# OPERATOR'S MANUAL

**Set-Up Instructions and Parts Catalog for**

# Torsion-Flex Soil Conditioners


## Models
## TF2, TF212 and TF215
**(serial # 2250 and higher)**

**12' to 45' Working Width**
**Torsion-Flex Double Rolling Baskets**

**J. & M. Manufacturing Co., Inc.**
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**REV. 03-12-09**

**TO THE DEALER:**

Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists in the Operator's Manual are completed before releasing equipment to the owner.

The dealer must complete the Warranty Registration Card attached to the front inside cover of this manual and return to J. & M. Mfg. Co., Inc. at the address indicated on the card. **Warranty claims will be denied if the Warranty Registration Card has not been completed and returned.**

**EXPRESS WARRANTY:**

J. & M. Mfg. Co. Inc. warrants against defects in construction or materials for a period of ONE year. We reserve the right to inspect and decide whether material or construction was faulty or whether abuse or accident voids our guarantee.

Warranty service must be performed by a dealer or service center authorized by J. & M. Mfg. Co. Inc. to sell and/or service the type of product involved, which will use only new or remanufactured parts or components furnished by J. & M. Mfg. Co. Inc. Warranty service will be performed without charge to the purchaser for parts or labor based on the Warranty Labor Times schedule. Under no circumstance will allowable labor times extend beyond the maximum hours indicated in the Warranty Labor Times schedule for each warranty procedure. The purchaser will be responsible, however, for any service call and/or transportation of the product to and from the dealer or service center's place of business, for any premium charged for overtime labor requested by the purchaser, and for any service and/or maintenance not directly related to any defect covered under the warranty. Costs associated with equipment rental, product down time, or product disposal are not warrantable and will not be accepted under any circumstance.

Each warranty term begins on the date of product delivery to the purchaser. Under no circumstance will warranty be approved unless (i) the product warranty registration card (attached to the inside of the Operator's Manual) has been properly completed and submitted to the equipment manufacturer. This Warranty is effective only if the warranty registration card is returned within 30 days of purchase.

This warranty does not cover a component which fails, malfunctions or is damaged as a result of (i) improper modification or repair, (ii) accident, abuse or improper use, (iii) improper or insufficient maintenance, or (iv) normal wear or tear. This warranty does not cover products that are previously owned and extends solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. J. & M. Mfg. Co. Inc. makes no warranty, express or implied, with respect to tires or other parts or accessories not manufactured by J. & M. Mfg. Co. Inc. Warranties for these items, if any, are provided separately by their respective manufacturers.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

In no event shall J. & M. Mfg. Co. Inc. be liable for special, direct, incidental or consequential damages of any kind. The exclusive remedy under this Warranty shall be repair or replacement of the defective component at J. & M. Mfg. Co. Inc's. option. This is the entire agreement between J. & M. Mfg. Co. Inc. and the Owner about warranty and no J. & M. Mfg. Co. Inc. employee or dealer is authorized to make any additional warranty on behalf of J. & M. Mfg. Co. Inc.

The manufacturer reserves the right to make product design and material changes at any time without notice. They shall not incur any obligation or liability to incorporate such changes and improvements in products previously sold to any customer, nor shall they be obligated or liable for the replacement of previously sold products with products or parts incorporating such changes.

**SERVICE:**

The equipment you have purchased has been carefully 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 signs on the equipment.

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

Use only genuine J. & M. service parts. Substitute parts may 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:

Serial # _____ Purchase Date: _____ Purchased From: _____

Please provide this information to your dealer to obtain the correct parts:

## GENERAL INFORMATION

**TO THE OWNER:**

The purpose of this manual is to assist you in operating and maintaining your running gear in a safe manner. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance and help maintain safe operating conditions. If this machine is used by an employee or is loaned or rented, make certain that the operator(s), prior to operating:

1. Is instructed in safe and proper use.
2. Reviews and understands the manual(s) pertaining to this machine.

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. When you see this symbol, carefully read the message that follows and be alert to the possibility of personal injury or death.


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

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

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.

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

Indicates that failure to observe can cause damage to equipment.

Indicates helpful information.

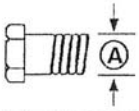
**BOLT TORQUE CHART**

Always tighten hardware to these values unless a different torque or tightening procedure is listed for a specific application.

Fasteners must always be replaced with the same grade as specified in the manual parts list.

Always use the proper tool for tightening hardware. SAE for SAE hardware and Metric for metric hardware.

Make sure fastener threads are clean and you start the thread engagement properly. All torque values are given to specification used on hardware defined by SAE J1701 & J1701M (Jul 96).

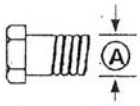


**SAE SERIES TORQUE CHART**

SAE Bolt Head Identification

**SAE Grade 2 (No Dashes)** | **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 |



**METRIC SERIES TORQUE CHART**


**Metric Grade 8.8**

Metric Bolt Head Identification


**Metric Grade 10.9**

| Diameter Ⓐ & Thread Pitch (Millimeters) | Wrench Size | COARSE THREAD | | | | FINE THREAD | | | | Diameter Ⓐ & Thread Pitch (Millimeters) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MARKING ON HEAD | | | | MARKING ON HEAD | | | | |
| | | Metric 8.8 | | Metric 10.9 | | Metric 8.8 | | Metric 10.9 | | |
| | | N-m | Lbs.-Ft. | N-m | Lbs.-Ft. | N-m | Lbs.-Ft. | N-m | Lbs.-Ft. | |
| 6 x 1.0 | 10 mm | 8 | 6 | 11 | 8 | 8 | 6 | 11 | 8 | 6 x 1.0 |
| 8 x 1.25 | 13 mm | 20 | 15 | 27 | 20 | 21 | 16 | 29 | 22 | 8 x 1.0 |
| 10 x 1.5 | 16 mm | 39 | 29 | 54 | 40 | 41 | 30 | 57 | 42 | 10 x 1.25 |
| 12 x 1.75 | 18 mm | 68 | 50 | 94 | 70 | 75 | 55 | 103 | 76 | 12 x 1.25 |
| 14 x 2.0 | 21 mm | 109 | 80 | 151 | 111 | 118 | 87 | 163 | 120 | 14 x 1.5 |
| 16 x 2.0 | 24 mm | 169 | 125 | 234 | 173 | 181 | 133 | 250 | 184 | 16 x 1.5 |
| 18 x 2.5 | 27 mm | 234 | 172 | 323 | 239 | 263 | 194 | 363 | 268 | 18 x 1.5 |
| 20 x 2.5 | 30 mm | 330 | 244 | 457 | 337 | 367 | 270 | 507 | 374 | 20 x 1.5 |
| 22 x 2.5 | 34 mm | 451 | 332 | 623 | 460 | 495 | 365 | 684 | 505 | 22 x 1.5 |
| 24 x 3.0 | 36 mm | 571 | 421 | 790 | 583 | 623 | 459 | 861 | 635 | 24 x 2.0 |
| 30 x 3.0 | 46 mm | 1175 | 867 | 1626 | 1199 | 1258 | 928 | 1740 | 1283 | 30 x 2.0 |

## SPECIFICATIONS

| | Specifications | | | | | Basket Sizes and Layout | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Working Width | Transport Width | Base Width | Wings Each | Approx. Weight | Side Wing | | | Base Unit | | | Side Wing | | |
| Model TF2 | 12’ | 12’ | 12’ | N/A | 2,195 lbs. | | | | 6’ | | 6’ | | | |
| | 13’ | 13’ | 12’ | N/A | 2,310 lbs. | | | | 4’ | 5’ | 4’ | | | |
| | 14’ | 14’ | 12’ | N/A | 2,425 lbs. | | | | 5’ | 4’ | 5’ | | | |
| | 15’ | 15’ | 15’ | N/A | 2,540 lbs. | | | | 5’ | 5’ | 5’ | | | |
| | 16’ | 16’ | 15’ | N/A | 2,655 lbs. | | | | 5’ | 6’ | 5’ | | | |
| | 17’ | 17’ | 15’ | N/A | 2,770 lbs. | | | | 6’ | 5’ | 6’ | | | |
| | 18’ | 18’ | 15’ | N/A | 2,885 lbs. | | | | 6’ | 6’ | 6’ | | | |
| Model TF212 | 20’ | 13’ 5” | 12’ | 4’ | 4,415 lbs. | | | 4’ | 6’ | | 6’ | 4’ | | |
| | 22’ | 13’ 5” | 12’ | 5’ | 4,645 lbs. | | | 5’ | 6’ | | 6’ | 5’ | | |
| | 23’ | 13’ 5” | 12’ | 5’ 6” | 4,760 lbs. | | | 5.5’ | 6’ | | 6’ | 5.5’ | | |
| | 24’ | 13’ 5” | 12’ | 6’ | 4,875 lbs. | | | 6’ | 6’ | | 6’ | 6’ | | |
| | 25’ | 13’ 5” | 12’ | 6’ 6” | 4,990 lbs. | | 3’ | 3.5’ | 6’ | | 6’ | 3.5’ | 3’ | |
| | 26’ | 13’ 5” | 12’ | 7’ | 5,105 lbs. | | 3.5’ | 3.5’ | 6’ | | 6’ | 3.5’ | 3.5’ | |
| | 27’ | 13’ 5” | 12’ | 7’ 6” | 5,220 lbs. | | 3.5’ | 4’ | 6’ | | 6’ | 4’ | 3.5’ | |
| | 28’ | 13’ 5” | 12’ | 8’ | 5,335 lbs. | | 4’ | 4’ | 6’ | | 6’ | 4’ | 4’ | |
| | 29’ | 13’ 5” | 12’ | 8’ 6” | 5,450 lbs. | | 3.5’ | 5’ | 6’ | | 6’ | 5’ | 3.5’ | |
| | 30’ | 13’ 5” | 12’ | 9’ | 5,565 lbs. | | 4’ | 5’ | 6’ | | 6’ | 5’ | 4’ | |
| | 31’ | 13’ 5” | 15’ | 9’ 6” | 5,680 lbs. | | 3.5’ | 6’ | 6’ | | 6’ | 6’ | 3.5’ | |
| | 32’ | 13’ 5” | 15’ | 10’ | 5,795 lbs. | | 5’ | 5’ | 6’ | | 6’ | 5’ | 5’ | |
| | 33’ | 13’ 5” | 15’ | 10’ 6” | 5,910 lbs. | | 5’ | 5.5’ | 6’ | | 6’ | 5.5’ | 5’ | |
| | 34’ | 13’ 5” | 15’ | 11’ | 6,025 lbs. | | 5.5’ | 5.5’ | 6’ | | 6’ | 5.5’ | 5.5’ | |
| | 35’ | 13’ 5” | 15’ | 11’ 6” | 6,140 lbs. | | 5.5’ | 6’ | 6’ | | 6’ | 6’ | 5.5’ | |
| | 36’ | 13’ 5” | 15’ | 12’ | 6,255 lbs. | | 6’ | 6’ | 6’ | | 6’ | 6’ | 6’ | |
| Model TF215 | 37’ | 15’ 5” | 15’ | 11’ | 6,370 lbs. | | 5’ | 6’ | 5’ | 5’ | 5’ | 6’ | 5’ | |
| | 38’ | 15’ 5” | 15’ | 11’ 6” | 6,485 lbs. | | 5.5’ | 6’ | 5’ | 5’ | 5’ | 6’ | 5.5’ | |
| | 39’ | 15’ 5” | 15’ | 12’ | 6,600 lbs. | | 6’ | 6’ | 5’ | 5’ | 5’ | 6’ | 6’ | |
| | 40’ | 15’ 5” | 15’ | 12’ 6” | 6,715 lbs. | 3.5’ | 4’ | 5’ | 5’ | 5’ | 5’ | 5’ | 4’ | 3.5’ |
| | 41’ | 15’ 5” | 15’ | 13’ | 6,830 lbs. | 4’ | 4’ | 5’ | 5’ | 5’ | 5’ | 5’ | 4’ | 4’ |
| | 42’ | 15’ 5” | 15’ | 13’ 6” | 6,945 lbs. | 3.5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 3.5’ |
| | 43’ | 15’ 5” | 15’ | 14’ | 7,060 lbs. | 4’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 4’ |
| | 44’ | 15’ 5” | 15’ | 14’ 6” | 7,175 lbs. | 4’ | 5’ | 5.5’ | 5’ | 5’ | 5’ | 5.5’ | 5’ | 4’ |
| | 45’ | 15’ 5” | 15’ | 15’ | 7,290 lbs. | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ | 5’ |

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# 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 erased by an operator's single careless act. In addition, 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.

Make certain that the operator(s), prior to operating is instructed in safe and proper use and reviews and understands the manual(s) pertaining to this machine.

Read this manual before you operate this machine. If you do not understand any part of this manual, or need more information, contact the manufacturer or your authorized dealer.

# SAFETY

Understand that your safety and the safety of other persons is measured by how you service, and operate this machine. Know the positions and functions of all controls before you try to operate them. Make sure to check all controls in a safe area before starting your work.

The safety information given in this manual does not replace safety codes, federal, state or local laws. Make certain your machine has the proper equipment as designated by local laws and regulations.

A frequent cause of personal injury or death is from persons falling off equipment and being run over. Do not permit persons to ride on this machine.

Travel speeds should be such that complete control and machine stability is maintained at all times. Where possible, avoid operating near ditches, embankments and holes. Reduce speed when turning, crossing slopes and rough, slick or muddy surfaces.

Collision of high speed road traffic and slow moving machines can cause personal injury or death. On roads, use flasher lights according to local laws. Keep slow-moving-vehicle emblem visible. Pull over to let faster traffic pass.

Never adjust, service, clean, or lubricate running gear until all power is shut off.

Keep all safety shields in place.

Keep hands, feet, hair and clothing away from moving parts while unit is in operation.

Make sure that everyone is clear of equipment before applying power or moving the machine.

