

OPERATOR'S MANUAL

VERTICAL TILLAGE



Tuffline®

TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Monroe Tufline dealer. Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists in the Owner's/Operator's Manual are completed before releasing equipment to the owner. The dealer must complete the Warranty Registration located on the Monroe Tufline website.

TO THE OWNER:

Read this manual before operating your Monroe Tufline equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all the adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your selling dealer.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the unit as specified. Observe all safety information in this manual and safety decals on the equipment.

For service, your authorized Monroe Tufline dealer has trained mechanics, genuine Monroe Tufline service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine Frontier service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

Model: _____ **Date of Purchase:** _____

Serial Number: (see Safety Decal section for location) _____

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **IMPORTANT** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING** and **DANGER** are used in conjunction with the Safety-Alert Symbol, (a triangle with an exclamation mark), to indicate the degree of hazard for items of personal safety.



This Safety-Alert Symbol indicates a hazard and means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

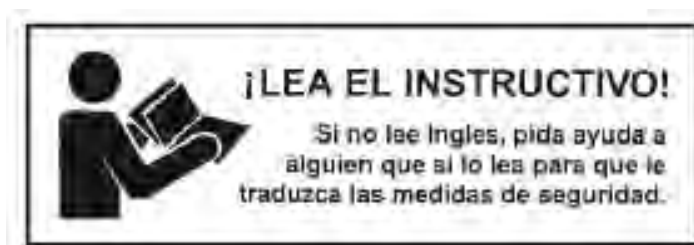
IMPORTANT NOTE

Indicates that failure to observe can cause damage to equipment.

Indicates helpful information.

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SPECIFICATIONS

MODEL	MVT1710	MVT1712	MVT1713	MVT1715
Dimensions				
Working width, ft, in.	*10'6"	*12'	*13'6"	*15'
Transport Width, ft, in	11' 9"	13' 9"	13' 9"	16' 6"
Overall Length	17' 6"	17' 6"	17' 6"	17' 6"
Transport Height	5'	5'	5'	5'
** Depending on dealer set up **				
Weight				
Operating, lb	*5,980*	*6,864*	*7,760*	*8,075*
** Average base model weight **				
Shipping, lb	6,380	7,264	8,160	8,475
Tractor requirements				
Horsepower range, hp	85-105	95-120	105-130	120-150
Hitch				
Type	Level lift drawn with clevis	Level lift drawn with clevis	Level lift drawn with clevis	Level lift drawn with clevis
Category	NA	NA	NA	NA
Quick coupler compatibility	NA	NA	NA	NA
Blade				
Spacing				
Front, in.	7.5"	7.5"	7.5"	7.5"
Rear, in.	7.5"	7.5"	7.5"	7.5"
Size, in.	20"/22"	20"/22"	20"/22"	20"/22"
Thickness, MM	6/5	6/5	6/5	6/5
Quantity	32	36	40	44
Weight/Blade(lbs/blade)	187	191	194	184
Type				
STANDARD	MVT-REX 22"	MVT-REX 22"	MVT-REX 22"	MVT-REX 22"
OPTIONAL	VORTEX 20"	VORTEX 20"	VORTEX 20"	VORTEX 20"
Gang axle				
Diameter, in.	1 1/8"	1 1/8"	1 1/8"	1 1/8"
Type	Square	Square	Square	Square
Material	C1045	C1045	C1045	C1045
Gang angles				
Front (degrees)	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°
Rear (degrees)	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°	0°, 3°, 6°, 9°, 12°
Tubing				
Frame, in.	4x4x0.50 and 6x4x0.50	4x4x0.50 and 6x4x0.50	4x4x0.50 and 6x4x0.50	4x4x0.50 and 6x4x0.50
Gang, in.	4x4x0.50	4x4x0.50	4x4x0.50	4x4x0.50

SPECIFICATIONS, Con't.

MODEL	MVT1710	MVT1712	MVT1713	MVT1715
Bearing hanger				
Material	Spring Steel	Spring Steel	Spring Steel	Spring Steel
C-Spring Hanger	Standard	Standard	Standard	Standard
Bearing type	Self aligning trunion mount, sealed or lubricated ball bearings	Self aligning trunion mount, sealed or lubricated ball bearings	Self aligning trunion mount, sealed or lubricated ball bearings	Self aligning trunion mount, sealed or lubricated ball bearings
Depth control				
Type	Pin adjust, center mount	Pin adjust, center mount	Pin adjust, center mount	Pin adjust, center mount
Lighting and safety				
Transport lights	Standard	Standard	Standard	Standard
Safety chain	Standard	Standard	Standard	Standard
Jack	Standard	Standard	Standard	Standard
Transport lock	Standard	Standard	Standard	Standard
Hydraulics				
Cylinder size, in.	4x8	4x8	4x8	4x8
Hose length, in.	160"	160"	160"	160"
Tires				
Type	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Size	11L-15 8 ply	11L-15 8 ply	11L-15 8 ply	11L-15 8 ply
Roller Baskets				
Working width, ft. in.	11' 4"	13' 4"	13' 4"	16' 2"
Basket Dia. in.	14"	14"	14"	14"
Adjustable	SPRING ADJUSTMENT	SPRING ADJUSTMENT	SPRING ADJUSTMENT	SPRING ADJUSTMENT
Removable	4-Pin	4-Pin	4-Pin	4-Pin
Set-up time				
Labor hours	6 hrs	6 hrs	6 hrs	6 hrs
Warranty				
Time period	One year	One year	One year	One year

GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your Vertical Tillage implement. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

These instructions have been compiled from field experience and engineering data. Some information may be general in nature, due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing. However, due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

Throughout this manual, references are made to right and left direction. These are determined by standing behind the tractor facing the direction of forward travel.

SAFETY & INSTRUCTIONAL LABELS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH

Replace Labels Immediately If Damaged!




⚠ WARNING

To avoid serious injury or death from crushing or pinching hazards:

- Be extremely careful handling various parts of the machine. They are extremely heavy and hands, fingers, feet and other body parts could be crushed or pinched between tractor and implement.
- Operate tractor controls from tractor seat only.
- Do not stand between tractor and implement when tractor is in gear.
- Make sure parking brake is engaged before going between tractor and implement.
- Stand clear of machine when in operation or being raised or lowered.

5TL15194A




⚠ WARNING

To avoid serious injury or death from falling blade hazard:

- Keep hands and feet from under raised blade.
- Always put disc in the lowered position and chock gangs to prevent rolling when disconnecting disc gangs for maintenance or repair.

5TL15194B



⚠ WARNING

To avoid serious injury from crushing or pinning:

- Install cylinder lockups before transporting, servicing, or storing machine.

5TL15362

Serial Number Plate
Serial Number Plate




⚠ CAUTION

To avoid serious injury:

- Read Operator's Manual before operating, servicing or repairing equipment. Follow all safety rules and instructions. Manuals are available from your selling dealer.
- Never allow riders.
- Keep bystanders away from equipment during operation.
- Operate from power unit seat only.
- Do not operate on public roadway.
- Stop engine, remove key and set brake before dismantling power unit.
- Never allow children or untrained persons to operate equipment.
- Do not operate towed or semi-mounted units over 20MPH.
- Stand clear of machine when in operation or when it is being raised or lowered.

5TL15194C



⚠ WARNING

High-Pressure hydraulic oil leaks can penetrate skin. To avoid serious injury, gangrene, or death:

- Relieve pressure on system before repairing or disconnecting.
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
- Consult physician immediately if skin penetration occurs.

5TL15364



⚠ WARNING

To avoid serious injury or death:

- DO NOT allow others to ride on the machine or tractor.
- Park or block disc so it will not roll when disconnecting from tractor drawbar.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured.
- Never place any part of the body underneath equipment or between movable parts even when the engine has been turned off.
- Be sure that everyone is standing clear before operating the machine.
- DO NOT operate or transport at high speeds.
- DO NOT operate or transport on steep slopes.

5TL15194D



⚠ WARNING

To avoid serious injury or death:

Do not exceed this Implement's maximum transport speed of 32 km/h (20 mph).

Exceeding this speed may result in loss of control.

Transport only with a properly ballasted tractor and a properly attached safety tow chain.

Do not transport with a motor vehicle.

Reduce speed and use additional caution when on inclines, towing under adverse surface conditions, and turning.

Check that all safety decals are installed and in good condition. Replace if decals are worn or damaged. Replacement Part numbers are listed here.

15363
5TL15363

Safety Decals 3

REFLECTORS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

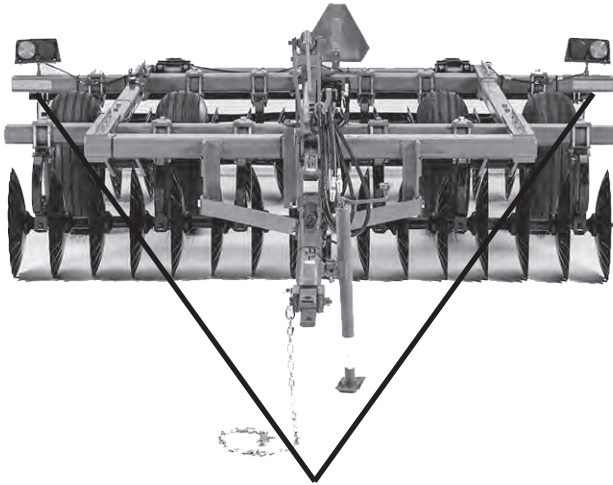
FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH

Replace Labels Immediately If Damaged!

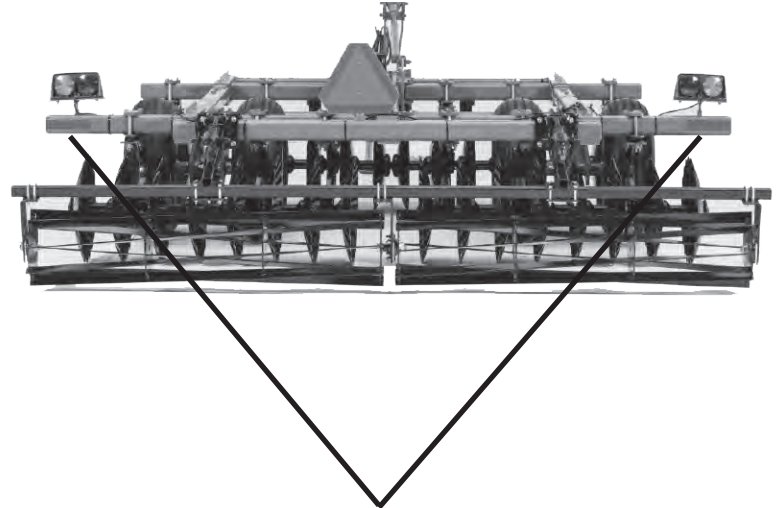
Check that all reflectors are installed and in good condition.

Replace if reflectors are worn or damaged.

MVT1710, MVT1712 and MVT1713 Reflector Decals



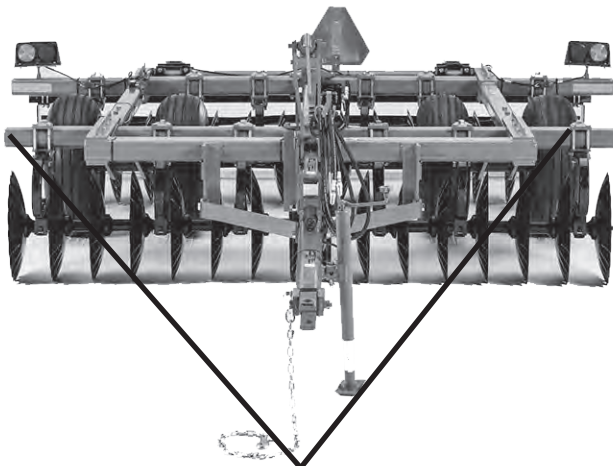
9" YELLOW REFLECTORS
15200



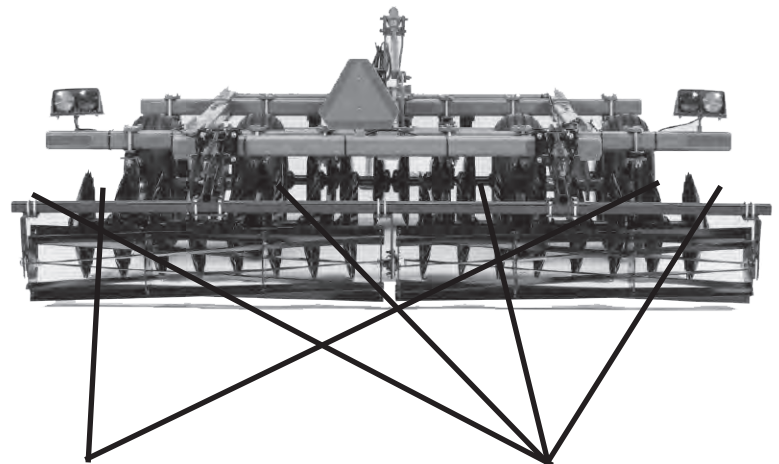
9" RED REFLECTORS
15199

MVT1715 Reflector Decals

**** This unit is for reflector reference only. Not an actual image of unit.****



9" YELLOW REFLECTORS
15200



9" ORANGE REFLECTORS
15361

9" RED REFLECTORS
15199



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement, and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said, "The best safety device is an informed, careful operator." We ask you to be that kind of operator.

TRAINING

- Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals are available from selling dealer.) Failure to follow instructions or safety rules can result in serious injury or death.
- If you do not understand any part of this manual and need assistance, see your dealer.
- Operators must be instructed in and be capable of the safe operation of the equipment, its attachments, and all controls. Do not allow anyone to operate this equipment without proper instructions.
- Never allow children or untrained persons to operate equipment.
- Train all new personnel and review instructions frequently with existing workers. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Keep hands and body away from pressurized

lines. Use paper or cardboard, not hands or other body parts to check for leaks. Wear safety goggles. Hydraulic fluid under pressure can easily penetrate skin and will cause serious injury or death.

- Make sure that all operating and service personnel know that if hydraulic fluid penetrates skin, it must be surgically removed as soon as possible by a doctor familiar with this form of injury or gangrene, serious injury, or death will result.

CONTACT A PHYSICIAN IMMEDIATELY IF FLUID ENTERS SKIN OR EYES. DO NOT DELAY.

PREPARATION

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.
- Route hydraulic hoses carefully to prevent damage. Hoses must not be twisted, bent sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hose immediately.
- Do not connect a low-pressure hydraulic hose into a high-pressure system—it will burst the hose. Do not use a high-pressure hose in place of a low-pressure hose—it is possible to rupture the valve.



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

PREPARATION (cont'd.)

- Power to unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in “locked up” position at all times.
- Do not exceed this implements transport speed of 20 mph (32 kmh). Exceeding this speed may cause loss of control during transport or braking and serious injury or death.
- Transport only with a properly ballasted tractor and a properly attached safety tow chain.
- Do not transport with a motor vehicle.
- Reduce speed and use additional caution when on inclines, towing when on adverse surface conditions, and turning.

TRANSPORTATION

- Always comply with all state and local laws governing highway safety and lighting and marking requirements.
- Never allow riders on power unit or attachment.
- Do not operate or transport on steep slopes.
- Use extreme care and reduce ground speed on slopes and rough terrain.
- Do not operate or transport equipment while under the influence of alcohol or drugs. Consult your doctor about operating this machine while taking prescription medications.

OPERATION

- Never go underneath equipment in the raised or transport position unless the transport lock is in place. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off.
- Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of

control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.

- Always comply with all state and local laws governing highway safety and lighting and marking requirements.
- Do not exceed this implements transport speed of 20 mph (32 kmh). Exceeding this speed may cause loss of control during transport or braking and serious injury or death.
- Transport only with a properly ballasted tractor and a properly attached safety tow chain.
- Do not transport with a motor vehicle.
- Reduce speed and use additional caution when on inclines, towing when on adverse surface conditions, and turning.
- Operate only in daylight or good artificial light.
- Keep bystanders away from equipment.
- Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.
- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in “locked up” position at all times.
- Never allow riders on power unit or attachment.
- Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake, and ensure all other controls are disengaged before starting power unit engine.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Use extreme care when working close to fences, ditches, other obstructions, or on hillsides.



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

OPERATION (cont'd.)

- Do not operate or transport on steep slopes.
- Do not stop, start, or change directions suddenly on slopes. Always operate down slopes; never across the face.
- Use extreme care and reduce ground speed on slopes and rough terrain.
- Keep alert and watch the front as well as the rear when operating.
- Always relieve the pressure on the hydraulic lift system before performing service or maintenance on any hydraulic components. Failure to do so may cause serious injury from injection of pressurized hydraulic fluid.
- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.
- Do not use hands to search for leaks on any hydraulic components. Use cardboard or similar material. Failure to do so may cause serious injury from injection of pressurized hydraulic fluid.
- When making gang adjustments, be careful to keep hands and feet clear of sliding parts and possible pinch points.
- Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, remove key, inspect, and repair any damage before resuming operation.
- Before leaving operator's seat, lower the lift carriage and put attachment on the ground. Engage brake, stop engine, remove key, and remove seat belt.

