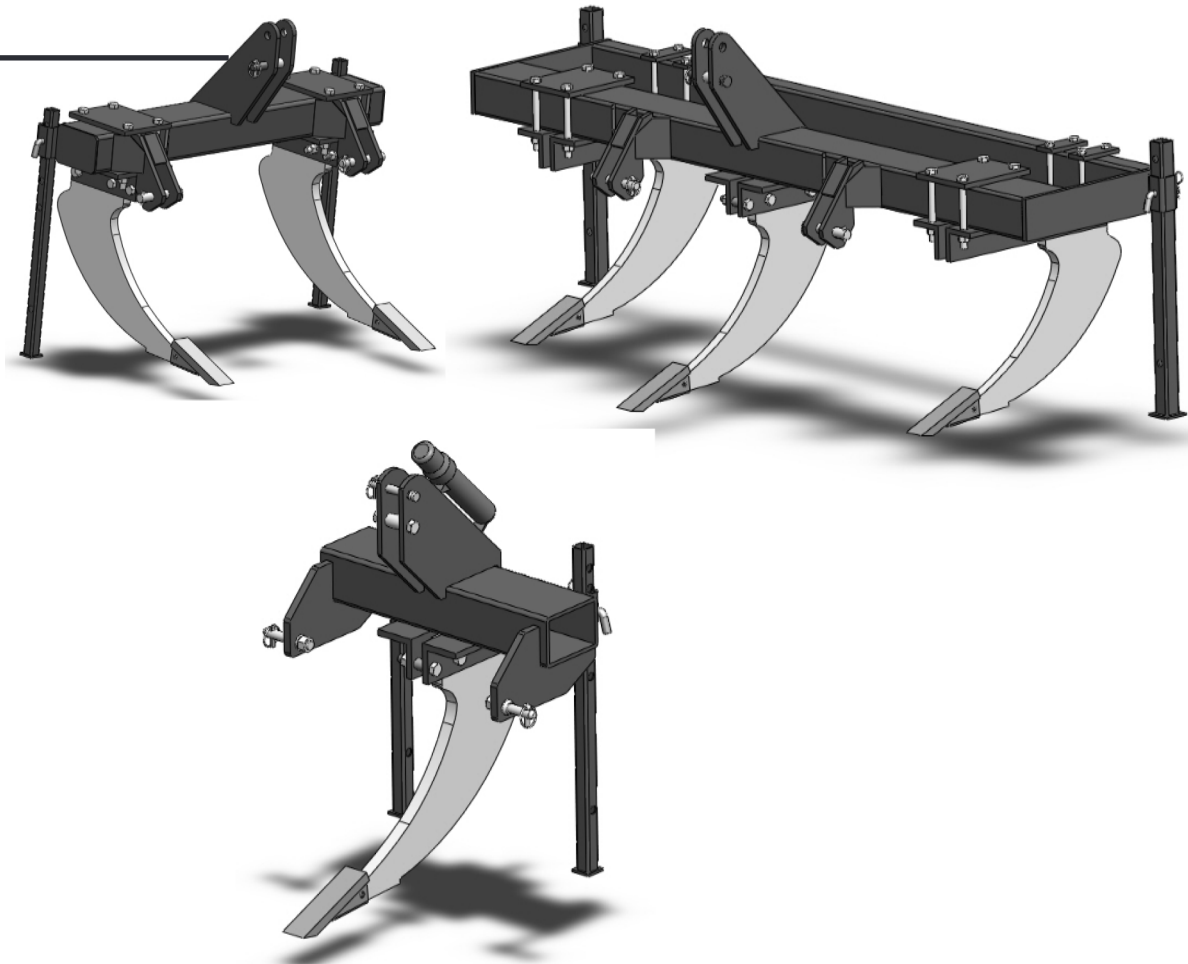


SUB-SOILERS

1S

2S

3S



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 Monroe Tufline 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 Monroe Tufline 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) _____

Dealer Name: _____ Dealer Contact Information: _____

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

Indicates that failure to observe can cause damage to equipment.

NOTE

Indicates helpful information.

Introduction ii

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SPECIFICATIONS

	1S	2S	3S
3-Point Hitch	Category 1 (iMatch Compatible)	Category 2 (iMatch Compatible)	Category 2 (iMatch Compatible)
Overall Width	32"	57"	98"
Overall Height	41"	43"	43"
Overall Length	34"	34"	34"
Tractor HP Range	30-75 HP	60-130 HP	90-130 HP
Approximate Operating Weight	222 lbs	466 lbs	892 lbs
Beam Type	5" X 7" X 3/8" Rect. Tube	5" X 7" X 3/8" Rect. Tube	5" X 7" X 3/8" Rect. Tube (Front) 3" x 5" Rect. Tube (Rear)
Number of Shanks	1	2	3
Shank Thicknes	1 1/4"	1 1/4"	1 1/4"
Shank Size	24" Standard (28" Optional) (32" Optional)	24" Standard (28" Optional) (32" Opitonal)	24" Standard (28" Optional) (32" Optional)
Shank Spacing	NA	34"	16"-39" Adjustable

GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your Sub-Ripper. 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 DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

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

Replace Decals Immediately If Damaged!

