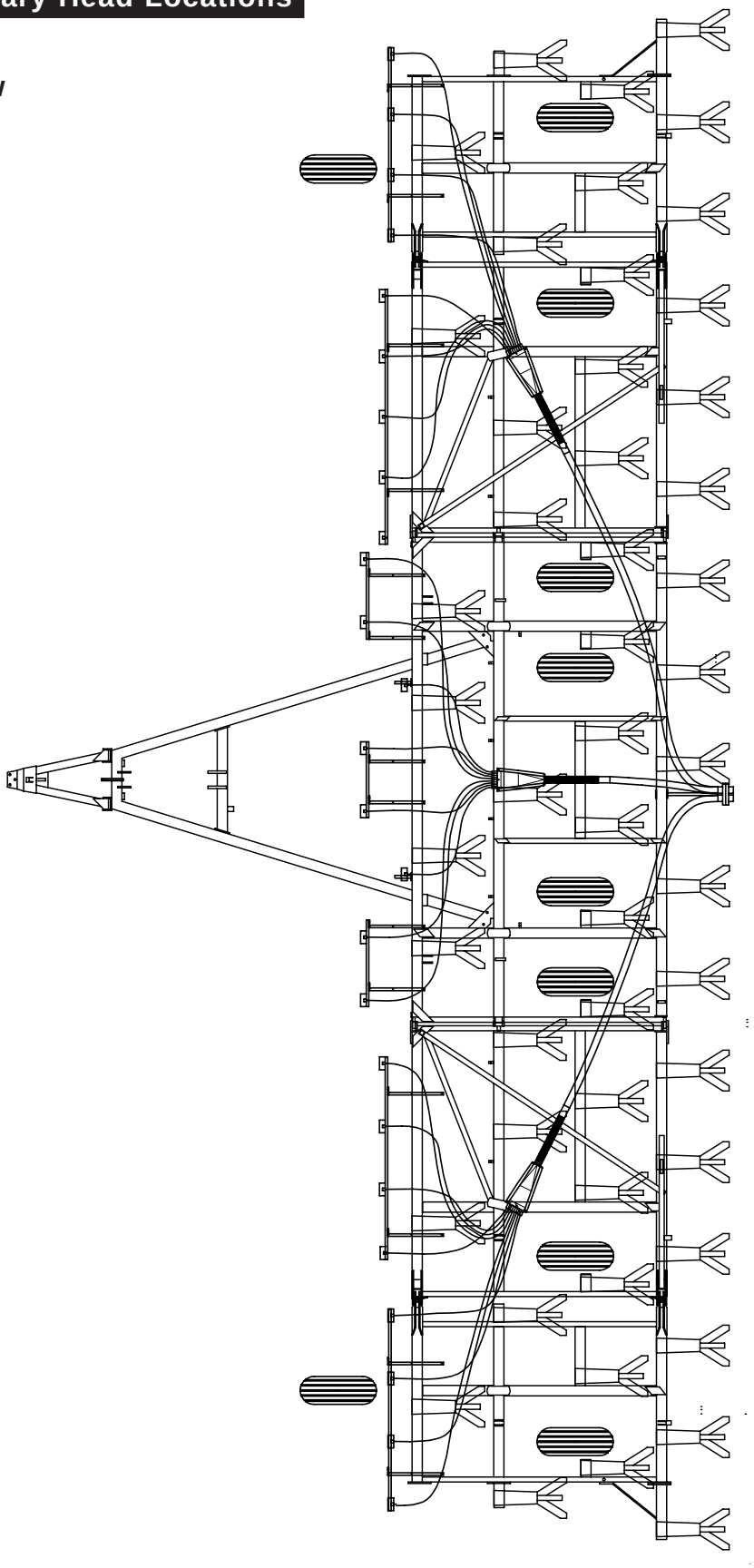
Model CP-843



Deflector and Secondary Head Locations

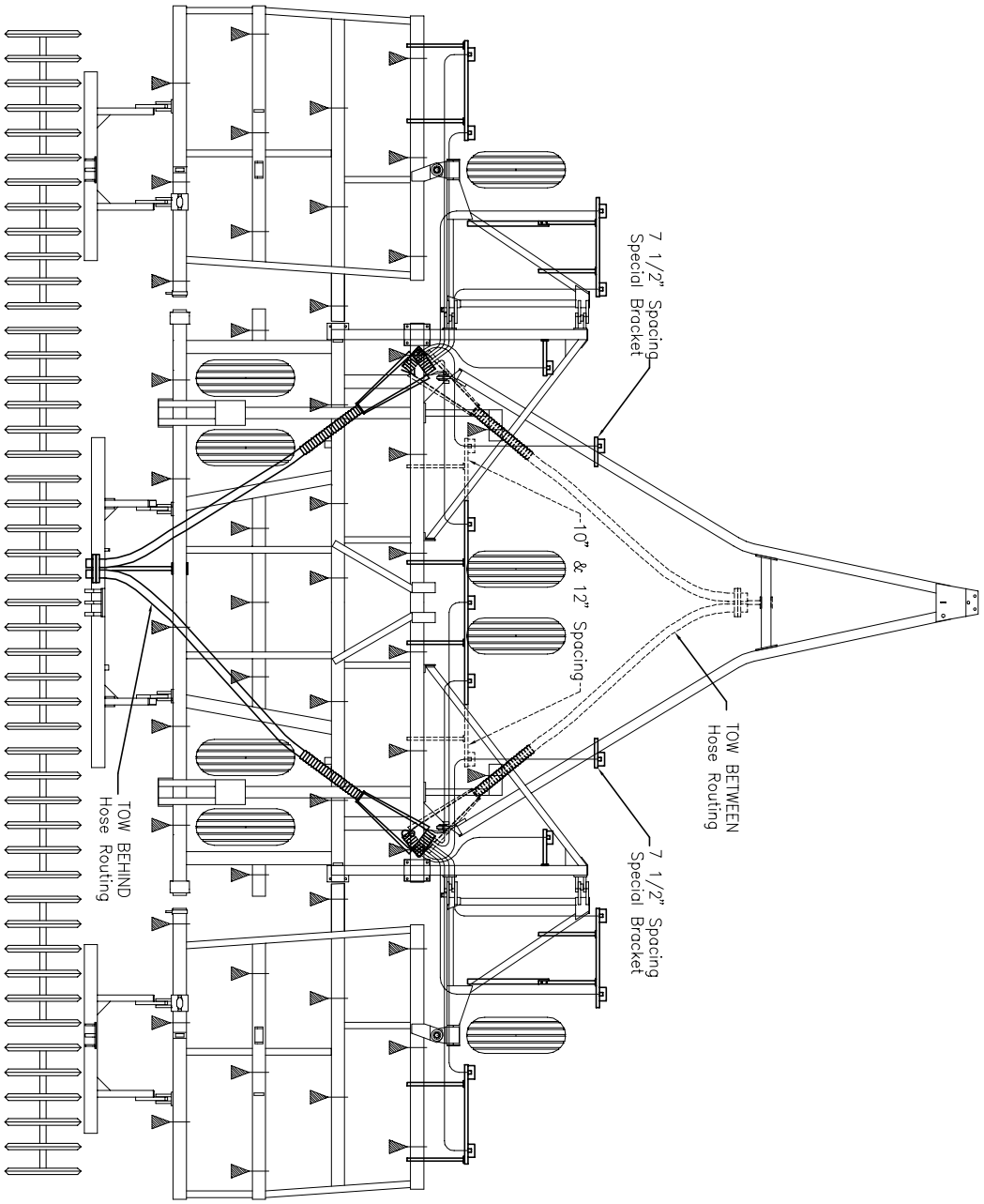
Magnum III Chisel Plow

Model CP-850



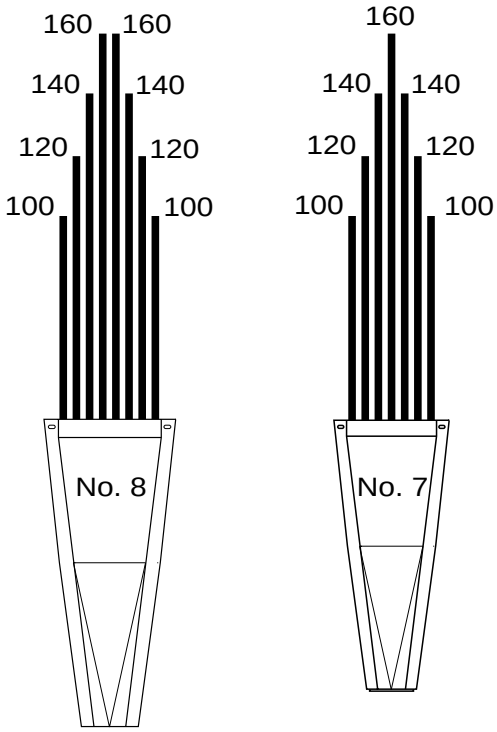
Maxim Air Drill Deflector and Secondary Head Locations

29 foot Maxim Air Drill



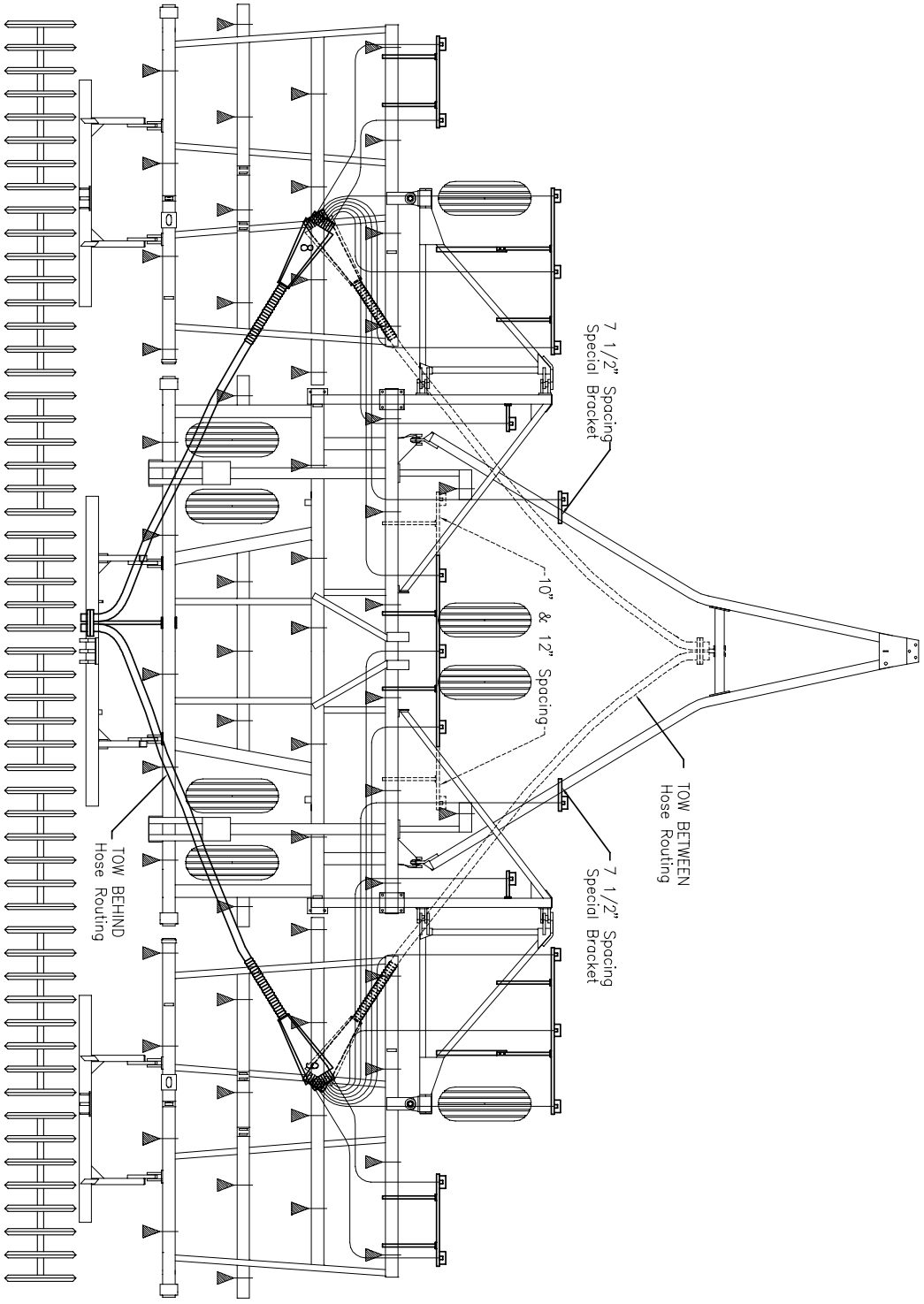
Maxim Air Drill Deflector and Secondary Head Locations

29 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
7 1/2	15	23.50	Main Frame Wing Frame	60 36 & 36	Special Mounting Brackets Required Mounting Extention Required
10	15	24.00	Main Frame Wing Frame	110 36 & 36	N/A Mounting Extention Required
12	15	23.25	Main Frame Wing Frame	110 36 & 36	N/A Mounting Extention Required