MAINTENANCE

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.
- When performing maintenance or repairs, make sure the equipment is in the lowered position and both the mainframe and gangs are properly blocked and secured to prevent rolling. Failure to do so can cause serious injury or death.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Before leaving operator's seat, lower the lift carriage and put attachment on the ground. Engage brake, stop engine, remove key, and remove seat belt.
- Never perform service or maintenance with engine running.
- Keep hands and body away from pressurized lines. Use paper or cardboard, not hands or other body parts to check for leaks. Wear safety goggles. Hydraulic fluid under pressure can easily penetrate skin and will cause serious injury or death.
- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

MAINTENANCE (cont'd.)

- connecting equipment or hoses or performing any hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.
- Route hydraulic hoses carefully to prevent damage. Hoses must not be twisted, bent, sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hose immediately.
- Do not connect a low-pressure hydraulic hose into a high-pressure system—it will burst the hose. Do not use a high-pressure hose in place of a low-pressure hose—it is possible to rupture the valve.
- Make sure that all operating and service personnel know that if hydraulic fluid penetrates skin, it must be surgically removed as soon as possible by a doctor familiar with this form of injury or gangrene, serious injury, or death will result.

CONTACT A PHYSICIAN IMMEDIATELY IF FLUID ENTERS SKIN OR EYES. DO NOT DE-LAY.

- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Tighten all bolts, nuts, and screws to torque chart specifications (page 45). Check that all cotter pins are installed securely to ensure equipment is in a safe condition before putting unit into service.

STORAGE

- Block equipment securely for storage in the lowered position.
- Keep children and bystanders away from storage area.

Dealer Instructions

Pre-Assembly

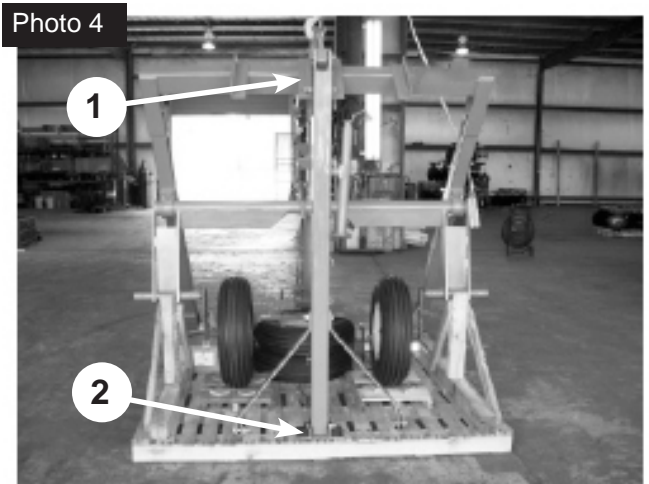
The MVT is shipped from the factory partially assembled (Photo 1). Move the unit to a suit-



able, open, flat location for complete assembly (Photo 2).



When completing this portion of the assembly process, be careful handling the large parts. The components are heavy and dropping them could cause serious injury or death.

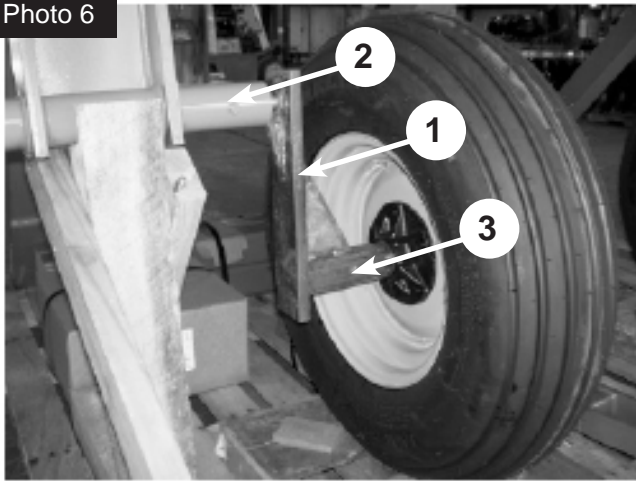


Use an overhead hoist (must be rated for up to 4,000 lb) and sling (must be rated for up to 4,000 lb) to raise frame up to relieve pressure on the tongue which is being used as a support



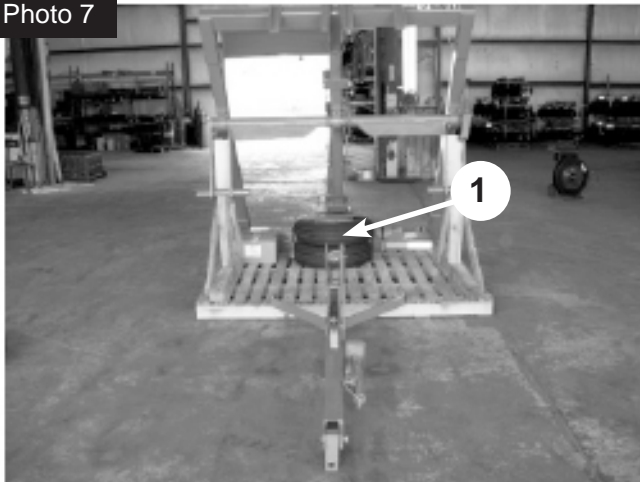
(Photo 3). Remove the two 7/8" x 6 1/2" Gr. 5 bolts (Ref. 1 & 2, Photo 4) which connect the tongue to the frame and pallet. Do not discard

Photo 6



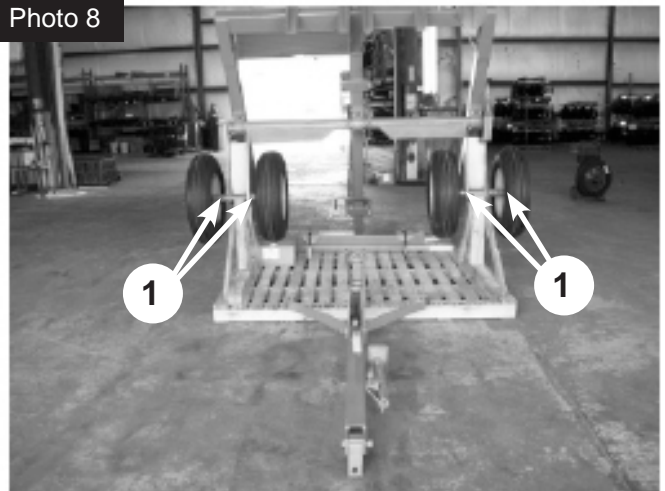
these bolts. They will be used to connect the tongue to the frame later in the set up. Lay the tongue assembly (284 lbs) on the ground (Photo 5). Using the overhead hoist, raise the frame until pressure has been removed from the wheels. Remove the wheel extensions (Ref. 1, Photo 6) from the wheel carriage by removing the 3/8" x 3" Gr. 5 bolt (Ref. 2, Photo 6). Do not discard 3/8" x 3" Gr. 5 bolts, they will be used again to reapply the wheel & spindle assembly to wheel carriage. Also, remove the

Photo 7



3/8" x 3" Gr. 5 bolt holding the wheel & spindle assembly to the wheel carriage extensions (Ref. 3, Photo 6). Once both wheel carriage extensions have been removed, discard both, as they are for shipping purposes only. Cut

Photo 8



band from the two remaining wheel & spindle assemblies on pallet (Ref. 1, Photo 7). Insert the spindle into the wheel carriage where the wheel carriage extensions were removed. Line up the hole in the spindle and wheel carriage and insert the 3/8" x 3" Gr. 5 bolt removed in an earlier step (Ref. 1, Photo 8). Repeat the same steps for the three remaining wheels. Once

Photo 9



complete, tighten nuts accordingly. Please see

Photo 10



Pre-Assembly cont'd on page 11

Bolt Torque Chart (Page 45) for proper torque information.

Photo 11



Before unit can be lowered to pallet, remove the bracing the wheel carriage was resting on when shipped (Photo 9). When bracing has been removed, lower frame so that wheels are rest-

Photo 12



Photo 13



ing on pallet (Photo 10). Use the two small pallets, shipped with unit, as chocks for the wheels on the wheel carriage (Photo 11). This will keep the frame from rolling off the pallet and cause serious injury or death. While the frame is resting on the pallet, relocate the sling from its current location to the main bar (6x4 tube) on front of frame (Photo 12). This will allow you to attach the leveling assembly without interference in a later step. Once sling has been relocated, connect to overhead hoist and raise hoist until slack has been removed from sling.

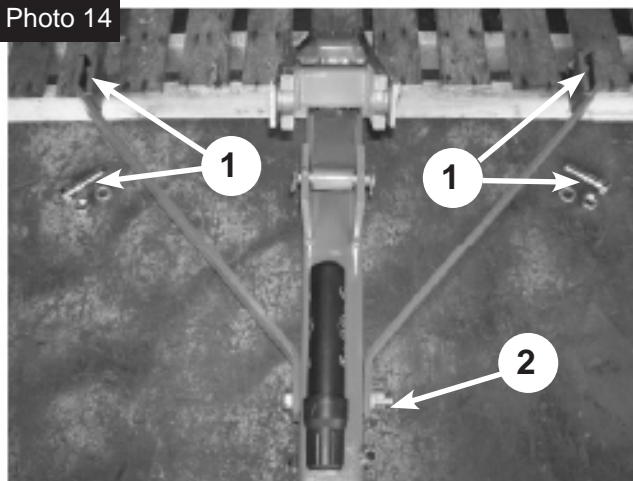


WARNING

When completing this portion of the assembly process, be careful handling the large parts. The components are heavy and dropping them could lead to serious injury or death.

Keep slight upward pressure on front of frame and cut bands connecting the rear of frame to the pallet (Photo 13). When all bands have been cut, lower the frame to the tongue lying on the ground. Down pressure may need to be applied to frame in order for the frame to come

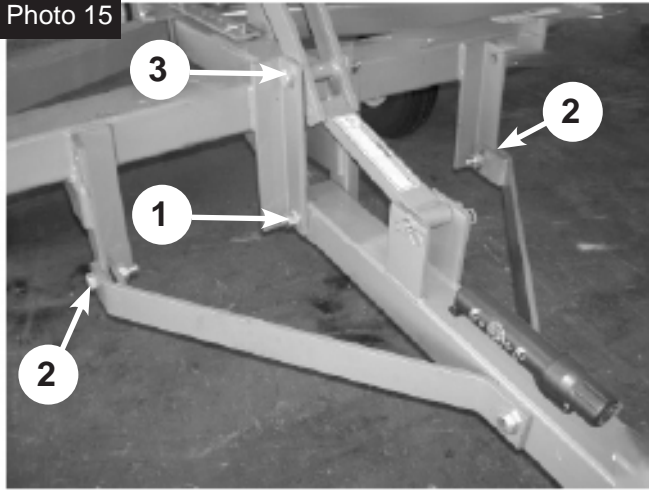
Photo 14



down. Connecting the tongue to the frame will be the next step in assembly. The two 7/8" x 6 1/2" Gr. 5 bolts removed from an earlier step (Photo 4) will be needed for this process. Once frame has been lowered to the pallet, remove the two 7/8" x 3 1/2" Gr. 5 bolts from the tongue

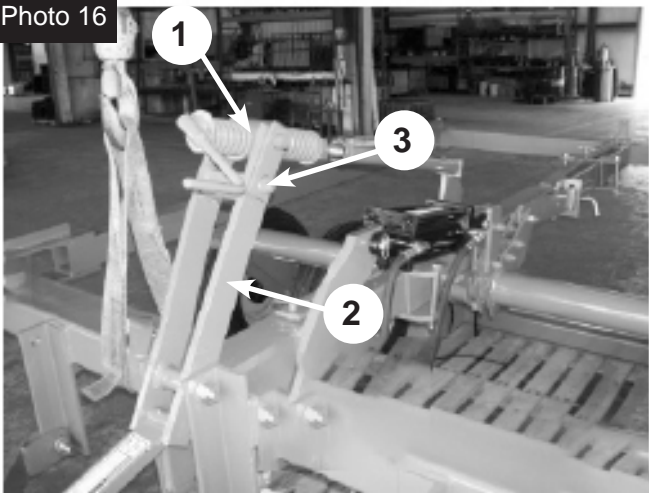
side braces which connect the braces to frame (Ref. 1, Photo 14). Loosen the 7/8" x 6 1/2" Gr. 5 bolt which connects the tongue side braces to

Photo 15



the tongue (Ref. 2, Photo 14). Do not remove! Using one of the 7/8" x 6 1/2" Gr. 5 bolts removed

Photo 16



earlier connect the tongue to the main frame (Ref. 1, Photo 15). Use the two 7/8" x 3 1/2" Gr. 5 bolts, to connect the tongue side braces to the frame (Ref. 2, Photo 15). Use the remaining 7/8" x 6 1/2" Gr. 5 bolt to connect the rocker arm & link bar to the frame (Ref. 3, Photo 15). Once tongue has been connected to frame, fold the spring rod assembly (Ref. 1, Photo 16) over to meet the rocker arm & link bar (Ref. 2, Photo 16). Connect the two using the 5/8" x 6 1/2" Gr. 2 bolt which is already in rocker arm & link bar (Ref. 3, Photo 16). Remove the hose holder (ref. 1, photo 17) which has been banded to the

Photo 17



Photo 18

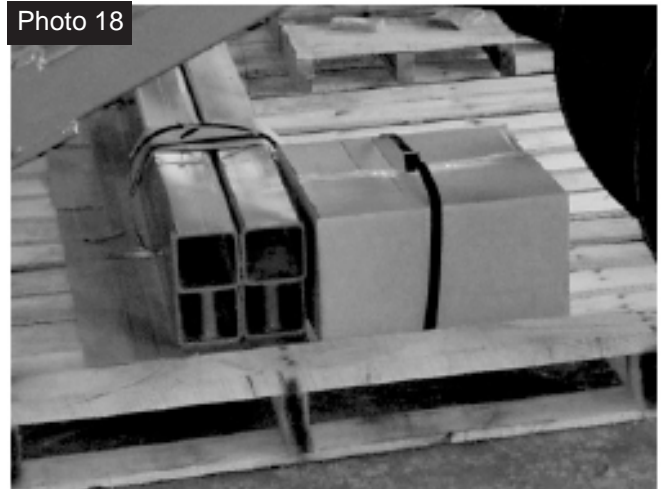


Photo 19



tongue. Place the hose holder into the round tube on side of tongue as seen in photo 17. Remove the safety chain and safety chain bolt from the cardboard box banded to pallet (Photo

Pre-Assembly cont'd on page 13

Photo 20



18). Connect the safety chain to the tongue using the 1" x 6" Gr. 5 bolt removed from box (Photo 19). Once all bolts are applied, tighten all nuts. Please see Bolt Torque Chart (Page Photo 21



45) for proper torque information. The unit should now look like Photo 20 on Page 13.

Photo 22



Chocks should now be removed and frame should be rolled off of pallet. Leave in open area for further assembly.

WARNING

The next steps will be attaching the gang beams & gangs to frame. Determine which beams are front and which are rear by looking at Figures 7 & 8 in Parts Catalog. Remove the 5/8" x 6" Gr. 5 bolts from the front and rear slide plates (Photo 21) to accommodate the gang

Photo 23



beams. Slide the rear beams through the slot in frame (Photo 22) till they meet the rear slide plate in center of frame. Repeat the same procedure for the front gang beams. Insert the 5/8" x 4 1/16" bushing into the hole at the inside end

Photo 24



of the gang beam (Photo 23). Reinsert the 5/8" x 6" Gr. 5 bolt downward through the hole in the

slide plate and through the bushing in the gang beam. Attach nut & washer and tighten (Photo 24). Please see Bolt Torque Chart (Page 45) for



proper torque information. Repeat the same procedure for the remaining gang beams.

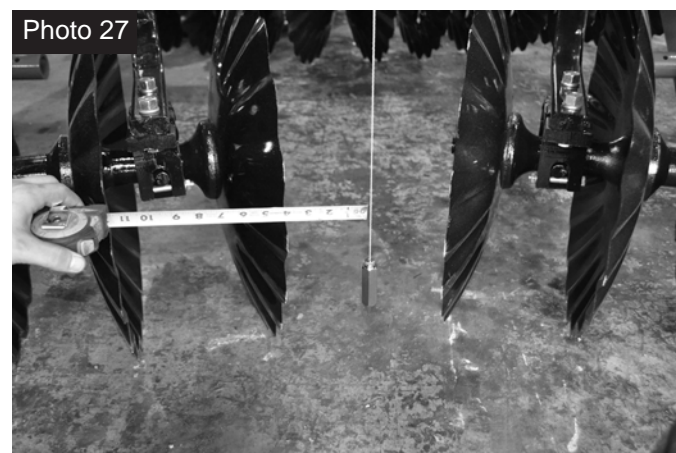
CAUTION

When completing this portion of the assembly process, be careful handling the large parts. The components are heavy and dropping them could lead to serious injury or death.