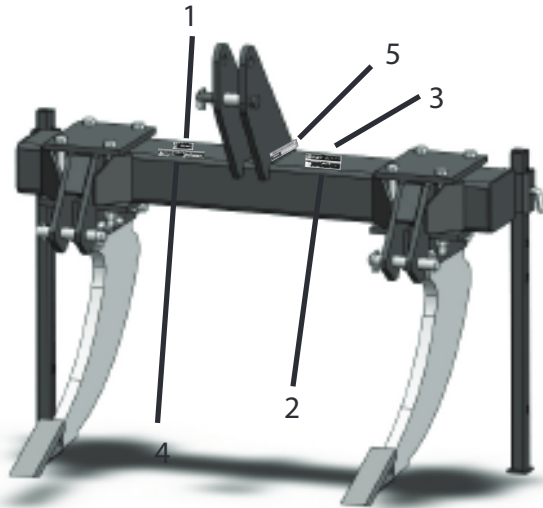


Figure 1.

Check that all safety decals are installed and in good condition. Replacement Part numbers are listed below. Use this diagram to affix new safety decals. Decals can be obtained from your local dealer.



WARNING

To avoid serious injury or death from falling implement hazard:

- Keep hands and feet from under raised implement.
- Always put machine in the lowered position and chock to prevent movement when disconnecting machine for maintenance, repair or storage.

5TL16318B

REF. #1
16318B

REF. #5
SERIAL NUMBER

WARNING

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

- Do not put hands, fingers, feet and other body parts 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.

5TL16318A

REF. #2
16318A

WARNING

To avoid serious injury or death:

- Do not allow others to ride on the machine or tractor.
- Park and chock machine so it will not roll and/or move when disconnecting from tractor.
- 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.

5TL16318D

REF. #3
16318D

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.

5TL16318C

REF. #4 16318C



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, judgment, 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 instruction's 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.

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.
- 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.
- A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate. Implement Code given in Specifications Section, page #1, is used to determine appropriate ballast. See your tractor operator's manual for required number of weights to use for your specified Implement Code.

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.



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

OPERATION

- 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.
- Always comply with all state and local laws governing highway safety and lighting and marking requirements.
- 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.
- 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.
- When making pitch and roll angle 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 lift arms 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.



SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

MAINTENANCE(cont'd)

- When performing maintenance or repairs make sure the equipment is in the lowered position and 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 lift arms 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 all persons away from operator control

area while performing adjustments, service, or maintenance.

- Tighten all bolts, nuts, and screws to torque chart specifications, page 19. Check that the land plane is properly attached to the power unit and that the equipment is in a safe condition before putting unit into service.

STORAGE

- Block equipment securely for storage.
- Always park on even level surface
- Keep children and bystanders away from storage area.

DEALER INSTRUCTIONS

1S Assembly

1. Remove the frame, shank and parking stands from packaging.
2. Support frame off the ground using a suitable hoist or lifting apparatus.
3. Place the parking stands Figure 2 (Ref. 12) into the frame and secure with pins(Ref. 11).
4. Attach the shank into the two welded angle brackets on the frame, as shown in Figure 2 using one 7/8" x 4" GR. 5 bolt supplied (Ref. 1), one 7/8" lock washers (Ref. 2) and one 7/8" hex nuts (Ref. 3) and one 3/4" x 4" GR. 2 shear bolt (Ref. 4), one 3/4" lock washer (Ref. 5) and one 3/4" hex nut (Ref. 6).
5. Insert spacer (Ref. 8) between the two welded angle brackets using one 3/4" x 4" GR. 5 bolt supplied (Ref. 7), one 3/4" lock washer (Ref. 9) and one 3/4" hex nut (Ref.10).
6. Tighten each nut to the torque chart on page 19.