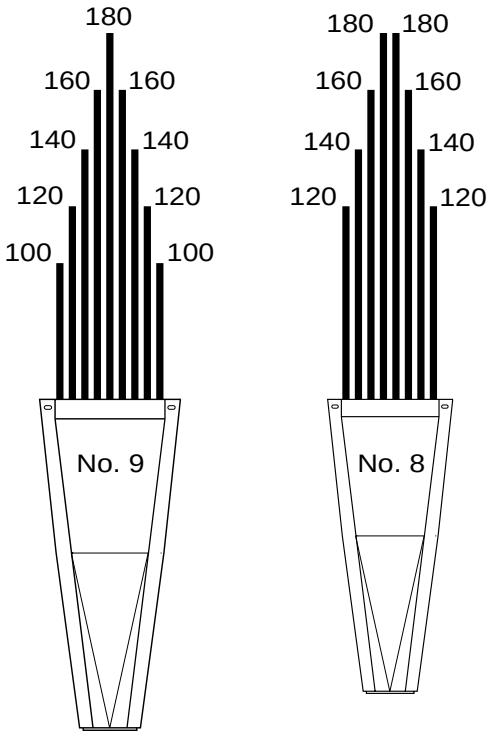
Maxim Air Drill Deflector and Secondary Head Locations

34 Foot Maxim Air Drill



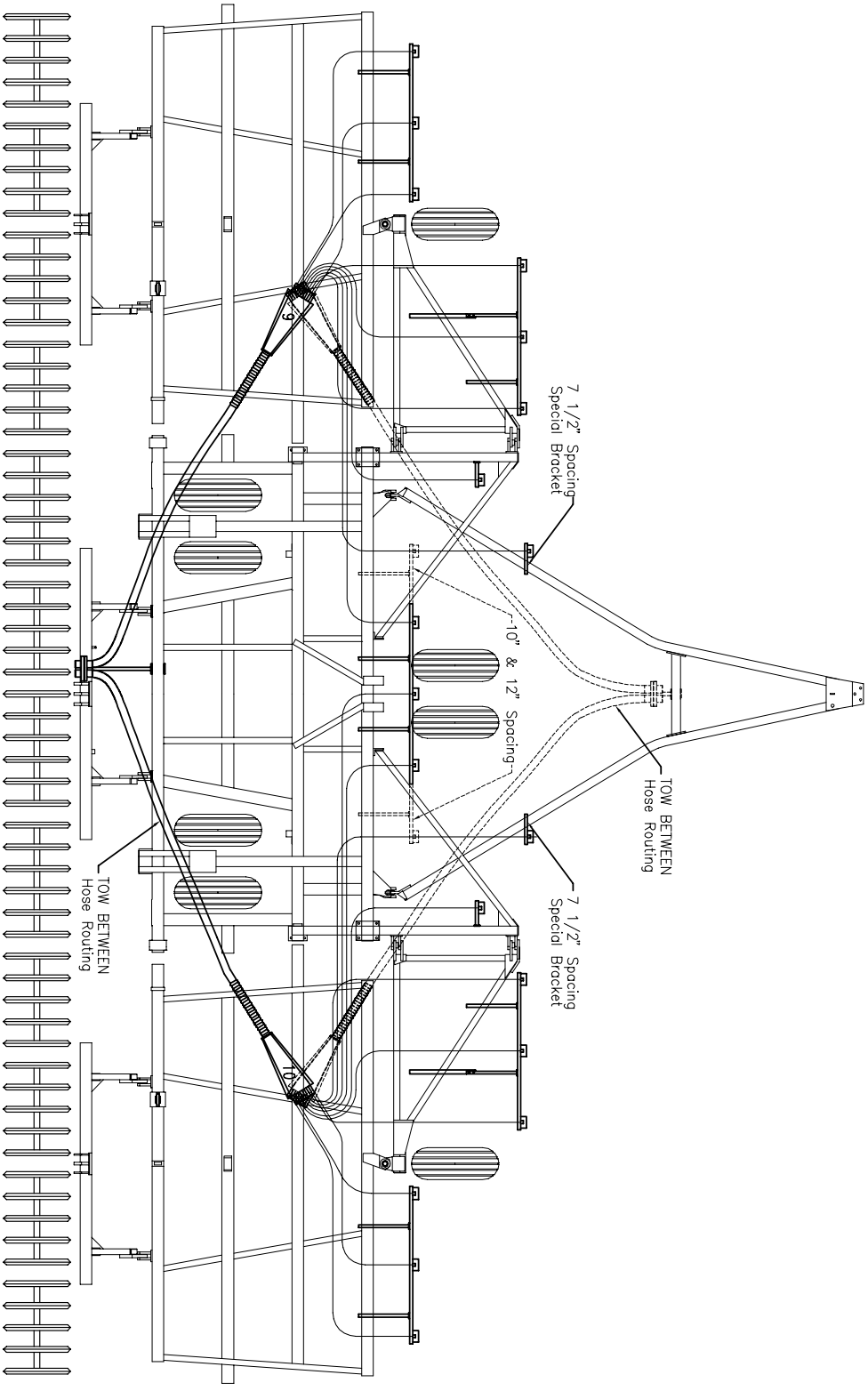
Maxim Air Drill Deflector and Secondary Head Locations

34 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
7 1/2	17	24.25	Main Frame Wing Frame	60 78 & 36	Special Mounting Brackets Required Mounting Extention Required
10	17	24.75	Main Frame Wing Frame	110 78 & 36	N/A Mounting Extention Required
12	17	24.75	Main Frame Wing Frame	110 78 & 36	N/A Mounting Extention Required



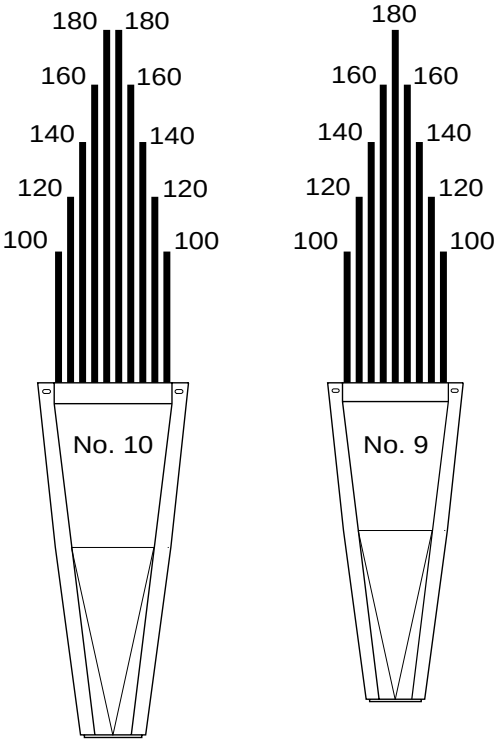
Maxim Air Drill Deflector and Secondary Head Locations

39 Foot Maxim Air Drill



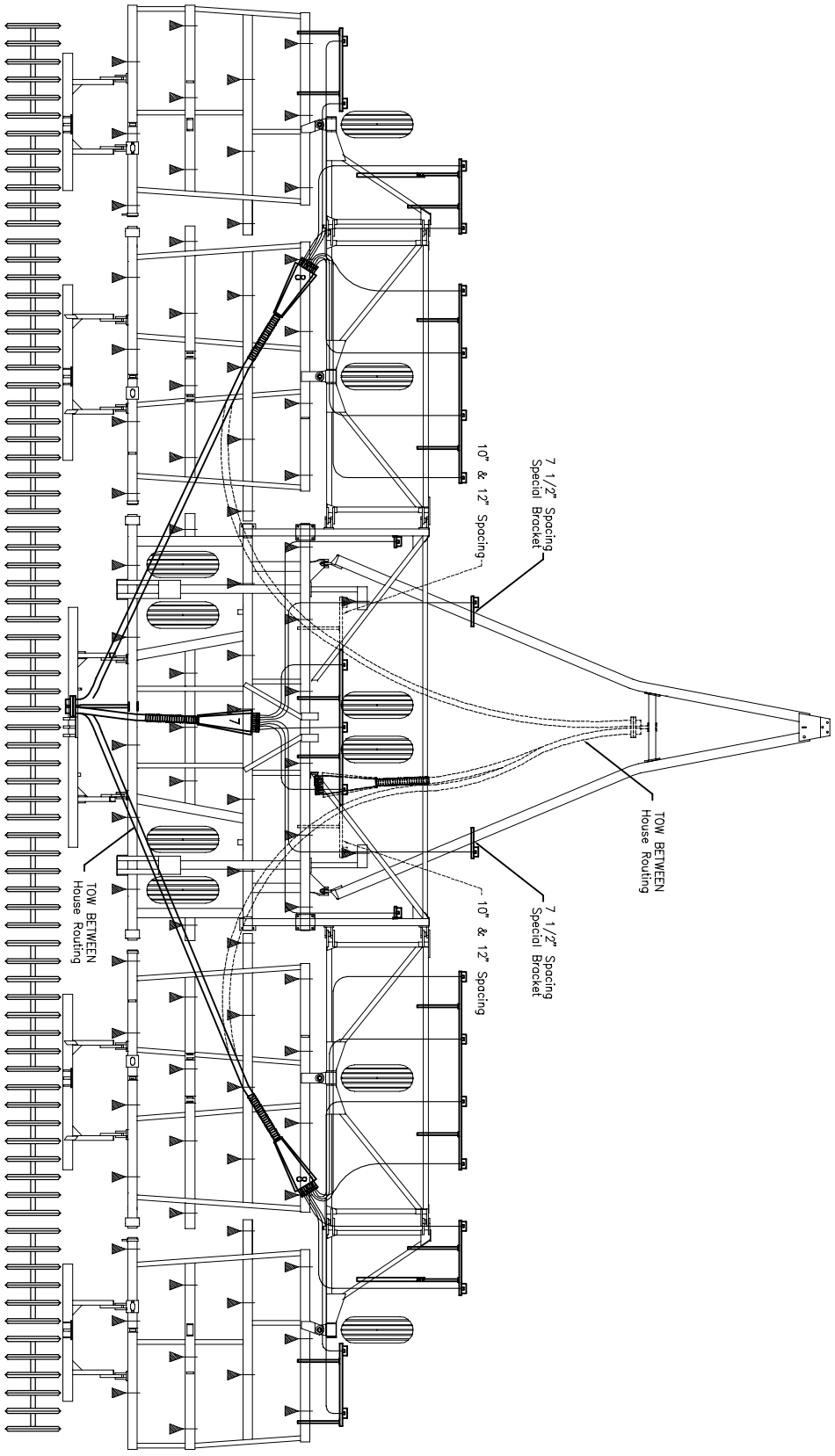
Maxim Air Drill Deflector and Secondary Head Locations

39 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
7 1/2	19	24.75	Main Frame	60	Special Mounting Brackets Required
			Wing Frame	80 & 80	Mounting Extention Required
10	19	39 Foot 24.25 40 Foot 25.25	Main Frame	110	N/A
			Wing Frame	80 & 80	Mounting Extention Required
12	19	39 Foot 24.5 41 Foot 25.5	Main Frame	110	N/A
			Wing Frame	80 & 80	Mounting Extention Required



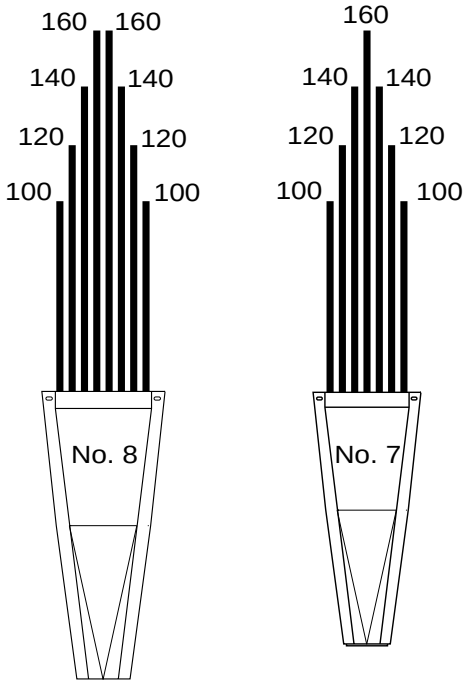
Maxim Air Drill Deflector and Secondary Head Locations

49 Foot Maxim Air Drill



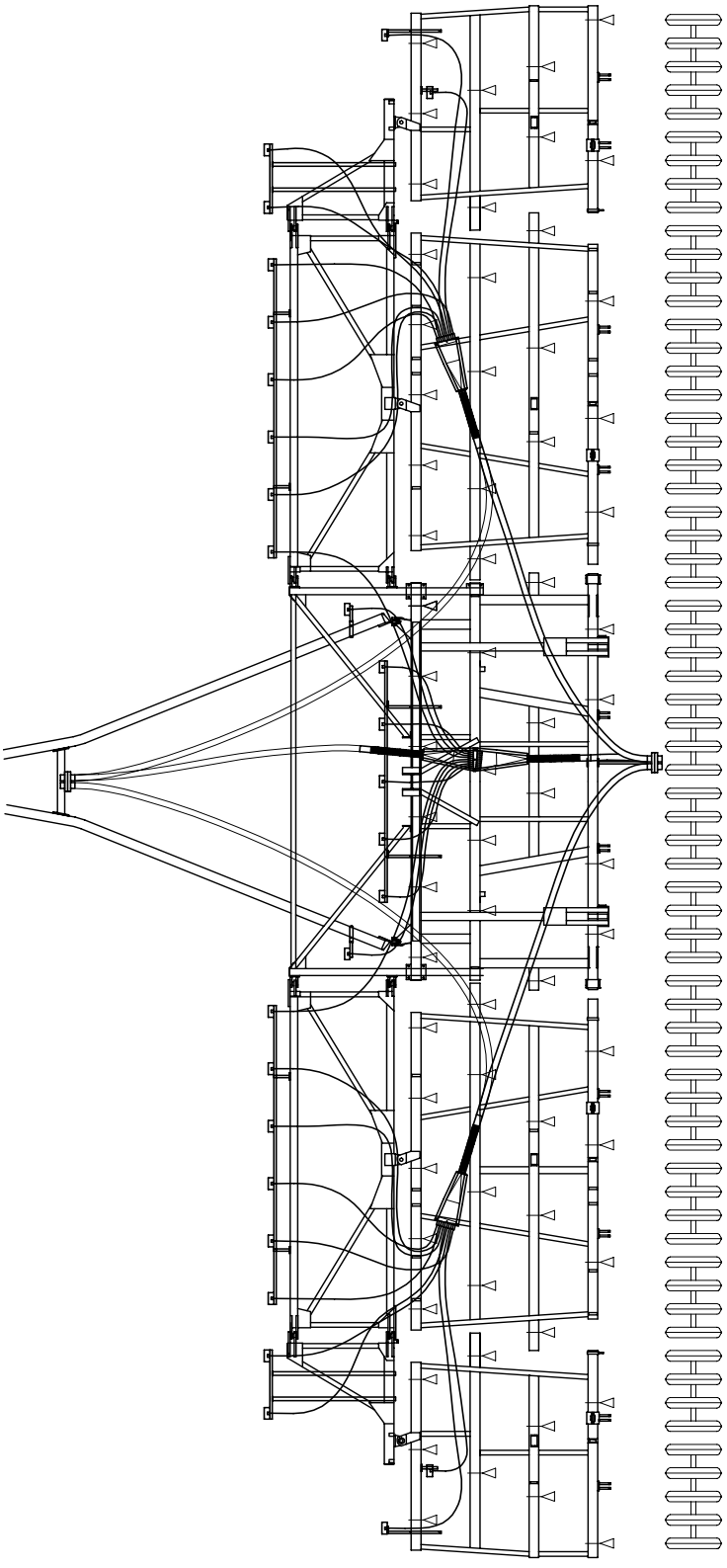
Maxim Air Drill Deflector and Secondary Head Locations