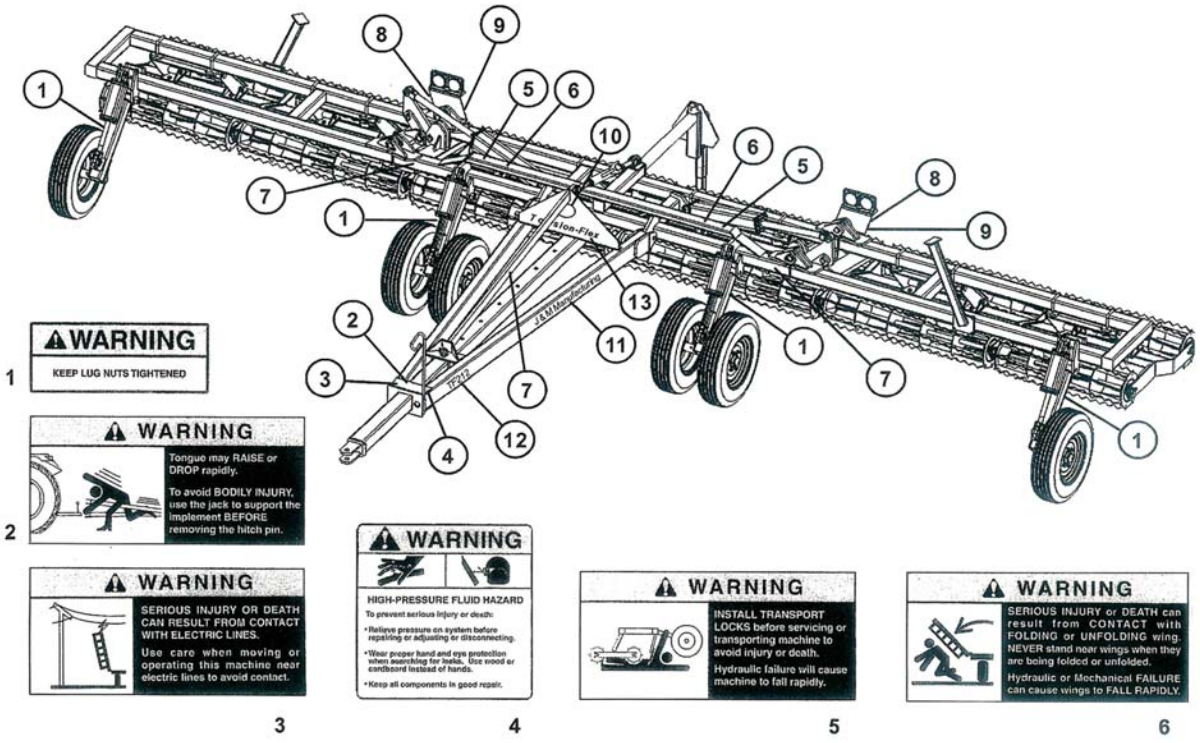
Make sure that the implement is fastened securely to the tractor by using the proper hitch pin, clip and safety chains.

Do NOT exceed speeds in excess of 20 MPH. Also be sure slow moving vehicle emblem is attached to rear of transport.

Before unhooking the implement from the towing unit, be sure to properly block the wheels to prevent the implement from moving. Be sure the jack assembly is positioned in the park position and the weight has been transferred to the jack assembly before unhooking the implement.

## SAFETY SIGNS

**IMPORTANT**: Install new safety signs if the old signs are destroyed, lost, painted over or cannot be read. When parts are replaced that have safety signs, make sure you install a new sign with each new part. New signs are available from the manufacturer or your authorized dealer.




**DECAL PARTS LIST**

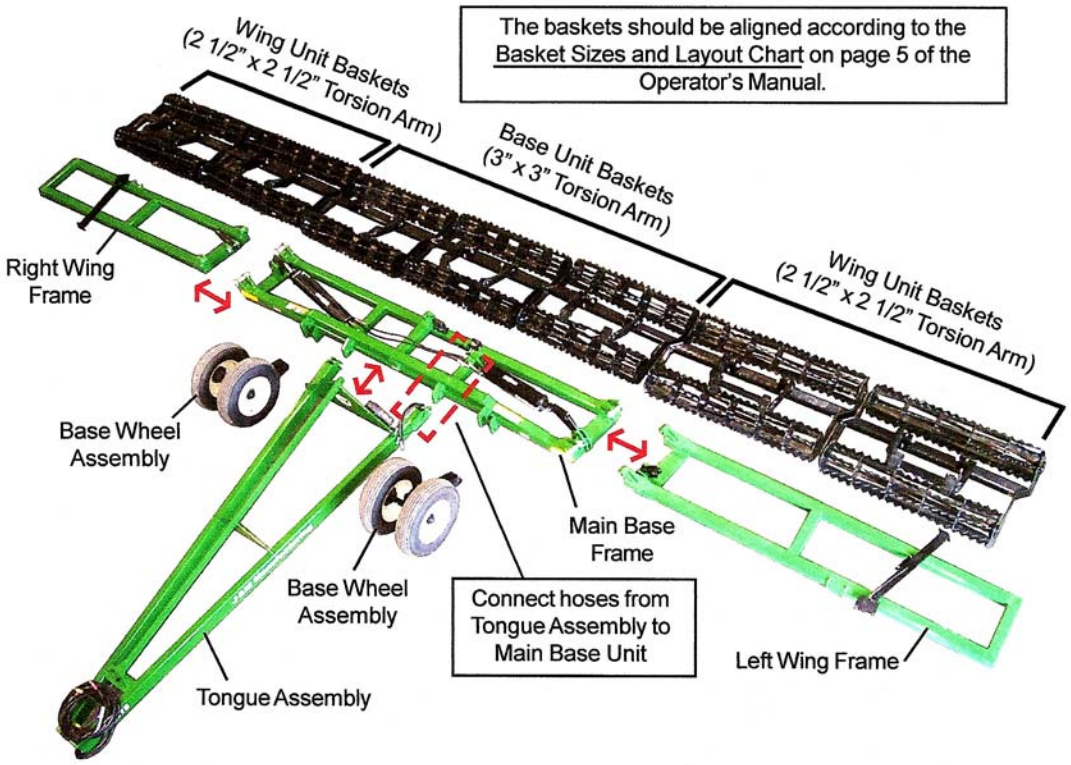
| Item # | Part # | Description |
|---|---|---|
| 1 | DW-107 | Warning: Keep Lug Nuts Tight |
| 2 | DW-128 | Warning: Rapidly Rising Tongue |
| 3 | DW-129 | Warning: Electric Lines |
| 4 | DW-105 | Warning: High Pressure Fluid |
| 5 | DW-126 | Warning: Transport Locks |
| 6 | DW-127 | Warning: Folding Wings |
| 7 | RD-1A | Reflective Amber Decal |
| 8 | RD-1R | Reflective Red Decal |
| 9 | RD-1O | Reflective Orange Decal |
| 10 | DI-114M | Medium Size J&M Oval |
| 11 | DI-125S | Small “J&M Manufacturing” Decal |
| 12 | DI-TF2 | “TF2” Decal |
| 12 | DI-TF212 | “TF212” Decal |
| 12 | DI-TF215 | “TF215” Decal |
| 13 | DI-130 | “Torsion-Flex” Decal |

## SET-UP INSTRUCTIONS

The J&M Torsion-Flex Soil Conditioner is shipped with components partially assembled. Hardware required to connect the Base Wheel Assembly, Main Base Frame Assembly, Wing Frames and Tongue Assembly should already be secured to the components at the point of attachment.

The hydraulic cylinders have the fittings already installed and are secured to the base wheel assembly. The hydraulic hoses and light harness wires should inserted into the component tubing and simply require the ends to be connected.

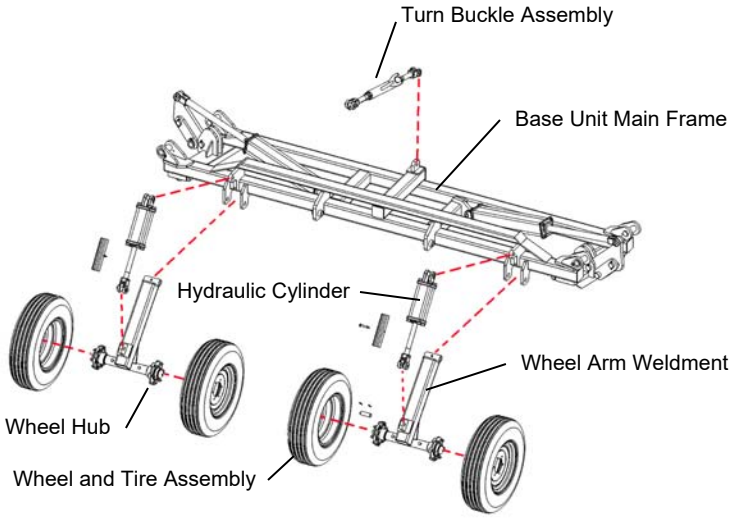
Each basket frame should have the rolling baskets and torsion flex arm installed. Refer to the Basket Size and Layout, located on the right side of the chart on page 5 of the Operator's Manual for recommended basket layout. Be sure the baskets with the 3" x 3" Torsion Bars are secure to the Main Base Unit and the baskets with the smaller 2 1/2" x 2 1/2" Torsion Bars are secured to the side wings.




The optional Lift Assist Bundle (wing wheels) and Harrow are also shipped partially assembled. Refer to the Set-Up Instructions on the following pages for installation.

## SET-UP INSTRUCTIONS

**Step 1 – Installing the Base Unit Wheels**
Using the 1” x 3 1/2" Pins and cotter pins, secure the two wheel lift hydraulic cylinders to the tabs welded on the front of the Base Unit Main Frame. (NOTE: For implements equipped with wing wheels, be sure a 3” MS hydraulic cylinder is used on the right set of wheels and a 2 3/4" MS hydraulic cylinder is used for the left set of wheels.)

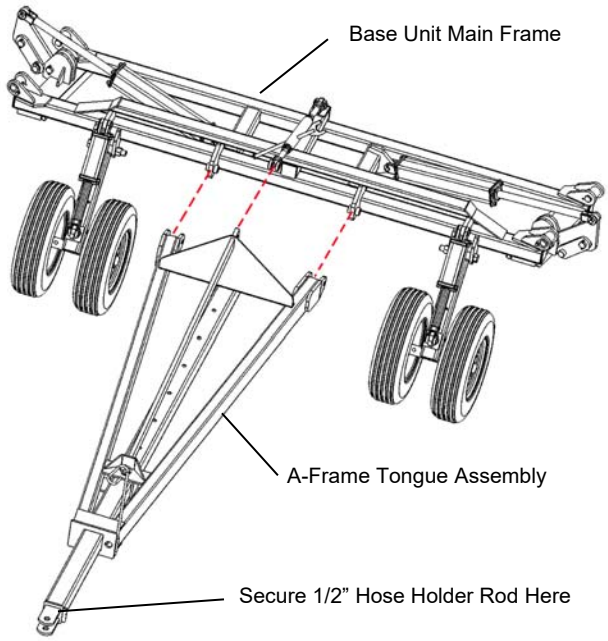



Bolt the Wheel Arm Weldments to the front of the Base Unit Main Frame directly below the hydraulic cylinder shown using one 1 1/4" x 9” Grade 5 Bolt and 1 1/4" Nylon Lock Nut.

Pin the clevis end of the hydraulic cylinder to the lower tab on the Wheel Arm Weldment and secure using the 1” x 3 1/2" pin and cotter pins. **Align the wheel and hub and tighten the wheel nuts in a star pattern to 80 Ft. Lbs. IMPORTANT: Check the wheel nuts periodically to ensure they remain tight.**

Secure one end of the Turn Buckle Assembly to the top of the Base Unit Main Frame as shown using one 1” x 3 1/2" pin and cotter pins.

**Step 2 – Installing the A-Frame Tongue**
Connect each side arm of the A-Frame Tongue Assembly to the front of the Main Frame Base Unit using one 1 1/4" x 6” Grade 5 Bolt and 1 1/4" Hex Nut.




Using the 1” x 3 1/2" pin and cotter pins, secure the top of the A-Frame Assembly by connecting the clevis end of the turn buckle to the end of the upper bar as shown.

Slide the Inner Tongue Weldment into the tongue A-Frame and secure using the 1” x 8” Tongue Pin. Insert the 1/2" Hose Holder Rod into the conduit on the front of the Inner Tongue Weldment and secure using one 3/8” x 3/4" Grade 5 Bolt.

**Step 3 – Connect the Hydraulic Hoses**
For soil conditioners equipped <u>without</u> wing wheels, connect the hydraulic hoses and light main wiring harness located in the left side tubing of the A-Frame to the corresponding hoses/wires located on the Main Frame Base Unit. For more information, refer to the “Light Kit / Wiring Harness” and “Hydraulic Hose and Fittings” diagrams at the end of the Set-Up Instructions.

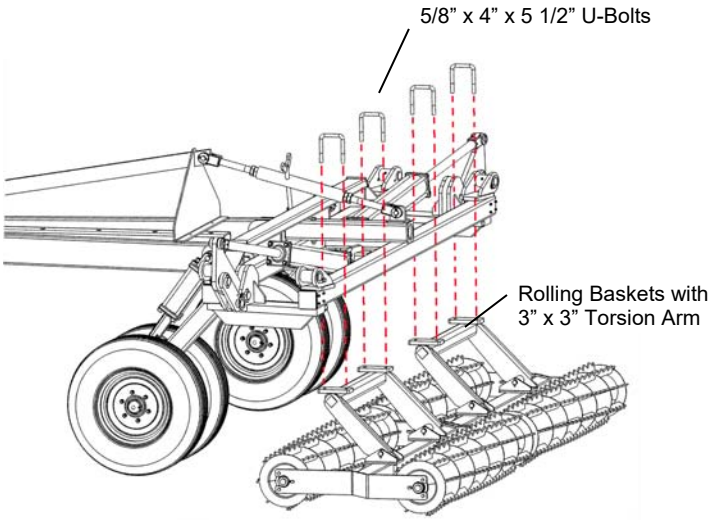
**WARNING: Before attaching the cylinders to the wing linkage, charge the cylinders with hydraulic oil to bleed all air out of the system, and then check for any leaks. Failure to do so could cause erratic, sudden movement of the wings which could damage the equipment and cause serious injury or death.**

## SET-UP INSTRUCTIONS

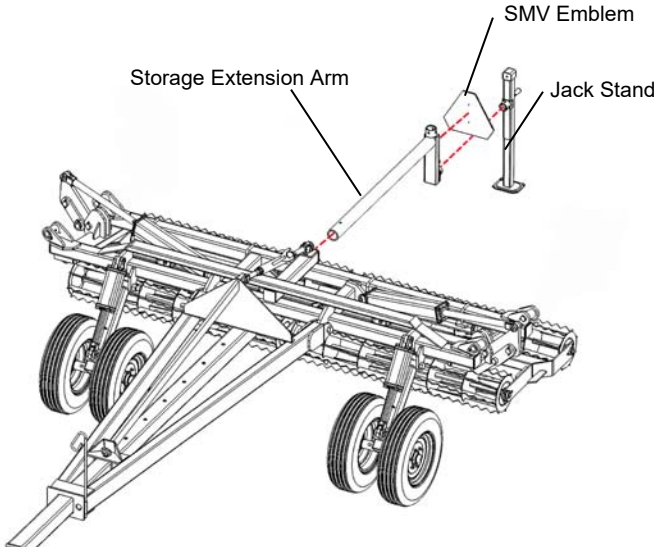
**Step 4 – Installing the Base Unit Baskets**
Secure the torsion-flex arm of the rolling basket assembly to the rear tubing member of the Base Unit Main Frame using two 5/8” x 4” x 5 1/2" U-Bolts and 5/8” Lock Nuts.