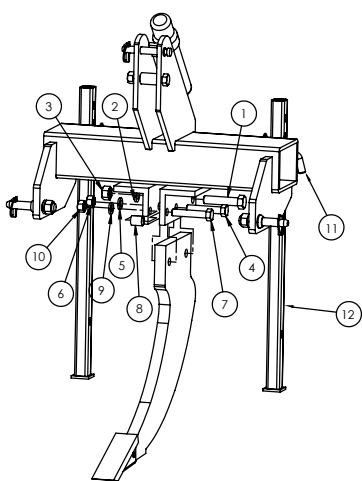


Figure 2. 1S Shank Assembly

2S Assembly

1. Remove the frame, shank and parking stands from packaging.
2. Support frame off the ground using a suitable hoist or lifting apparatus.
3. Place the parking stands Figure 2 (Ref. 5) into the frame and secure with pins(Ref. 4).
4. Attach the shank preassemblies onto the frame, as shown in Figure 3 using four per shank 3/4" x 8" GR. 5 bolts supplied (Ref. 1), four per shank 3/4" lock washers (Ref. 2) and four per shank 3/4" hex nuts (Ref. 3).
5. Tighten each nut to the torque chart on page 19.

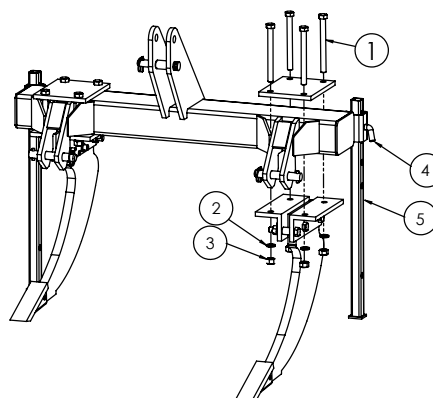


Figure 3. 2S Shank Assembly

Assembly

3S

1. Remove the frame, shank and parking stands from packaging.
2. Support frame off the ground using a suitable hoist or lifting apparatus.
3. Place the parking stands Figure 2 (Ref. 8) into the frame and secure with pins(Ref. 7).
4. Attach the center shank into the two welded on angle brackets using Step 4 of SR1201 assembly instructions on page 6.
5. Attach the shank preassemblies onto the frame, as shown in Figure 4 using four per shank front 3/4" x 8" GR. 5 bolts supplied (Ref. 1), four per shank 3/4" lock washers (Ref. 2) and four per shank 3/4" hex nuts (Ref. 3), and four per shank rear 5/8" x 7" GR. 5 bolts supplied (Ref. 4), four per shank 5/8" lock washers (Ref. 5) and four per shank 5/8" hex nuts (Ref. 6).
6. Tighten each nut to the torque chart on page 12.

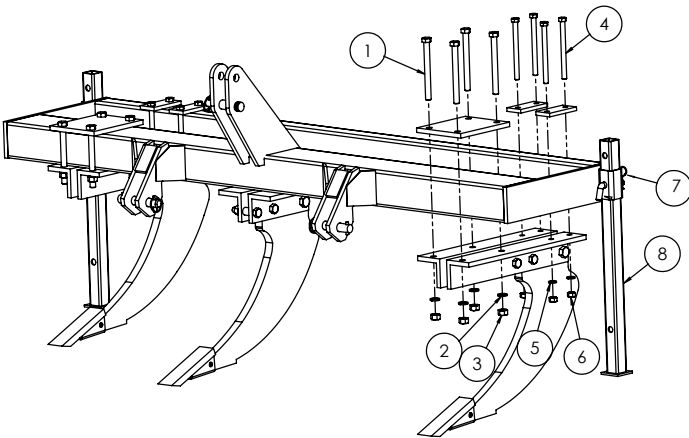


Figure 4. 3S Shank Assembly

7 Dealer Instructions

Dealer Checklist

(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.

____ It is important for the dealer to visually check and make sure all parts are intact prior to delivery to customer.

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

____ For mounted units, add ballast in front tires, and/or front tractor weight to enhance front end stability. A minimum 20% of tractor and equipment gross weight must be on front tractor wheels. When adding weight to attain 20% of tractor and equipment weight on front tractor wheels, you must not exceed the ROPS weight certification. Weigh the tractor and equipment. Do not estimate!

____ 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 2-6.

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.
- 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 2 through page 5.

____ 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.

____ Make sure no underground wires, pipes, or other hazards are not in the work area. If there is any question call all utility companies in the area that may have underground obstructions.

____ Remove draw bar before attaching 1S or 2S.

Connecting 1S Shank-Ripper to Tractor

The Shank-Ripper is compatible with tractors equipped with Category 1, 3-point hitch systems that use side-swing type lower lift arms. The Shank-Ripper will also fit tractors equipped with an iMatch or Category 1 Quick Hitch system.