49 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
7 1/2	23	26	Main Frame	60	Special Mounting Brackets Required
			Inner Wing	86 1/2	N/A
			Outer Wing	36 & 36	Mounting Extention Required
10	23	26.25	Main Frame	110	N/A
			Inner Wing	86 1/2	N/A
			Outer Wing	36 & 36	Mounting Extention Required
12	23	25.75	Main Frame	110	N/A
			Inner Wing	86 1/2	N/A
			Outer Wing	36 & 36	Mounting Extention Required



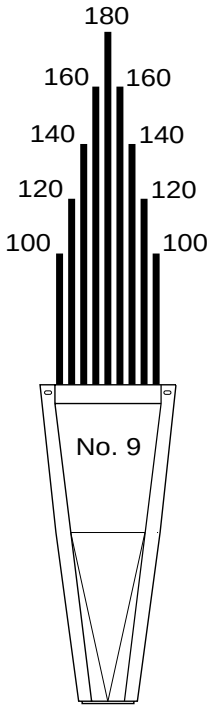
Maxim Air Drill Deflector and Secondary Head Locations

55 Foot Maxim Air Drill



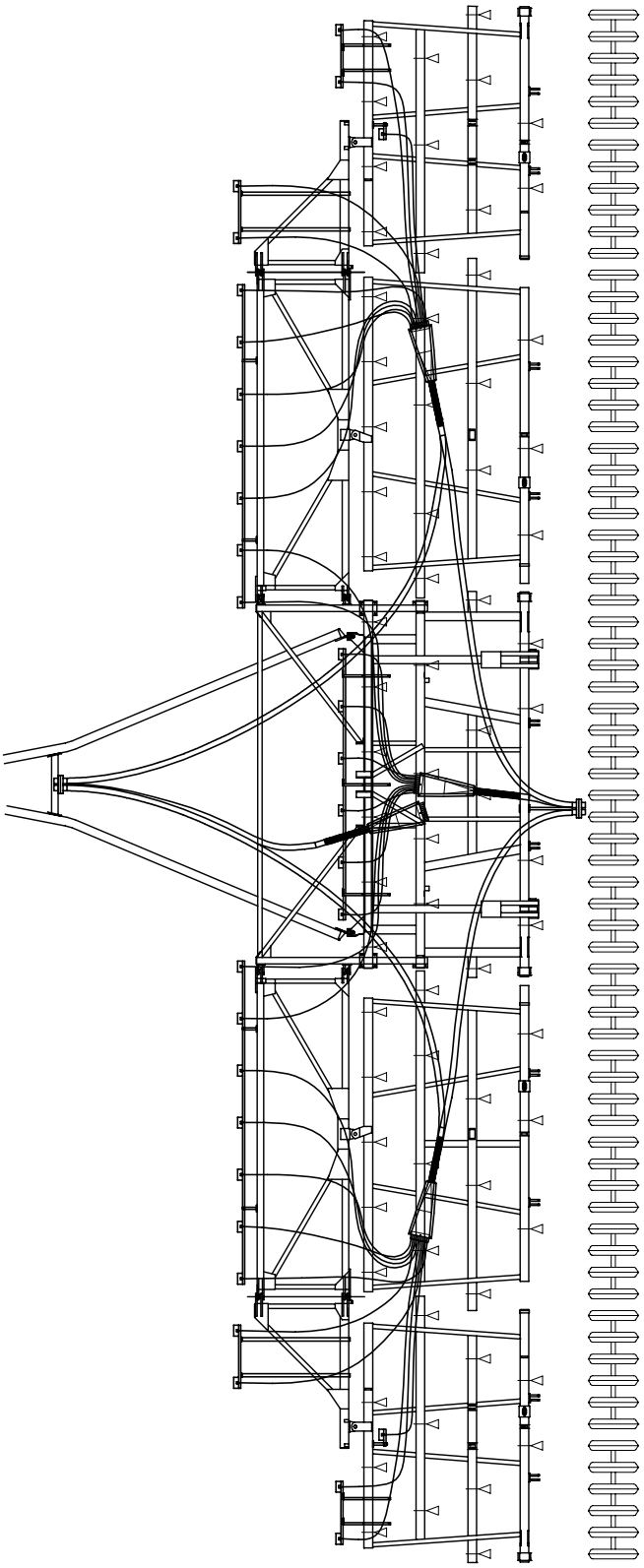
Maxim Air Drill Deflector and Secondary Head Locations

55 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
10	27	24.5	Main Frame	103	Special Mounting Brackets Required
			Inner Wing	128	N/A
			Outer Wing	30	Special Mounting Brackets Required
12	27	24.5	Main Frame	103	Special Mounting Brackets Required
			Inner Wing	128	N/A
			Outer Wing	30 & 9	Special Mounting Brackets Required



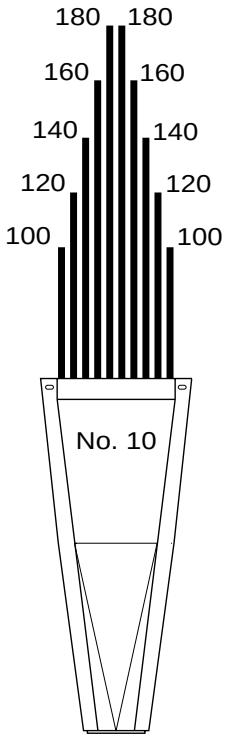
Maxim Air Drill Deflector and Secondary Head Locations

60 Foot Maxim Air Drill



Maxim Air Drill Deflector and Secondary Head Locations

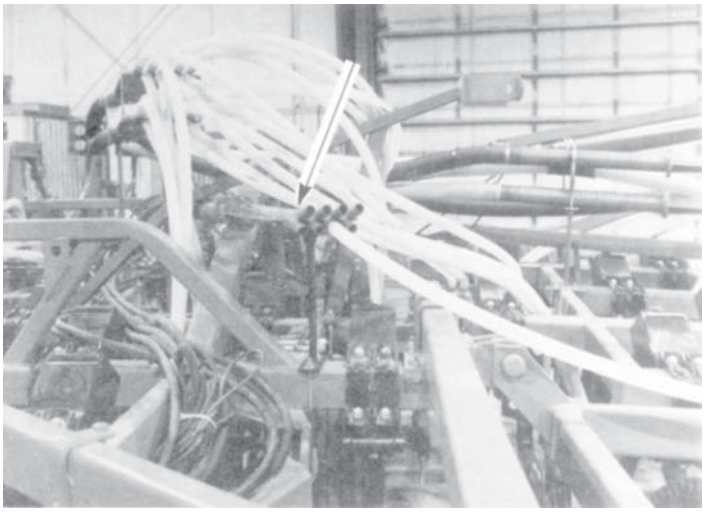
60 Foot Maxim Air Drill					
Shank Spacing (Inches)	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
10	30	24	Main Frame	125	N/A
			Inner Wing	149	N/A
			Outer Wing	29 & 29	Special Mounting Brackets Required
12	30	24.5	Main Frame	125	N/A
			Inner Wing	152	N/A
			Outer Wing	29 & 29	Special Mounting Brackets Required



Maxim Air Drill Deflector and Secondary Head Locations

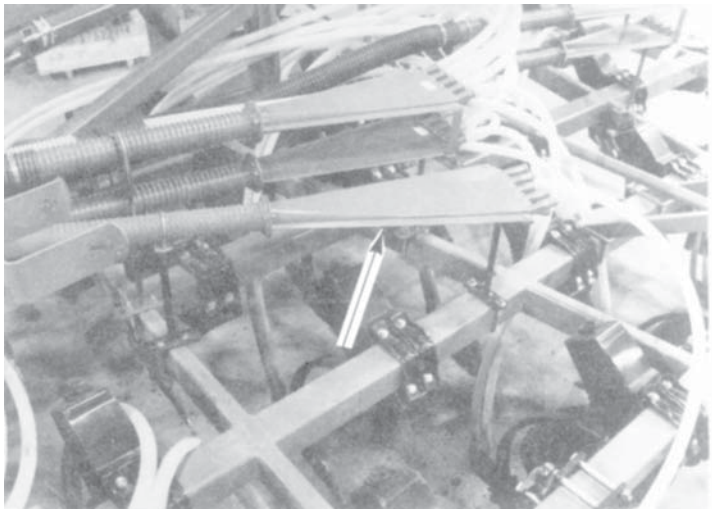
29 Foot

Mount Divider Head on main frame as shown. The head should be tight to the wing lift rest to clear transport tires when raised in field position.



34 Foot and 39 Foot

Mount Divider Head on wing frame as shown.



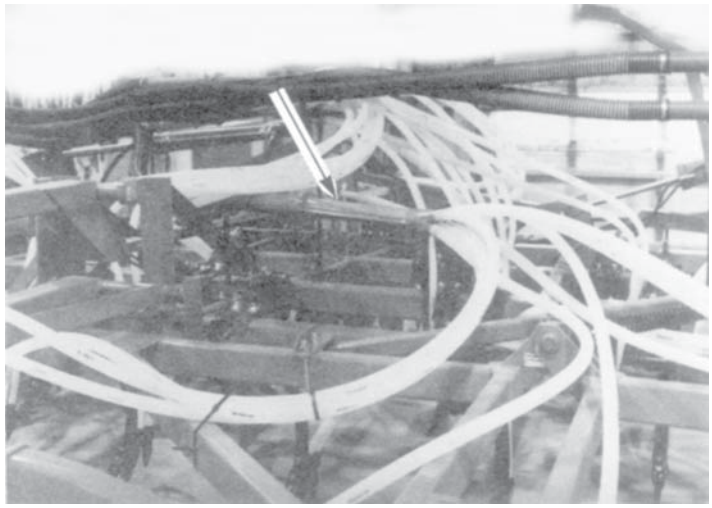
49 Foot

Mount the 7 outlet Divider Head on the main frame as shown.

Maxim Air Drill Deflector and Secondary Head Locations

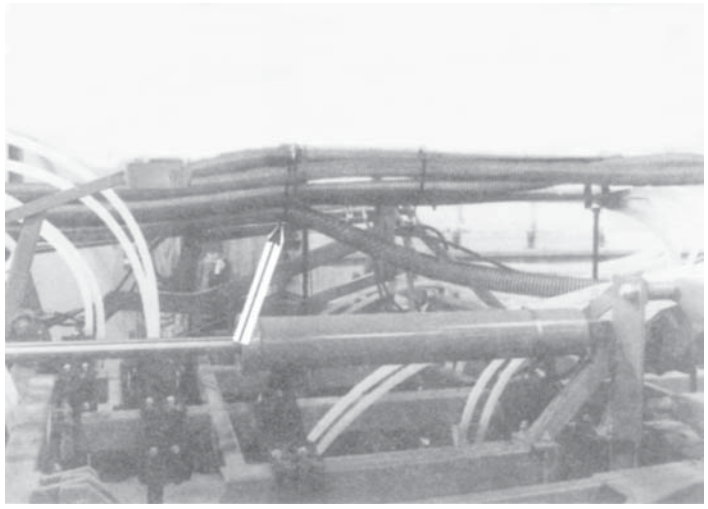
49 Foot

Mount the 8 outlet Divider Heads on the wing frames as shown. Care must be taken when routing the secondary lines to prevent kinking of the hoses.



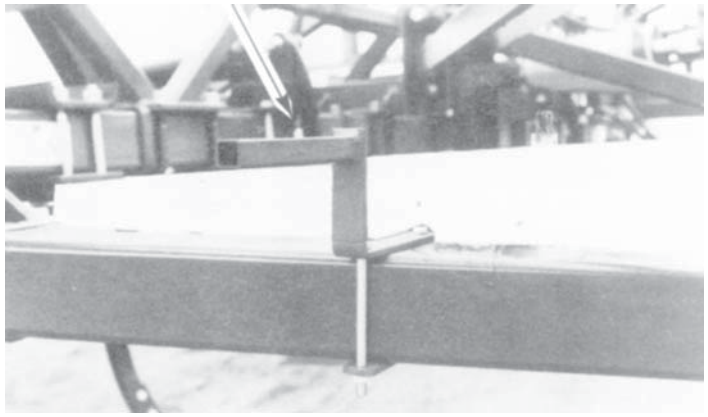
49 Foot

Secure the primary hose to the seed/fertilizer divider heads as shown.