**Make sure the baskets are symmetrically placed on the Base Unit Main Frame and have a 1 1/2” clearance between baskets.**

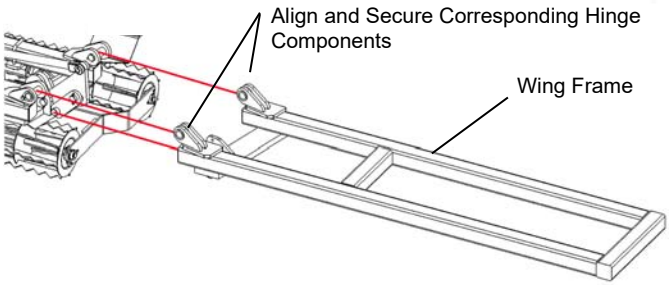
Note: Be sure the basket assemblies with the 3” x 3” torsion arms are secured to the Base Unit Main Frame. The rolling basket assemblies for the side wings have a smaller 2 1/2” x 2 1/2” torsion arm.

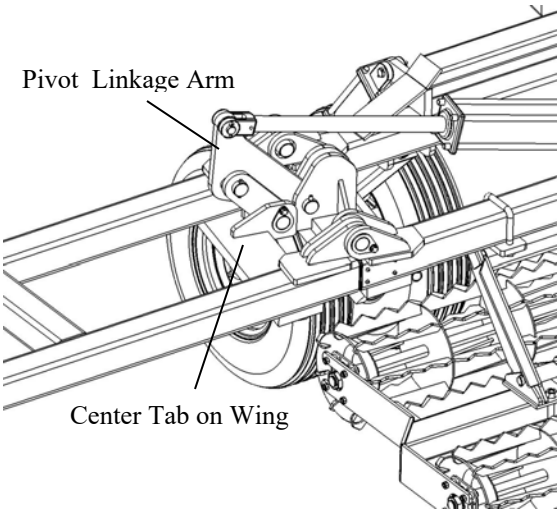



**Step 5 – Installing the Jack Stand**
Slide the Storage Extension Arm into the square tubing on the Base Unit Main Frame as shown and secure using one 1/2" x 4 1/2" Grade 5 Bolt and 1/2" Lock Nut. Pin the Jack Stand Assembly to parking position on the extension arm and lower the jack so the weight of the base unit is transferred to the jack. Using two 1/4” x 1” Grade 5 Bolts, mount the SMV emblem to the extension arm as shown. (Note: For soil conditioners with side wings that are 5’ long or smaller. If equipped with side wings longer than 5’, secure the SMV emblem to the right Wing Arm Rest.




**Step 6 – Installing the Wings**
Align and connect the hinges on the side Wing Frame to the matching hinge assembly on the Main Unit Base Frame using two 1 3/4" x 5 1/4" Grade 5 Bolt with 1 3/4” Lock Nut.

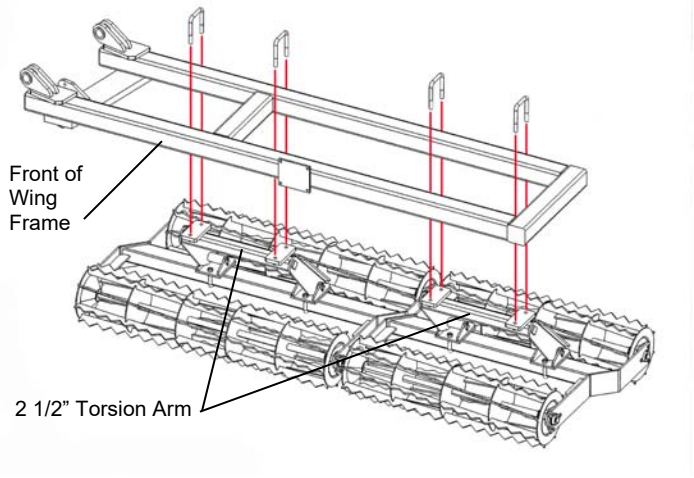



Connect the Pivot Linkage Arm on the base main frame to the center tab on the folding wing frame using one 1 3/4" x 4 3/4" Grade 5 Bolt, one 1 3/4" Washer and one 7/16" x 2 3/4" Roll Pin. (As Shown in the figure to the right)

## SET-UP INSTRUCTIONS

**Step 7 – Installing the Wing Baskets**
Secure the torsion-flex arm of the rolling basket assembly to the rear tubing member of the Wing Frame using two 5/8” x 4” x 5 1/2" U-Bolts and 5/8” Lock Nuts.



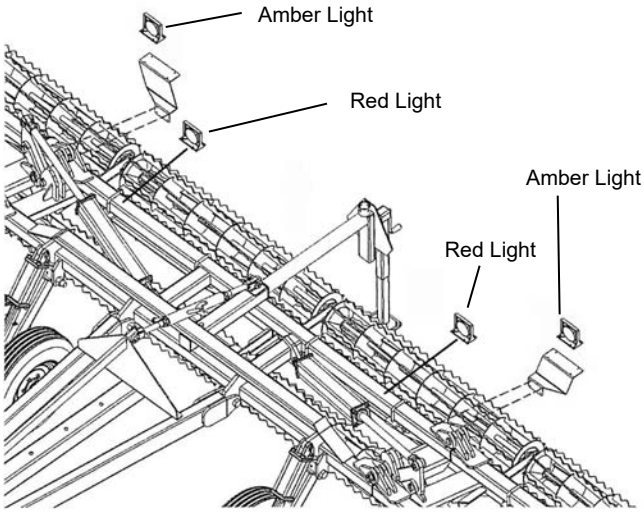

Make sure the wing baskets are placed according to the “Basket Sizes and Layout” section of the chart found on page 5. **IMPORTANT: Make sure the wing baskets closest to the baskets on the Base Unit baskets have a clearance of 2”. The spacing between wing baskets should have a clearance of 1 1/2”.**

Note: Be sure the basket assemblies with the 2 1/2” x 2 1/2” x 2’-0” torsion arms are secured to the side wings. (The baskets on the base unit main frame should have a larger 3” x 3” torsion arm.)

Repeat for opposite side wing.

**Step 8 – Installing the Wing Arm Rests**
Attach the Wing Rest Arm to the Wing Frame as shown using four 1/2" x 1 1/2" Grade 5 Bolts and 1/2" Lock Nuts. One wing rest arm is longer than the other. The longer wing arm should be mounted to the left side wing and the short wing arm should be mounted to the right wing arm.

**Step 9 – Mounting the Light Brackets and Lights**
Mount the left and right Light Mounting Bracket to the back of the Base Unit Main Frame using four 1/4” Self-Tapping Screws. Secure the Amber Light to the mounting bracket using four 1/4” x 1” Grade 5 Bolts and 1/4” Lock Nuts. Place the Red Lights approximately 18” from the hinges of the Main Base Unit and secure to the top of the 4” x 4” tubing using four self-tapping screws.

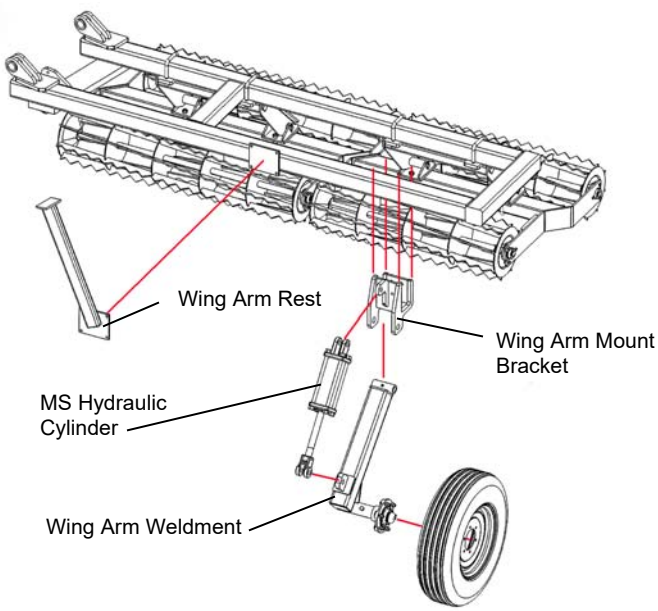



Snap the end plugs of each light into the light wiring harness already located inside the frame of the Main Frame Base Unit. **(See Pg. 27 for Diagram)**

# SET-UP INSTRUCTIONS

## INSTALLING OPTIONAL WING WHEELS

For soil conditioners equipped with side wing wheels, mount the Wing Arm Mount Bracket to the front tubing member of the Wing Frame as shown (approximately 6” from the end of the wing frame) using two 1/2" x 5” Grade 5 Bolts and 1/2" Lock Nuts.




Bolt the Wheel Arm Weldments to the front of the Base Unit Main Frame directly below the hydraulic cylinder shown using one 1 1/4" x 9” Grade 5 Bolt and 1 1/4" Nylon Lock Nut. Pin the clevis end of the hydraulic cylinder to the lower tab on the Wheel Arm Weldment and secure using the 1” x 3 1/2" pin and cotter pins. **(See Diagram on Pg. 33).** Align the wheel and hub and tighten the wheel nuts in a star pattern to 80 Ft. Lbs. IMPORTANT: Check the wheel nuts periodically to ensure they remain tight.

Using the 1” x 3 1/2" Pins and cotter pins, secure the two wheel lift hydraulic cylinders to the tabs welded on the front of the Base Unit Main Frame.

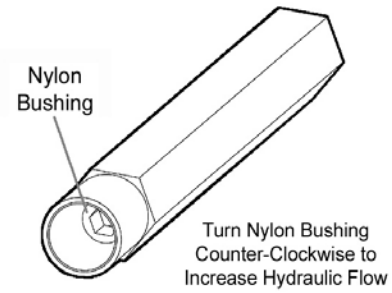
NOTE: Soil Conditioners with working widths between 37’ and 39’ have a longer Wing Arm Rest and a spacer on the hydraulic cylinder that folds the left side wing.

**MAKE SURE THE MS CYLINDERS AND HYDRAULIC HOSES ARE MOUNTED ACCORDING TO THE DIAGRAM ON PAGE 29.**

## ADJUSTING THE PRESET VALVE ON THE FOLDING WING CYLINDER

Wings wheels installed on the Torsion Flex Soil Conditoner are equipped with a preset valve on each folding cylinder that allows the wings to fold in sequence (see hydraulic diagram). When folding the wings for transport, the right side wing should fold first. When unfolding for field use, the left wing should fold first. Failure to fold/unfold the wings in proper sequence could result in damage to the wings, wheel assembly or baskets.

The rate at which the wings fold/unfold is dependent on the side of the wings and the hydraulic pressure supplied by the tractor. If the wings fold slower than 2 minutes, the preset valve can be removed and adjusted to increase hydraulic flow (see diagram). To increase the hydraulic flow through the preset valve, insert an L-wrench through the nylon bushing located inside the preset valve and rotate counter-clockwise up to one complete turn. (One complete counter-clockwise turn will increase the flow through the valve up to 100 psi.) IMPORTANT: Be sure to adjust the preset valve on each folding wing cylinder the same.




If your tractor supplies too much hydraulic pressure with the existing preset valve, causing the wings to hit during the fold/unfold sequence, please call our Torsion-Flex Service Department at 419-375-2376 for a free replacement preset valve set for higher hydraulic pressures.

**ADJUSTING THE PRESET VALVE ON THE FOLDING WING CYLINDER (continued)**
NOTE: Be sure the baskets are free from excessive mud, rocks or debris before beginning the folding/unfolding sequence. Excessive weight could effect the timing of the folding sequence, causing possible collision.

**WARNING: Charge the cylinders with hydraulic oil to bleed all air out of the system, and then check for any leaks. Failure to do so could cause erratic, sudden movement of the wings which could damage the equipment and cause serious injury or death. Units that have the gauge wheels on the wings have a slave hydraulic system that must be "charged" so the cylinder ram extends first on all four cylinders.**

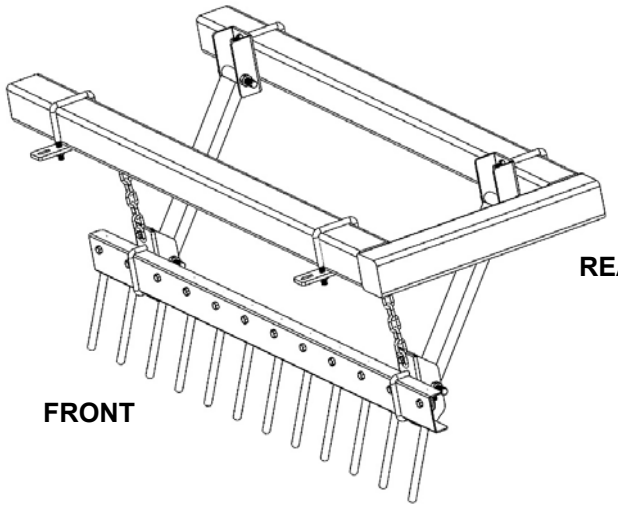
**WHEN TWO SETS OF HYDRAULIC PORTS ARE NOT AVAILABLE…**

Torsion Flex Soil Conditioners equipped with wing wheels have one set of hoses to fold the wings and another set of hoses to raise and lower the wheels. When two hydraulic ports are not available, we suggest teeing the hydraulic hoses that fold the wings into the hydraulic lines that fold the wings on the front implement. Therefore, the wings of both implements will fold at the same time.