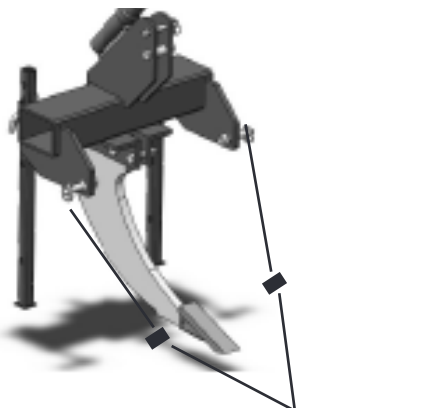
Category 1 Standard 3-Point Hook-up

1. Attach the tractor's lower lift arms to the Shank-Ripper on the lower draft hitch pins. Re-install the lynch pins.
2. Attach the tractor's top link to the Shank-Ripper's mast, using the heavy-duty top link pin and lynch pin supplied, with the top link to the upper top link pin hole.

Category 1 iMatch or Quick Hitch (Figure 5)

1. Connect the tractor's iMatch or Quick Hitch by guiding the top hook through the lower top link pin with bushings.
2. Install bushing set (sold separately) to lower draft pins. These bushings allow the hooks on the iMatch or Quick Hitch and the pins on the land plane to fit together properly. Slide sleeve shoulder bushings over draft pins. Secure each shoulder bushing with roll pins.
3. Upper bushing should already be installed to the top link.

Adjusting Shank-Ripper



Lower iMatch bushings
(Sold separately)

Figure 5. Category 1 Quick Hitch Set-up

Connecting 2S and 3S Shank-Ripper to Tractor

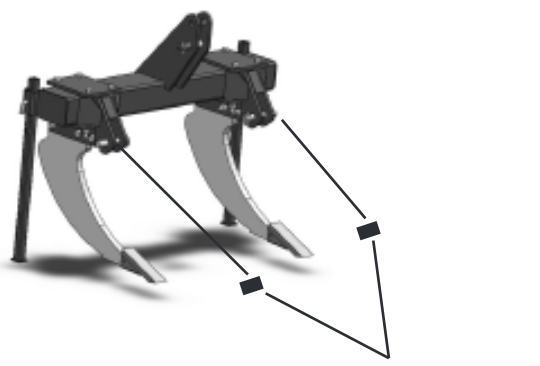
The Shank-Ripper is compatible with tractors equipped with Category 2, 3-point hitch systems that use side-swing type lower lift arms. The Shank-Ripper will also fit tractors equipped with a Category 2 Quick Hitch system.

Category 2 Standard 3-Point Hook-up

1. Attach the tractor's lower lift arms to the Shank-Ripper on the lower hitch pins. Re-install the lynch pins.
2. Attach the tractor's top link to the Shank-Ripper's mast, using the heavy-duty top link pin and lynch pin supplied, with the top link to the upper top link pin hole.

Category 2 Quick Hitch (Figure 6)

1. Slide lower bushing (sold separately) over the mounting pin supplied with Shank-Ripper. Re-install lynch pins.
2. Slide upper bushing over the heavy-duty top link pin supplied with top link. Reinstall lynch pin.
3. Connect the tractor's Quick Hitch to the Shank-Ripper through the upper set of holes.



Lower iMatch bushings
(Sold separately)

Figure 6. Category 2 Quick Hitch Set-up

Adjust the 3-point top link so that Shank-Ripper is level front to rear. In most cases this will give the desired results. To adjust for more aggressive draft, shorten the 3-point top link.

Adjust right to left level by adjusting the lower lift arm on tractor.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Bent Shank	Turning with shank in the ground	Lift Shank-Ripper out of the ground before turning.
	Unit not level right to left	Adjust lower lift arms to level Shank-Ripper.
Shank will not go into the ground	Unit not level front to rear	Adjust Shank-Ripper to level front to rear by adjusting the top link. Shorten top link to achieve more aggressive draft angle.
	Shank-Ripper point is worn	Replace point.

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.

WARNING

- Read Manual for service instructions or have service performed by a qualified dealer.

CAUTION

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.

Owner should check and tighten all hardware after the first hour of operation. The break in stage of your new land plane can cause minimal loosening of hardware. Please see Bolt Torque Chart (page 19) for proper torque information.

WARNING

- 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.
- 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.

CAUTION

Storage

When storing your Sub-Ripper make sure, parking stands are in place, the unit is placed on level ground and clear of any obstructions. Use caution when disconnecting the Sub-Ripper from the tractor.