Hitch Bracket

Used on 7 1/2” spacing only. Mount to hitch poles as shown.



Maxim Air Drill Deflector and Secondary Head Locations

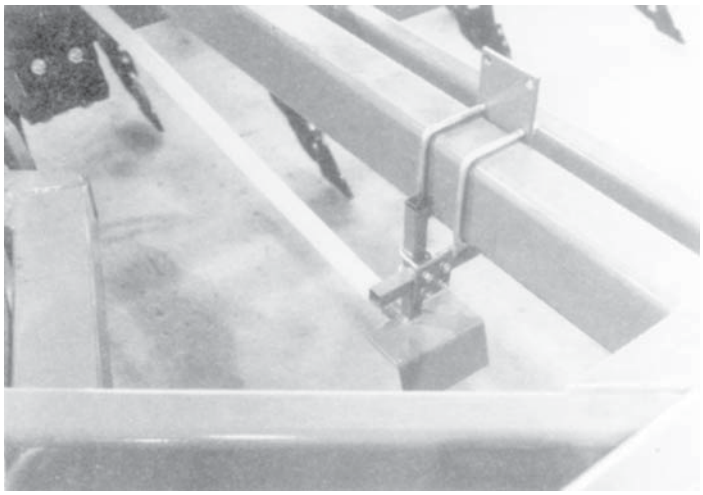
Main Frame All Models

Mount the deflectors close to the frame as shown.

Note: 10” spacing shown. On 7 1/2” spacing the last deflector shown in photo will be mounted on the hitch pole as shown in diagrams.

Main Frame All Models

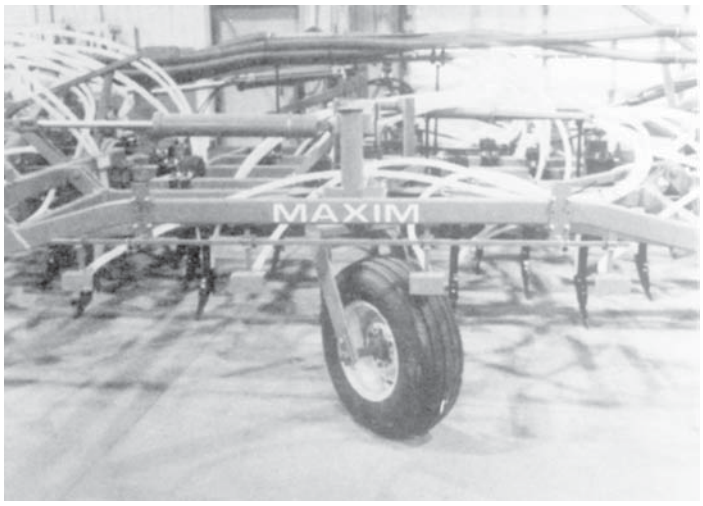
Mount the outer deflector to the main frame hitch truss as shown.



49 Foot Inner Wing

Mount the deflectors to the inner frame hitch truss as shown.

Note: Check for tire clearance of the hose and deflectors.

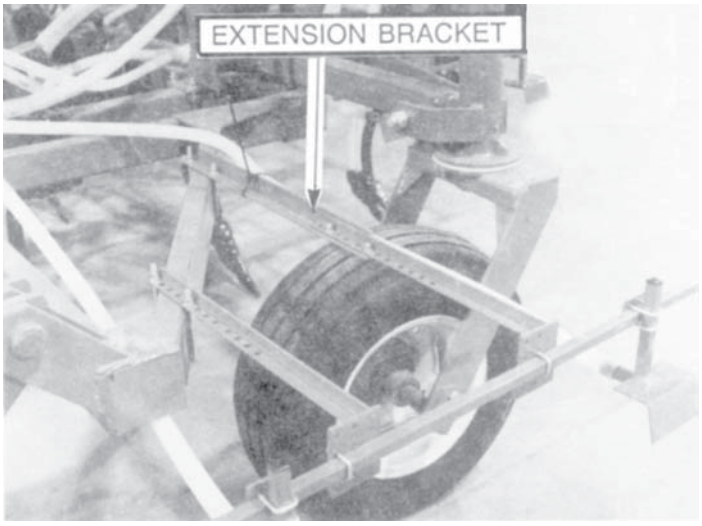


Maxim Air Drill Deflector and Secondary Head Locations

29 Foot, 34 Foot, and
39 Foot Wing Frame.
49 Foot Outer Wing.

Mount the deflectors to the wing frame hitch truss as shown, using mounting extension bracket.

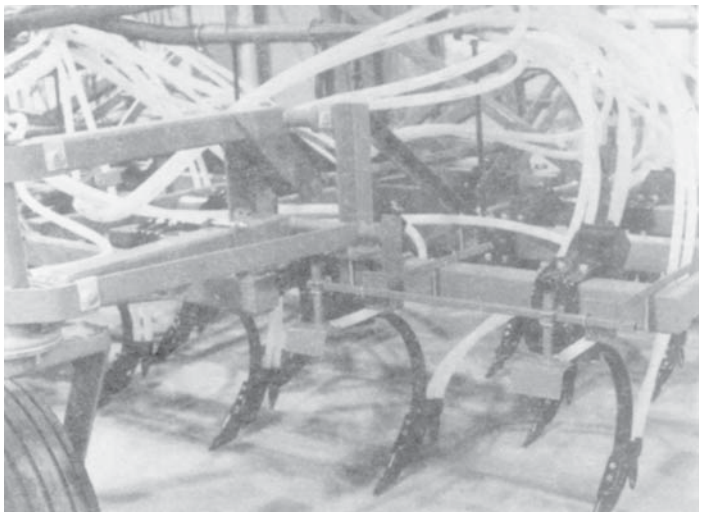
Note: Check for tire clearance of the hose and deflectors.



29 Foot, 34 Foot, and
39 Foot Wing Frame.
49 Foot Outer Wing.

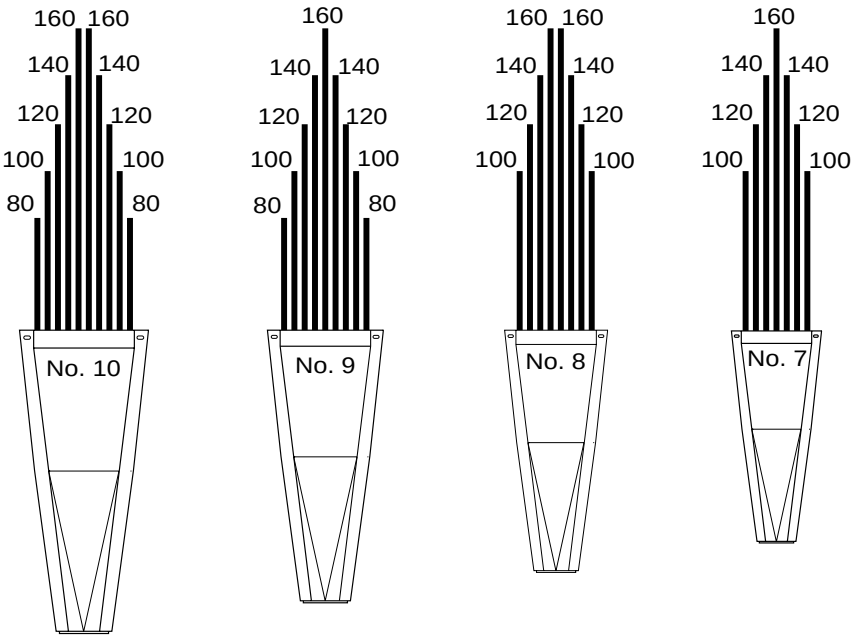
Mount the deflectors close to the wing frame as shown.

Note: Check for tire clearance of the deflectors.