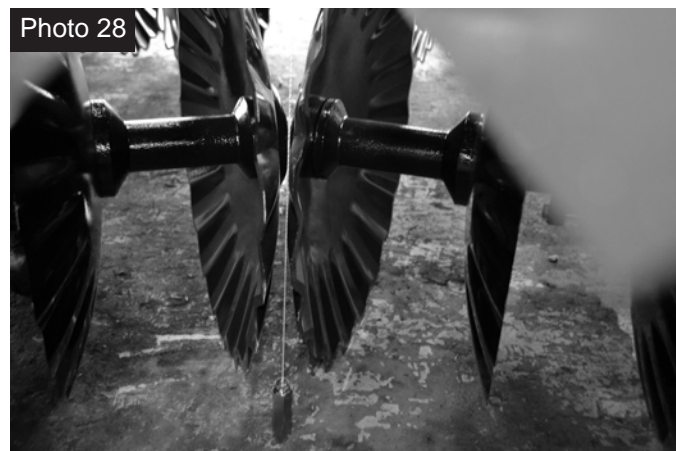


The next steps will be attaching the gangs to the gang beams and correctly adjusting each gang. Gangs and roller baskets are on a separate pallet (Photo 25). Cut bands from gang pallet (Photo 26). Roll a gang assembly under

its corresponding gang beam. Gangs assembled with an outrigger washer should be placed



on the rear gang beams with the washer facing outward. Gangs with relube bearings should be placed with the grease fitting pointing to the



rear of the unit. Only hand tighten hangers to the gang beams. Gangs will need to be adjusted later. To correctly adjust the spacing between the rear gang assemblies, drop a plumb bob from the rear of the main frame directly under the center of the center beam. The proper distance from the center of the center beam to the rear tip of a 22" disk blade is 4" (Photo 27). To correctly adjust the spacing between the front gang assemblies, drop a plumb bob from the front of the main frame directly under the center of the center beam. Adjust the gang assemblies so the front disk blades of each gang assembly

Pre-Assembly cont'd on page 15

Photo 29



are within 1/2" of touching (Photo 28). Once gangs are positioned in the correct location, tighten all u-bolts and/or fasteners to the correct torque. Please see Bolt Torque Chart (Page 45) for proper torque information.

Remove the SMV sign & mounting bracket from the cardboard box in Photo 18. Mount the SMV sign to the mounting bracket using 1/8" x 1/2" Gr. 2 round head machine screws. Now mount the mounting bracket to the rear of frame using 5/16" x 1" Gr. 2 carriage bolts (Photo 29). When mounted, tighten nuts accordingly.

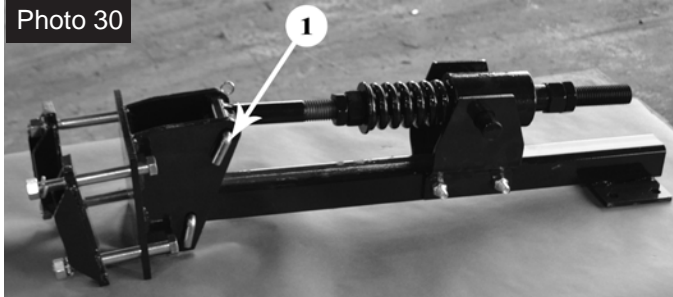
Roller Basket Assembly

Assembly

The MVT is shipped from the factory with the roller basket assembly.

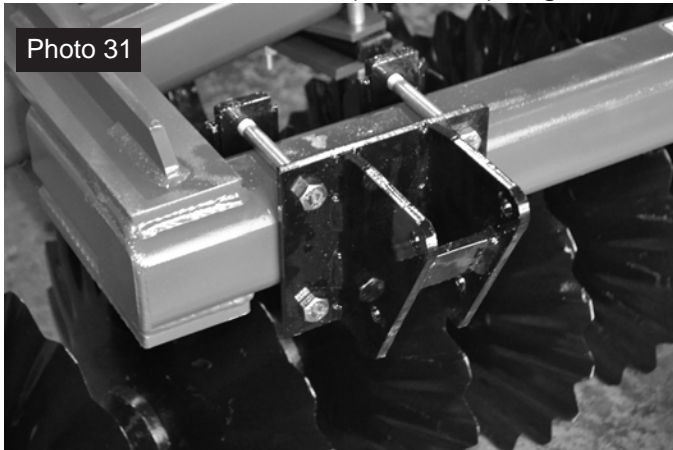
Mounting bracket, straps, arm, spring rod assembly and hardware are assembled together (Photo 30). Attach the mounting

Photo 30



bracket to the rear of the frame, with the mounting straps, using the 5/8" x 6" bolts, lock washers and nuts. Bracket should be 1/2" from the inside wall of frame (Photo 31). Tighten the

Photo 31



top and bottom bolts evenly during this step. Failure to do so will not allow the bracket to

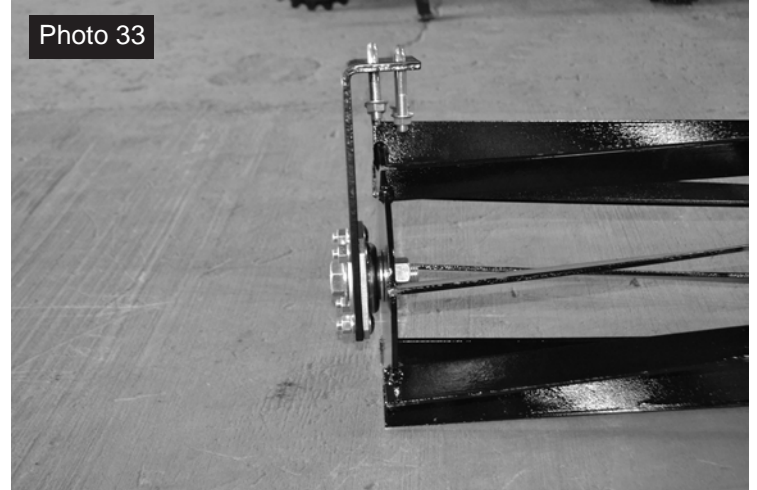
Photo 32



mount properly. Next attach the arm and spring rod assembly using the two mount pins (Photo 32).

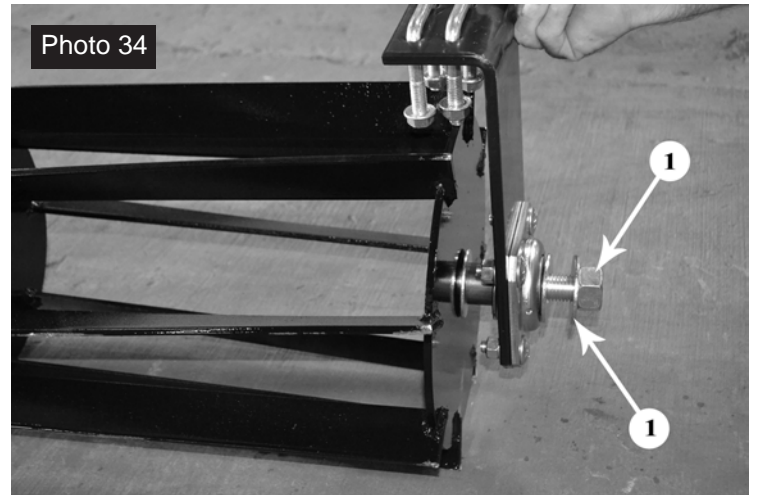
After both sides have been mounted start assembling the roller baskets together. Outer hangers are pre assembled onto the outer end of the roller basket (Photo 33). The inner hanger or hangers are

Photo 33



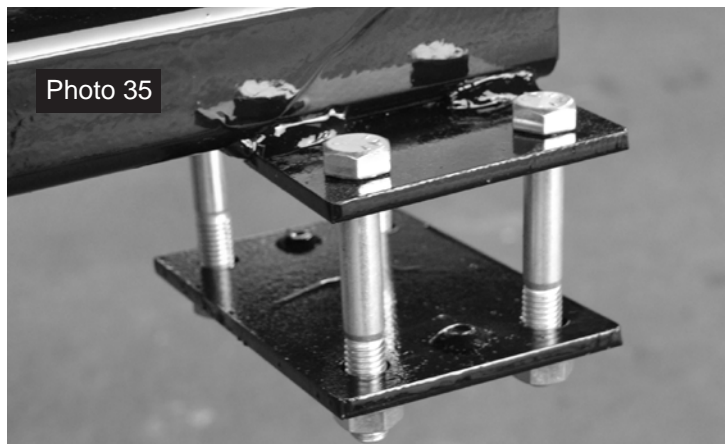
loosely attached to the inner end of the roller basket (Photo 34). Attach the inner ends of the roller bas-

Photo 34

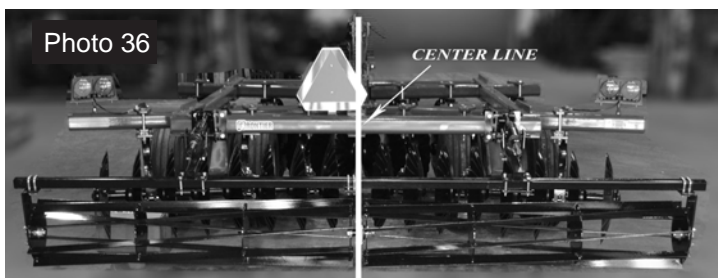


kets together. Do this by removing the 1" lock nut and one 1" flat washer (Photo 34, Ref. 1). Slide baskets together and insert end of bolt into hole in the roller basket. Put flat washer and lock nut back onto bolt. Tighten bolt and lock nut to torq specs (Page 45). Place tool bar onto hanger assembly. Use 2" sq. u-bolts located on the hanger. Adjust tool bar to the center. Roughly 2" of tool bar should extend past outer hangers. Attach tool bar to arms. Remove arm toolbar mount plate from arm

Roller Basket Assembly (cont'd.)



assembly (Photo35). Place roller assembly under arms. Position roller assembly to the center of vertical tillage unit left to right (Photo 36). Remove pin (Photo30, Ref 1) from arm and spring rod assembly. This will let the arms easily lay on top



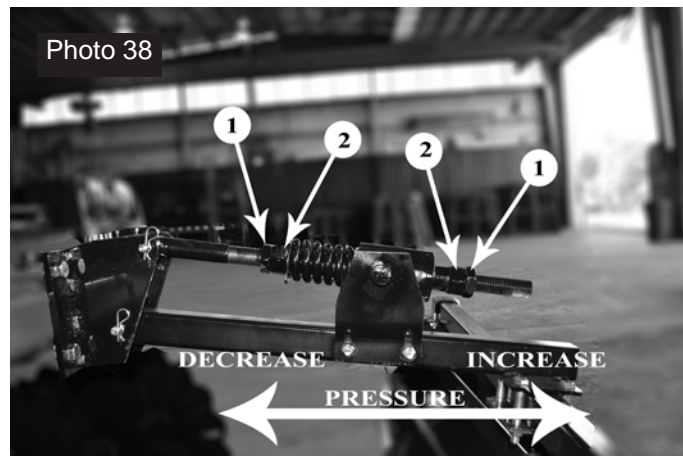
of the tool bar. Place the four 1/2" x 3 1/2" bolts thru the plate welded to the arm. Place the arm mount plate under the tool bar with four 1/2" lock nuts (Photo 37). Check to make sure the roller basket assembly is centered to the vertical tillage unit (Photo 36). Tighten bolts and lock nuts in an



alternating pattern to ensure even pressure to torque specs (Page45). Raise roller basket assembly with hoist to reinsert top pin.

Adjusting Roller Basket

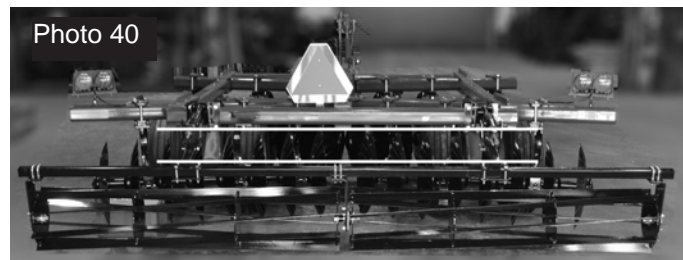
Loosen jam nuts (Photo38, Ref. 1) and hex nuts (Photo38, Ref. 2) on both ends of each spring rod assembly. Adjust the rear facing hex nut on spring rod assemblies to desired height.



Tighten the jam nut on each side against the hex nut to create a lock. Tighten the forward facing hex nut on the front of each spring rod assembly to apply pressure on the spring (Photo 39). Once desired pressure is applied tighten the jam nut to create the lock. Make



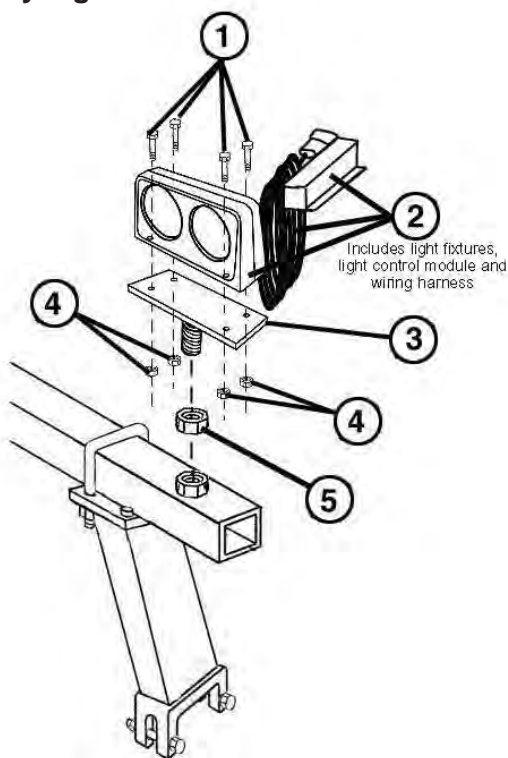
sure the roller basket assembly is level horizontally with the vertical tillage unit (Photo 40).



Always comply with all state and local laws governing highway safety and lighting and marking requirements.

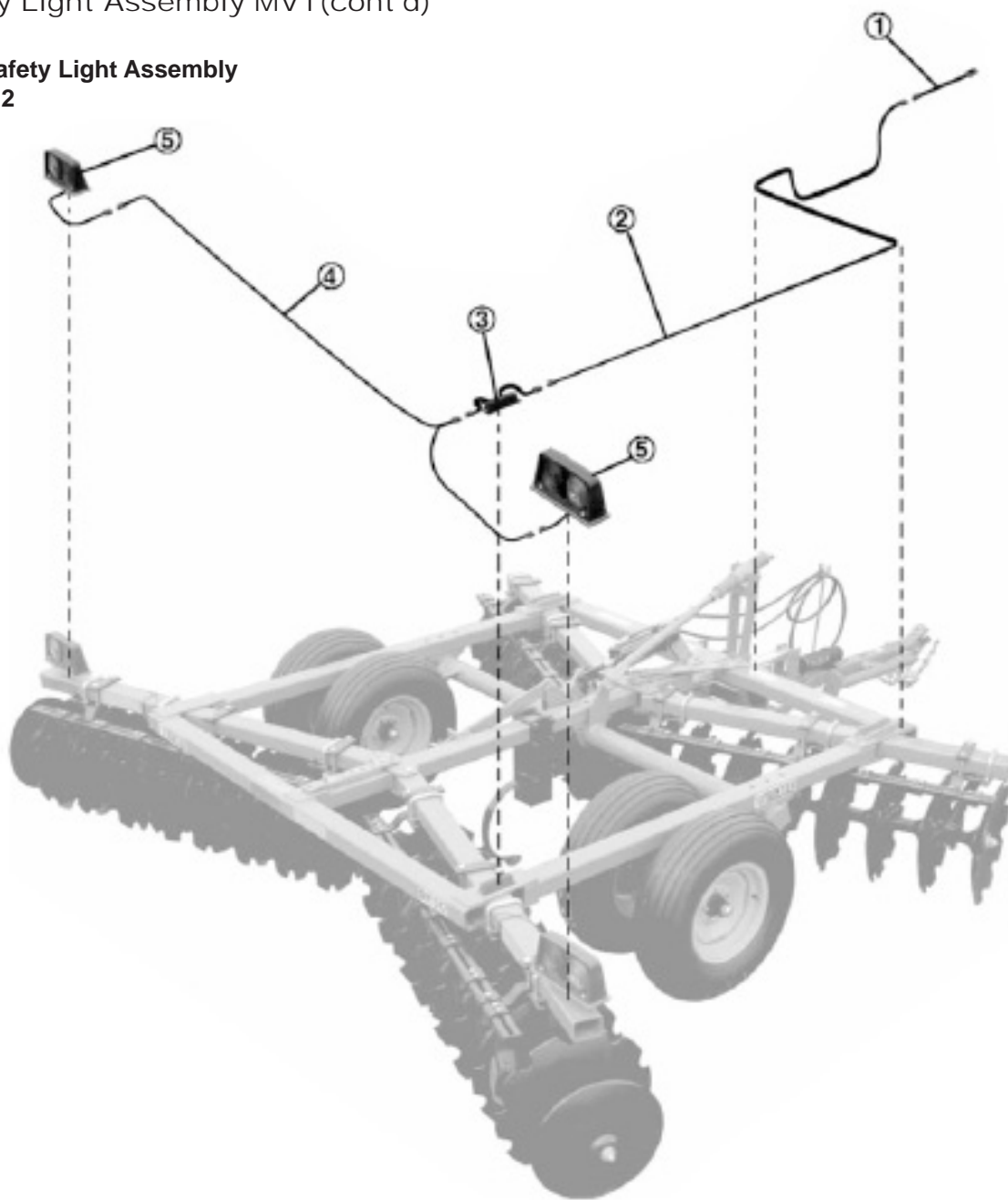
The light mount brackets (Ref.3) are attached to the rear gang beams from the factory. It may be

MVT Safety Light



necessary to loosen the 5/8" hex nut(Ref.5) in order to rotate the light mount bracket and attach the light fixture. Attach the light fixture to the light mount bracket using the 1/4" X 1 1/2" Gr. 2 hex bolts(Ref.1) and 1/4" nylon hex nuts(Ref.4) and tighten. Please see Bolt Torque Chart (Page 45) for proper torque information. Turn the light unit so that the red and orange lights are to the rear and the orange is on the outside. Make sure they are clearly visible from the rear of the unit and tighten the 5/8" nut. Please see Bolt Torque Chart (Page 45) for proper torque information.