PARTS CATALOG 1S

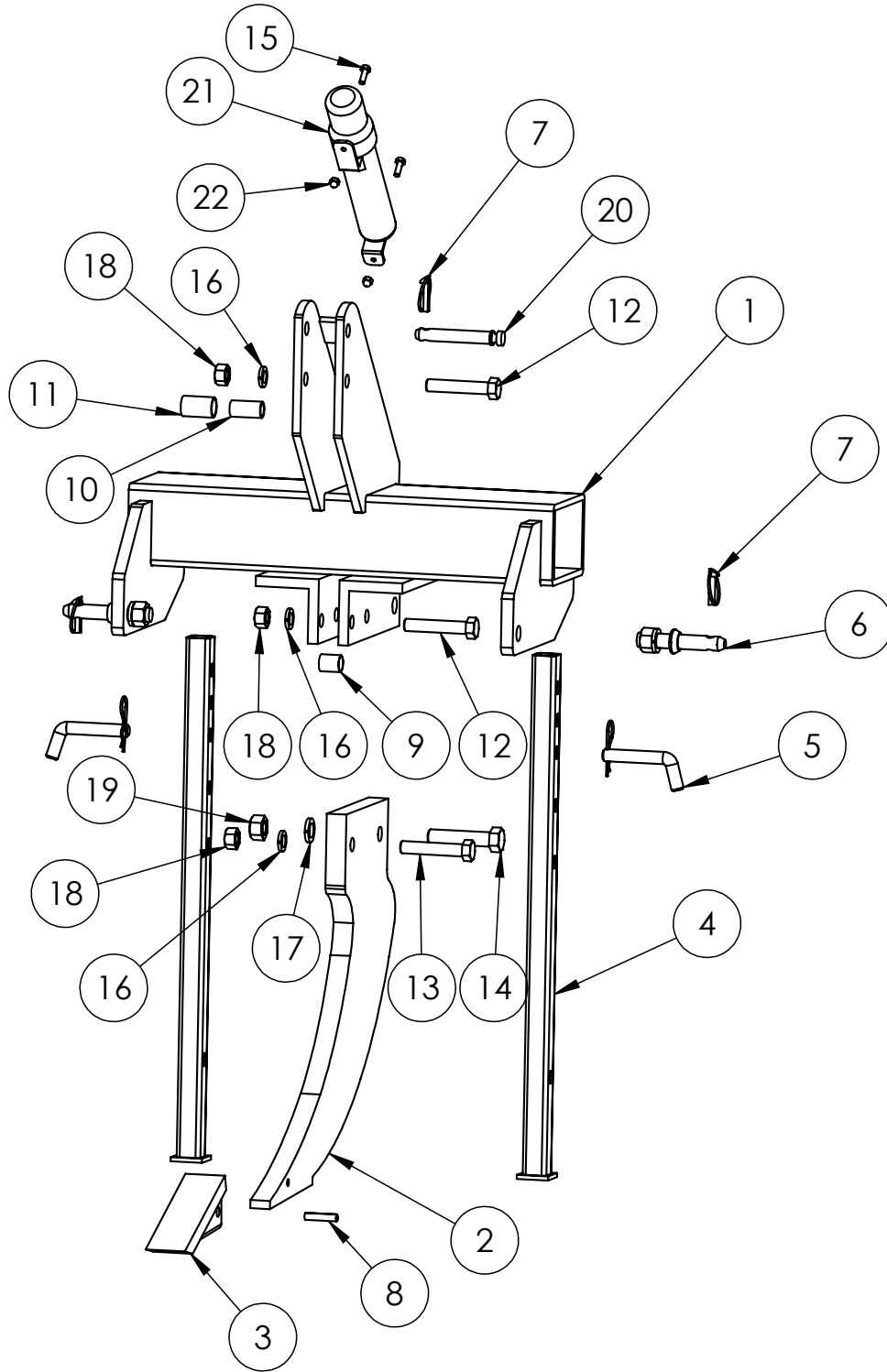


Figure 7

PARTS CATALOG 1S

Ref.#	Part #	Description	Qty.
1	11152	1S FRAME	1
2	VP24	24" SHANK	1
	VP28	28" SHANK	1
3	MT13454	POINT	1
4	11037	PARKING STAND	2
5	9690	PARKING STAND PIN, HAIR CLIP PIN INCLUDED	2
6	T33	HITCH PIN, CAT 1 W/NUT & WASHER	2
7	VP252	LYNCH PIN	3
8	VP25	ROLL PIN	1
9	10535	SPACER	1
10	15209	CAT 1 BUSHING, 1 15/16"	1
11	15210	CAT 2 BUSHING, 1 15/16"	1
12	9859	HEX BOLT, 3/4" X 4" GR. 5	2
13	12870	HEX BOLT, 3/4" X 4" GR. 2	1
14	T771	HEX BOLT, 7/8" X 4" GR. 5	1
15	15197	HEX BOLT, 5/16" X 1"	2
16	T31	LOCK WASHER, 3/4"	3
17	T21	LOCK WASHER, 7/8"	1
18	T27	HEX NUT, 3/4"	3
19	T19	HEX NUT, 7/8"	1
20	15206	CAT 1 TOP LINK PIN	1
21	15189	OPERATORS MANUAL CANISTER	1
22	15198	NYLON LOCK NUT, 5/16	2
	16318A	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318B	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318C	SAFETY CAUTION DECAL (not shown, see page 2)	1
	16318D	SAFETY WARNING DECAL (not shown, see page 2)	1