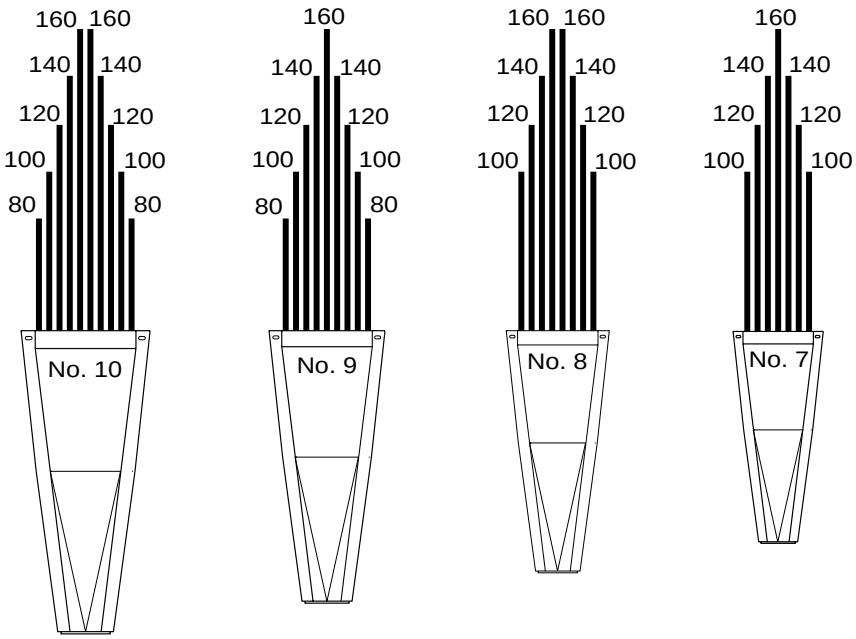


Concept 2000 - Hose Lengths

Tow Behind Models with Two Primaries

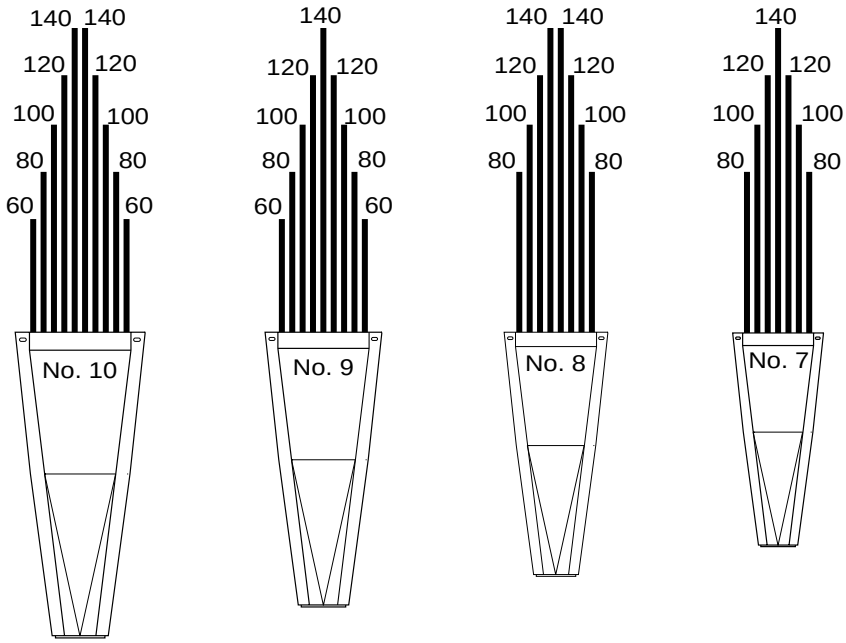


Tow Between Models with Two Primaries

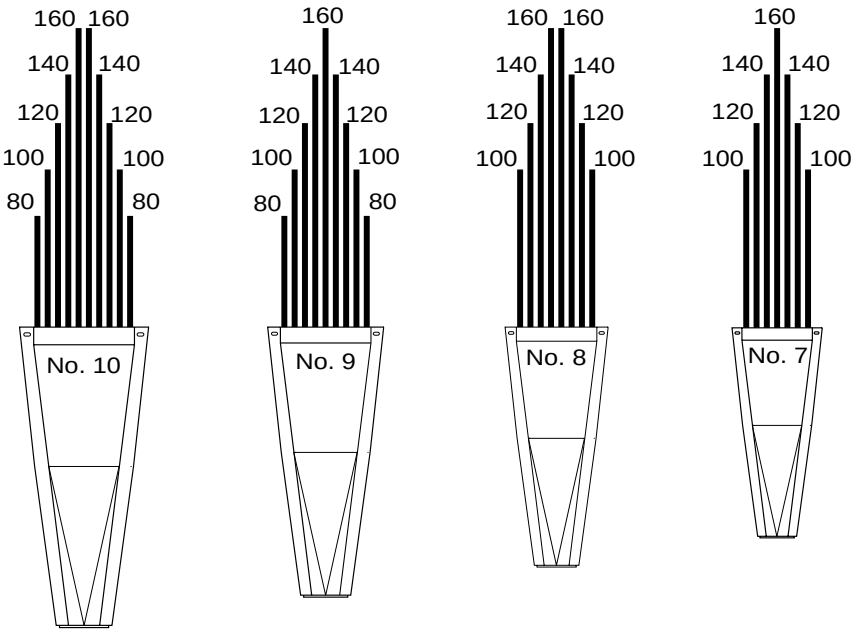


Concept 2000 - Hose Lengths

Three Frame Models with Three Primaries

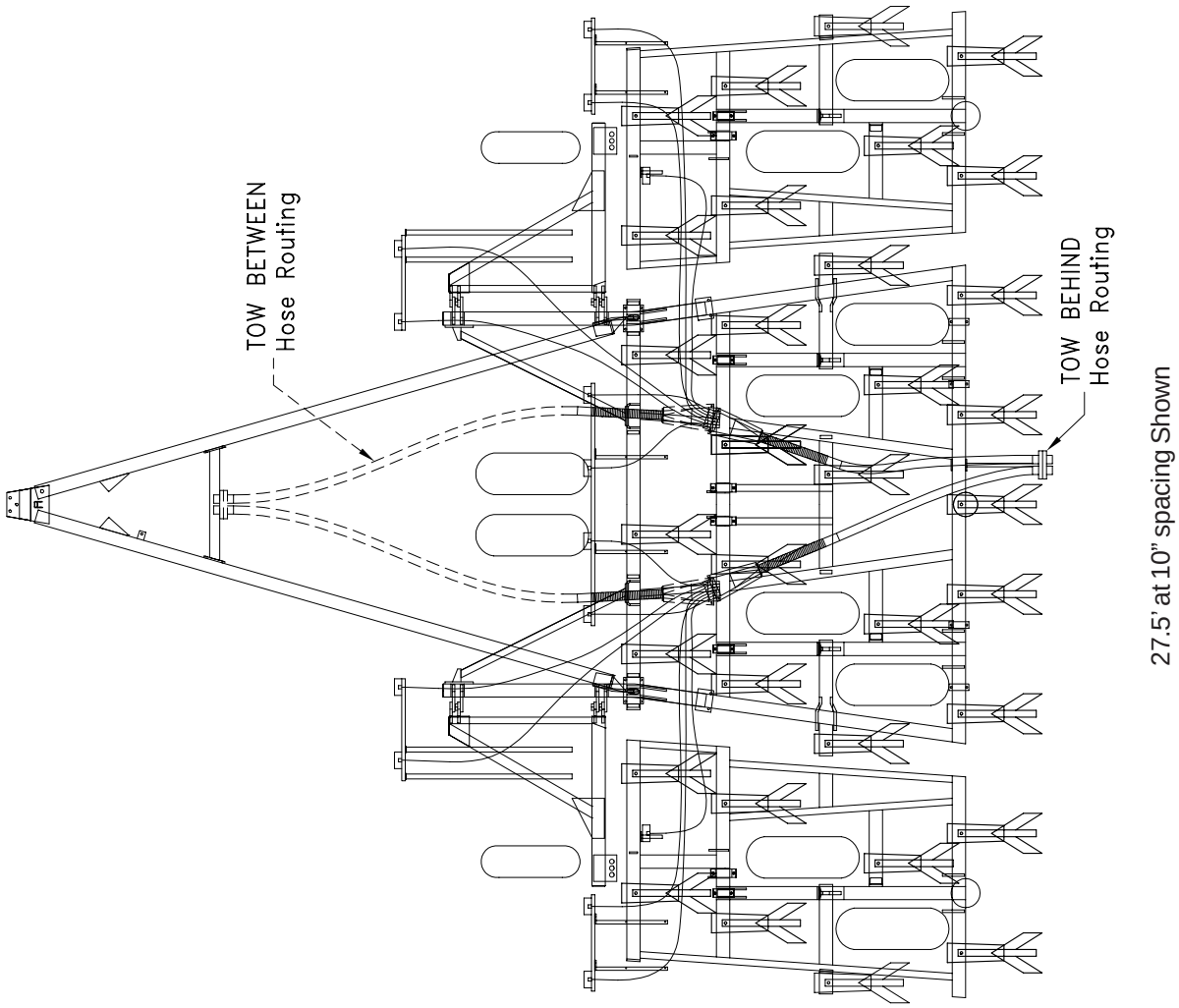


Five Frame Models



Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 23 Foot Base



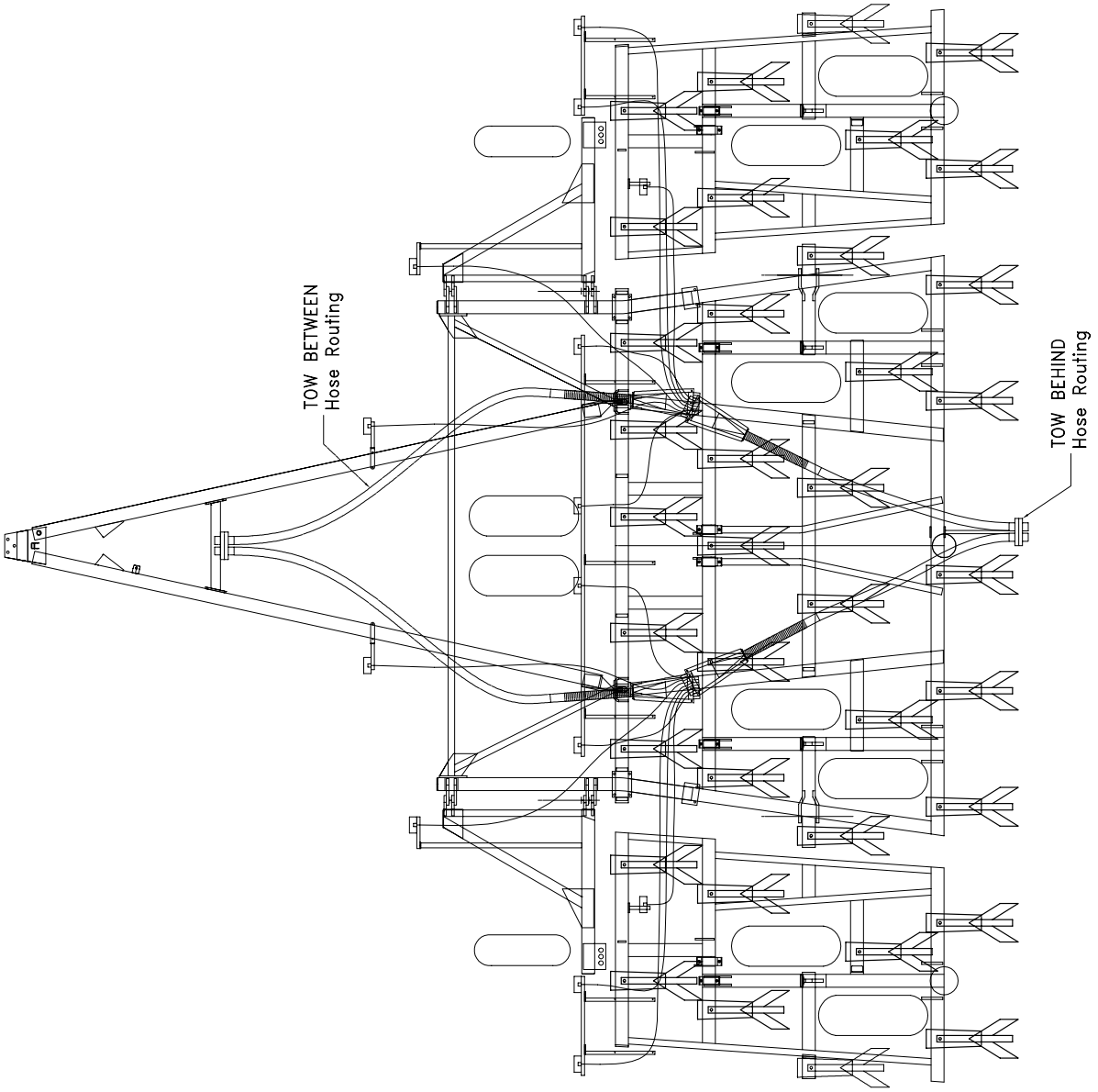
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 23 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**23.5'**	-	-	Main Frame	-	-
				Wing Frame	-	-
	25'	14	22	Main Frame	-	-
				Wing Frame	-	-
10	**24'**	14	22	Main Frame	-	-
				Wing Frame	-	-
	26'	14	23.25	Main Frame	71	-
				Wing Frame	32 & 27	Special Mounting Brackets Required
12	**23'**	-	-	Main Frame	-	-
				Wing Frame	-	-
	25'	-	-	Main Frame	-	-
				Wing Frame	-	-

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 26 Foot Base



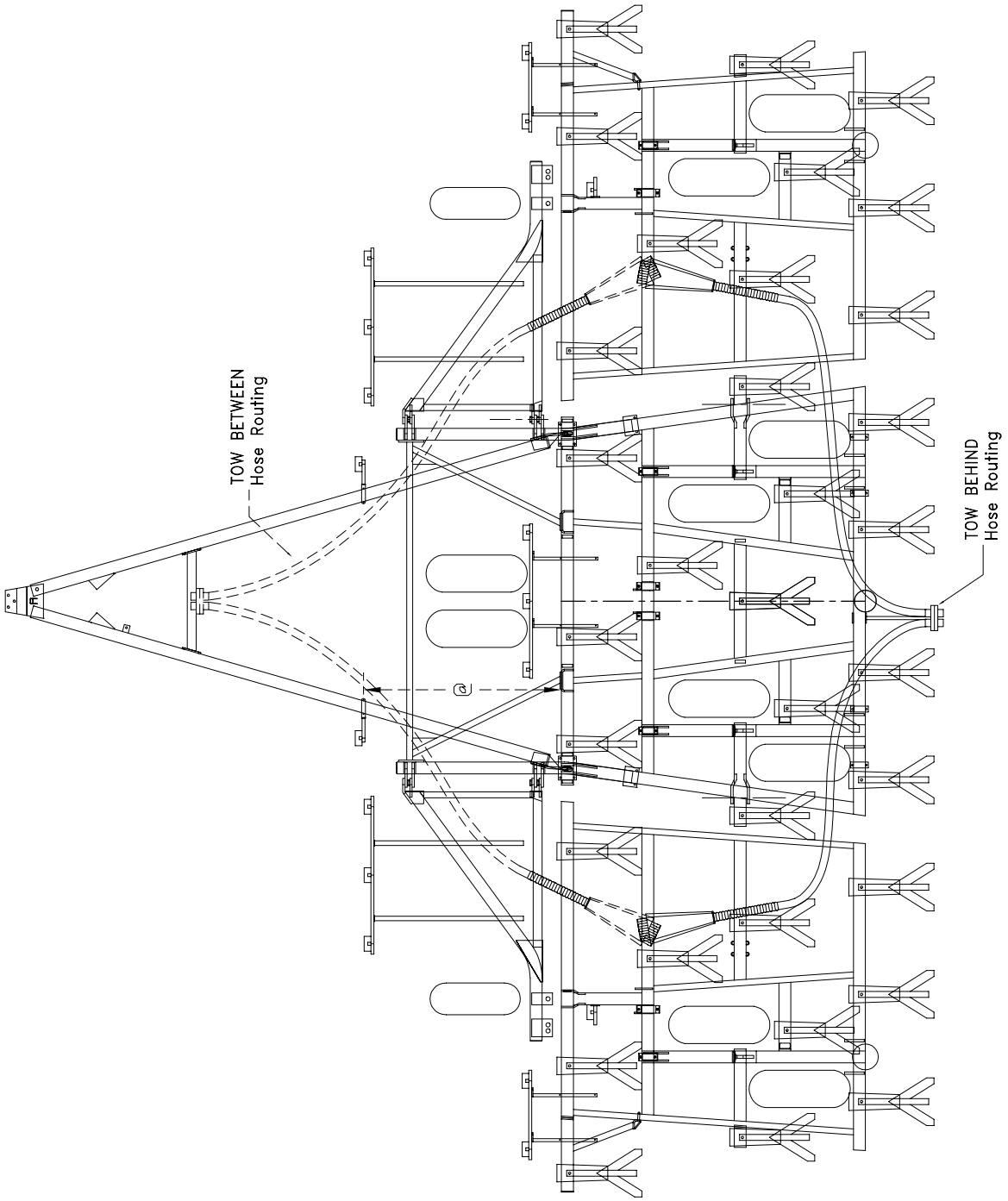
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 26 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**26.5'**	14	22	Main Frame	115	Special Hitch Brackets Required @94"
				Wing Frame	28	Special Mounting Brackets Required
	28'	14	23.5	Main Frame	123	Special Hitch Brackets Required @84"
				Wing Frame	52 & 8	-
10	**27.5'**	14	23	Main Frame	129	Special Hitch Brackets Required @87.25"
				Wing Frame	51	Special Mounting Brackets Required
	29'	15	23	Main Frame	142	Special Hitch Brackets Required @37.5"
				Wing Frame	8 & 28	Special Mounting Brackets Required
12	**26'**	14	22	Main Frame	115	Special Hitch Brackets Required @94"
				Wing Frame	27	Special Mounting Brackets Required
	28'	14	23.75	Main Frame	124	Special Hitch Brackets Required @82.25"
				Wing Frame	29 & 8	Special Mounting Brackets Required