MVT Safety Light Assembly
Figure 2



Begin assembling the wire harness from the front of the unit. Plug the harness extension (Ref.2 Figure 2) to the tractor connector (Ref. 1). Lay the harness extension around the right side of the unit as shown in Figure 2. Connect the harness extension (Ref.2) to the light control module (Ref. 3) with the holes on the mainframe. Insert 1/4" screws into the two holes and tighten. Connect the Y harness (Ref. 4) to the light control module (Ref. 3). Attach the short end of the Y harness (Ref. 4) into the closest light fixture (Ref. 5). Attach the

long end of the Y harness (Ref. 4) into the furthest light fixture (Ref. 5). Hook up the front of the light harness to a tractor and check that all lights are working properly.

Use cable ties to attach the light harness to the mainframe. Be careful about pinch points and rubbing areas of machine surfaces that might damage the wiring. Allow room from the front of the mainframe to the tractor for right and left turning radius.

DEALER INSTRUCTIONS(cont'd.)

(Dealer's Responsibility)

Inspect the equipment thoroughly after assembly to be certain it is set up properly before delivering it to the customer. The following check list is a reminder of points to inspect.

Check off each item if it is found satisfactory or after proper adjustment is made.

_____ Check that all safety decals are installed and in good condition. Replace if damaged.

_____ Check all bolts to be sure they are tight.

_____ Check that all cotter pins and safety pins are properly installed.

_____ Show customer the safe, proper procedures to be used when mounting, dismounting, and storing equipment.

_____ Inform the customer on the correct use and safety precautions for hydraulic components.

_____ Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any

hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.

_____ Show customer how to make adjustments.

_____ Present Owner's/Operator's Manual and request that customer and all operators read it before operating equipment. Point out the manual safety rules, explain their meanings and emphasize the increased safety hazards that exist when safety rules are not followed.

_____ Point out the safety decals. Explain their meaning and the need to keep them in place and in good condition. Emphasize the increased safety hazards when instructions are not followed.

_____ Explain to customer the potential crushing hazards of going underneath raised equipment. Instruct customer that service work does not require going underneath unit and never to do so.

_____ Complete the Warranty Registration located on the Frontier website.

Operation

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement, and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator." We ask you to be that kind of operator.

The operator is responsible for the safe operation of this equipment. The operator must be properly trained. Operators should be familiar with the equipment, the tractor, and all safety practices before starting operation. Read the safety rules and safety decals on pages 3-8.

Owner should check and tighten all hardware after the first hour of operation. The break in stage of your new disk harrow can cause minimal loosening of disk gangs and other hardware as the new paint wears. Please see Bolt Torque Chart (page 45) for proper torque information.

WARNING

- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in "locked up" position at all times.
- Never allow children or untrained persons to operate equipment.
- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic maintenance, purge any air in

hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.

- Keep bystanders away from equipment.
- **NEVER GO UNDERNEATH EQUIPMENT.** Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.
- Service work does not require going underneath.
- Read Manual for service instructions or have service performed by a qualified dealer.
- Stop tractor and implement immediately upon striking an obstruction. Turn off engine, remove key, inspect, and repair any damage before resuming operation.
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head.

Owner/Operator Pre-Operation Checklist (Owner's/Operator's Responsibility)

____ Review and follow all safety rules and safety decal instructions on page 3 through page 8.

____ Check that equipment is properly and securely attached to tractor.

____ Check that all safety decals are installed and in good condition. Replace if damaged.

____ Check that all hardware is properly installed and secured.

____ Do not allow riders.

____ Make sure tractor ROPS or ROPS CAB and seat belt are in good condition. Keep seat belt securely fastened during operation.

GETTING STARTED

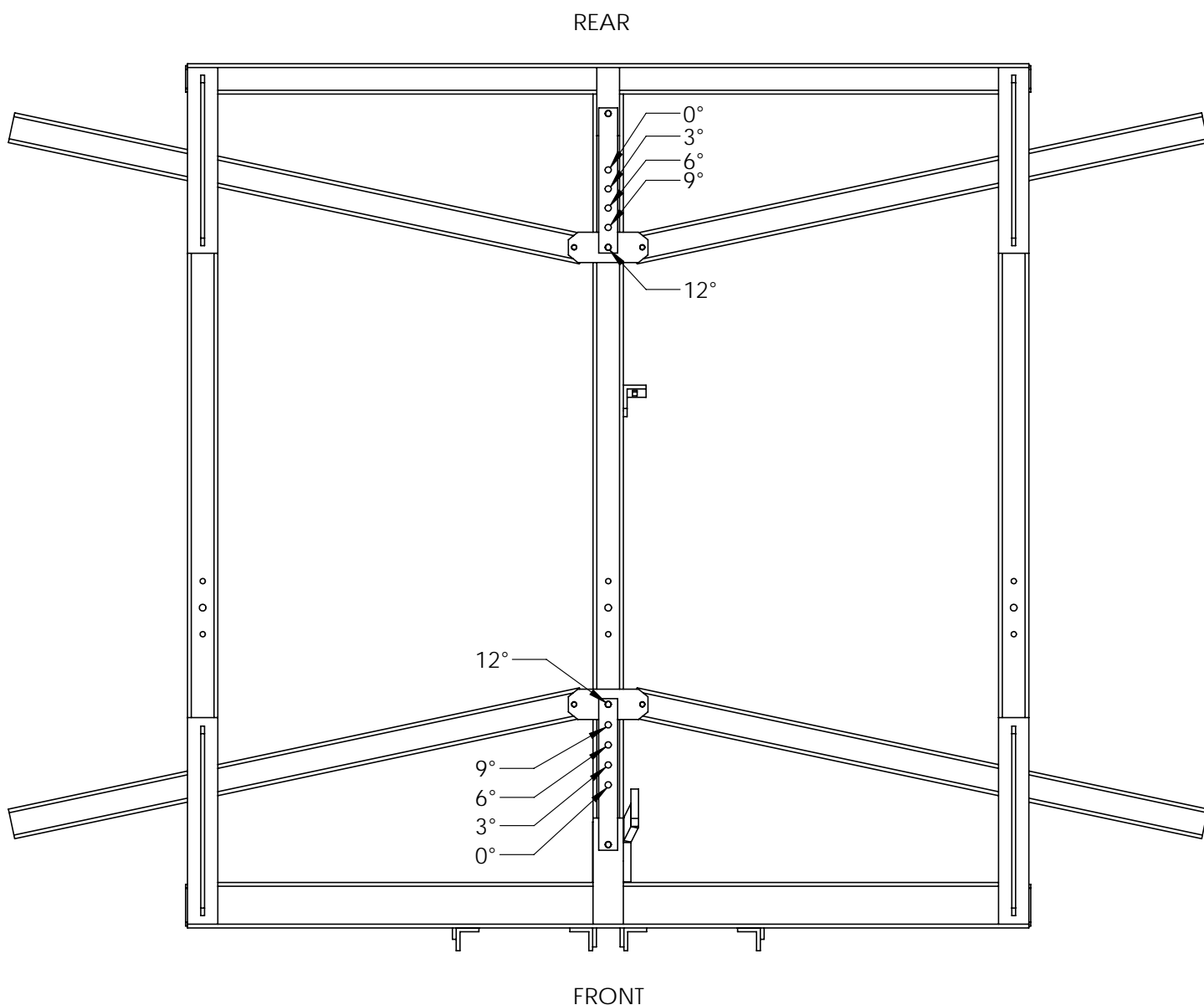
5 simple adjustments to remember to help operate disk properly.

STEP 1: SET INITIAL GANG ANGLE

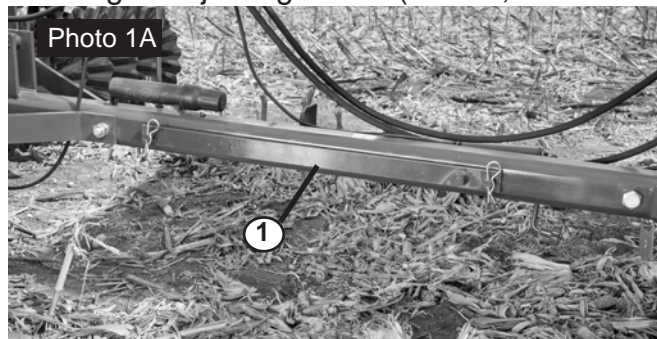
Setting the initial gang angle on the MVT vertical tillage unit is very important in providing good penetration capabilities, good soil sizing abilities and minimal soil ridging problems. Listed below are six settings for gang angles(Figure A). For a general purpose gang angle set the front and rear to 6°, a more

aggressive gang angle set at 12°, and a less aggressive gang angle set at 0°-3°. It is recommended the unit be set with the general purpose gang angles first. There are additional gang angle settings for the front and rear other than the three basic settings listed before. When making gang adjustments, be careful to keep hands and feet clear of sliding parts and possible pinch points. To adjust the gang angle, the unit should be lifted and secured with the transport lock out bracket.

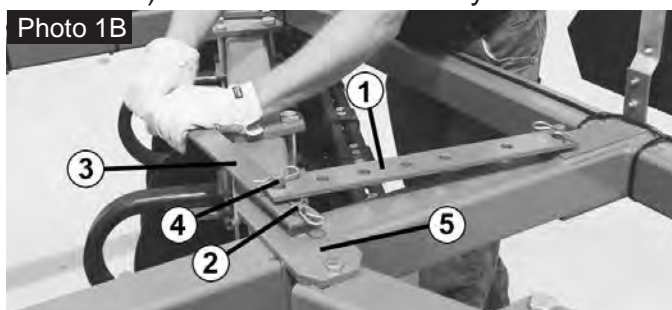
Figure A



To adjust the front or rear gang angles remove the angle adjusting lever (Ref. 1, Photo 1A)



from the tongue assembly. Remove the gang adjusting bar (Ref. 1, Photo 1B) from slide plate stud (Ref. 2, Photo 1B). Place hole in angle adjusting lever (Ref. 3, Photo 1B) over slide plate stud (Ref. 2, Photo 1B). Insert angle adjusting lever stud (Ref. 4, Photo 1B) into proper hole in gang adjusting bar. This will provide leverage to shift the slide plate (Ref. 5, Photo 1B) whichever direction you desire for



the gang angle needed. Once desired gang angle is set, position the gang adjusting bar over the stud on slide plate. Use hair pin clips to secure. Hang the angle adjusting lever back on hose holder until further adjustments are needed.

STEP 2: LEVEL VERTICAL TILLAGE UNIT FRONT TO REAR

The leveling system automatically keeps the disk level from full depth penetration all the way up to transport height. Once it is set for the particular tractor drawbar height, only minor adjustments will ever be required. The springs also allow pressure controlled flexibility when obstructions and/or uneven terrain are encountered.

Most operating problems are caused by unequal

pressure and penetration of the front and rear gangs. Adjust the leveling system to obtain equal penetration by the front and rear gangs and stabilize the direction and side shift of the unit.

To adjust the leveling system use the handle welded to the leveling arm (Ref. 1, Photo 2).

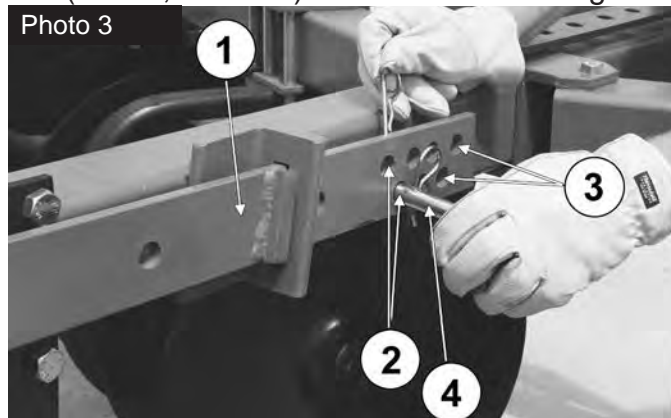


Turning clockwise will lower the rear and counter-clockwise will raise the rear. It is recommended to re-adjust the levelness when unit is at actual working depth to prevent ridging.

IMPORTANT: It is important that the transport wheels be in contact with the ground and have some pressure on them for the leveling system to work properly. If they are not in contact with the ground the front gangs could severely gouge into the ground and cause ridges.

STEP 3: SET WORKING DEPTH

The MVT17 is equipped with a depth control bar (Ref. 1, Photo 3). The shallow diskings hole



positions are indicated by (Ref. 2, Photo 3) and the deep diskings hole positions are indicated by (Ref. 3, Photo 3). To set depth control, stop the tractor with the disk clear of the ground. Lower the unit to the ground. Remove the pin (Ref. 4, Photo 3) from the depth control bar. Disengage

the parking brake on the tractor and engage the tractor. Begin pulling unit to desired depth. Turn off tractor, remove key, and engage the parking brake before dismounting the tractor. Replace the pin (Ref. 4, Photo 3) in the depth control bar through the nearest hole (Ref. 2, Photo 3) to the depth control bar stop. Once again, it is very important to have the transport wheels in contact with the ground and have some pressure on them for the leveling system to make a level pass and prevent ridging.

STEP 4: SET DISKING SPEED

The recommended operating speed for the MVT vertical tillage unit is 6-10 MPH.

STEP 5: ADJUST GANG ANGLE IF NEEDED

Once the initial setup steps are finished, if a deeper penetration is desired, increase the front & rear gang angles. If a smoother soil profile is desired, decrease the front & rear gang angles. Each trial run should be made with the tractor in the same gear and approximately the same RPM. Keep in mind that many variables affect the operation of your tillage tool. These include, but are not limited to penetration, speed, soil conditions, etc. Any changes in any one of these could cause a requirement for further adjustments.

Observe the soil behind the unit. It should be level and smooth. If the unit leaves a water furrow in the center, and you've verified that the unit is set level, the transport tires have some weight on them and your operating speed is between 6 and 10 mph, this would indicate that the front gangs are more aggressive than the rear gangs. To correct this, either increase the angle of the rear gangs or decrease the angle of the front gangs. Conversely, if the unit is ridging, that is leaving a ridge behind it, this would indicate that the rear gangs are more aggressive than the front gangs. To correct this, either decrease the angle of the rear gangs or increase the angle of the front gangs.

TRANSPORTATION AND LOCK OUT

WARNING

- Always comply with all state and local laws governing highway safety and lighting and marking requirements.
- Do not exceed this implements transport speed of 20 mph (32 kmh). Exceeding this speed may cause loss of control during transport or braking and serious injury or death.
- Transport only with a properly ballasted tractor and a properly attached safety tow chain.
- Do not transport with a motor vehicle.

The MVT comes equipped with a RED transport lock out device. It is shipped to the dealer in transport lock out position from the factory. (Ref. 1, Photo 4). Storage for the transport is located on the rocker arm assembly (Photo 5).

Photo 4

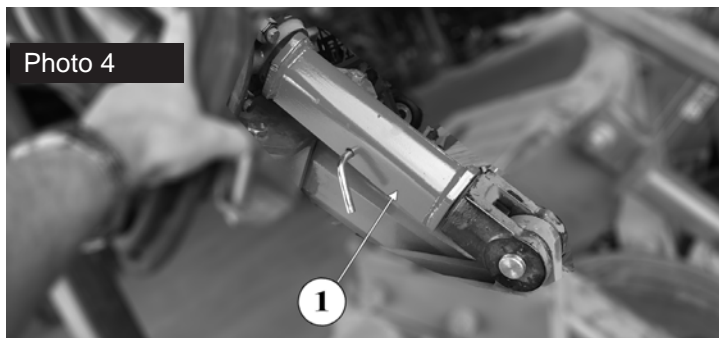


Photo 5



Gang Adjustment Troubleshooting

- | | |
|--|--|
| 1. Unit not tracking or is fishtailing | A. Adjust leveling system to increase weight on the rear of the disk and make sure the wheels have some weight on them
B. Disk assembled incorrectly. Refer to assembly instructions. |
| 2. Unit not tracking: skipping, jumping, and fishtailing(in untilled, hard soil) | A. Level disk and make sure the wheels have some weight on them
B. Reduce speed.
C. Reduce gang angle. |
| 3. Unit leaving water furrow in center. | A. Disk not level. Lower rear gangs or raise front gangs.
B. Increase speed.
C. Increase angle on rear gangs.
D. Decrease angle on front gangs.
E. Any combination of the above. |
| 4. Unit ridging or leaving behind a high spot in center of machine. | A. Disk not level. Raise rear gangs or lower front gangs.
B. Decrease speed.
C. Decrease angle on rear gangs
D. Increase angle on front gangs.
E. Any combination of the above. |
| 5. Unit leaving water furrows on outside of each rear gang. | A. Add optional outrigger attachments. |
| 6. Blades plugging with soil or trash. | A. Add optional heavy scraper kit.
If already equipped, re-adjust them.
B. Soil conditions not suitable for disking due to excessive moisture. |
| 7. Unit leaving a balk between front inside gangs. | A. Add optional center sweep balkbreaker assembly. |
| 8. Unit does not penetrate as desired. | A. Check gang angle. Increase slightly, keeping front gang angle approximately 2 degrees more aggressive than the rear.
B. Check depth control and that cylinders retract freely. |

Owner Service

WARNING

- **NEVER GO UNDERNEATH EQUIPMENT.** Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.
- Service work does not require going underneath.
- Read Manual for service instructions or have service performed by a qualified dealer.