PARTS CATALOG

2S

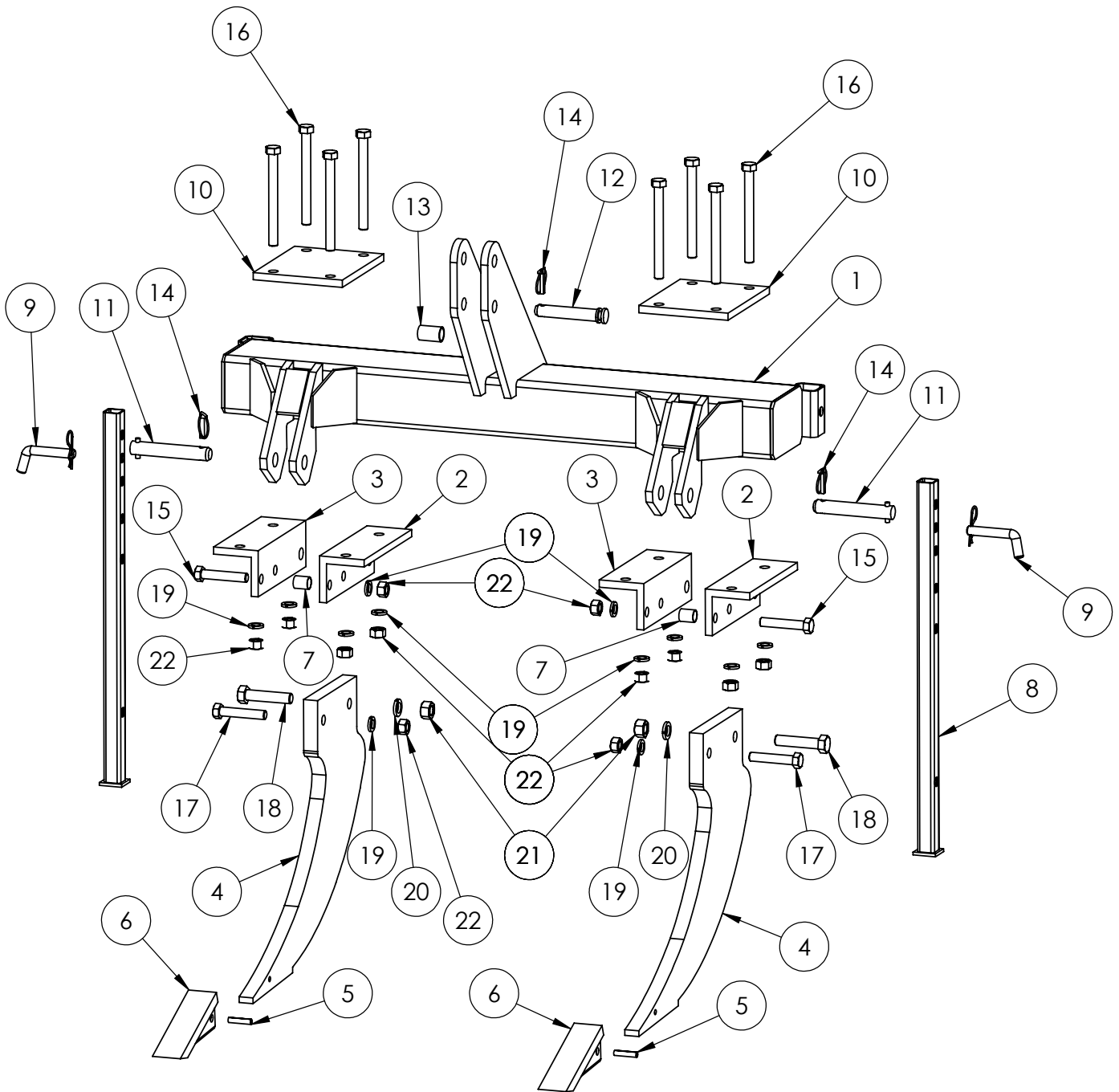


Figure 8.