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 29 Foot Base



33' at 12" spacing Shown

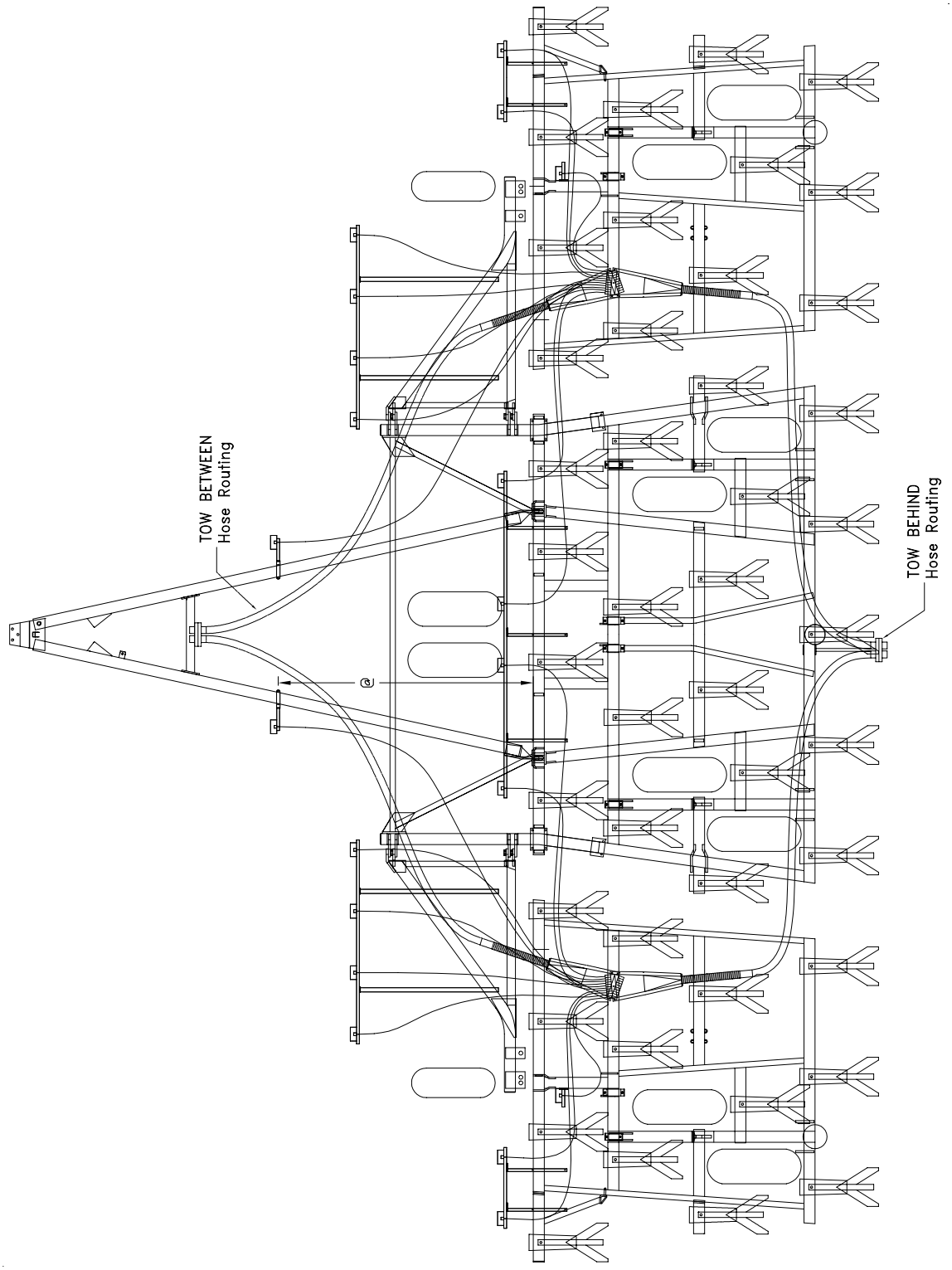
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 29 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**29.5'**	15	23	Main Frame	51	Special Hitch Brackets Required @66.5"
				Wing Frame	51	Special Mounting Brackets Required
	31'	15	24.25	Main Frame	54	Special Hitch Brackets Required @58"
				Wing Frame	54 & 9	Special Mounting Brackets Required
	32.5'	15	25.25	Main Frame	56	Special Hitch Brackets Required @51"
				Wing Frame	56 & 30	-
10	**31'**	15	24.5	Main Frame	54	Special Hitch Brackets Required @56"
				Wing Frame	54	Special Mounting Brackets Required
	32.5'	16	24.25	Main Frame	78	-
				Wing Frame	54 & 30	Special Mounting Brackets Required
	34'	16	25	Main Frame	80	-
				Wing Frame	55 & 30	Special Mounting Brackets Required
12	**29'**	15	23	Main Frame	51	Special Hitch Brackets Required @67"
				Wing Frame	51	Special Mounting Brackets Required
	31'	15	24.5	Main Frame	54	Special Hitch Brackets Required @56"
				Wing Frame	54 & 9	Special Mounting Brackets Required
	33'	17	23	Main Frame	51	Special Hitch Brackets Required @66.5"
				Wing Frame	28 & 51	Special Mounting Brackets Required

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 32 Foot Base



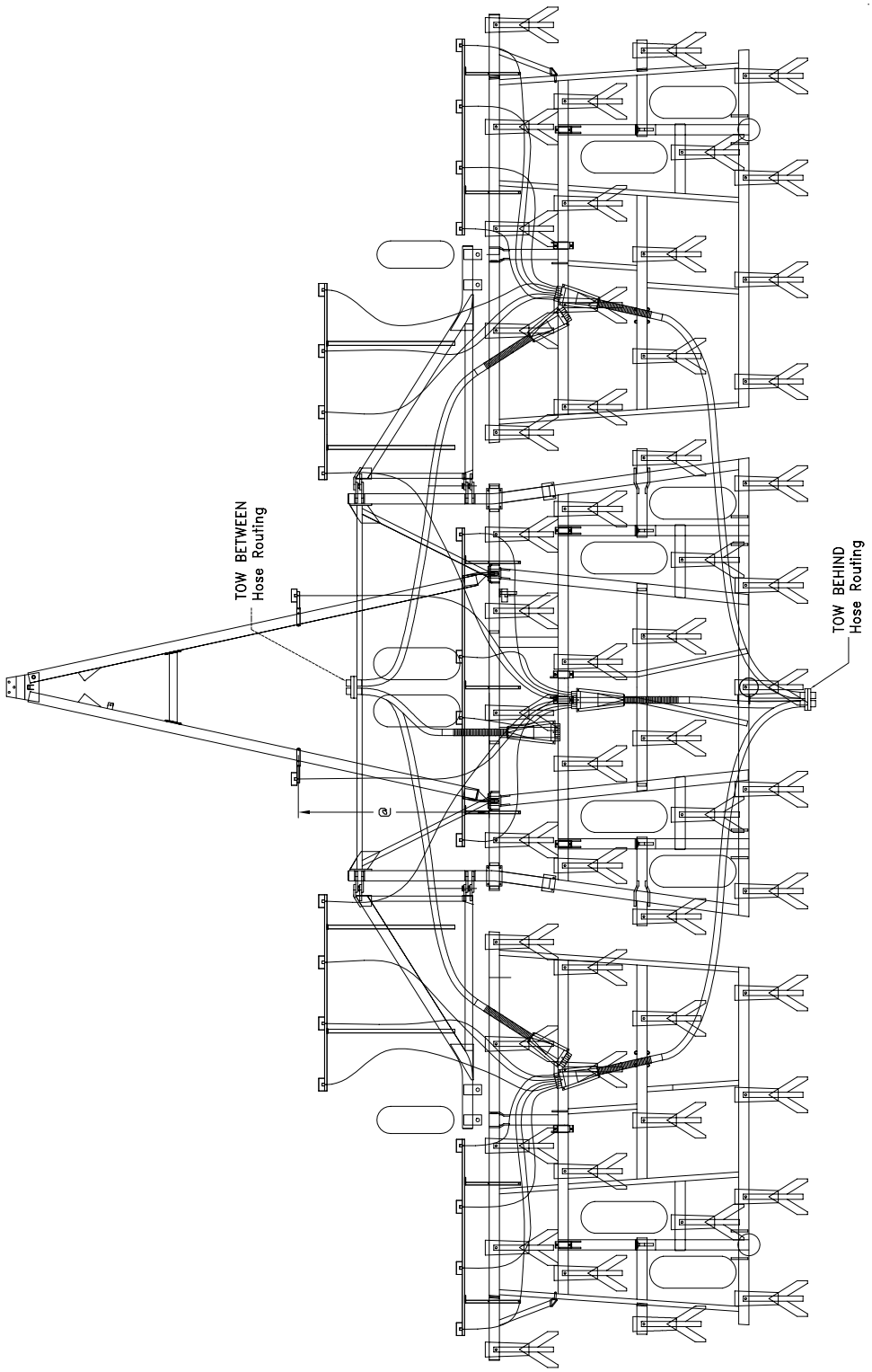
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 32 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**32.5'**	16	24	Main Frame	125	Special Hitch Brackets Required @81"
				Wing Frame	53	Special Mounting Brackets Required
	34'	17	23.5	Main Frame	146	Special Hitch Brackets Required @31"
				Wing Frame	52 & 9	Special Mounting Brackets Required
	35.5'	17	24.5	Main Frame	57	Special Hitch Brackets Required @21"
				Wing Frame	54 & 30	Special Mounting Brackets Required
10	**34'**	17	24	Main Frame	60	Special Hitch Brackets Required @25..5"
				Wing Frame	77	Special Mounting Brackets Required
	36'	18	23.75	Main Frame	124	Special Hitch Brackets Required @82.5"
				Wing Frame	53 & 29	Special Mounting Brackets Required
	37.5'	20	22.25	Main Frame	116	Special Hitch Brackets Required @92"
				Wing Frame	72 & 28	Special Mounting Brackets Required
12	**32'**	17	22.5	Main Frame	140	Special Hitch Brackets Required @40"
				Wing Frame	50	Special Mounting Brackets Required
	34'	17	23.75	Main Frame	148	Special Hitch Brackets Required @28"
				Wing Frame	53 & 9	Special Mounting Brackets Required
	36'	19	22.5	Main Frame	140	Special Hitch Brackets Required @40"
				Wing Frame	50 & 28	Special Mounting Brackets Required

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 38 Foot Base



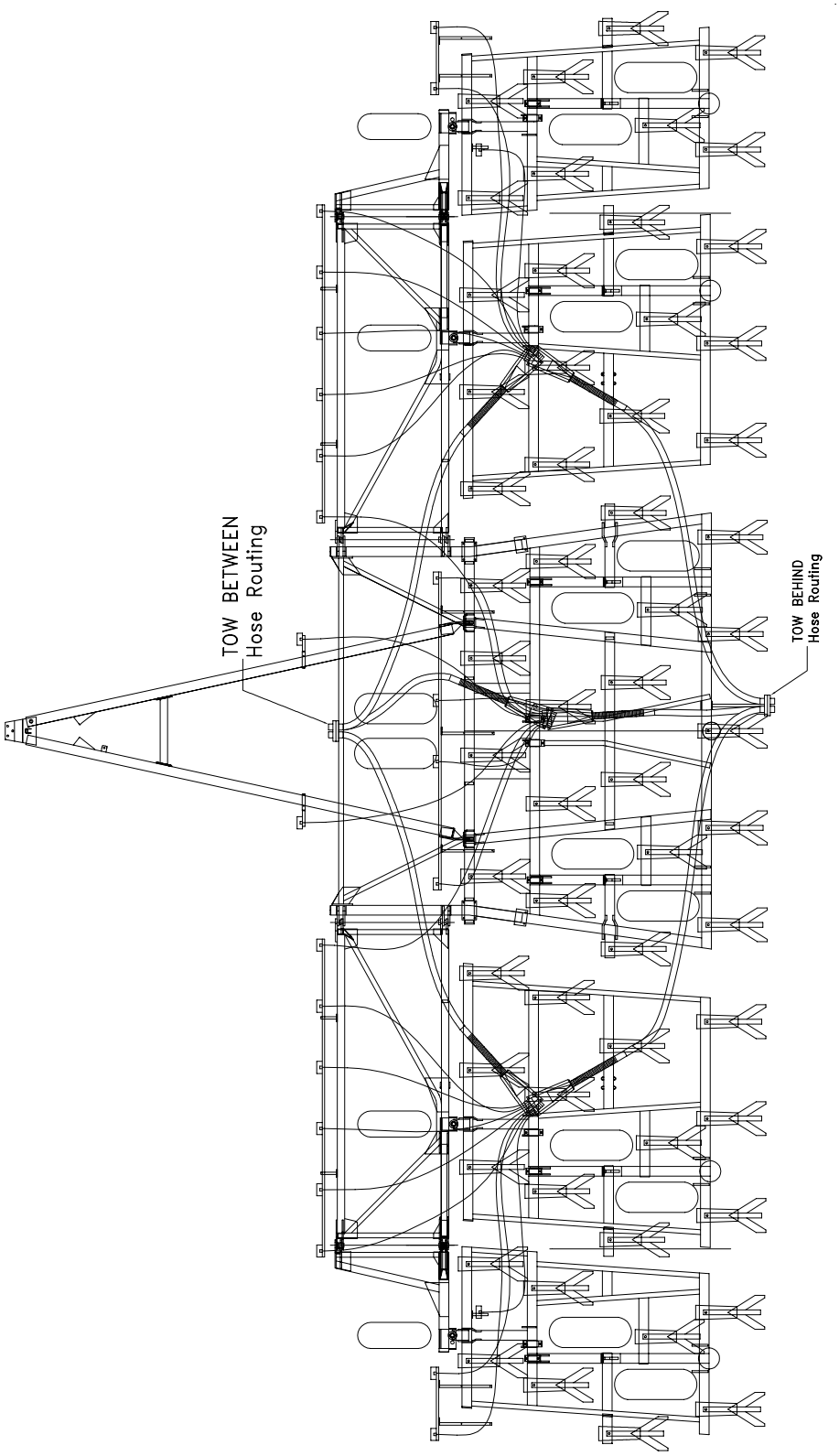
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 38 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**38.5'**	18	25.25	Main Frame	132	Special Hitch Brackets Required @72"
				Wing Frame	56 & 33	Special Mounting Brackets Required
	40'	20	23.5	Main Frame	123	Special Hitch Brackets Required @78"
				Wing Frame	52 & 52	Special Mounting Brackets Required
	41.5'	21	23.25	Main Frame	145	Special Hitch Brackets Required @27"
				Wing Frame	52 & 52	Special Mounting Brackets Required
10	**41'**	20	24.25	Main Frame	127	Special Hitch Brackets Required @73"
				Wing Frame	54 & 54	Special Mounting Brackets Required
	42.5'	20	25.25	Main Frame	132	Special Hitch Brackets Required @66.5"
				Wing Frame	56 & 56	Special Mounting Brackets Required
	44'	22	24	Main Frame	125	Special Hitch Brackets Required @75"
				Wing Frame	77 & 77	-
12	**38'**	19	23.75	Main Frame	148	Special Hitch Brackets Required @28"
				Wing Frame	53 & 30	Special Mounting Brackets Required
	40'	19	25	Main Frame	55	Special Hitch Brackets Required @11"
				Wing Frame	80 & 30	Special Mounting Brackets Required
	42'	21	23.75	Main Frame	148	Special Hitch Brackets Required @23"
				Wing Frame	53 & 53	Special Mounting Brackets Required