**INSTALLING THE OPTIONAL HARROW BAR**
For part identification, refer to the Harrow Parts List on pages 34-35.

For each harrow section, attach two Harrow Arm Mounting Brackets (#2) to the rear tubing along the wing or base unit using two 5/8" x 4" x 5 1/2" U-Bolt (#3) and four 5/8" lock nuts (#4). Do not tighten, as the bracket may need to be adjusted.

Attach one 2" x 8 1/4" Chain Plate (#7) on the front tubing (directly across from the Harrow Arm Mounting Bracket) using one 5/8" x 4" x 5 1/2" U-Bolt (#3) and two 5/8" lock nuts (#4). Do not tighten, as the plate may need to be adjusted.




Connect one 3" x 21" Harrow Arm to each of the rear mounting bracket using one 3/4" x 6" Grade 5 bolt (#5) and 3/4" lock nut (#6). Connect the Pivot Bracket (#12) to the lower end of each harrow arm using one 3/4" x 6" grade 5 bolt (#5) and 3/4" lock nut (#6).

Connect one 16" long chain (#9) to the top of each pivot bracket using one 3/8" x 1" flange bolt (#10) and 3/8" flange nut (#11). Slide the top of the chain through the slot in the chain plate and pin in place using the Clip Pin (#8). Be sure to pin all the chains to the same length to keep the harrow level.

**To Install the Round Bar Assembly**
Insert the Round Bar Hooks (#14) into the Round Bar Bracket (#13) and secure using the 1/2" x 1/2" grade 5 bolts (#17), 1/2" x 2 1/4" oversized washers (#18) and 1/2" lock nuts (#16). Be sure all the round bars are aligned in the same direction. Secure the round bar bracket to the pivot brackets using the 1/2" x 4" x 4" U-Bolts (#15) and 1/2" lock nuts (#16).

**To Install the Coil Tine Spring Assembly**
Slide the Coil Tine Springs (#22) around the Coil Tine Pipe (#21) and secure at each hole location using the 1/2" x 3 1/2" J-Bolt (#23) and 1/2" Lock Nut (#16). Repeat for each pipe. Secure the Coil Tine Pipe to the pivot brackets on the lower end of the harrow arm using the two Squeeze Blocks (#19) and four 1/2" x 4 1/2" Grade 5 Bolt (#20) with 1/2" Lock Nuts (#16).

**Below is a recommended layout of the harrow pipe bar and round bar bracket lengths along the width of the conditioner. Be sure the Harrow is properly and evenly spaced along the Base Unit Main Frame and Wing Frames, making adjustments as necessary.**

| | | Coil Tine Pipe Bar and Round Bar Bracket Layout for Optional Leveling Harrow | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Working Width | Wing | | | Base Unit | | | Wing | | | | |
| Model TF2 | 12' | | | | 6' | | 6' | | | | | |
| | 13' | | | | 4' | 5' | 4' | | | | | |
| | 14' | | | | 5' | 4' | 5' | | | | | |
| | 15' | | | | 5' | 5' | 5' | | | | | |
| | 16' | | | | 5' | 6' | 5' | | | | | |
| | 17' | | | | 6' | 5' | 6' | | | | | |
| | 18' | | | | 6' | 6' | 6' | | | | | |
| Model TF212 | 20' | | | 4' | 6' | | 6' | 4' | | | | |
| | 22' | | | 5' | 6' | | 6' | 5' | | | | |
| | 23' | | | 5' | 6' | | 6' | 5' | | | | |
| | 24' | | | 6' | 6' | | 6' | 6' | | | | |
| | 25' | | | 6' | 6' | | 6' | 6' | | | | |
| | 26' | | | 7' | 6' | | 6' | 7' | | | | |
| | 27' | | | 7' | 6' | | 6' | 7' | | | | |
| | 28' | | 4' | 4' | 6' | | 6' | 4' | 4' | | | |
| | 29' | | 4' | 4' | 6' | | 6' | 4' | 4' | | | |
| | 30' | | 4' | 5' | 6' | | 6' | 5' | 4' | | | |
| | 31' | | 4' | 5' | 6' | | 6' | 5' | 4' | | | |
| | 32' | | 5' | 5' | 6' | | 6' | 5' | 5' | | | |
| | 33' | | 5' | 5' | 6' | | 6' | 5' | 5' | | | |
| | 34' | | 5' | 6' | 6' | | 6' | 6' | 5' | | | |
| | 35' | | 5' | 6' | 6' | | 6' | 5' | 6' | | | |
| | 36' | | 6' | 6' | 6' | | 6' | 6' | 6' | | | |
| Model TF215 | 37' | | 5' | 6' | 5' | 5' | 5' | 6' | 5' | | | |
| | 38' | | 5' | 6' | 5' | 5' | 5' | 6' | 5' | | | |
| | 39' | | 6' | 6' | 5' | 5' | 5' | 6' | 6' | | | |
| | 40' | | 7' | 5' | 5' | 5' | 5' | 5' | 7' | | | |
| | 41' | 4' | 4' | 5' | 5' | 5' | 5' | 5' | 4' | 4' | | |
| | 42' | 4' | 4' | 5' | 5' | 5' | 5' | 5' | 4' | 4' | | |
| | 43' | 4' | 5' | 5' | 5' | 5' | 5' | 5' | 5' | 4' | | |
| | 44' | 4' | 5' | 5' | 5' | 5' | 5' | 5' | 5' | 4' | | |
| | 45' | 5' | 5' | 5' | 5' | 5' | 5' | 5' | 5' | 5' | | |

# OPERATIONS

## PREPARING THE TORSION-FLEX SOIL CONDITIONER

Before putting the soil conditioner into operation, check the machine for damaged or worn parts and replace as necessary.

### Hardware

Make sure all hardware is properly fastened according to the Bolt Torque chart found in this manual. Recheck all hardware for tightness after the unit has been operated for several hours. Check all pins and retaining rings are in good condition. Replace any pins of retaining rings that are worn, damaged or missing.

### Hydraulic Hoses

Check all the hydraulic hoses to make sure there are not rubbing against sharp edges or are kinked or twisted. Hoses should be secured to the soil conditioner with nylon tie straps. Check hoses and fitting for hydraulic leaks. Tighten or replace as necessary.

### Lubrication

Lubricate the Torsion-Flex soil conditioner according to the Lubrication Schedule outlined in the SERVICE section of this manual.

### Tires and Wheels

Check the tire pressure in the transport tires. The recommended air pressure is 46 PSI. Make sure the tire pressure is equal in all tires. Make sure the wheel lug nuts are tightened to 80 Ft. Lbs. Check the wheel lug nuts before initial operation and after the unit has been operated for several hours to ensure the lug nuts remain tight.

### Adjusting the Inner Tongue

Before attaching the Torsion-Flex soil conditioner to your primary tillage tool, extend the inner tongue of the A-Frame Tongue Assembly to ensure adequate turning clearance between the implements when turning. Adjust the Inner Tongue length by removing the 1” x 8” Tongue Pin and Cotter Pin. Readjust the Inner Tongue to the appropriate setting and re-pin as before.

### Attaching to the Primary Tillage Tool

Back the primary tillage tool into position and attach the soil conditioner to the implement using a high quality hitch pin and clip and lock into place. Install a transport chain. Transport chain should have a minimum rating equal to the gross weight of implement and all attachments. Use only ASAE approved chains. If the unit is parked in the transport position, turn the handle on the jack stand after the soil conditioner has been connected to the primary tillage tool to remove pressure. Remove the Jack Assembly from the storage position and re-pin to the transport position located on top of the Storage Extension Arm.

### Unfolding the Wings / Removing the Transport Locks

It is recommended to unfold the side wings in the field. Remove the wheel lift cylinder transport locks so the unit may be lowered to the field working position. Pin the transport locks on the back of the A-Frame Tongue Assembly for easy storage.

## TRANSPORTING

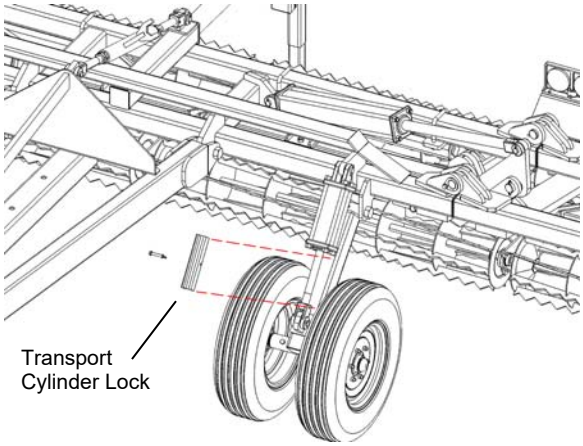
Before the soil conditioner is transported, be sure to secure the Jack Assembly in the transport position located on the top of the Storage Extension Arm.

The Torsion-Flex Soil Conditioner will increase the overall length of the primary tillage tool. Use extreme caution when turning to avoid obstacles. Reduce ground speed as necessary to maintain control of equipment.

Install hydraulic cylinder transport locks on the Base Unit wheels BEFORE transporting.

Comply with ALL state and local laws governing highway safety and regulations when moving machinery on public roads. Be sure an SMV emblem is in place and clearly visible on the rear of the conditioner. Make sure all lights are clearly visible and working properly BEFORE highway travel. Be sure the amber, red and orange retroreflective tape on the implement is in place and clearly visible.

The transport speed should not exceed 10 MPH in the field or over rough terrain. Reduce transport speed when necessary to maintain full control of the implement at all times.




## UNHITCHING

**WARNING –** Before unhooking the soil conditioner, be sure to install the hydraulic cylinder transport locks. Reposition the jack stand on the Storage Extension Arm to the parked position and lower the jack stand to the ground by turning the handle until weight of the soil conditioner is transferred to the jack. Keep hands and feet away from the jack stand when lowering.

Remove the Hitch Pin and unhook the safety chains.

**WARNING** – Always relieve hydraulic system pressure before disconnecting hoses from tractor or servicing hydraulic system. See the tractor's operators manual for proper procedures. Disconnect the hydraulic hoses. Install dust covers over the hose plugs and outlets.

## FIELD ADJUSTMENTS

The Torsion-Flex Soil Conditioner is designed to provide an excellent seedbed when used in conjunction with you primary tillage tool. For maximum performance in normal field conditions, the soil conditioner should be used with the transport wheels in the raised position to allow maximum transfer of weight to the rolling baskets.

With the wheels in the raised position, adjust the Turn Buckle Adjustment Bar until the wheels are approximately 2" above the ground. This will set your Torsion-Flex Soil Conditioner at the maximum clearance height during transport.

The Spring Coil-Tine Harrow Bar is designed to improve the soil leveling capabilities of your conditioner. To improve the ground leveling capabilities of the harrow in heavier soils, pin the harrow bar so the coil-tines are positioned more vertically. In softer soils or to improve field residue flow through the leveler bar, position the bar with a decreased vertical angle of the tines.

## STORAGE

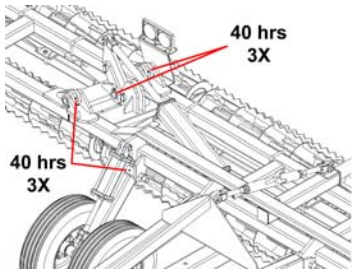
To add longer service and life to your Torsion-Flex Soil Conditioner, perform the following before placing the implement in storage:

1. Remove dirt and trash that may cause rusting.
2. Repaint any areas where the paint has been chipped, scratched or worn away.
3. Coat all earth moving surfaces with a suitable rust preventative.
4. Inspect for damaged or worn parts and replace before next use.
5. Lubricate wing and wheel pivot points.
6. Block up the conditioner to keep the wheels and ground tools off the ground.
7. Replace all worn, torn and faded decals and reflectors.
8. Store the implement inside away from inclement weather.

## SERVICE

To add longer life to your Torsion-Flex Soil Conditioner, perform the following on a regular basis:

1. Grease hinge, linkage area and wheel transport pivots (3X) weekly or every 40 hours. Grease the 4-Hole Flange Bearings (2X) on the Rolling Basket Assembly every 20 Hours.
2. Check lighting before over the road transport. Make sure lights and SMV emblem are clean from dirt and field debris.
3. Check implement for damage, cracked welds, loosened hardware, etc. Promptly repair to prevent further damage.
4. Check hydraulic system for leaks and hose damage, twists or kinks and repair.
5. Check tire pressures and lug nuts periodically and adjust as required.