PARTS CATALOG

2S

Ref.#	Part #	Description	Qty.
1	11159	2S FRAME	1
2	11030	MOUNT ANGLE, LEFT HAND	2
3	11031	MOUNT ANGLE, RIGHT HAND	2
4	VP24	24" SHANK	2
	VP28	28" SHANK	2
5	VP25	ROLL PIN	2
6	MT13454	POINT	2
7	10535	SPACER	2
8	11037	PARKING STAND	2
9	9690	PARKING STAND PIN, HAIR CLIP PIN INCLUDED	2
10	11029	SHANK MOUNT TOP PLATE	2
11	11167	CAT 2 HITCH PIN	2
12	15208	CAT 2 TOP LINK PIN	1
13	15210	CAT 2 BUSHING, 1 15/16"	1
14	VP252	LYNCH PIN	3
15	9859	HEX BOLT, 3/4" X 4" GR. 5	2
16	11032	HEX BOLT, 3/4" X 8" GR. 5	8
17	12870	HEX BOLT, 3/4" X 4" GR. 2	2
18	T771	HEX BOLT, 7/8" X 4" GR. 5	2
19	T31	LOCK WASHER, 3/4"	12
20	T21	LOCK WASHER, 7/8"	2
21	T19	HEX NUT, 7/8"	2
22	T27	HEX NUT, 3/4"	12
	16318A	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318B	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318C	SAFETY CAUTION DECAL (not shown, see page 2)	1
	16318D	SAFETY WARNING DECAL (not shown, see page 2)	1

PARTS CATALOG

3S

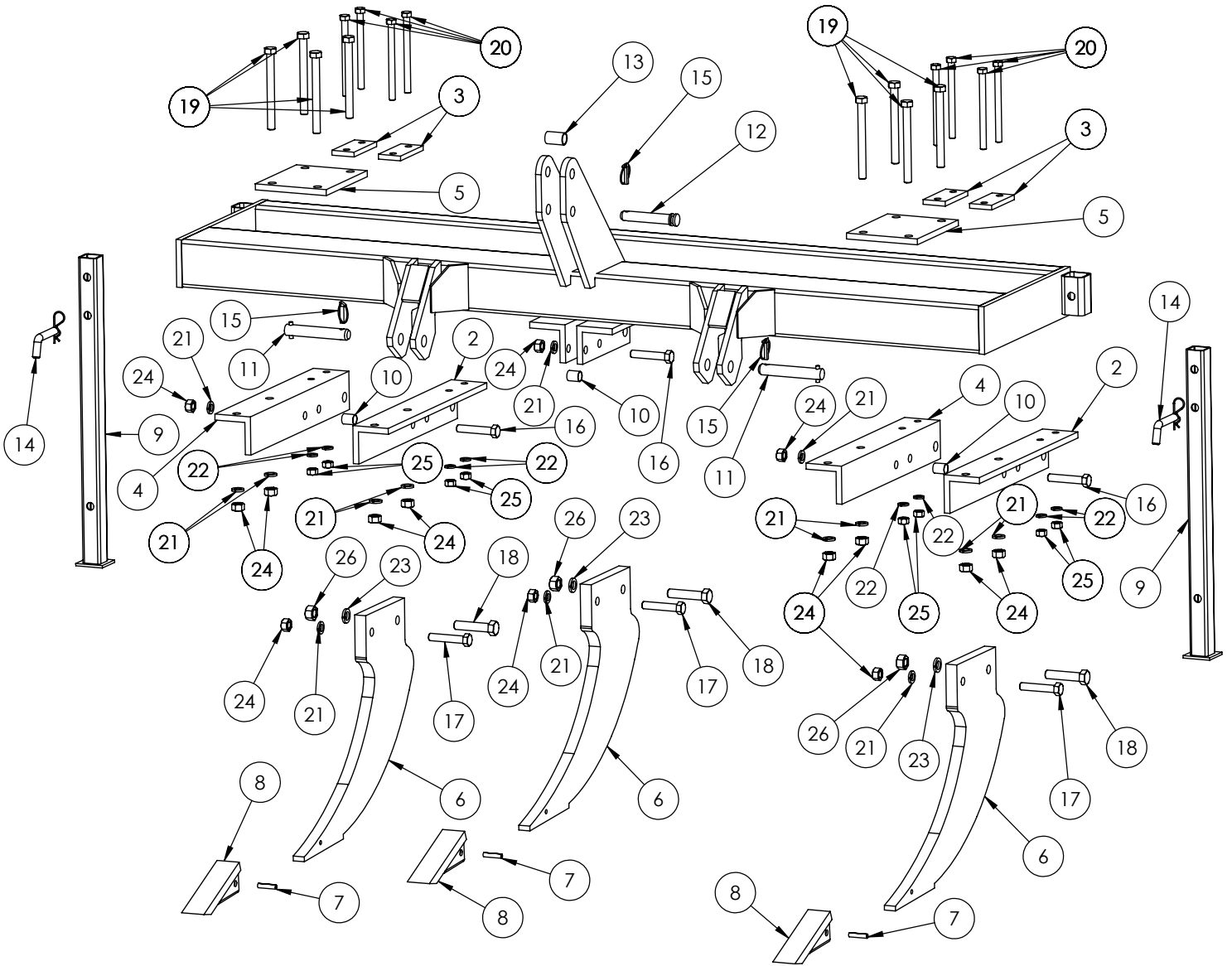


Figure 9.