WARNING

The information in this section is written for operators who possess basic mechanical skills. If you need help, your dealer has trained service technicians available. For your protection, read and follow the safety information in this manual.

- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to equipment, lower the 3 point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.

CAUTION

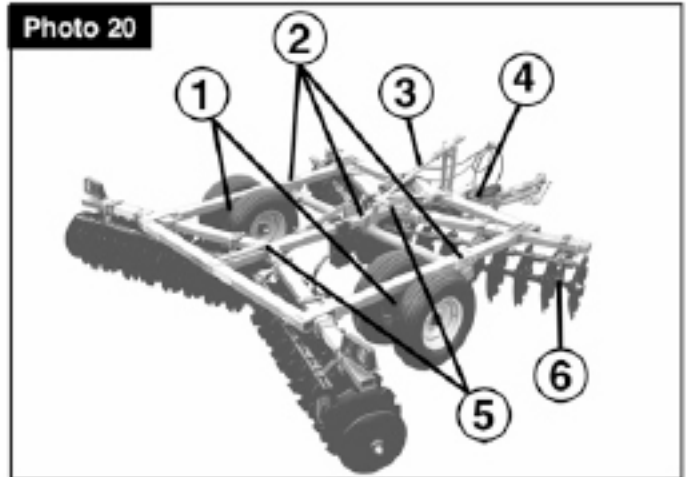
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head.
- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic main-

tenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.

- Route hydraulic hoses carefully to prevent damage. Hoses must not be twisted, bent sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hose immediately.
- Do not connect a low-pressure hydraulic hose into a high-pressure system—it will burst the hose. Do not use a high-pressure hose in place of a low-pressure hose—it is possible to rupture the valve.

Lubrication

Photo 20



Lubricate the following every 50 hours or annually:

- Wheel hubs(Ref. 1, Photo 20), one on each hub.
- Wheel carriage bearings(Ref. 2), One on each wheel carriage bracket.
- Leveling tube(Ref. 3).
- Leveling rocker pivot(Ref. 4), 2 at bottom of rocker pivot.

Lubricate the following every 25 hours:

- Optional regreasable gang bearings(Ref. 6) with lithium based pressure gun grease. One on each gang bearing.
- If gang angles are hard to slide place some grease

Lubrication(cont'd.)

on the mainframe where the gang angle turn-buckles slide.

Lubricate the following at the end of each use period :

- Transport wheel bearings. Pack with heavy wheel bearing grease.

Check all gang axle nuts for proper torque periodically. Please see Bolt Torque Chart (Page 45) for proper torque information.

Check gang hanger bolts periodically. Please see Bolt Torque Chart (Page 45) for proper torque information.



WARNING

Gang Assembly for Maintenance

- When performing maintenance or repairs make sure the equipment is in the lowered position and both the mainframe and gangs are properly blocked and secured to prevent rolling. Failure to do so can cause serious injury or death.

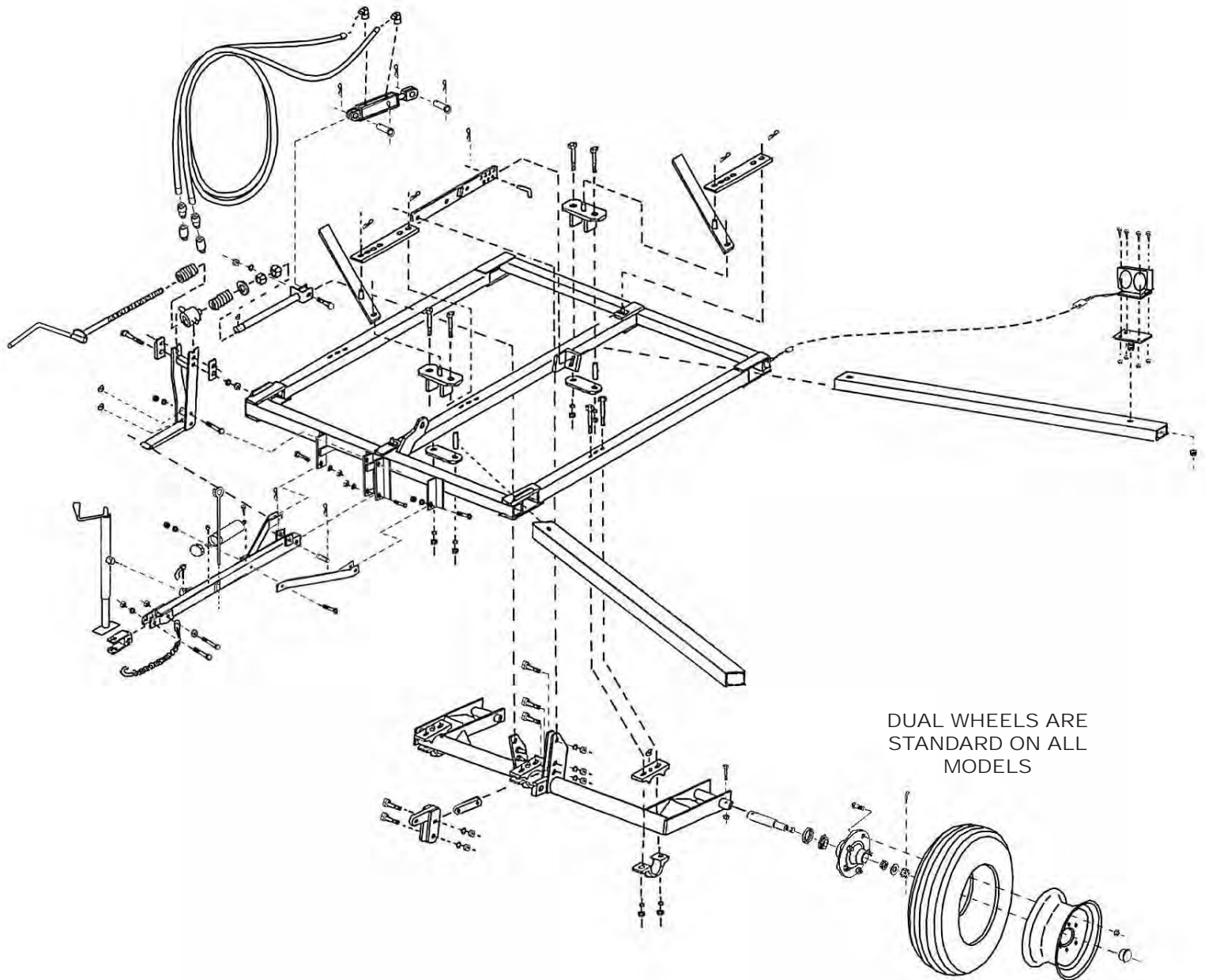
When gang component replacement is required, carefully observe all safety issues. Place unit on level ground prior to gang drop. Also make sure that gangs are blocked to keep them from rolling in either direction. After unit is lowered to ground and gangs are secure, loosen nuts on all u-bolts holding hangers to main frame. Observe the sequence and location of each gang component and refer to the gang diagrams on Pages 33 and 35 for removal and replacement of the desired component. After replacement is completed reinstall gang parts in proper order as shown on gang diagrams on Pages 33 and 35. Make sure that the gang nut on the gang axle is properly tightened after replacements are made. Refer to Bolt Tightening Torque Chart on (Page 45) for proper torque information.

Storage

Lower unit for storage on level ground with gangs resting on plyboard or other sheet material to keep components out of the ground.

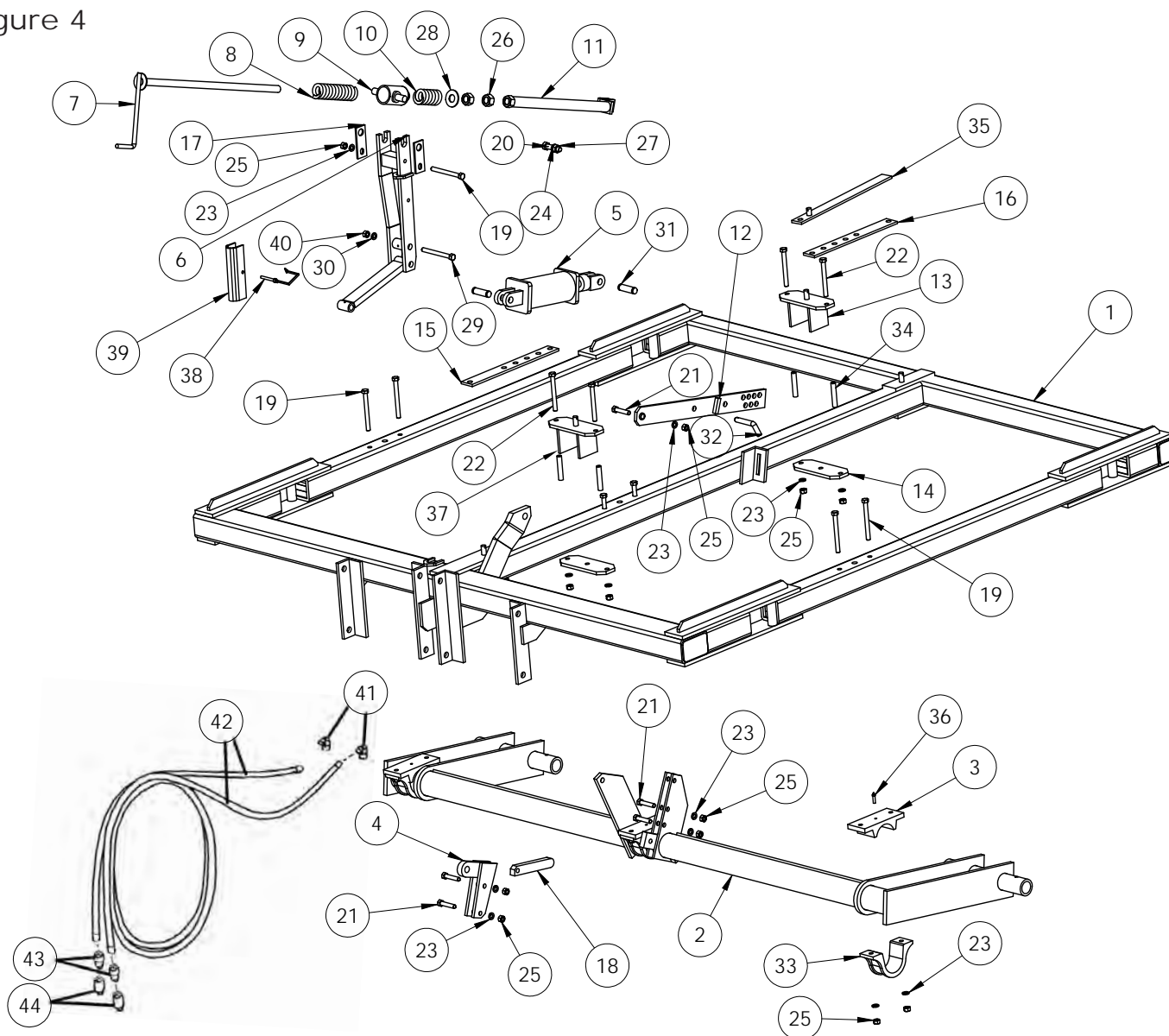
MVT Assembly Schematic

Figure 3



Assembly Schematic 28

MVT Main Parts Schematic
Figure 4



MVT Main Parts List

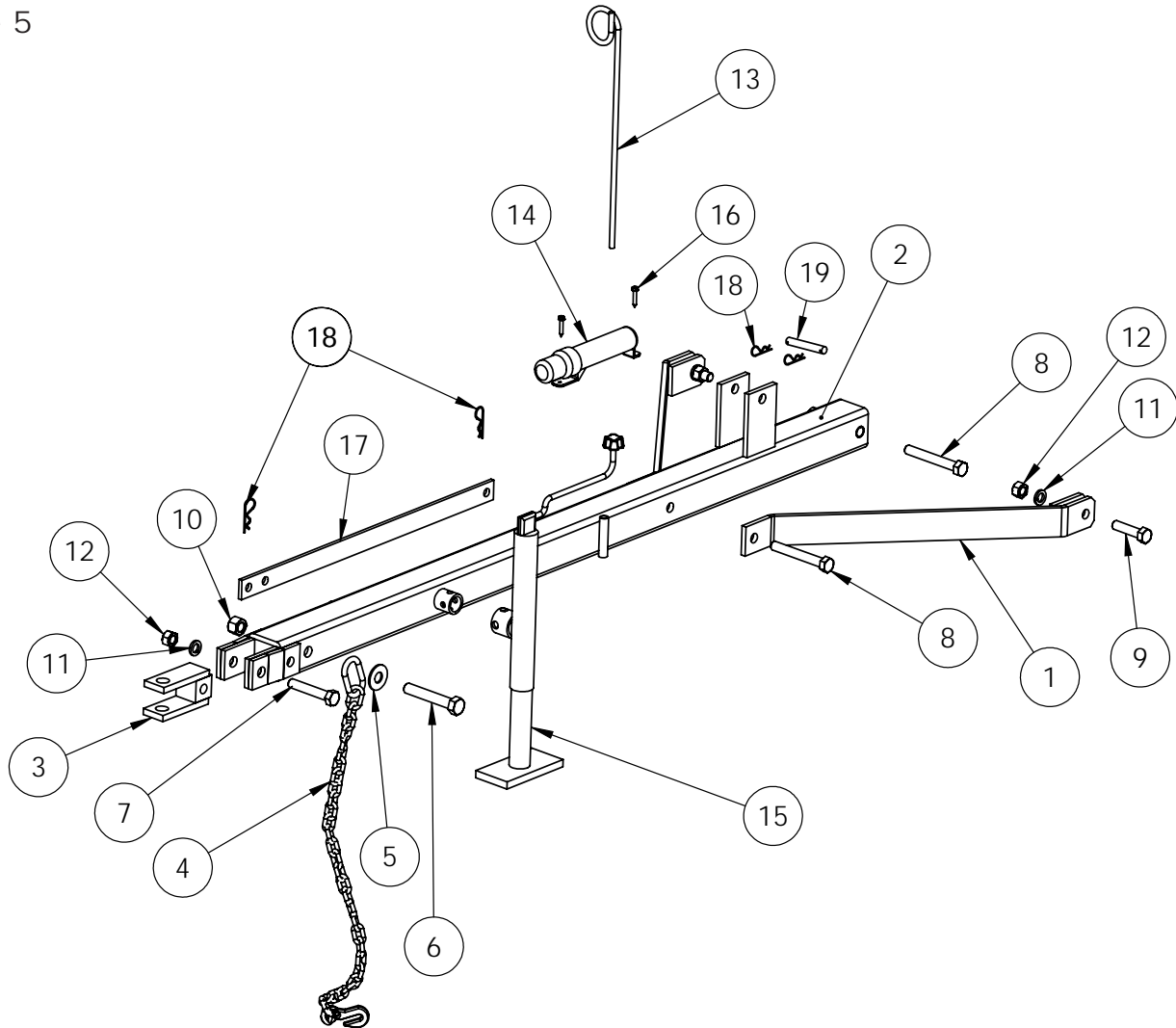
Ref.#	Part #	Description	Qty.
1	16105	MAIN FRAME- MVT1710, MVT1712	1
	16106	MAIN FRAME- MVT1713, MVT1715	1
2	16130	WHEEL CARRIAGE- MVT1710, MVT1712	1
	16131	WHEEL CARRIAGE- MVT1713, MVT1715	1
3	T-58	WHEEL CARRIAGE BEARING TOP	3
4	9892	CYLINDER LATCH WELDMENT	1
5	10610	CYLINDER	1
6	9004	ROCKER ARM AND LINK BAR	1
7	9011	LEVELING ROD WELDMENT	1
8	T-509	ADJUSTING SPRING 8 1/2"	1

MVT Main Parts List (cont'd)