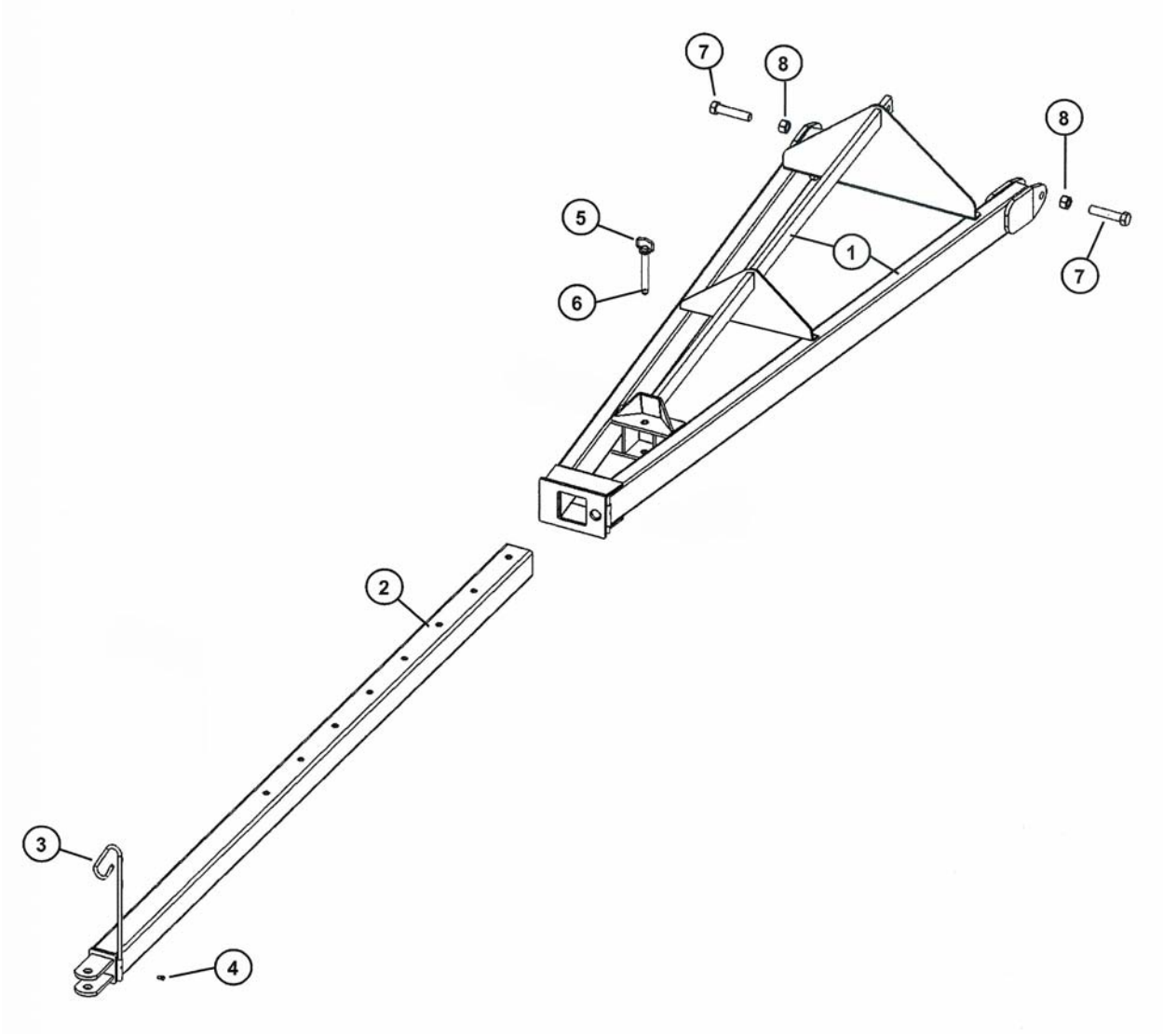

## TROUBLESHOOTING

**When Hydraulics Are Not Functioning Properly…**

| PROBABLE CAUSE | CORRECTION |
|---|---|
| Hoses are incorrectly connected to the tractor control levers. | See the Tractor Operator's Manual for valve and control lever arrangement. |
| Insufficient hydraulic pressure from Tractor. | Check the hydraulic reservoir oil level. See the tractor Operator's Manual for hydraulic system recommendations. |
| Hydraulic components leaking oil. | Locate the leak and replace or repair components. |
| Hydraulic hoses are kinked or twisted. | Locate the twisted hose and correct. |
| Hydraulic cylinders are leaking. | Repair or replace cylinders. See Repair Parts section for cylinder or seal kit part numbers. |
| The orifice in the wing-fold cylinder is plugged. | Remove the contamination from the system. Flush system and change the oil and filter. |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Tongue Assembly

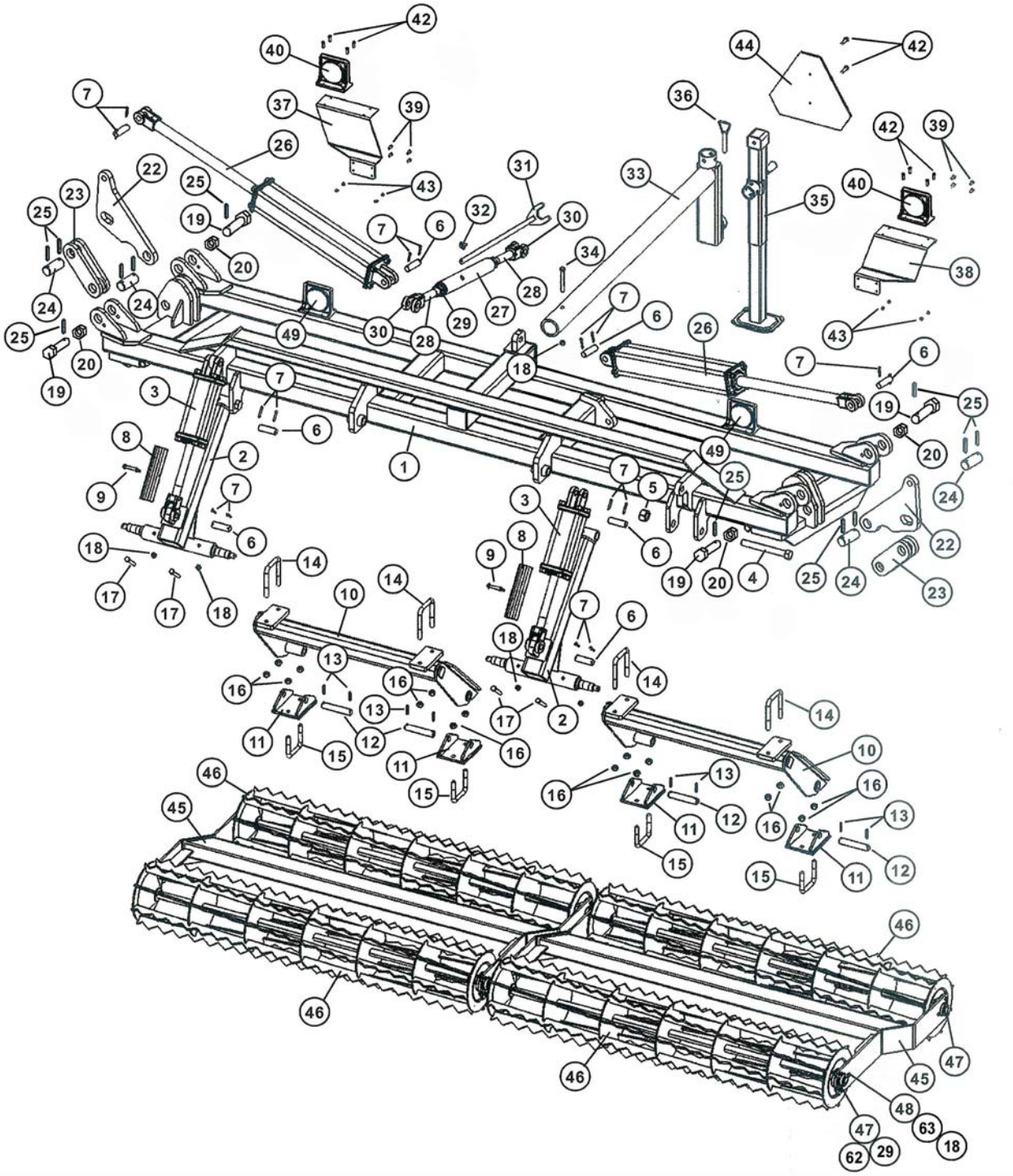



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | AFTW-2 | A-Frame Tongue Weldment (TF2) |
| 1 | AFTW-212 | A-Frame Tongue Weldment (TF212) |
| 1 | AFTW-215 | A-Frame Tongue Weldment (TF215) |
| 2 | ITW-TF1 | Inner Tongue Weldment |
| 3 | 12HHR | 1/2” Hose Holder Rod |
| 4 | 3834G5B | 3/8” x 3/4" Grade 5 Bolt |
| 5 | 18PCP | 1” x 8” Tongue Pin |
| 6 | CP-316 | Cotter Pin |
| 7 | 1146G5B | 1 1/4" x 6” Grade 5 Bolt |
| 8 | HLN-114 | 1 1/4" Hex Nut |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Base Assembly



# TORSION-FLEX SOIL CONDITIONER PARTS LIST

## Base Assembly

**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | BMF-2-12 | Base Unit Main Frame (TF2 – 12’ or 13’ working width) |
| 1 | BMF-2-14 | Base Unit Main Frame (TF2 – 14’ or 15’ working width) |
| 1 | BMF-2-16 | Base Unit Main Frame (TF2 – 16’ or 17’ working width) |
| 1 | BMF-2-18 | Base Unit Main Frame (TF2 – 18’ working width) |
| 1 | BMF-212 | Base Unit Main Frame (TF212) |
| 1 | BMF-215 | Base Unit Main Frame (TF215) |
| 2 | WAW-1 | Wheel Arm Weldment (TF2) |
| 2 | WAW-2 | Wheel Arm Weldment (TF212 or TF215) |
| 3 | 38HC | 3” x 8” Hydraulic Cylinder (left or right side wheel cylinder on units equipped WITHOUT wing wheels) |
| 3 | 3148HCMS | 3 1/4” x 8” MS Hydraulic Cylinder (for units equipped WITH wing wheels) (32TP08-125 639706) |
| 3 | 3128HCMS | 3 1/2" x 8” MS Hydraulic Cylinder (for units equipped WITH wing wheels) (35TP08-125 639707) |
| 4 | 1149G5B | 1 1/4" x 9” Grade 5 Bolt |
| 5 | 114NLN | 1 1/4" Nylon Lock Nut |
| 6 | 1312P | 1” x 3 1/2" Pin |
| 7 | CP-316 | 3/16” Cotter Pin |
| 8 | CYLK-2 | Cylinder Lock |
| 9 | 38212WLP | 3/8” x 2 1/2" Wire Lock Pin |
| 10 | 21220TFA | 2 1/2” x 2 1/2” x 2’ 0” Torsion-Flex Arm (units under 25’ wide) |
| 10 | 3330TFA | 3” x 3” x 3’ 0” Torsion-Flex Arm (TF212 units 25’ to 36’ wide) |
| 10 | 3320TFA | 3” x 3” x 2’-0” Torsion-Flex Arm (TF215) |
| 11 | SWB-1 | Swivel Bracket |
| 12 | 16G5B | 1” x 6" Grade 5 Bolt |
| 13 | 1G5LN | 1” Grade 5 Lock Nut |
| 14 | 584512UB | 5/8” x 4” x 5 1/2" U-Bolt |
| 15 | 5844UB | 5/8” x 4” x 4” U-Bolt |
| 16 | 58G5LN | 5/8” Grade 5 Lock Nut |
| 17 | 12312G5B | 1/2" x 3 1/2" Grade 5 Bolt |
| 18 | 12G5LN | 1/2" Grade 5 Lock Nut |
| 19 | 134514G5B | 1 3/4" x 5 1/4" Grade 5 Bolt |
| 20 | HN-134 | 1 3/4” Hex Nut |
| 22 | LA-2TF24 | Leverage Arm (round hole) (for working widths 24’ and smaller) |
| 22 | LA-2TF212 | Leverage Arm (oblong hole) (for model TF212, 25’ to 36’ wide) |
| 22 | LA-2TF215 | Leverage Arm (for model TF215) |
| 23 | PLA-2 | Pivot Linkage Arm (TF212) |
| 23 | PLA-2L | Pivot Linkage Arm, Long (TF215) |
| 24 | 1344P | 1 3/4" x 4” Pin |
| 25 | 716234RP | 7/16” x 2 3/4" Roll Pin |
| 26 | 424HC | 4” x 24” Hydraulic Cylinder (TF212) |
| 26 | 430HC | 4” x 30” Hydraulic Cylinder (TF215) |

# TORSION-FLEX SOIL CONDITIONER PARTS LIST

## Base Assembly (continued)

**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 27 | TBCB-1 | Turn Buckle Center Pipe |
| 28 | TBS-2RH | Turn Buckle Shaft (both ends R/H thread) |
| 28 | TBS-1RH1LH | Turn Buckle Shaft (1 end L/H thread; 1 end R/H thread) |
| 29 | HN-114 | 1 1/4" Hex Nut |
| 30 | CE-2 | Turn Buckle Clevis End |
| 31 | TBW-1 | Turn Buckle Wrench |
| 32 | LP-1 | Lynch Pin |
| 33 | SEA-1 | Storage Extension Arm |
| 34 | 12412G5B | 1/2" x 4 1/2" Grade 5 Bolt |
| 35 | JSA-TF | Jack Stand Assembly |
| 36 | JSA-P1 | Jack Stand Assembly Pin |
| 37 | LMB-TF-R | Light Mounting Bracket (for Right Hand Light) |
| 38 | LMB-TF-L | Light Mounting Bracket (for Left Hand Light) |
| 39 | 14STS | 1/4” Self Tapping Screw |
| 40 | AL-TF1 | Single Amber Light |
| 42 | 141G5B | 1/4" x 1” Grade 5 Bolt |
| 43 | 14LN | 1/4" Lock Nut |
| 44 | SMV-2 | Slow Moving Vehicle Emblem |
| 45 | BFS40-4 | 4’ Basket Frame Support Only (used with soil conditioners equipped with 4-hole flange bearings) |
| 45 | BFS50-4 | 5’ Basket Frame Support Only (used with soil conditioners equipped with 4-hole flange bearings) |
| 45 | BFS60-4 | 6’ Basket Frame Support Only (used with soil conditioners equipped with 4-hole flange bearings) |
| 46 | RB40-4-114 | 4’ Rolling Basket Only (used with soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 46 | RB50-4-114 | 5’ Rolling Basket Only (used with soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 46 | RB60-4-114 | 6’ Rolling Basket Only (used with soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 47 | ST491A-162-114 | 1 1/4” Flange Bearing – 4 Hole (used on all soil conditioners with serial numbers 2250 and higher) |
| 48 | 12214G5B | 1/2” x 2 1/4” Grade 5 Bolt |
| 49 | RL-TF1 | Red Flashing Light |
| 50 | 1610BL | Grease Fitting (not shown) |
| 51 | 1633 | Grease Fitting (not shown) |
| 52 | SK-3HC | Seal Kit for 3” Hydraulic Cylinder (38HC) (SK-3HC) |
| 53 | SK639581 | Seal Kit for 4” Hydraulic Cylinder (424HC) |
| 54 | SK639582 | Seal Kit for 4” Hydraulic Cylinder (430HC) |
| 55 | FBSS-1 | Set Screw in Flange Bearing |
| 56 | SK639558 | Seal Kit for 3” M/S Hydraulic Cylinder |
| 57 | SK639560 | Seal Kit for 3 1/4” M/S Hydraulic Cylinder |
| 58 | SK639561 | Seal Kit for 3 1/2” M/S Hydraulic Cylinder |
| 59 | SK639563 | Seal Kit for 3 3/4” M/S Hydraulic Cylinder |
| 60 | HCSS-1 | Set Screw in Hydraulic Cylinder Clevis |