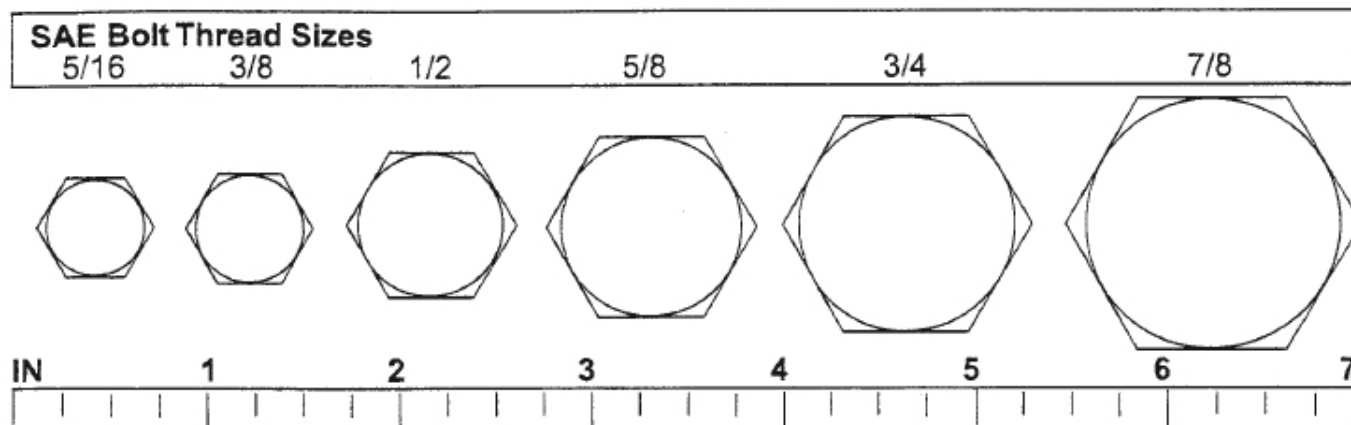
PARTS CATALOG

3S

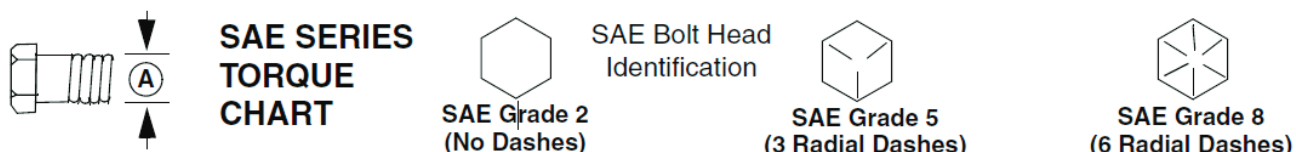
Ref.#	Part #	Description	Qty.
1	11163	3S FRAME	1
2	11165	MOUNT ANGLE, LEFT HAND	2
3	11164	REAR SHANK MOUNT TOP PLATE	4
4	11166	MOUNT ANGLE, RIGHT HAND	2
5	11029	SHANK MOUNT TOP PLATE	2
6	VP24	24" SHANK	3
	VP28	28" SHANK	3
7	VP25	ROLL PIN	3
8	MT13454	POINT	3
9	VP54	PARKING STAND	2
10	10535	SPACER	3
11	11167	CAT 2 HITCH PIN	2
12	15208	CAT 2 TOP LINK PIN	1
13	15210	CAT 2 BUSHING, 1 15/16"	1
14	9690	PARKING STAND PIN, HAIR CLIP PIN INCLUDED	2
15	VP252	LYNCH PIN	3
16	9859	HEX BOLT, 3/4" X 4" GR. 5	3
17	12870	HEX BOLT, 3/4" X 4" GR. 2	3
18	T771	HEX BOLT, 7/8" X 4" GR. 5	3
19	11032	HEX BOLT, 3/4" X 8" GR. 5	8
20	T751	HEX BOLT, 5/8" X 7 1/2" GR. 5	8
21	T31	LOCK WASHER, 3/4"	14
22	T24	LOCK WASHER, 5/8	8
23	T21	LOCK WASHER, 7/8"	3
24	T27	HEX NUT, 3/4"	14
25	T22	HEX NUT, 5/8	8
26	T19	HEX NUT, 7/8"	3
	16318A	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318B	SAFETY WARNING DECAL (not shown, see page 2)	1
	16318C	SAFETY CAUTION DECAL (not shown, see page 2)	1
	16318D	SAFETY WARNING DECAL (not shown, see page 2)	1

Bolt Size Chart

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



SAE Torque Chart



Ⓐ 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

19 Bolt Size and Bolt Torque Chart

NOTES

PART NO.
14329

Tufline[®]