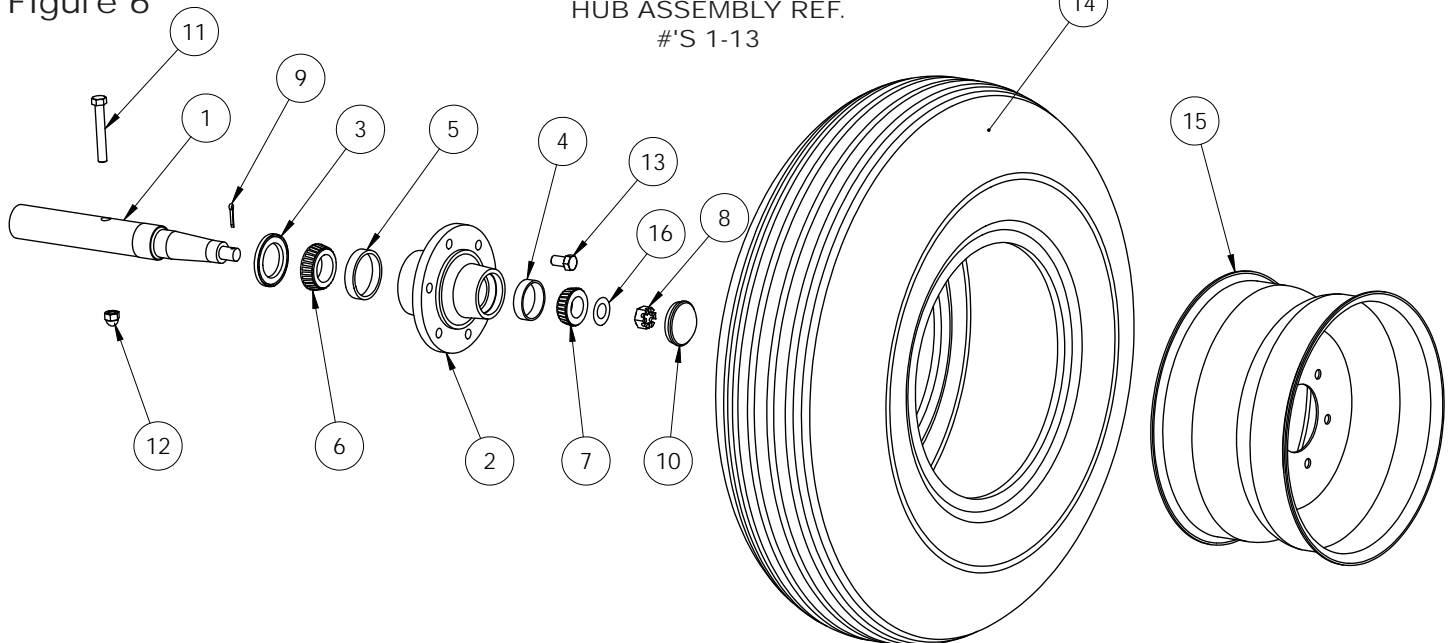
Ref.#	Part #	Description	Qty.
9	T-510	SPRING HOUSING	1
10	T-511	ADJUSTING SPRING 4 1/2"	1
11	11991	ADJUSTING TUBE WELDMNET	1
12	12387	DEPTH CONTROL BAR WELDMENT	1
13	12409	SLIDE PLATE TOP WELDMENT, REAR	1
14	11421	SLIDE PLATE, BOTTOM	2
15	16140	FRONT ANGLE ADJUSTMENT BAR, MVT1710, MVT1712 17, 1/8"	1
	16138	FRONT ANGLE ADJUSTMENT BAR, MVT1713, MVT1715, 20"	1
16	16141	REAR ANGLE ADJUSTMENT BAR, MVT1710, MVT1712, 16 1/4"	1
	16139	REAR ANGLE ADJUSTMENT BAR, MVT1713, MVT1715, 16 7/8"	1
17	9006	RETAINER STRAP	2
18	9893	WHEEL LIFT BAR	1
19	T-749	HEX BOLT, 5/8" X 6 1/2" GR. 5	7
20	T-763	HEX BOLT, 3/4" X 3" GR. 5	1
21	9973	HEX BOLT, 5/8" X 3" GR. 5	5
22	T-748	HEX BOLT, 5/8" X 6" GR. 5	4
23	T-24	LOCK WASHER, 5/8	16
24	T-31	LOCK WASHER, 3/4"	1
25	T-22	HEX NUT, 5/8	16
26	T-18	HEX NUT, 1 1/8"	2
27	T-27	HEX NUT, 3/4"	1
28	T-698	FLAT WASHER, 1 1/8"	1
29	T-773	HEX BOLT, 7/8" X 6 1/2" GR. 5	1
30	T-21	LOCK WASHER, 7/8"	2
31	15374	CYLINDER PINS, 1" X 3 1/2"	2
32	11034	PARKING STAND PIN	1
33	T-57	WHEEL CARRIAGE BEARING BOTTOM	3
34	T-610	BUSHING, 5/8" X 4 1/16"	4
35	16190	ANGLE ADJUSTMENT LEVER	1
36	12511	EXTENDED GREASE FITTING	3
37	16202	SLIDE PLATE TOP WELDMENT, FRONT	1
38	16219	CYLINDER LOCK PIN	1
39	16216	CYLINDER LOCK	1
40	T-19	HEX NUT, 7/8"	
41	15540	3/4" ORB MALE- 3/8" FEMALE SWIVEL ELBOW	2
42	13071	160" HYDRAULIC HOSE	2

* M/S - Model Specific

Figure 5



MVT Wheel Parts Schematic
Figure 6



16227 SPINDLE AND
HUB ASSEMBLY REF.
#'S 1-13

DUAL WHEELS ARE
STANDARD ON ALL
MODELS

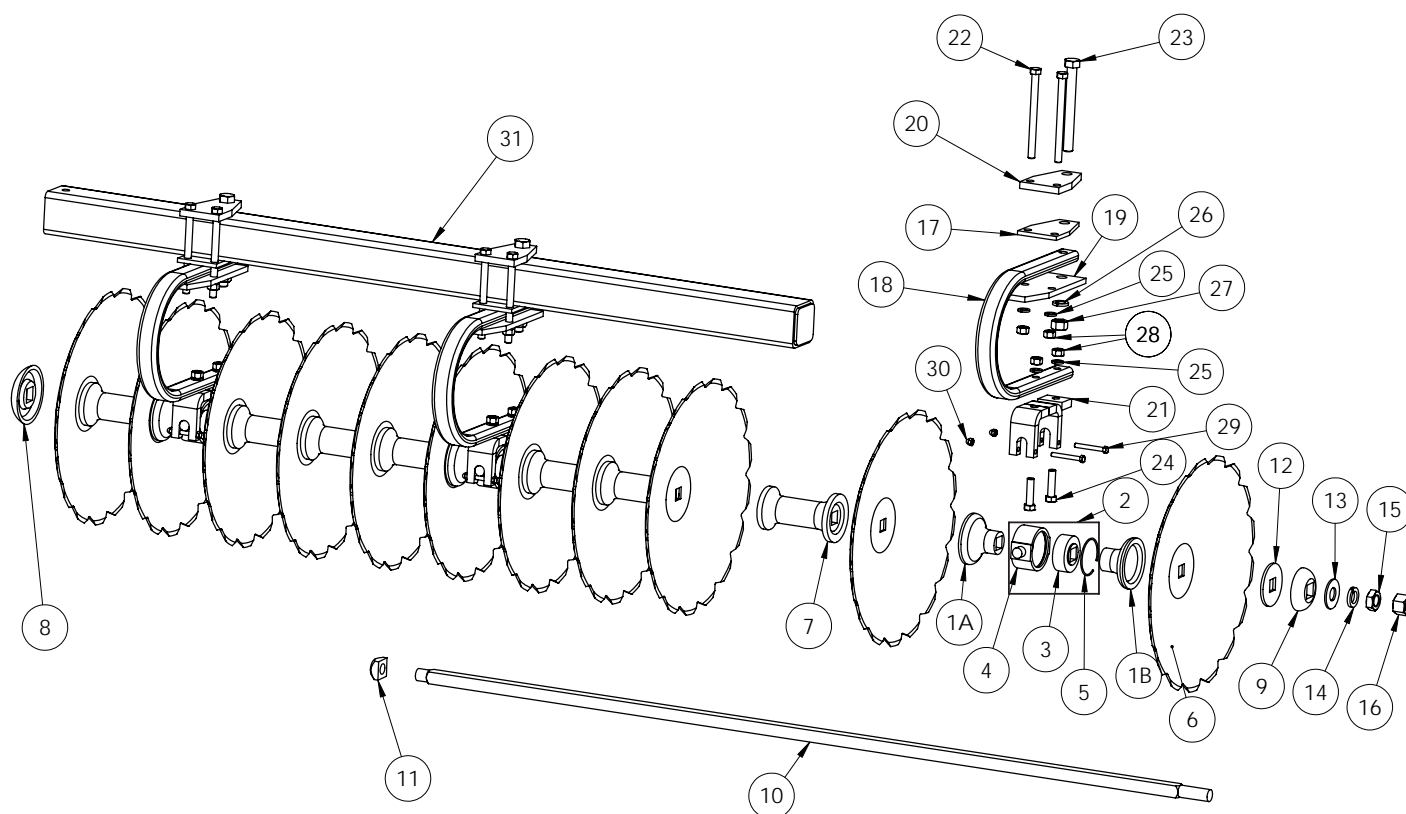
MVT Drawbar Parts List

Ref.#	Part #	Description	Qty.
1	T-970	TONGUE BRACE WELDMENT	2
2	16168	TONGUE WELDMENT	1
3	T-2665	TONGUE CLEVIS WELDMENT	1
4	15186	SAFETY CHAIN	1
5	T-606	FLAT WASHER, 1"	1
6	15349	HEX BOLT, 1" X 6" GR. 5	1
7	15567	HEX BOLT, 7/8" X 6" GR.5	1
8	T-773	HEX BOLT, 7/8" X 6 1/2" GR. 5	2
9	T-770	HEX BOLT, 7/8" X 3 1/2" GR. 5	2
10	10332	LOCK NUT, 1"	1
11	T-21	LOCK WASHER, 7/8"	5
12	T-19	HEX NUT, 7/8"	5
13	T-465	HOSE HOLDER	1
14	15189	ASSEMBLY MANUAL TUBE	1
15	T-933	TONGUE JACK	1
16	15348	SELF TAPPING SCREW	2
17	16190	ANGLE ADJUSTMENT BAR	1
18	9979	COTTOR HAIR PIN	4

MVT Wheel Parts List

Ref.#	Part #	Description	Qty.
1	9269	SPINDLE, 2" X 15"	4
2	10042	HUB, 6 BOLT	4
3	10039	SEAL, 1 7/8" X 3 1/16" OD	4
4	T-583	OUTER WHEEL BEARING CUP 2.328	4
5	9962	INNER WHEEL BEARING CUP 2 7/8"	4
6	10040	INNER WHEEL BEARING, 1 5/8"	4
7	T-575	OUTER WHEEL BEARING, 1 1/4"	4
8	T-567	SLOTTED NUT, 3/4" UNF	4
9	T-342	COTTER PIN, 5/32" X 1 1/4"	4
10	T-578	HUB CAP	4
11	12163	HEX BOLT, 1/2" X 3 1/2"	4
12	9226	FLANGE LOCKNUT, 1/2"	4
13	13387	LUG BOLT, 9/16" X 1"	4
14	11L158T	IMPLEMENT TIRE, (11L-15/8T TUBELESS)	4
15	T-614	15" X 8" 6-HOLE RIM	4
16	T-723	FLAT WASHER, 3/4"	4
NS	16220	TIRE AND RIM ASSEMBLED (11L158T & T614)	4

MVT Front Gang Parts Schematic
Figure 7

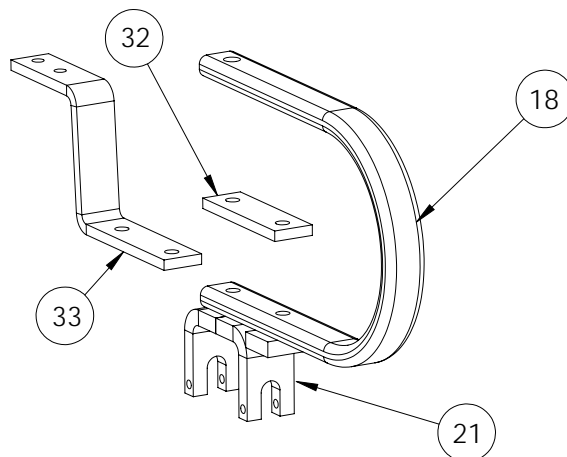


MVT Front Gang Parts List

Ref.#	Part #	Description	Qty.
1A	T-49	END SPACER, 3 3/4"	*MS
1B	9524	END SPACER, 2 1/4"	*MS
2	T-MBT602	HOUSING & BEARING ASSEMBLY (SEALED)	*MS
	T-MBRT602R	HOUSING & BEARING ASSEMBLY (RELUBE)	*MS
3	T-602	SEALED BEARING, 1 1/8"	*MS
	T-602R	RELUBE BEARING, 1 1/8"	*MS
4	T-MB	SEALED TRUNNION BEARING HOUSING	*MS
	T-MBR	RELUBE TRUNNION BEARING HOUSING	*MS
5	T-722	SNAP RING, 3 1/2"	*MS
6	2-22197VTR	22" MVT-REX CONCAVE BLADE	*MS
	2-20236VTF	20" VORTEX COULTER BLADE	*MS
7	T-91	SPACER SPOOL 1 1/8" X 7 1/2"	*MS
8	T-2	1 1/8" BUMPER WASHER	2
9	T1	1 1/8" END WASHER	2
10	16142	AXLE 1 1/8" X 59 1/4" MVT1710	2
	16143	AXLE 1 1/8" X 67" MVT1712	2

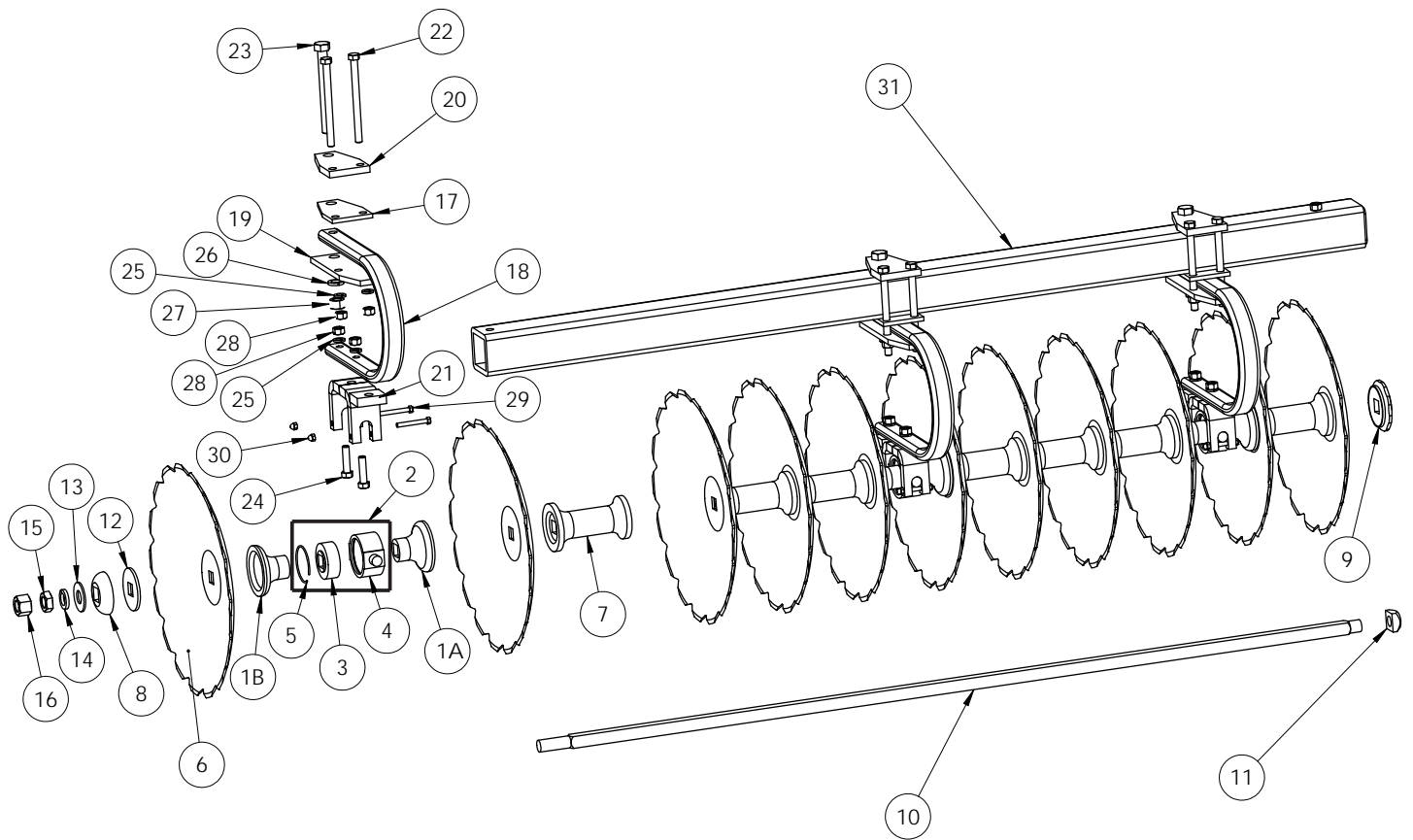
MVT Front Gang Parts List (cont'd)