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 44 Foot Base



49' at 10" spacing Shown

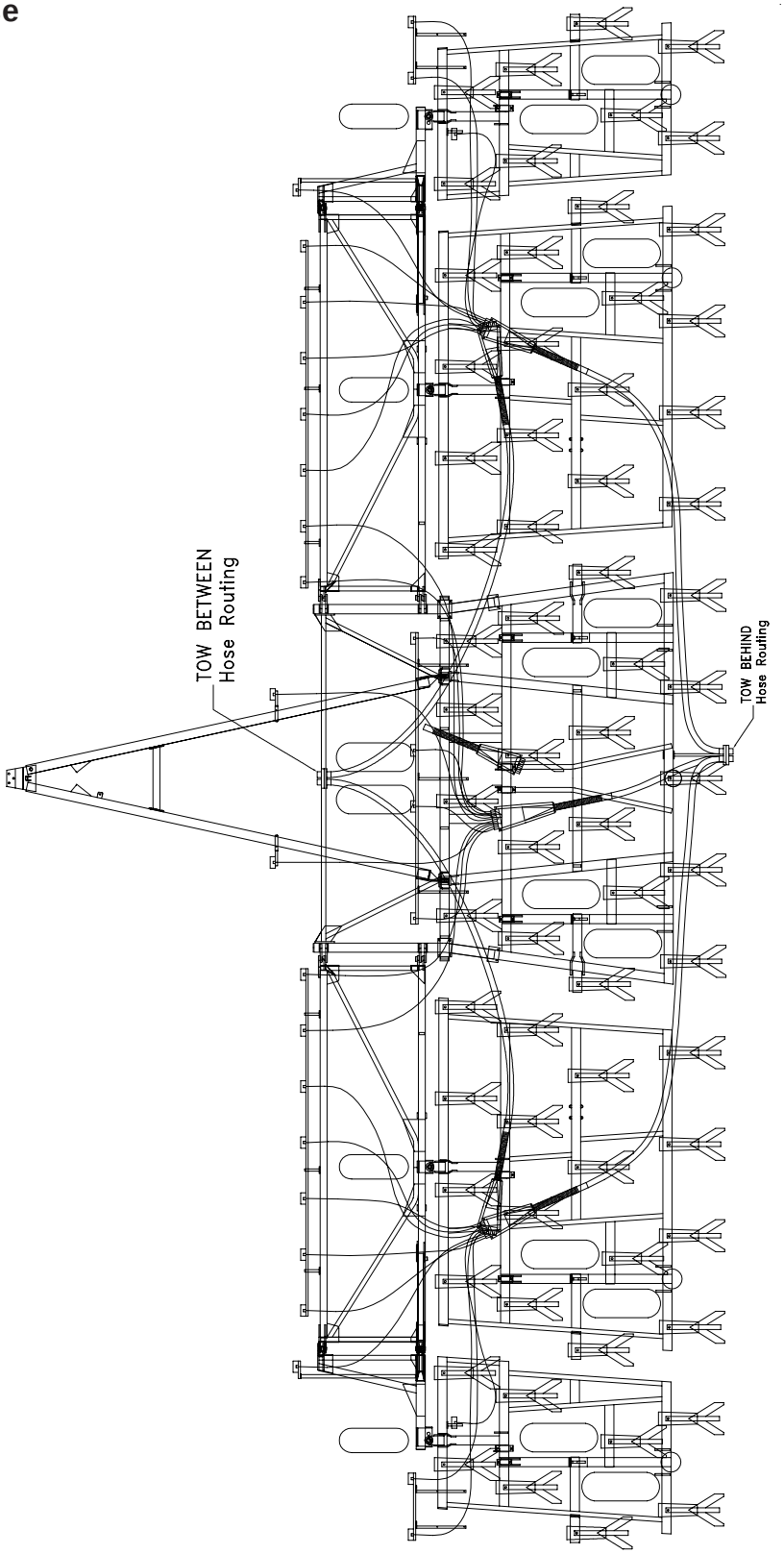
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 44 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**44.5'**	23	22.75	Main Frame	142	Special Hitch Brackets Required @32"
				Inner Wing Frame	119	2 Special Mounting Brackets used
				Outer Wing Frame	-	Special Mounting Brackets Required
	46'	23	23.75	Main Frame	148	Special Hitch Brackets Required @22"
				Inner Wing Frame	100	2 Special Mounting Brackets used
				Outer Wing Frame	29 & 8	-
10	**47.5'**	23	24.5	Main Frame	59	Special Hitch Brackets Required @1.5"
				Inner Wing Frame	152	2 Special Mounting Brackets used
				Outer Wing Frame	-	Special Mounting Brackets Required
	49'	24	24.25	Main Frame	127	Special Hitch Brackets Required @73"
				Inner Wing Frame	127	2 Special Mounting Brackets used
				Outer Wing Frame	34 & 8	-
12	**44'**	23	22.75	Main Frame	142	Special Hitch Brackets Required @32"
				Inner Wing Frame	119	2 Special Mounting Brackets used
				Outer Wing Frame	-	Special Mounting Brackets Required
	46'	23	23.75	Main Frame	148	Special Hitch Brackets Required @22"
				Inner Wing Frame	100	2 Special Mounting Brackets used
				Outer Wing Frame	8	Special Mounting Brackets Required

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 50 Foot Base



56' at 10" spacing Shown

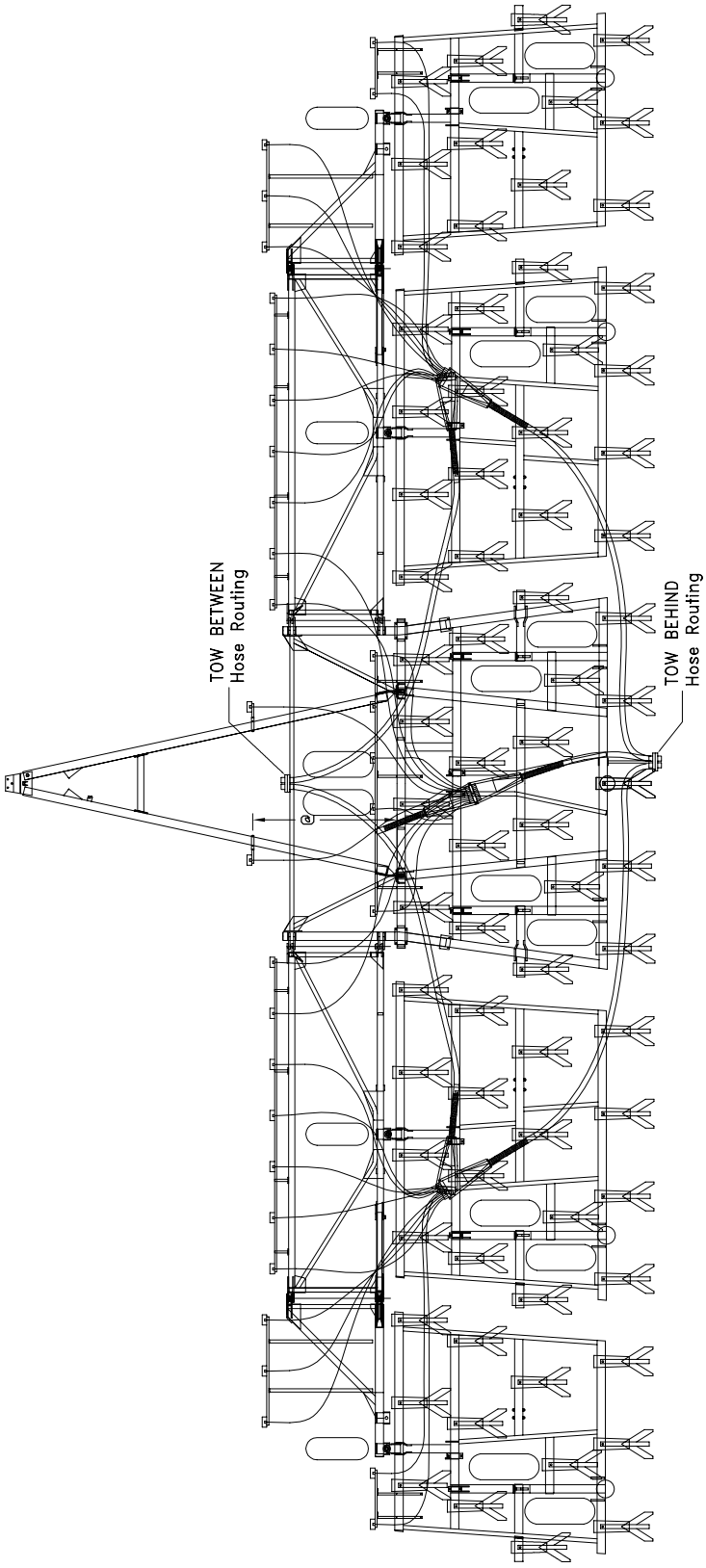
Note: See page 76 for assembly details.

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 50 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**50.5'**	26	23	Main Frame	120	Special Hitch Brackets Required @81.5"
				Inner Wing Frame	143	3 Special Mounting Brackets used
				Outer Wing Frame	14	Special Mounting Brackets Required
	52'	26	23.75	Main Frame	124	Special Hitch Brackets Required @75.5"
				Inner Wing Frame	148	3 Special Mounting Brackets used
				Outer Wing Frame	29 & 9	-
10	**54'**	28	23	Main Frame	120	Special Hitch Brackets Required @81.5"
				Inner Wing Frame	166	3 Special Mounting Brackets used
				Outer Wing Frame	30	-
	56'	28	23.75	Main Frame	124	Special Hitch Brackets Required @76.5"
				Inner Wing Frame	172	3 Special Mounting Brackets used
				Outer Wing Frame	29	Special Mounting Brackets Required
12	**50'**	26	23	Main Frame	120	Special Hitch Brackets Required @81.5"
				Inner Wing Frame	143	3 Special Mounting Brackets used
				Outer Wing Frame	14	Special Mounting Brackets Required
	52'	26	23.75	Main Frame	124	Special Hitch Brackets Required @75.5"
				Inner Wing Frame	148	3 Special Mounting Brackets used
				Outer Wing Frame	29 & 9	-

Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 56 Foot Base



Note: See page 76 for assembly details.

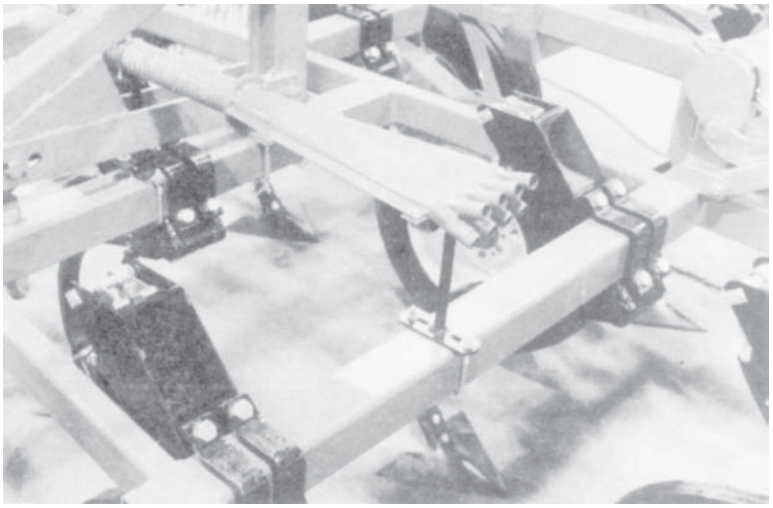
Concept 2000 Tillage Deflector and Secondary Head Locations