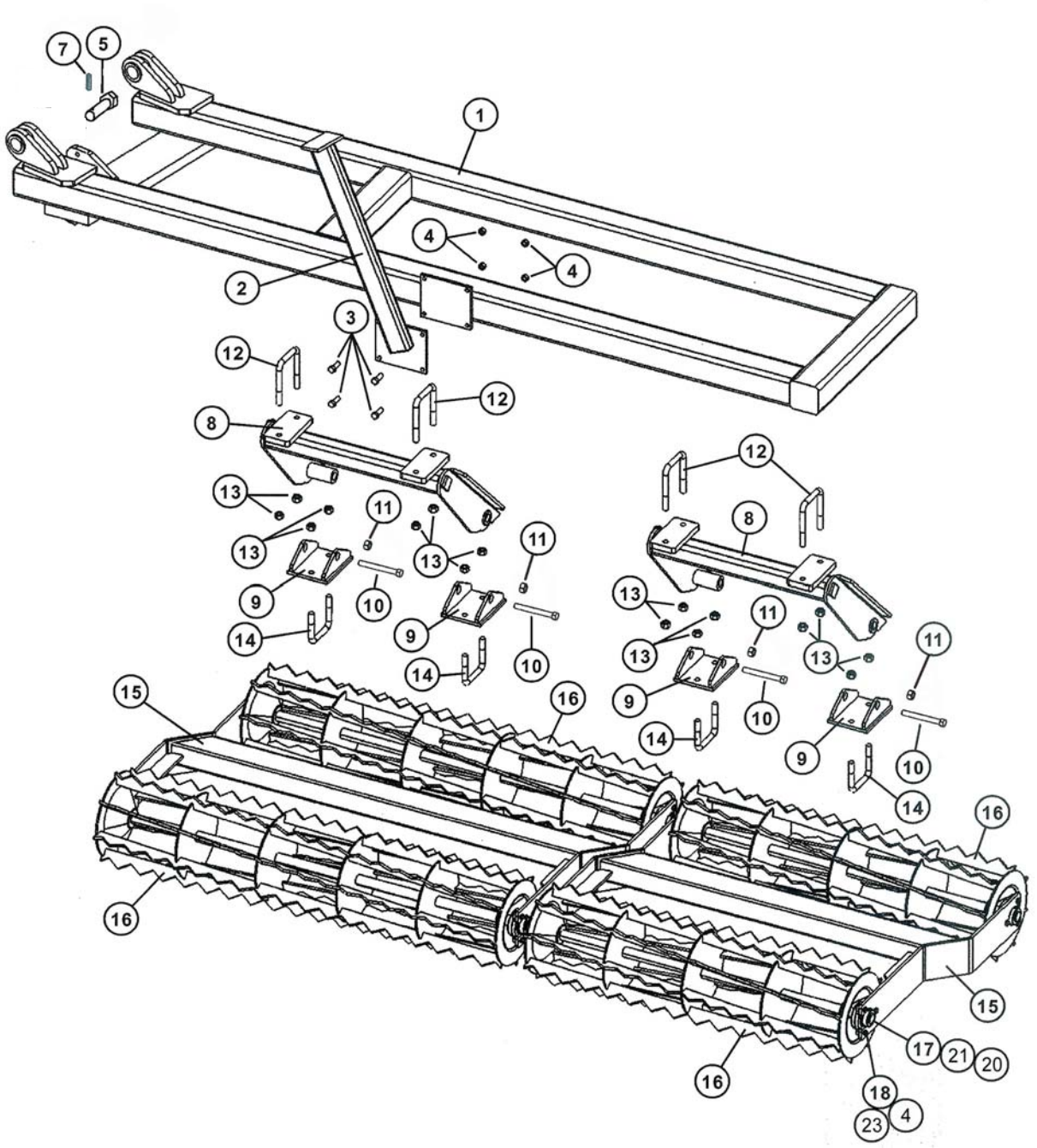
## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Base Assembly (continued)

**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 62 | LW-114 | 1 1/4” Lock Washer |
| 63 | 121PS | 1/2” x 1” Pipe Spacer |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST



## TORSION-FLEX SOIL CONDITIONER PARTS LIST
### Left and Right Side Wing Assemblies (TF212 and TF215 only)

**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | WF-212-4 | Wing Frame (TF212) (4’ L) |
| 1 | WF-212-5 | Wing Frame (TF212) (5’ L) |
| 1 | WF-212-6 | Wing Frame (TF212) (6’ L) |
| 1 | WF-212-7 | Wing Frame (TF212) (7’ L) |
| 1 | WF-212-8 | Wing Frame (TF212) (8’ L) |
| 1 | WF-212-9 | Wing Frame (TF212) (9’ L) |
| 1 | WF-212-10 | Wing Frame (TF212) (10’ L) |
| 1 | WF-212-11 | Wing Frame (TF212) (11’ L) |
| 1 | WF-212-12 | Wing Frame (TF212) (12’ L) |
| 1 | WF-215-11 | Wing Frame (TF215) (11’ L) |
| 1 | WF-215-12 | Wing Frame (TF215) (12’ L) |
| 1 | WF-215-13 | Wing Frame (TF215) (13’ L) |
| 1 | WF-215-14 | Wing Frame (TF215) (14’ L) |
| 1 | WF-215-15 | Wing Frame (TF215) (15’ L) |
| 2 | WRA-1L | Wing Rest Arm (for Left Hand Side Wing) |
| 2 | WRA-1R | Wing Rest Arm (for Right Hand Side Wing) |
| 3 | 12112G5B | 1/2" x 1 1/2" Grade 5 Bolt |
| 4 | 12LN | 1/2" Lock Nut |
| 5 | 134434G5B | 1 3/4" x 4 3/4" Grade 5 Bolt |
| 6 | ------ | ---------- |
| 7 | 716234RP | 7/16” x 2 3/4” Roll Pin |
| 8 | 21220TFA | 2 1/2” x 2 1/2” x 2’ 0” Torsion Flex Arm |
| 9 | SWB-1 | Swivel Bracket |
| 10 | 16G5B | 1” x 6” Grade 5 Bolt |
| 11 | 1G5LN | 1” Grade 5 Lock Nut |
| 12 | 584512UB | 5/8” x 4” x 5 1/2" U-Bolt |
| 13 | 58G5LN | 5/8” Grade 5 Lock Nut |
| 14 | 5844UB | 5/8” x 4” x 4” U-Bolt |
| 15 | BFS30-4 | 3’ Basket Frame Support (used on soil conditioners equipped with 4-hole flange bearings) |
| 15 | BFS36-4 | 3’ 6” Basket Support Frame (used on soil conditioners equipped with 4-hole flange bearings) |
| 15 | BFS40-4 | 4’ 0” Basket Support Frame (used on soil conditioners equipped with 4-hole flange bearings) |
| 15 | BFS50-4 | 5’ Basket Support Frame (used on soil conditioners equipped with 4-hole flange bearings) |
| 15 | BFS56-4 | 5’ 6” Basket Support Frame (used on soil conditioners equipped with 4-hole flange bearings) |
| 15 | BFS60-4 | 6’ Basket Support Frame (used on soil conditioners equipped with 4-hole flange bearings) |
| 16 | RB30-4-114 | 3’ Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 16 | RB36-4-114 | 3’ 6” Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 16 | RB40-4-114 | 4’ Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |

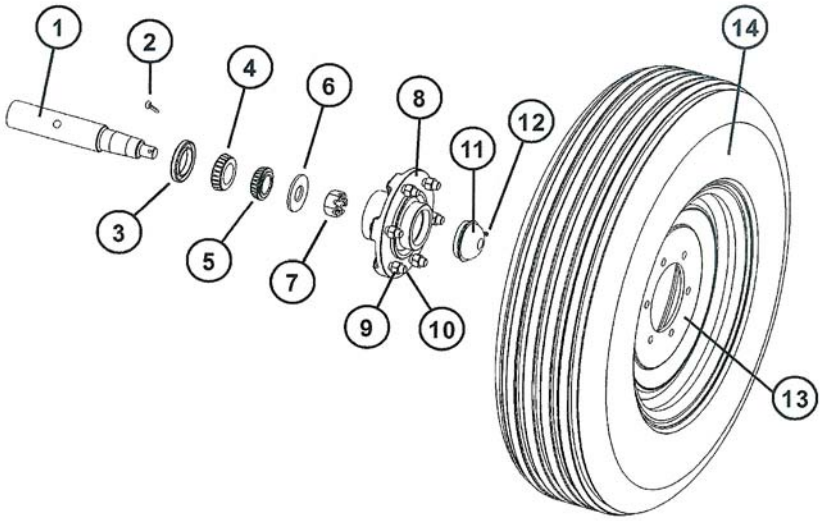
## TORSION-FLEX SOIL CONDITIONER PARTS LIST
### Left and Right Side Wing Assemblies (TF212 and TF215 only)

**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 16 | RB40-4-114 | 4’ Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 16 | RB50-4-114 | 4’ 6” Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 16 | RB56-4-114 | 5’ 6” Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 16 | RB60-4-114 | 6’ Rolling Basket (used on soil conditioners equipped with 4-hole flange bearings with 1 1/4” diameter shaft) |
| 17 | ST491A-162-114 | 1 1/4” Flange Bearing – 4 Hole |
| 18 | 12214G5B | 1/2” x 2 1/4” Grade 5 Bolt |
| 19 | 1633 | Grease Fitting (not shown) |
| 20 | HN-114 | 1 1/4” Hex Nut |
| 21 | LW-114 | 1 1/4” Lock Washer |
| 23 | 1234PS | 1/2” x 34” Pipe Spacer |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Wheel Assembly

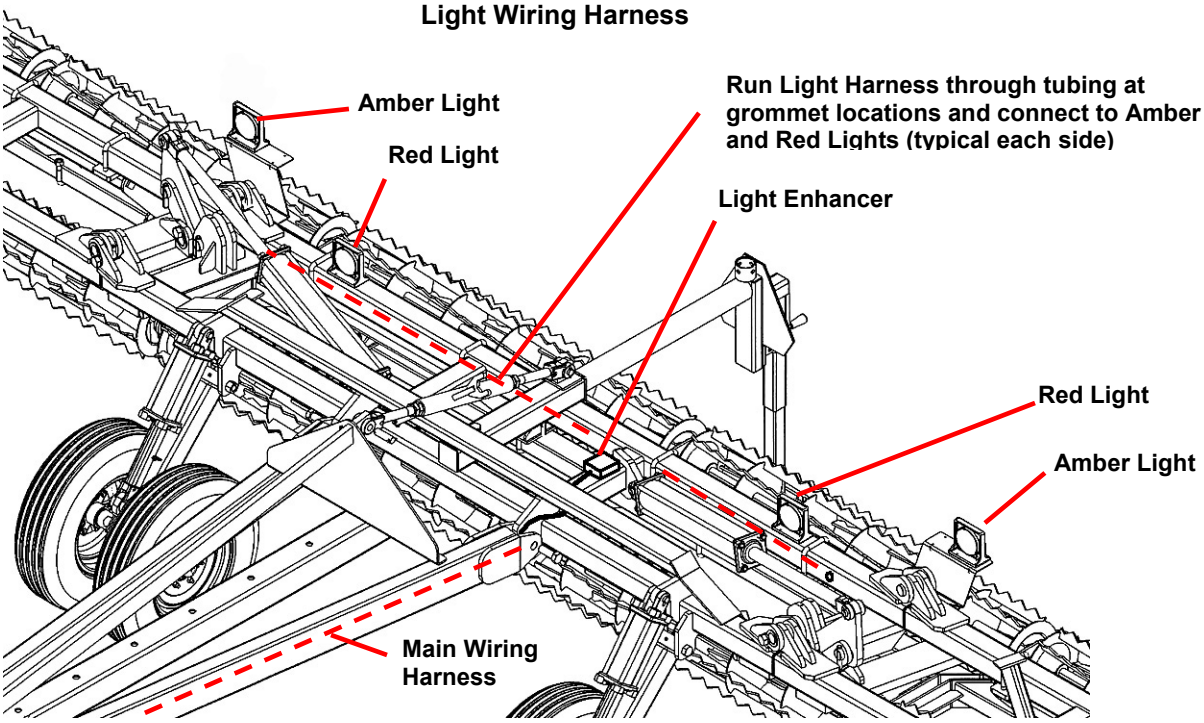



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | SS-134SC | 1 3/4" Diameter Spindle |
| 2 | CP-316 | Cotter Pin |
| 3 | 103953 | Grease Seal |
| 4 | 104579 | Cone (large) 104579 or LM-48548 |
| 5 | 104082 | Cone (small) 104082 or LM-67048 |
| 6 | 104581 | Spindle Washer |
| 7 | 103289 | Slotted Spindle Nut |
| 8 | 105218 | Hub with Studs, Nuts and Cups |
| 9 | 5552 | Wheel Nut |
| 10 | 4187 | Wheel Stud |
| 11 | 103969 | Dust Cap |
| 12 | 1633 | Grease Fitting |
| 13 | WR-156-6 | Wheel Rim, 15” x 6” – 6 hole (WR-SC2) |
| 13 | WR-158-6 | Wheel Rim, 15” x 8” – 6 hole |
| 14 | 760-15SL | New Tire (7.60-15SL, 8 ply) (for 15x6 wheel) |
| 14 | 95L-15SL8PR | New Tire (9.5L-15SL, 8 ply) (for 15x8 wheel) |
| | 104580 | Cup (large) 104580 or LM-48510 (not shown) |
| | 104081 | Cup (small) 104081 or LM-67010 (not shown) |
| | | |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Light Wiring Harness