Ref.#	Part #	Description	Qty.
	16144	AXLE 1 1/8" X 74 3/4" MVT1713	2
	16145	AXLE 1 1/8" X 82 1/2" MVT1715	2
11	L11398	SQ. AXLE NUT, 1 1/8"	2
12	11170	1 1/8" SPACER WASHER (IF NEEDED)	*MS
13	T-698	FLAT WASHER, 1 1/8"	2
14	T-20	LOCK WASHER, 1 1/8"	2
15	9401	JAM NUT, 1 1/8"	2
16	T-18A	LOCK NUT, 1 1/8"	2
17	9220	SPRING MOUNT MIDDLE PLATE	*MS
18	9222	SPRING HANGER SHANK	*MS
19	9221	SPRING MOUNT BOTTOM PLATE	*MS
20	9219	SPRING MOUNT TOP PLATE	*MS
21	12160	TRUNION MOUNT WELDMENT	*MS
22	T-753	HEX BOLT, 5/8" X 8" GR. 5	*MS
23	11032	HEX BOLT, 3/4" X 8" GR. 5	*MS
24	T-742	HEX BOLT, 5/8" X 3 1/2" GR. 5	*MS
25	T-24	LOCK WASHER, 5/8	*MS
26	T-31	LOCK WASHER, 3/4"	*MS
27	T-27	HEX NUT, 3/4"	*MS
28	T-22	HEX NUT, 5/8	*MS
29	T-892	HEX BOLT, 3/8" X 3" GR. 5	4
30	12899	FLANGE LOCK NUT, 3/8"	4
31	16146	GANG BEAM WELDMENT, 56" MVT1710	2
	16148	GANG BEAM WELDMENT, 62" MVT1712	2
	16150	GANG BEAM WELDMENT, 70" MVT1713	2
	16152	GANG BEAM WELDMENT, 77" MVT1715	2
32	16224	SCRAPER SPACER PLATE	*MS
33	16223	SCRAPER BAR MOUNT BRACKET	*MS



* M/S - Model Specific

MVT Rear Gang Parts Schematic
Figure 8

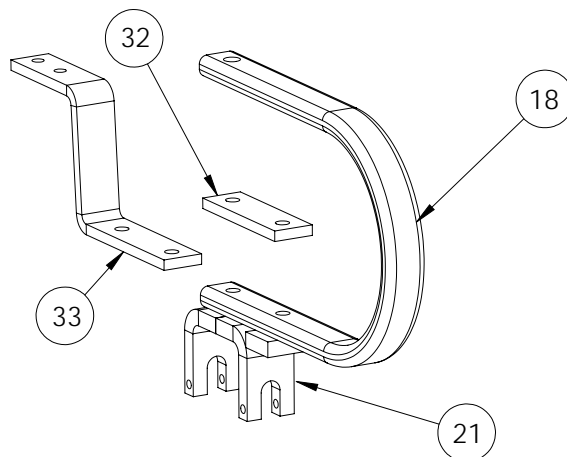


MVT Rear Gang Parts List

Ref.#	Part #	Description	Qty.
1A	T-49	END SPACER, 3 3/4"	*MS
1B	9524	END SPACER, 2 1/4"	*MS
2	T-MBT602	HOUSING & BEARING ASSEMBLY	*MS
	T-MBRT602R	HOUSING & BEARING ASSEMBLY (RELUBE)	*MS
3	T-602	1 1/8" BEARING	*MS
	T-602R	RELUBE BEARING, 1 1/8"	*MS
4	T-MB	1 1/8" TRUNNION BEARING HOUSING	*MS
	T-MBR	RELUBE TRUNNION BEARING HOUSING	*MS
5	T-722	SNAP RING, 3 1/2	*MS
6	2-22197VTR	22" MVT-REX CONCAVE BLADE	*MS
	2-20236VTF	20" VORTEX COULTER BLADE	*MS
7	T-91	SPACER SPOOL 1 1/8" X 7 1/2"	*MS
8	T-1	END WASHER	2
9	T-OR1	OUTRIGGER WASHER 1 1/8"	2
10	16142	AXLE 1 1/8" X 59 1/4" MVT1710	2
	16143	AXLE 1 1/8" X 67" MVT1712	2

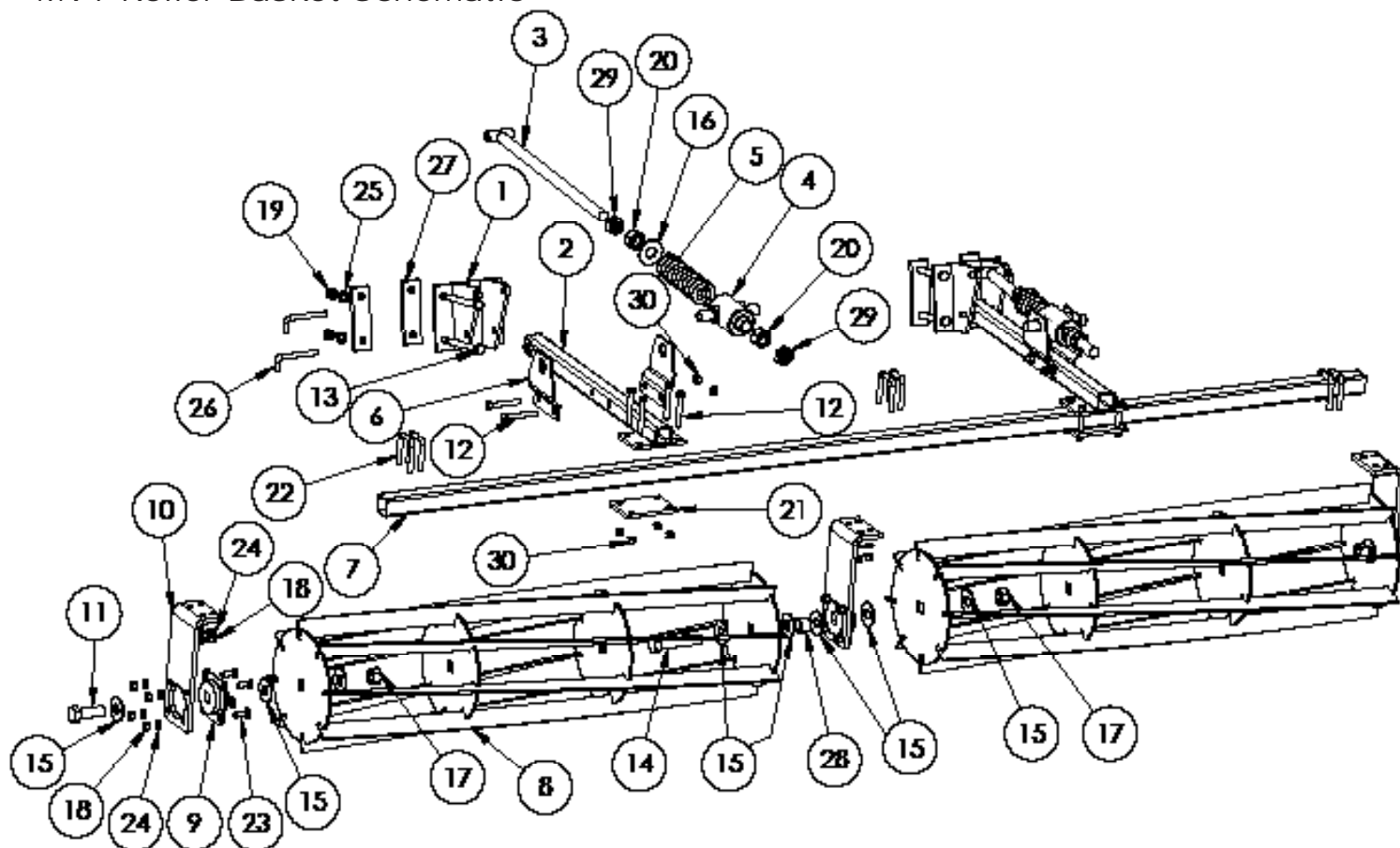
MVT Rear Gang Parts List (cont'd)

Ref.#	Part #	Description	Qty.
	16144	AXLE 1 1/8" X 74 3/4" MVT1713	2
	16145	AXLE 1 1/8" X 82 1/2" MVT1715	2
11	16225	LARGE SQ. AXLE NUT, 1 1/8"	2
12	11170	1 1/8" SPACER WASHER (IF NEEDED)	*MS
13	T-698	FLAT WASHER, 1 1/8"	2
14	T-20	LOCK WASHER, 1 1/8"	2
15	9401	JAM NUT, 1 1/8"	2
16	T-18A	LOCK NUT, 1 1/8"	2
17	9220	SPRING MOUNT MIDDLE PLATE	*MS
18	9222	SPRING HANGER SHANK	*MS
19	9221	SPRING MOUNT BOTTOM PLATE	*MS
20	9219	SPRING MOUNT TOP PLATE	*MS
21	12160	TRUNION MOUNT WELDMENT	*MS
22	T-753	HEX BOLT, 5/8" X 8" GR. 5	*MS
23	11032	HEX BOLT, 3/4" X 8" GR. 5	*MS
24	T-742	HEX BOLT, 5/8" X 3 1/2" GR. 5	*MS
25	T-24	LOCK WASHER, 5/8	*MS
26	T-31	LOCK WASHER, 3/4"	*MS
27	T-27	HEX NUT, 3/4"	*MS
28	T-22	HEX NUT, 5/8	*MS
29	T-892	HEX BOLT, 3/8" X 3" GR. 5	4
30	12899	FLANGE LOCK NUT, 3/8"	4
31	16147	GANG BEAM WELDMENT, 66" MVT1710	2
	16149	GANG BEAM WELDMENT, 74" MVT1712	2
	16151	GANG BEAM WELDMENT, 80" MVT1713	2
	16153	GANG BEAM WELDMENT, 87" MVT1715	2
32	16224	SCRAPER SPACER PLATE	*MS
33	16223	SCRAPER BAR MOUNT BRACKET	*MS



* M/S - Model Specific

MVT Roller Basket Schematic



MVT Roller Basket Parts List

Ref.# Part # Description Qty.

1	16071	MOUNT WELDMENT	2
2	16076	ARM WELDMENT	2
3	16080	SPRING ROD WELDMENT	2
4	T-510	SPRING HOUSING	2
5	T-509	ADJUSTING SPRING 8 1/2"	2
6	16082	PIVOT PLATE	4
7	16086	TOOL BAR 141", MVT1710	1
	16087	TOOL BAR 165", MVT1712, MVT1713	1
	16088	TOOL BAR 198", MVT1715	1
8	16089	BASKET WELDMENT, 54"	*MS
	16091	BASKET WELDMENT, 66"	*MS
	16092	BASKET WELDMENT, 78"	*MS
9	13689	1" BALL FLANGE BEARING	*MS
10	15095	GANG HANGER	*MS
11	T-780	HEX BOLT, 1" X 3 1/2"	2
12	12163	HEX BOLT, 1/2" X 3 1/2"	12
13	T-748	HEX BOLT, 5/8" X 6" GR.5	4

MVT Roller Basket Parts List (cont'd)

Ref.#	Part #	Description	Qty.
-------	--------	-------------	------

14	16166	HEX BOLT, 1" X 5" GR. 5	*MS
15	T-606	FLAT WASHER, 1"	*MS
16	T-698	FLAT WASHER, 1 1/8"	2
17	10332	LOCK NUT, 1"	*MS
18	T-26	HEX NUT, 1/2"	*MS
19	T-22	HEX NUT, 5/8	4
20	T-18	HEX NUT, 1 1/8"	4
21	16079	ARM TOOLBAR MOUNT PLATE	2
22	11138	2" X 2" U-BOLT	*MS
23	T-804	CARRIAGE BOLT, 1/2" X 1 1/2"	*MS
24	T-25	LOCK WASHER, 1/2"	*MS
25	T-24	LOCK WASHER, 5/8	4
26	9406	MOUNT PIN	4
27	16203	MOUNTING STRAP WELDMENT	4
28	16167	SPACER	*MS
29	9401	JAM NUT, 1 1/8"	4
30	16104	LOCK NUT, 1/2"	12

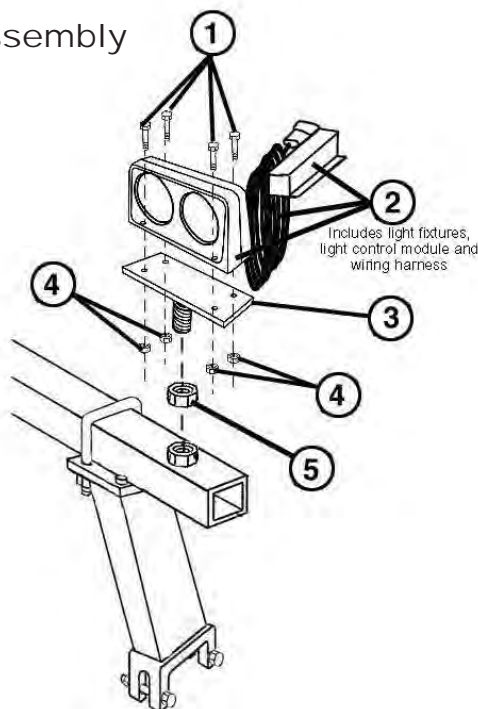
MVT17 Roller Basket Kit Model Numbers

MVT1710 RB1710
 MVT1712 RB1712
 MVT1713 RB1713
 MVT1715 RB1715

* M/S - Model Specific

MVT Safety light Kit Assembly
Figure 9

**16169MVT
LIGHT KIT WITH
BRACKET**



MVT Safety Light Kit Parts List

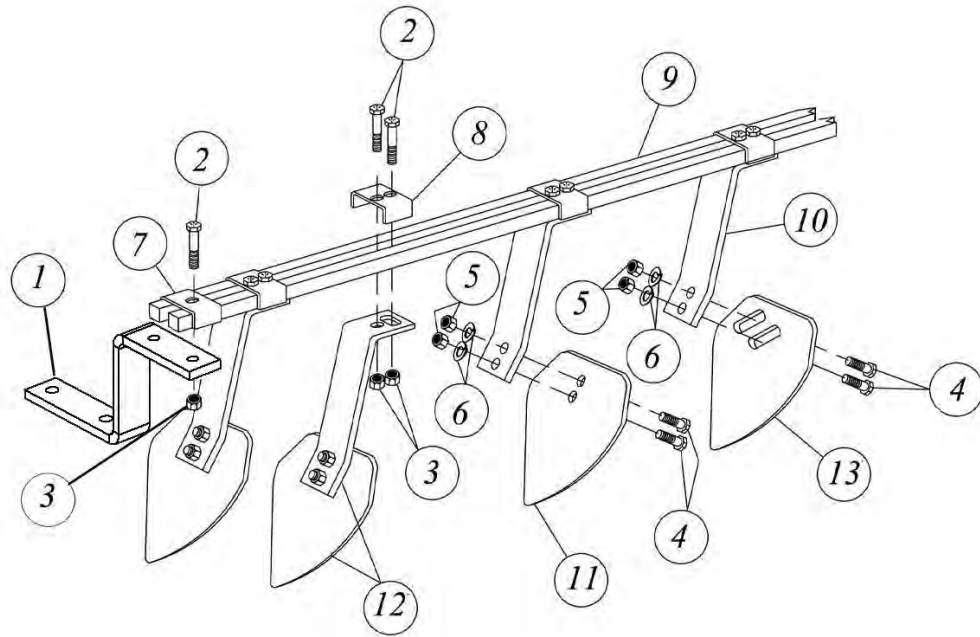
Ref.#	Part #	Description	Qty.
1	15365	HEX BOLT, 1/4" x 1 1/2", GR. 2	8
2	15346	LIGHT KIT	1
3	15347	LIGHT MOUNT BRACKET	2
4	15366	NYLON INSERT LOCK NUT, 1/4"	8
5	T-22	HEX NUT, 5/8"	2

Parts Not Shown in Figures 4 - 9

Ref.#	Part #	Description	Qty.
N/S	15194	SAFETY DECAL SHEET	1
N/S	15362	WARNING DECAL (CYLINDER LOCKUPS)	1
N/S	15363	WARNING DECAL (TRANSPORTING)	1
N/S	15364	WARNING DECAL (PRESSURIZED HYD. FLUID)	1
N/S	16212	MODEL MVT1710 DECAL	1
N/S	16213	MODEL MVT1712 DECAL	1
N/S	16214	MODEL MVT1713 DECAL	1
N/S	16215	MODEL MVT1715 DECAL	1
N/S	15195	3" FRONTIER LOGO DECAL	3
N/S	16154	MVT17 OPERATORS MANUAL	1
N/S	15199	9" RED REFLECTOR	*MS
N/S	15200	9" YELLOW REFLECTOR	2
N/S	15361	9" FLUORESCENT ORANGE DECAL	*MS
N/S	15718	4X8 CYLINDER SEAL KIT	1

Optional Equipment

Heavy Scraper Kit
Figure 10
MVT Series



MVT Series Heavy Scraper Kit Model Numbers

SK7327 for the MVT1710

SK7367 for the MVT1712

SK7407 for the MVT1713

SK7447 for the MVT1715

Heavy Scraper Kit Parts List

Ref.#	Part #	Description	Qty.
1	16223	SCRAPER MOUNT BRACKET	12
2	11082	HEX BOLT, 1/2" X 2 1/2" GR. 2	*MS
3	9226	FLANGE LOCK NUT, 1/2"	*MS
4	T733	HEX BOLT, 1/2" X 1 1/2" GR. 2	*MS
5	T26	HEX NUT, 1/2"	*MS
6	T25	LOCK WASHER, 1/2"	*MS
7	T803	SCRAPER BAR CLAMP, "U" CLAMP- 1 HOLE	12
8	9356	2- HOLE CLAMP	*MS
9	12344	HEAVY SCRAPER BAR, 55"- MVT1710 FRONT	2
	12462	HEAVY SCRAPER BAR, 59"- MVT1710 REAR	2
	12347	HEAVY SCRAPER BAR, 64"- MVT1712 FRONT	2
	12463	HEAVY SCRAPER BAR, 68"- MVT1712 REAR	2
	T2581	HEAVY SCRAPER BAR, 73"- MVT1713 FRONT	2
	12348	HEAVY SCRAPER BAR, 77"- MVT1713 REAR	2
	11731	HEAVY SCRAPER BAR, 82"- MVT1715 FRONT	2
	12466	HEAVY SCRAPER BAR, 86"- MVT1715 REAR	2
10	10151	SCRAPER ARM	*MS
11	11081	UNIVERSAL SCRAPER BLADE	*MS
12	11027 or	ARM & BLADE ASSEMBLY FOR RIGHT FRONT OR LEFT REAR	*MS
	11028	ARM & BLADE ASSEMBLY FOR LEFT FRONT OR RIGHT REAR	*MS
13	11065	FURROW FILLER BLADE	2
NS	15169	FURROW FILLER SCRAPER KIT (NOT SHOWN)	*MS

Heavy Scraper Kit Mounting Instructions

*NOTE – When attaching heavy scraper kit, do NOT tighten any hardware until stated in directions. Adjustments may need to be made.