CONCEPT 2000 - 56 Foot Base						
Shank Spacing (Inches)	**Machine Size**	**Number of Deflectors**	**Deflector Spacing (Inches)**	**Mounting Tube**	**Mounting Tube Length (Inches)**	**Additional Comments**
9	**56.5'**	28	24	Main Frame	125	Special Hitch Brackets Required @75"
				Inner Wing Frame	149	3 Special Mounting Brackets used
				Outer Wing Frame	29	Special Mounting Brackets Required
	58'	28	24.5	Main Frame	128	Special Hitch Brackets Required @77"
				Inner Wing Frame	152	3 Special Mounting Brackets used
				Outer Wing Frame	30 & 10	Special Mounting Brackets Required
	59.5'	28	24.25	Main Frame	132	Special Hitch Brackets Required @66.5"
				Inner Wing Frame	132	3 Special Mounting Brackets used
				Outer Wing Frame	30 & 30	Special Mounting Brackets Required
10	**61'**	30	24.25	Main Frame	127	Special Hitch Brackets Required @73"
				Inner Wing Frame	151	3 Special Mounting Brackets used
				Outer Wing Frame	54	Special Mounting Brackets Required
	62.5'	30	24.75	Main Frame	129	Special Hitch Brackets Required @70"
				Inner Wing Frame	154	3 Special Mounting Brackets used
				Outer Wing Frame	55 & 30	-
	64'	30	25.5	Main Frame	133	Special Hitch Brackets Required @64.75"
				Inner Wing Frame	158	3 Special Mounting Brackets used
				Outer Wing Frame	56 & 31	-
12	**56'**	28	23.75	Main Frame	124	Special Hitch Brackets Required @76.5"
				Inner Wing Frame	148	3 Special Mounting Brackets used
				Outer Wing Frame	53 & 7	-
	58'	28	24.75	Main Frame	129	Special Hitch Brackets Required @ 69.5"
				Inner Wing Frame	154	3 Special Mounting Brackets used
				Outer Wing Frame	33 & 8	Special Mounting Brackets Required
	60'	28	25.5	Main Frame	133	Special Hitch Brackets Required @64.5"
				Inner Wing Frame	133	3 Special Mounting Brackets used
				Outer Wing Frame	56 & 31	-

Concept 2000 Tillage Deflector and Secondary Head Locations

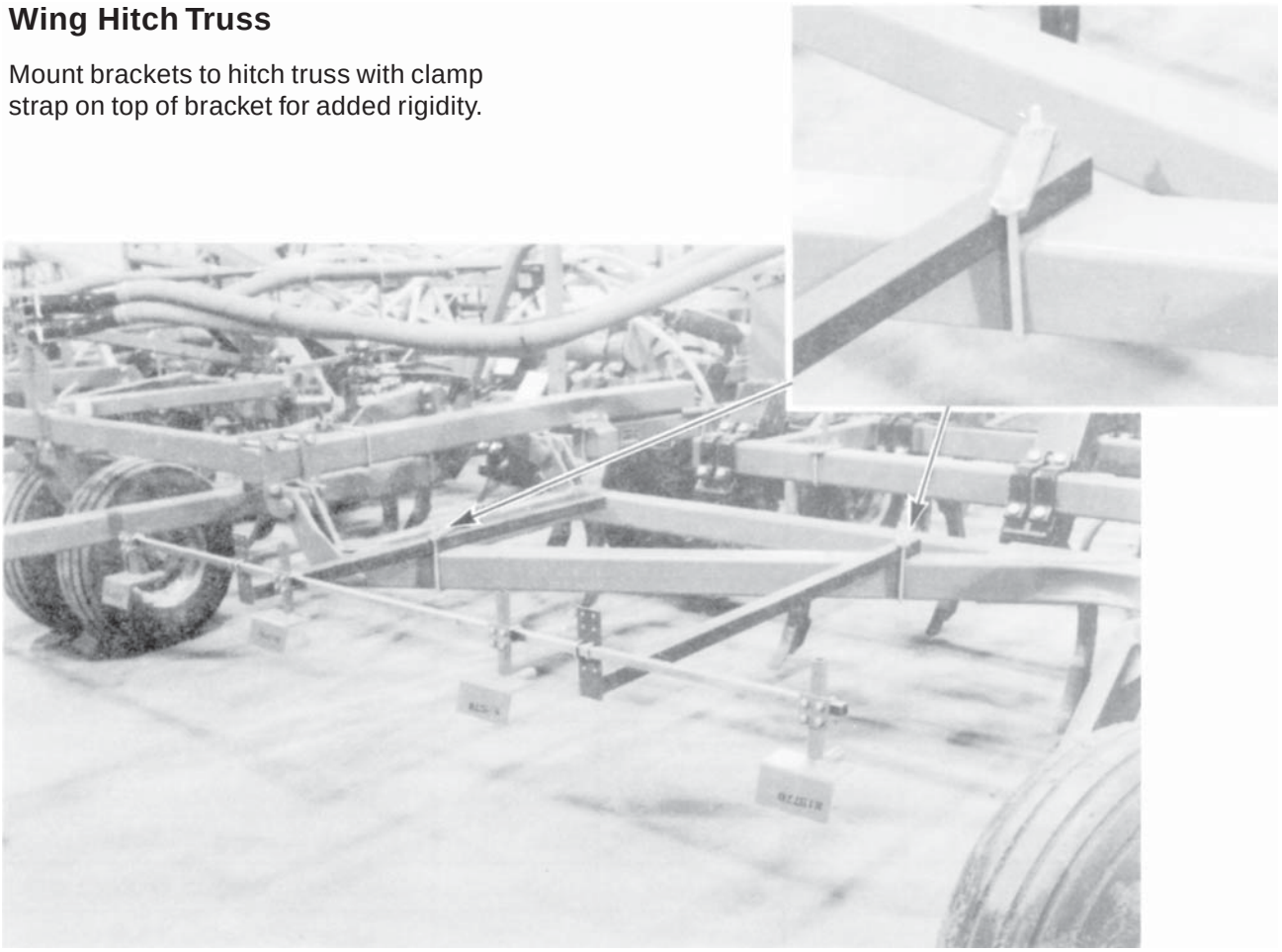
Tow Behind Three Frames

Trim 4” off stands. Mount Divider Head on wing frame through wing lift truss as shown.



Wing Hitch Truss

Mount brackets to hitch truss with clamp strap on top of bracket for added rigidity.



Section 10:
Metric

Section Contents

Metric Rate Calibration

Calibration Chart based on 1/4 of a Hectare.

W = Machine Spread Width (Centimetres)

F = Optional Mechanical Acre Tally Factor = 56/R

R = Crank Rotation - turns
for 1/4 Hectare = 99,243.75/W for 7130 with 16.5 x 16.1 All Weather Tires.
for 1/4 Hectare = 87,487.5/W for 7180 with 16.5 x 16.1 All Weather Tires.
for 1/4 Hectare = 69,465.08/W for 7180 with 18.4x 26 All Weather Tires.
for 1/4 Hectare = 65,606.25/W for 7240 & 7300 with 23.1 x 26 All Weather Tires.
for 1/4 Hectare = 59,643.75/W for 7240 & 7300 with 23.1 x 26 Rice Tires.

D = Distance required for 1/4 Hectare (Meter) = 250,000/W

7000 Series Granular Applicator
METRIC RATE CALIBRATION CHART

SPREAD WIDTH		AIRSEEDER MODEL					DISTANCE [D]	SPREAD WIDTH		AIRSEEDER MODEL					DISTANCE [D]
		7130	7180		7240/7300					7130	7180		7240/7300		
		Tire 16.5 x 16.1	Tire 21.5 x 16.1	Tire 18.4 x 26	Tire 23.1 x 26	Rice Tire 23.1 x 26				Tire 16.5 x 16.1	Tire 21.5 x 16.1	Tire 18.4 x 26	Tire 23.1 x 26	Rice Tire 23.1 x 26	
(ins)	(cm)	[R]	[R]	[R]	[R]	[R]	(m)	(ins)	(cm)	[R]	[R]	[R]	[R]	[R]	(m)
315	800	124.05	109.36	86.83	82.01	74.55	312.5	490	1245	79.71	70.27	55.80	52.70	47.91	200.8
323	820	121.03	106.69	84.71	80.01	72.74	304.9	492	1250	79.40	69.99	55.57	52.49	47.72	200.0
324	823	120.59	106.30	84.40	79.72	72.47	303.8	498	1265	78.45	69.16	54.91	51.86	47.15	197.6
330	838	118.43	104.40	82.89	78.29	71.17	298.3	504	1280	77.53	68.35	54.27	51.25	46.60	195.3
336	853	116.35	102.56	81.44	76.91	69.92	293.1	510	1295	76.64	67.56	53.64	50.66	46.06	193.1
338	859	115.53	101.85	80.87	76.38	69.43	291.0	516	1311	75.70	66.73	52.99	50.04	45.49	190.7
342	869	114.20	100.68	79.94	75.50	68.63	287.7	520	1321	75.13	66.23	52.59	49.66	45.15	189.3
343	871	113.94	100.44	79.75	75.32	68.48	287.0	522	1326	74.84	65.98	52.39	49.48	44.98	188.5
348	884	112.27	98.97	78.58	74.22	67.47	282.8	525	1334	74.40	65.58	52.07	49.18	44.71	187.4
352	894	111.01	97.86	77.70	73.39	66.72	279.6	528	1341	74.01	65.24	51.80	48.92	44.48	186.4
354	899	110.39	97.32	77.27	72.98	66.34	278.1	534	1356	73.19	64.52	51.23	48.38	43.99	184.4
360	914	108.58	95.72	76.00	71.78	65.26	273.5	536	1361	72.92	64.28	51.04	48.20	43.82	183.7
366	930	106.71	94.07	74.69	70.54	64.13	268.8	540	1372	72.34	63.77	50.63	47.82	43.47	182.2
372	945	105.02	92.58	73.51	69.42	63.12	264.6	546	1387	71.55	63.08	50.08	47.30	43.00	180.3
375	953	104.14	91.80	72.89	68.84	62.59	262.3	552	1402	70.79	62.40	49.55	46.79	42.54	178.3
378	960	103.38	91.13	72.36	68.34	62.13	260.4	558	1417	70.04	61.74	49.02	46.30	42.09	176.4
382	970	102.31	90.19	71.61	67.64	61.49	257.7	564	1433	69.26	61.05	48.48	45.78	41.62	174.5
384	975	101.79	89.73	71.25	67.29	61.17	256.4	570	1448	68.54	60.42	47.97	45.31	41.19	172.7
387	983	100.96	89.00	70.67	66.74	60.68	254.3	575	1461	67.93	59.88	47.55	44.91	40.82	171.1
390	991	100.15	88.28	70.10	66.20	60.19	252.3	576	1463	67.84	59.80	47.48	44.84	40.77	170.9
392	996	99.64	87.84	69.74	65.87	59.88	251.0	582	1478	67.15	59.19	47.00	44.39	40.35	169.2
396	1006	98.65	86.97	69.05	65.21	59.29	248.5	588	1494	66.43	58.56	46.50	43.91	39.92	167.3
402	1021	97.20	85.69	68.04	64.26	58.42	244.9	592	1504	65.99	58.17	46.19	43.62	39.66	166.2
408	1036	95.80	84.45	67.05	63.33	57.57	241.3	594	1509	65.77	57.98	46.03	43.48	39.53	165.7
412	1046	94.88	83.64	66.41	62.72	57.02	239.0	600	1524	65.12	57.41	45.58	43.05	39.14	164.0
414	1052	94.34	83.16	66.03	62.36	56.70	237.6	606	1539	64.49	56.85	45.14	42.63	38.75	162.4
420	1067	93.01	81.99	65.10	61.49	55.90	234.3	612	1554	63.86	56.30	44.70	42.22	38.38	160.9
421	1069	92.84	81.84	64.98	61.37	55.79	233.9	613	1557	63.74	56.19	44.61	42.14	38.31	160.6
426	1082	91.72	80.86	64.20	60.63	55.12	231.1	618	1570	63.21	55.72	44.25	41.79	37.99	159.2
432	1097	90.47	79.75	63.32	59.81	54.37	227.9	624	1585	62.61	55.20	43.83	41.39	37.63	157.7
434	1102	90.06	79.39	63.04	59.53	54.12	226.9	625	1588	62.50	55.09	43.74	41.31	37.56	157.4
438	1113	89.17	78.61	62.41	58.95	53.59	224.6	630	1600	62.03	54.68	43.42	41.00	37.28	156.3
441	1120	88.61	78.11	62.02	58.58	53.25	223.2	636	1615	61.45	54.17	43.01	40.62	36.93	154.8
444	1128	87.98	77.56	61.58	58.16	52.88	221.6	642	1631	60.85	53.64	42.59	40.22	36.57	153.3
447	1135	87.44	77.08	61.20	57.80	52.55	220.3	648	1646	60.29	53.15	42.20	39.86	36.24	151.9
450	1143	86.83	76.54	60.77	57.40	52.18	218.7	654	1661	59.75	52.67	41.82	39.50	35.91	150.5
456	1158	85.70	75.55	59.99	56.65	51.51	215.9	660	1676	59.21	52.20	41.45	39.14	35.59	149.2
460	1168	84.97	74.90	59.47	56.17	51.06	214.0	662	1681	59.04	52.04	41.32	39.03	35.48	148.7
462	1173	84.61	74.58	59.22	55.93	50.85	213.1	666	1692	58.65	51.71	41.06	38.77	35.25	147.8
466	1184	83.82	73.89	58.67	55.41	50.37	211.2	672	1707	58.14	51.25	40.69	38.43	34.94	146.5
468	1189	83.47	73.58	58.42	55.18	50.16	210.3	675	1715	57.87	51.01	40.50	38.25	34.78	145.8
470	1194	83.12	73.27	58.18	54.95	49.95	209.4	678	1722	57.63	50.81	40.34	38.10	34.64	145.2
472	1199	82.77	72.97	57.94	54.72	49.74	208.5	682	1732	57.30	50.51	40.11	37.88	34.44	144.3
474	1204	82.43	72.66	57.70	54.49	49.54	207.6	684	1737	57.14	50.37	39.99	37.77	34.34	143.9
480	1219	81.41	71.77	56.99	53.82	48.93	205.1	690	1753	56.61	49.91	39.63	37.43	34.02	142.6
484	1229	80.75	71.19	56.52	53.38	48.53	203.4	696	1768	56.13	49.48	39.29	37.11	33.74	141.4
486	1234	80.42	70.90	56.29	53.17	48.33	202.6	702	1783	55.66	49.07	38.96	36.80	33.45	140.2

MORRIS

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