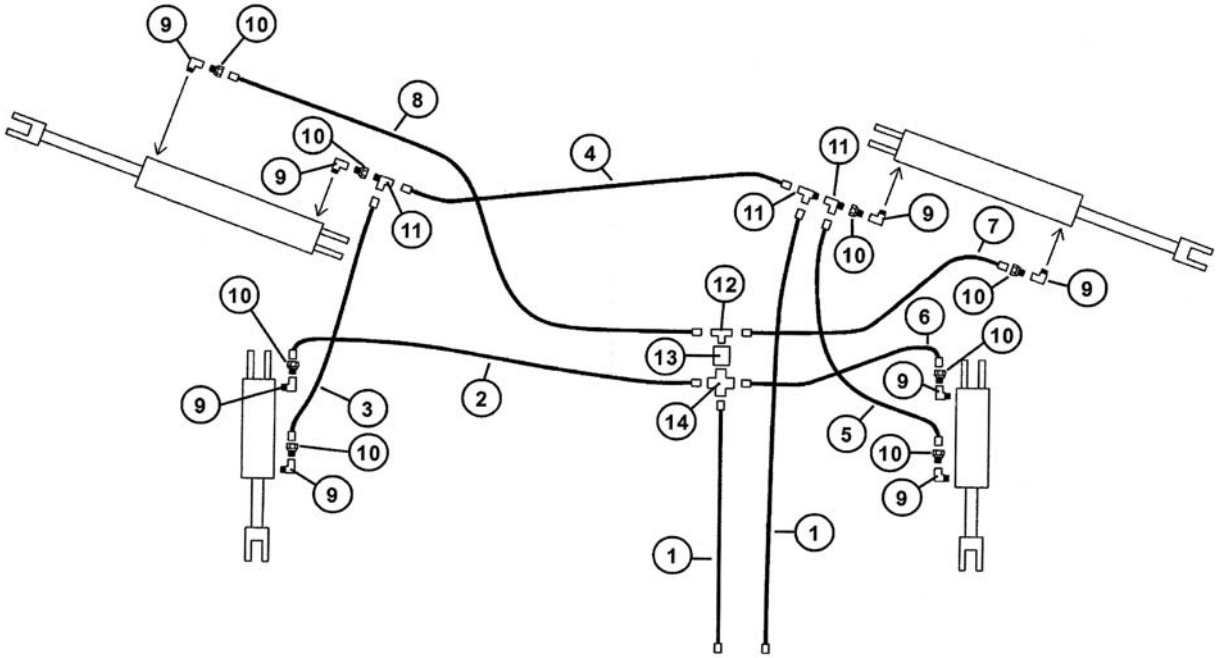



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | MWH-TF2 | Main Wiring Harness with 7-Prong Connector End |
| 2 | LWH-TF2 | Light Wiring Harness (from enhancer to red and amber lights) |
| 3 | LE-1B | Light Enhancer (connects main wiring harness with rear lights) |
| | GR-134 | 1 3/4” Rubber Grommet |
| | | |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Hydraulic Lines and Fittings for Models TF212 and TF215
### EQUIPPED <u>WITHOUT</u> OPTIONAL WING WHEELS

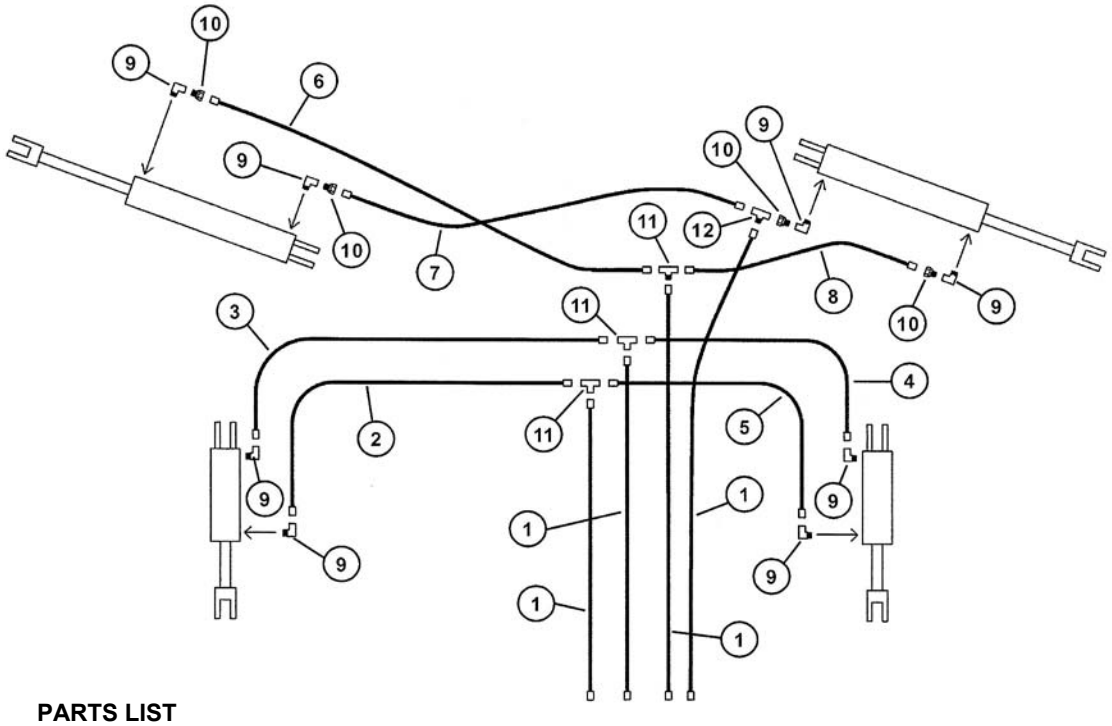



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | HH-38336 | 3/8” x 336” Hydraulic Hose (TF212) |
| 1 | HH-38384 | 3/8” x 384” Hydraulic Hose (TF215) |
| 2 | HH-3866 | 3/8” x 66” Hydraulic Hose (TF212) |
| 2 | HH-3875 | 3/8” x 75” Hydraulic Hose (TF215) |
| 3 | HH-3843 | 3/8” x 43” Hydraulic Hose (TF212) |
| 3 | HH-3832 | 3/8” x 32” Hydraulic Hose (TF215) |
| 4 | HH-3840 | 3/8” x 40” Hydraulic Hose with swivel end (TF212) |
| 4 | HH-3860 | 3/8” x 60” Hydraulic Hose with swivel end (TF215) |
| 5 | HH-3843 | 38” x 43” Hydraulic Hose (TF212) |
| 5 | HH-3832 | 3/8” x 32” Hydraulic Hose (TF215) |
| 6 | HH-3834 | 3/8” x 34” Hydraulic Hose (TF212) |
| 6 | HH-3825 | 3/8” x 25” Hydraulic Hose (TF215) |
| 7 | HH-3829 | 3/8” x 29” Hydraulic Hose (TF212) |
| 7 | HH-3835 | 3/8” x 35” Hydraulic Hose (TF215) |
| 8 | HH-3862 | 3/8” x 62” Hydraulic Hose (TF212) |
| 8 | HH-3888 | 3/8” x 88” Hydraulic Hose (TF215) |
| 9 | 38M38F | Elbow, 3/8” Male, 3/8” Female |
| 10 | 1404-045 | 3/8” Orifice Restrictor (.045) |
| 11 | 38T-MFF | 3/8” Tee (male-female-female) |
| 12 | 38T-FFM | 3/8” Tee (female-female-male) |
| 13 | BV-TF1 | Ball Valve |
| 14 | C1M3F | Cross (1 male / 3 female) |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Hydraulic Lines and Fittings for Models TF212 and TF215
### EQUIPPED WITH 2-SETS OF HOSES AND WITHOUT OPTIONAL WING WHEELS

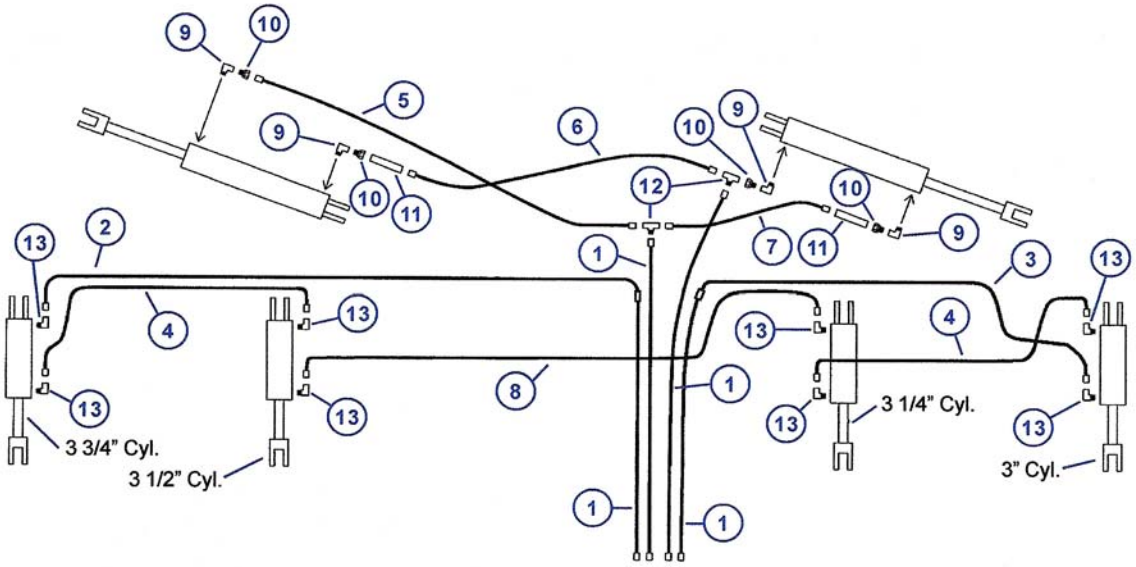



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | HH-38336 | 3/8” x 336” Hydraulic Hose (TF212) |
| 1 | HH-38384 | 3/8” x 384” Hydraulic Hose (TF215) |
| 2 | HH-3877 | 3/8” x 77” Hydraulic Hose (TF212) |
| 2 | HH-3889 | 3/8” x 89” Hydraulic Hose (TF215) |
| 3 | HH-3865 | 3/8” x 65” Hydraulic Hose (TF212) |
| 3 | HH-3877 | 3/8” x 77” Hydraulic Hose (TF215) |
| 4 | HH-3832 | 3/8” x 32” Hydraulic Hose (TF212) |
| 4 | HH-3844 | 3/8” x 44” Hydraulic Hose (TF215) |
| 5 | HH-3840 | 3/8” x 40” Hydraulic Hose (TF212) |
| 5 | HH-3856 | 3/8” x 56” Hydraulic Hose (TF215) |
| 6 | HH-3862 | 3/8” x 62” Hydraulic Hose (TF212) |
| 6 | HH-3888 | 3/8” x 88” Hydraulic Hose (TF215) |
| 7 | HH-3844 | 3/8” x 44” Hydraulic Hose (TF212) |
| 7 | HH-3860 | 3/8” x 60” Hydraulic Hose (TF215) |
| 8 | HH-3829 | 3/8” x 29” Hydraulic Hose (TF212) |
| 8 | HH-3835 | 3/8” x 35” Hydraulic Hose (TF215) |
| 9 | 12M38F | Elbow, 1/2” Male, 3/8” Female |
| 10 | 1404-045 | 3/8” Orifice Restrictor (.045) |
| 11 | 38T3F | Tee, 3/8” Female (3) |
| 12 | 38T-FFM | 3/8” Tee (female-female-male) |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Hydraulic Lines and Fittings for Model TF212
### EQUIPPED WITH OPTIONAL WING WHEELS

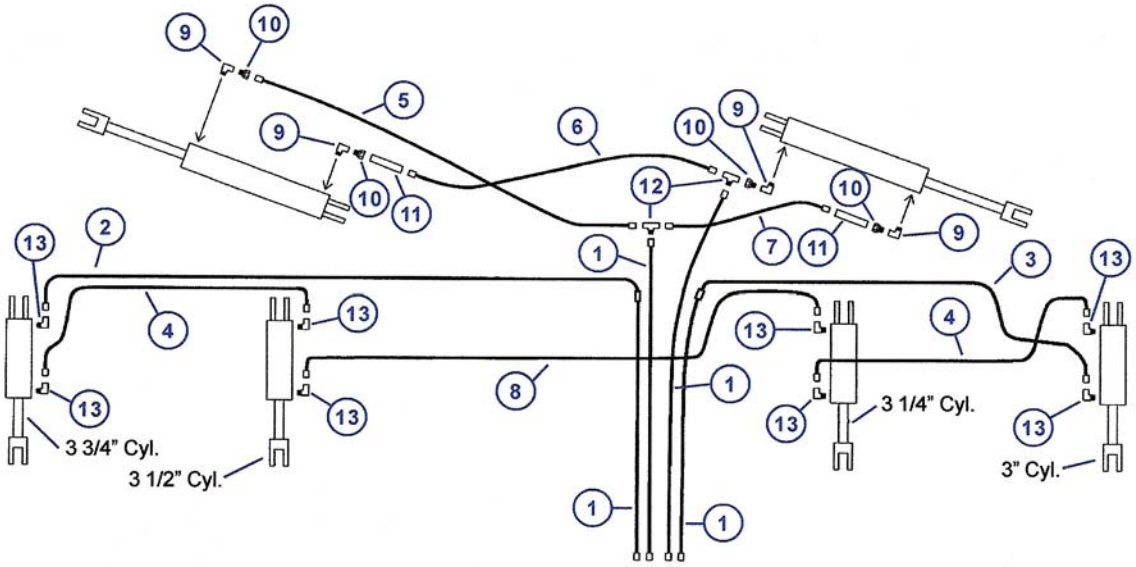



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | HH-38336 | 3/8” x 336” Hydraulic Hose |
| 2 | HH-38210 | 3/8” x 210” Hydraulic Hose (TF212-32, TF212-33) |
| 2 | HH-38222 | 3/8” x 222” Hydraulic Hose (TF212-34, TF212-35) |
| 2 | HH-38234 | 3/8” x 234” Hydraulic Hose (TF212-36) |
| 3 | HH-38174 | 3/8” x 174” Hydraulic Hose (TF212-32, TF212-33) |
| 3 | HH-38186 | 3/8” x 186” Hydraulic Hose (TF212-34, TF212-35) |
| 3 | HH-38198 | 3/8” x 198” Hydraulic Hose (TF212-36) |
| 4 | HH-38162 | 3/8” x 162” Hydraulic Hose (TF212-32, TF212-33) |
| 4 | HH-38174 | 3/8” x 174” Hydraulic Hose (TF212-34, TF212-35) |
| 4 | HH-38186 | 3/8” x 186” Hydraulic Hose (TF212-36) |
| 5 | HH-3862 | 3/8” x 62” Hydraulic Hose |
| 6 | HH-3834 | 3/8” x 34” Hydraulic Hose |
| 7 | HH-3829 | 3/8” x 29” Hydraulic Hose |
| 8 | HH-38112 | 3/8” x 112” Hydraulic Hose |
| 9 | 38M38F | Elbow, 3/8” Male, 3/8” Female |
| 10 | 1404-045 | 3/8” Orifice Restrictor (.045) |
| 11 | VBV-1 | Valve |
| 12 | 38T-FFM | 3/8” Tee (female-female-male) |
| 13 | 38M38F-O | Elbow, 3/8” Male, 3/8” Female, O-Ring |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Hydraulic Lines and Fittings for Model TF215
### EQUIPPED WITH OPTIONAL WING WHEELS