**NOTE – When mounting outrigger scraper blades make sure rear scraper bar is mounted as far to the outside as possible. This allows outrigger scraper blade to reach outrigger disc blade.

**NOTE – Units ordered with scraper kits as an option will come from the manufacturer with scraper mount brackets (Fig. 10B, Ref. 1) installed from the factory. Units ordered without scraper kits as an option will come from the manufacturer with scraper spacer blocks (Fig. 10B, Ref 2) installed from the factory. If scraper kit is ordered after original order. Remove scraper spacer block and replace with scraper mount brackets (Fig. 10B, Ref. 1).

Reference Figure 10

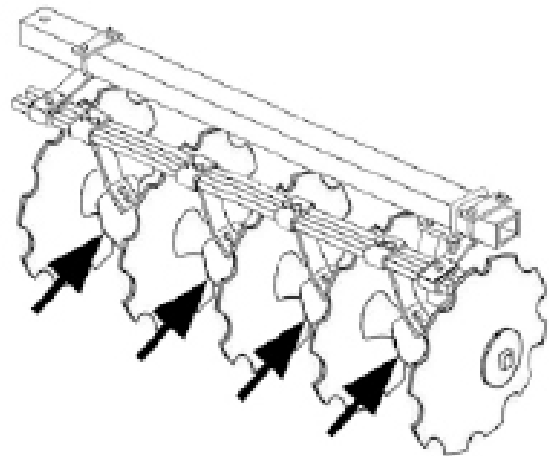
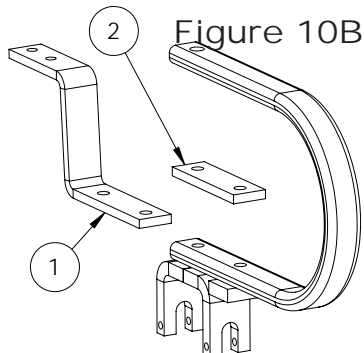
There should be a scraper mount bracket assembled on each gang hanger. Some adjustment may need to be made when mounting scraper arm & blade assemblies (ref. #16). Take heavy scraper bar (ref. #13) and mount on top of scraper mount bracket assembly with 1-hole scraper bar clamp (ref. #11). Use a $\frac{1}{2}$ " x $2\frac{1}{2}$ " Gr. 2 bolt (ref. #6) and a $\frac{1}{2}$ " flange locknut (ref. #7) to fasten. Scraper arm & blade assemblies (ref. #16) are now mounted on bottom of scraper bar (ref. #13). There are two different

#16). One side fits the right front and left rear, the other side fits the left front and right rear. When mounting scraper arm & blade assemblies (ref. #16) to bottom of scraper bar (ref. #13), use 2-hole clamp (ref. #12) on top of scraper bar (ref. #13) and fasten together with $\frac{1}{2}$ " x $2\frac{1}{2}$ " Gr. 2 bolt (ref. #6) and $\frac{1}{2}$ " flange locknut (ref. #7). Scraper arm & blade assemblies are not provided for outside front and inside rear blades! Once all scraper arm & blade assemblies (ref. #16) have been mounted, now is the time to make adjustments to scraper mount bracket assemblies, if needed. When adjustments are made, tighten scraper mount bracket assemblies to gang beam and tighten scraper bar (ref. #13) to scraper mount bracket assembly using 1-hole scraper bar clamp (ref. #11) and hardware (ref. #6&7). Scraper arm & blade assemblies (ref. #16) should then be positioned as close to the disk blade as possible without touching it. Turning the gang after mounting each scraper arm & blade assembly (ref. #16) will help determine the correct mounting position of each one. This is recommended to prevent dragging or binding of the gang.

*NOTE – Tighten all fasteners after setting and adjustments are made. Please see Bolt Torque chart (page 45) for proper torque information.

*NOTE – Re-tighten all fasteners after first operational use. Please see Bolt Torque Chart (page 45) for proper torque information.

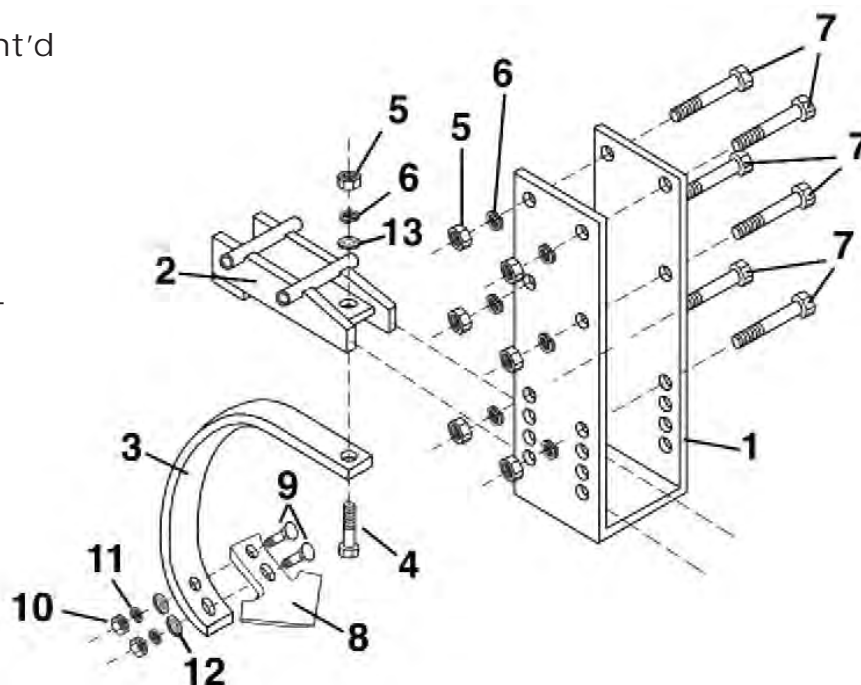
Regardless of model or configuration, scrapers are only located between two disk blades (Refer to the diagram to the right). There is no need for a scraper on the far outside blades on the front gangs or the far inside blades on the rear gangs.



Optional Equipment Cont'd

Center Sweep Kit Figure 11

MVT1710, MVT1712,
MVT1713, MVT1715
Part Number 11476MVT



Ref.#	Part #	Description	Qty.
1	10388	SHANK BRACKET 4" BEAM	1
2	9175	SHANK HOLDER 4" BEAM	1
3	10602	BALK BREAKER SHANK	1
4	9192	HEX BOLT, 5/8" X 2 1/2", GR. 5	1
5	T-22	HEX NUT, 5/8"	7
6	T-24	LOCK WASHER, 5/8"	7
7	T-746	HEX BOLT, 5/8" X 5 1/2"	6
8	13614	4" SWEEP POINT	1
9	14984	PLOW BOLT, 7/16" X 1 1/2"	2
10	14986	HEX NUT, 7/16"	2
11	14987	LOCK WASHER, 7/16"	2
12	14985	FLAT WASHER, 7/16"	2
13	9354	FLAT WASHER, 5/8"	1

Center Sweep Kit Mounting Instructions Reference Figure 11

To attach balk breaker to disk, remove the two top bolts from Ref. #1 (shank bracket) and slide on to center tube of frame, between the wheel carriage and depth control bracket. Insert top bolts back in Ref. #1 and apply lock washer and hex nut. DO NOT TIGHTEN! Attach Ref. #3 (balk breaker shank) to Ref. #2 (shank holder) with hardware supplied, then tighten this bolt only. Ref. #2 can be adjusted for different

depths. Normal operational depth is the same as the disk blade depth. Depth adjustments can be made by putting disk on the ground, and adjusting bolts in Ref. #2 up or down. Once depth has been set, tighten all bolts and balk breaker is ready for operation. Please see Bolt Torque Chart (Page 45) for proper torque information.

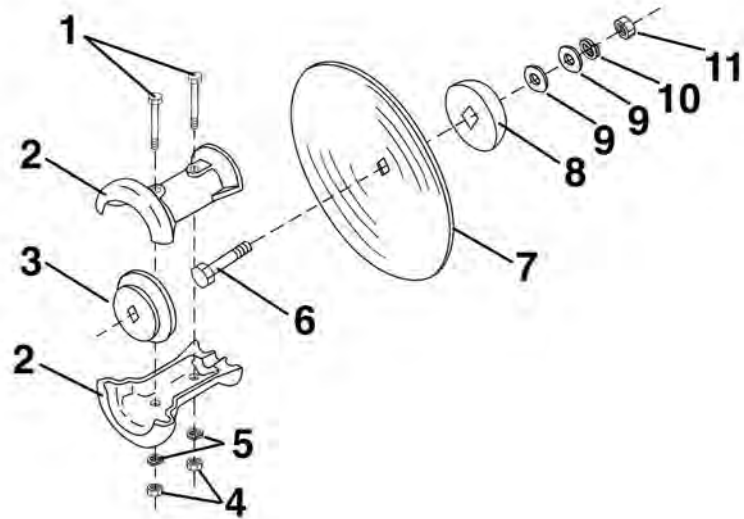
*NOTE- Retighten all fasteners after first operational use. Please see Bolt Torque Chart (Page 45) for proper torque information.

Optional Equipment 43

Optional Equipment Cont'd

Outrigger Kit Figure 12

MVT1710, MVT1712,
MVT1713, MVT1715
Part Number T-70316MVT
T-70318MVT



Ref.#	Part #	Description	Qty.
1	12163	HEX BOLT, 1/2" X 3 1/2" GR. 5	4
2	T-OR2	OUTRIGGER HALF	4
3*	T-OR1	OUTRIGGER WASHER, 1 1/8"	*Note
4	T-26	HEX NUT, 1/2"	4
5	T-25	LOCK WASHER, 1/2"	4
6	T-760	HEX BOLT, 3/4" X 3 1/2" GR. 5	2
7	181381	DISK BLADE, 18" X 1" PLAIN for 22"	2
8	T-1	END WASHER, 1 1/8"	2
9	T-723	FLAT WASHER, 3/4"	2
10	T-31	LOCK WASHER, 3/4"	2
11	T-27	HEX NUT, 3/4"	2

*Note: Item #3, Part# T-OR15 is not included with this assembly. The T-OR15 is standard equipment on the rear gangs of the MVT series.

Outrigger Kit Mounting Instructions Reference Figure 12

Outrigger kits only attach to rear gang with outrigger washers (Ref. #3). Outrigger washers DO NOT come with kit. They are standard equipment on rear gangs of the MVT series. To attach outriggers, remove cast iron end washer (Ref. #8), 3/4" flat washer (Ref. #9), 3/4" lock washer (Ref. #10), and 3/4" hex nut (Ref. #11) from 3/4" x 3 1/2" Gr. 5 bolt (Ref. #6). Remove 1/2" hex nuts & lock washers (Ref. #4 & #5) from 1/2" x 3 1/2" Gr. 5 bolts (Ref. #1). Take outrigger halves (Ref. #2) and pull apart wide enough to clamp over outrigger washer (Ref. #3) on gang assembly. Re-apply the 1/2" hex nuts & lock washers (Ref. #4 & #5) to 1/2" x 3 1/2" Gr. 5 bolt (Ref. #1) and tighten. Make sure

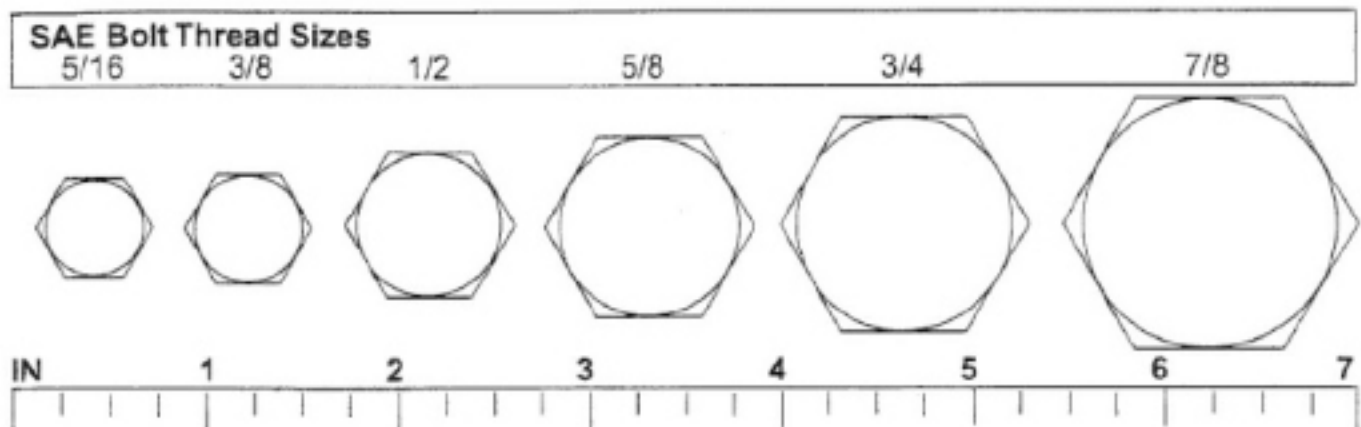
the 3/4" x 3 1/2" Gr. 5 bolt (Ref. #6) is pulled out as far as possible before tightening. Once tightened, apply the outrigger disk blade (Ref. #7) on the 3/4" x 3 1/2" Gr. 5 bolt (Ref. #6), followed by the cast iron end washer (Ref. #8), 3/4" flat washer (Ref. #9), 3/4" lock washer (Ref. #10), and 3/4" hex nut (Ref. #11). Tighten and outrigger is ready for operation. Please see Bolt Torque Chart (Page 45) for proper torque information.

*NOTE-MVT models use 18" outrigger blades for 22" disk blades.

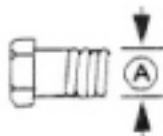
*NOTE- Retighten all fasteners after first operational use. Please see Bolt Torque Chart (Page 45) for proper torque information.

Bolt Size Chart

NOTE: Chart shows bolt thread sizes and corresponding head (wrench) sizes for standard SAE and metric bolts.



SAE Torque Chart



SAE SERIES
TORQUE
CHART

SAE Grade 2
(No Dashes)


SAE Bolt Head Identification



SAE Grade 5
(3 Radial Dashes)



SAE Grade 8
(6 Radial Dashes)

 Diameter (Inches)	Wrench Size	MARKING ON HEAD					
		SAE 2		SAE 5		SAE 8	
		lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m
1/4"	7/16"	6	8	10	13	14	18
5/16"	1/2"	12	17	19	26	27	37
3/8"	9/16"	23	31	35	47	49	67
7/16"	5/8"	36	48	55	75	78	106
1/2"	3/4"	55	75	85	115	120	163
9/16"	13/16"	78	106	121	164	171	232
5/8"	15/16"	110	149	170	230	240	325
3/4"	1-1/8"	192	261	297	403	420	569
7/8"	1-5/16"	306	416	474	642	669	907
1"	1-1/2"	467	634	722	979	1020	1383

MVT Series gang bolt torquee 350lbs-ft, then tighten nut clockwise 180*

PART NO.
16154