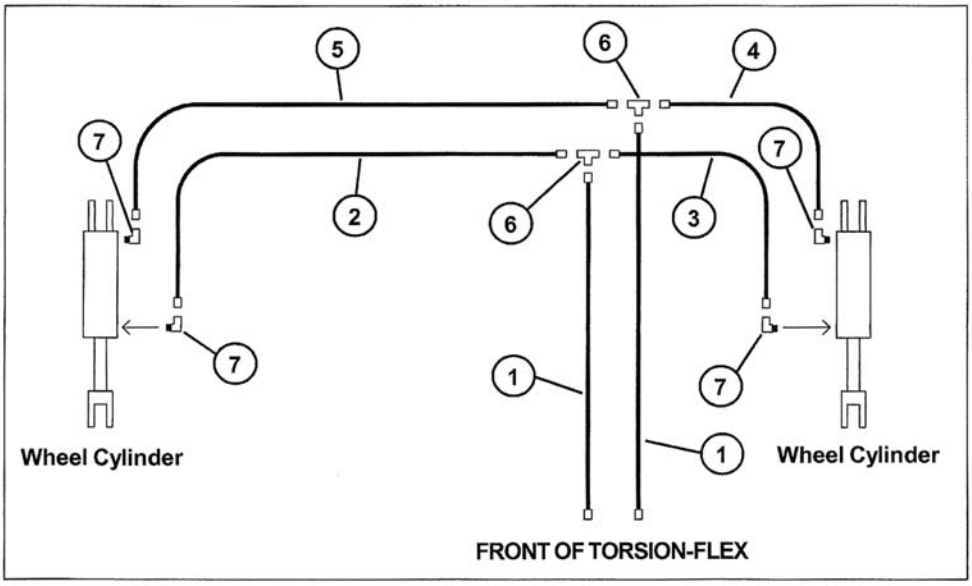



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | HH-38384 | 3/8” x 384” Hydraulic Hose |
| 2 | HH-38234 | 3/8” x 234” Hydraulic Hose (TF215-37, TF215-38) |
| 2 | HH-38246 | 3/8” x 246” Hydraulic Hose (TF215-39, TF215-40) |
| 2 | HH-38258 | 3/8” x 258” Hydraulic Hose (TF215-41, TF215-42) |
| 2 | HH-38270 | 3/8” x 270” Hydraulic Hose (TF215-43, TF215-44, TF215-45) |
| 3 | HH-38198 | 3/8” x 198” Hydraulic Hose (TF215-37, TF215-38) |
| 3 | HH-38210 | 3/8” x 210” Hydraulic Hose (TF215-39, TF215-40) |
| 3 | HH-38222 | 3/8” x 222” Hydraulic Hose (TF215-41, TF215-42) |
| 3 | HH-38234 | 3/8” x 234” Hydraulic Hose (TF215-43, TF215-44, TF215-45) |
| 4 | HH-38198 | 3/8” x 198” Hydraulic Hose (TF215-37, TF215-38) |
| 4 | HH-38210 | 3/8” x 210” Hydraulic Hose (TF215-39, TF215-40) |
| 4 | HH-38222 | 3/8” x 222” Hydraulic Hose (TF215-41, TF215-42) |
| 4 | HH-38234 | 3/8” x 234” Hydraulic Hose (TF215-43, TF215-44, TF215-45) |
| 5 | HH-3888 | 3/8” x 88” Hydraulic Hose |
| 6 | HH-3854 | 3/8” x 54” Hydraulic Hose |
| 7 | HH-3835 | 3/8” x 35” Hydraulic Hose |
| 8 | HH-38112 | 3/8” x 112” Hydraulic Hose |
| 9 | 38M38F | Elbow, 3/8” Male, 3/8” Female |
| 10 | 1404-045 | 3/8” Orifice Restrictor (.045) |
| 11 | VBV-1 | Valve |
| 12 | 38T-FFM | 3/8” Tee (female-female-male) |
| 13 | 38M38F-O | Elbow, 3/8” Male, 3/8” Female, O-Ring |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

### Hydraulic Lines and Fittings for Model TF2
### (12' to 18' Working Width)

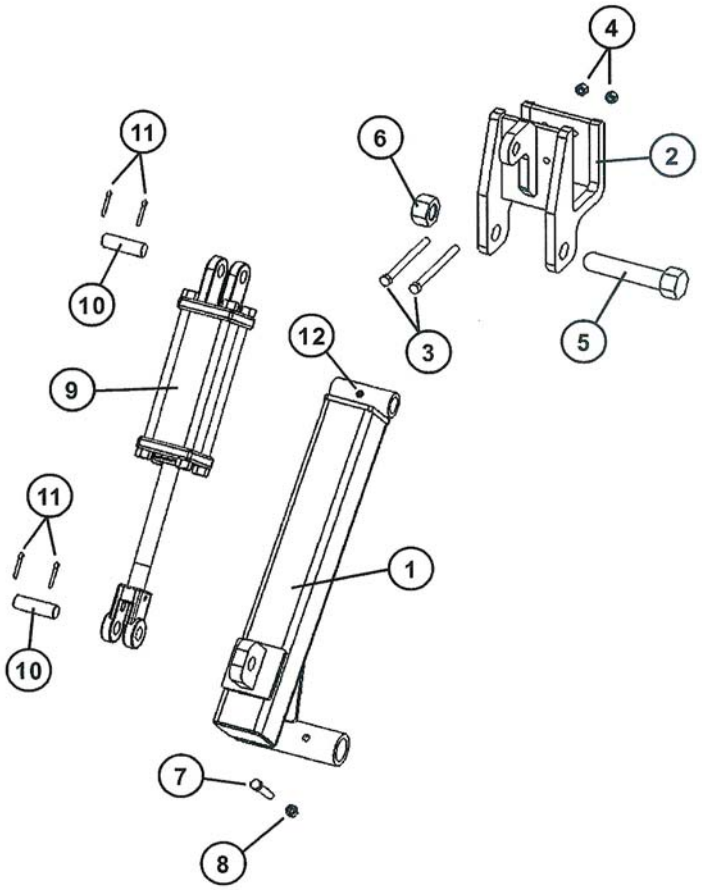



**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | HH-38264 | 3/8" x 264" Hydraulic Hose |
| 2 | HH-3877 | 3/8" x 77" Hydraulic Hose |
| 3 | HH-3844 | 3/8" x 44" Hydraulic Hose |
| 4 | HH-3832 | 3/8" x 32" Hydraulic Hose |
| 5 | HH-3865 | 3/8" x 65" Hydraulic Hose |
| 6 | 38T3F | Tee, 3/8" Female (3) |
| 7 | 12M38F | Elbow, 1/2" Male, 3/8" Female |
| | | |

## TORSION-FLEX SOIL CONDITIONER PARTS LIST

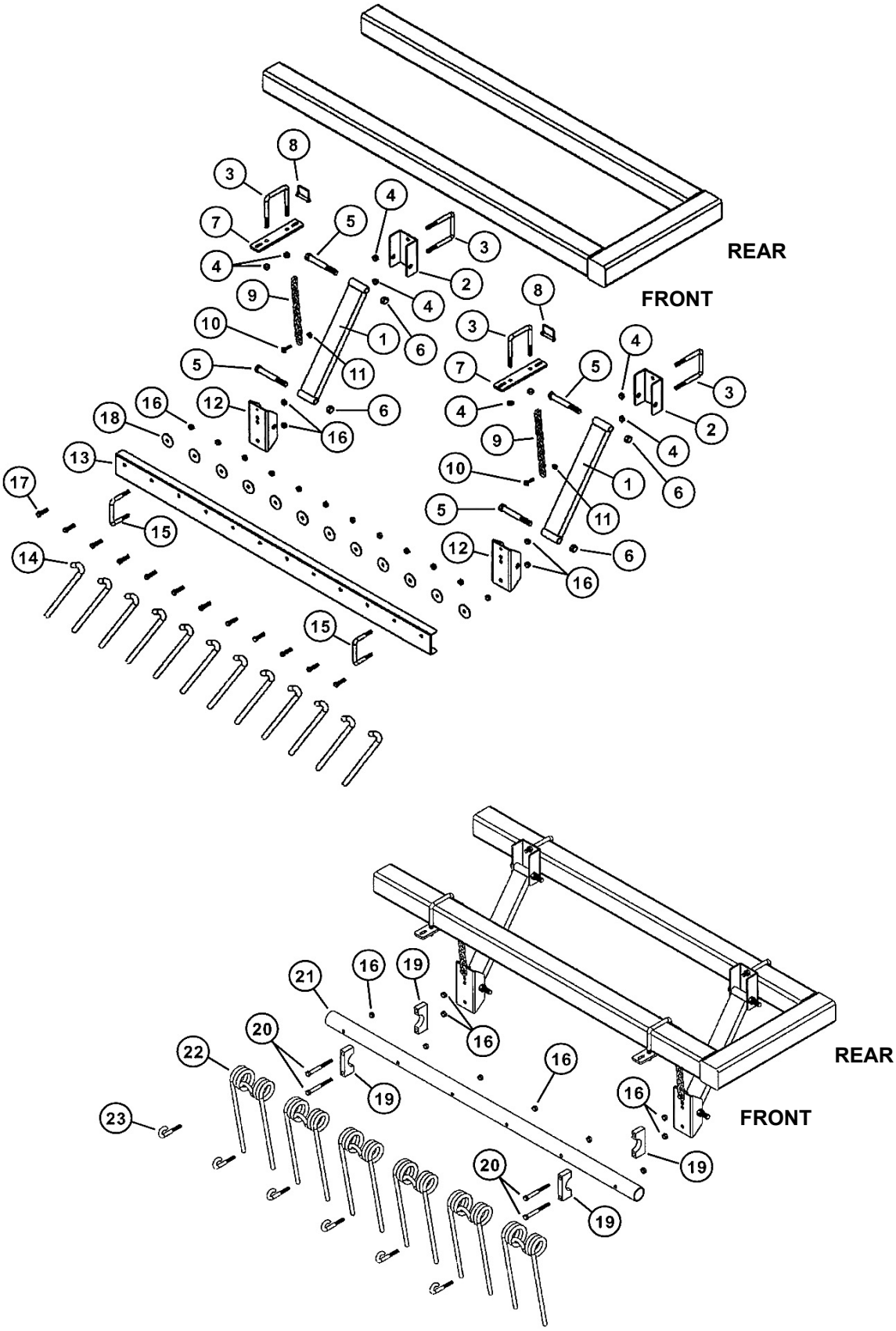
### Optional Wing Wheel Assembly




**PARTS LIST**

| Item # | Part # | Description |
|---|---|---|
| 1 | WAW-2L | Wing Arm Weldment (left) |
| 1 | WMB-2R | Wing Arm Weldment (right) |
| 2 | WMB-2 | Wing Arm Mount Bracket |
| 3 | 125GR5B | 1/2" x 5” Grade 5 Bolt |
| 4 | 12LN | 1/2" Lock Nut |
| 5 | 1149G5B | 1 1/4" x 9” Grade 5 Bolt |
| 6 | 114NLN | 1 1/4" Nylon Lock Nut |
| 7 | 12312G5B | 1/2" x 3 1/2" Grade 5 Bolt |
| 8 | 12G5LN | 1/2" Grade 5 Lock Nut |
| 9 | 3348HCMS | 3 3/4” x 8” Hydraulic Cylinder (37TP08-137 639708) |
| 9 | 38HCMS | 3” x 8” Hydraulic Cylinder (30TP08-125 639705) |
| 10 | 1312P | 1” x 3 1/2" Pin |
| 11 | CP316 | 3/16” Cotter Pin |
| 12 | 1633 | Grease Fitting |
| | SK-38HC | Seal Kit for Hydraulic Cylinder (not shown) |

**TORSION-FLEX SOIL CONDITIONER PARTS LIST**
**Optional Leveling Harrow**



## TORSION-FLEX SOIL CONDITIONER PARTS LIST
## Optional Leveling Harrow

**PARTS LIST**

| # | Part # | Description |
|---|---|---|
| 1 | 321HA | 3” x 21” Harrow Arm |
| 2 | 21246MB | 2 1/2” x 4” x 6” Mounting Bracket |
| 3 | 584512UB | 5/8” x 4” x 5 1/2” U-Bolt |
| 4 | 58LN | 5/8” Lock Nut |
| 5 | 346G5B | 3/4” x 6” Grade 5 Bolt |
| 6 | 34LN | 3/4” Lock Nut |
| 7 | 2814CP | 2” x 8 1/4” Chain Plate |
| 8 | SCP2 | Spring Clip Pin |
| 9 | 16RC | Chain, 16” L |
| 10 | 381FB | 3/8” x 1” Flange Bolt |
| 11 | 38FN | 3/8” Flange Nut |
| 12 | 48PB | 4” x 8” Pivot Bracket |
| 13 | RBB40 | 4’-0” L Round Bar Bracket |
| 13 | RBB50 | 5’-0” L Round Bar Bracket |
| 13 | RBB60 | 6’-0” L Round Bar Bracket |
| 13 | RBB70 | 7’-0” L Round Bar Bracket |

| # | Part # | Description |
|---|---|---|
| 14 | 3415RB | 3/4” x 15” Round Bar |
| 15 | 1244UB | 1/2” x 4” x 4” U-Bolt |
| 16 | 12LN | 1/2” Lock Nut |
| 17 | 12112G5B | 1/2” x 1 1/2” Grade 5 Bolt |
| 18 | 12214W | 1/2” x 2 1/4” Oversized Washer |
| 19 | HSB-2 | Squeeze Blocks (set) |
| 20 | 12412G5B | 1/2” x 4 1/2” Grade 5 Bolt |
| 21 | CTP38 | Coil Tine Pipe x 3’-8” L |
| 21 | CTP48 | Coil Tine Pipe x 4’-8” L |
| 21 | CTP58 | Coil Tine Pipe x 5’-8” L |
| 21 | CTP68 | Coil Tine Pipe x 6’-8” L |
| 21 | CTP78 | Coil Tine Pipe x 7’-8” L |
| 22 | CTS-1 | Coil Tine Spring |
| 23 | 12312JB | 1/2” x 3 1/2” J-Bolt |
| | | |
| | | |

## SERVICE / MAINTENANCE RECORD

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