# ASSEMBLY/OPERATORS MANUAL

# WIL-RICH 2510/2530 CHISEL PLOW

**WIL-RICH**
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# WARRANTY

The only warranty Wil-Rich gives and the only warranty the dealer is authorized to give is as follows:

We warrant products sold by us to be in accordance with our published specifications or those specifications agreed to by us in writing at time of sale. Our obligation and liability under this warranty is expressly limited to repairing, or replacing, at our option, within 12 months after date of retail delivery, any product not meeting the specifications. ***We make no other warranty, express or implied and make no warranty of merchantability or of fitness for any particular purpose.*** Our obligation under the warranty shall not include any transportation charges or costs or installation or any liability for direct, indirect or consequential damage or delay. If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. Any improper use, operation beyond rated capacity, substitution of parts not approved by us, or any alteration or repair by others in such manner as in our judgment affects the product materially and adversely shall void this warranty. ***No employee or representative is authorized to change this warranty in any way or grant any other warranty.***

Wil-Rich reserves the right to make improvement changes on any of our products without notice.

***When warranty limited or not applicable***: Warranty on hoses, cylinders, hubs, spindles, engines, valves, pumps or other trade accessories are limited to the warranties made by the respective manufactures of these components. Rubber tires and tubes are warranted directly by the respective tire manufacturer only, and not by Wil-Rich.

Warranty does not apply to any machine or part which has been repaired or altered in any way so as in the our judgment to affect its reliability, or which has been subject to misuse, negligence or accident.

***A Warranty Validation and Delivery Report Form must be filled out and received by Wil-Rich to initiate the warranty coverage.***

## WARRANTY CLAIMS PROCEDURE

1. The warranty form must be returned to Wil-Rich within fifteen (15) working days from the repair date.

2. Parts returned to Wil-Rich without authorization will be refused. The parts must be retained at the dealership for ninety (90) days after the claim has been filed. If the Service Department would like to inspect the parts, a packing slip will be mailed to the dealer. The packing slip must be returned with the parts. The parts must be returned prepaid within thirty (30) days of receiving authorization. After the parts are inspected and warranty is verified, credit for the return freight will be issued to the dealer.

3. Parts that will be scrapped at the dealership will be inspected by a Wil-Rich Sales Representative, District Sales Manager or Service Representative within the ninety (90) day retaining period.

# Chisel Plough

# 1. Safety

# 1.1 Introduction

## 1.1.1 Safety alert symbol

The safety alert symbol means Attention! Become Alert! Your Safety Is Involved!

Look for the safety alert symbol both in this manual and on safety signs on this machine. The safety alert symbol will direct your attention to information that involves your safety and the safety of others.


*Fig. 1*

## 1.1.2 Safety messages

The words DANGER, WARNING or CAUTION are used with the safety alert symbol. Learn to recognize these safety alerts and follow the recommended precautions and safety practices.


*Fig. 2*

**DANGER:**
**Indicates an imminently hazardous situation that, if not avoided, will result in DEATH OR VERY SERIOUS INJURY.**

**WARNING:**
**Indicates a potentially hazardous situation that, if not avoided, could result in DEATH OR SERIOUS INJURY.**

**CAUTION:**
**Indicates a potentially hazardous situation that, if not avoided, may result in MINOR INJURY.**

## 1.1.3 Informational messages

The words important and note are not related to personal safety, but are used to give additional information and tips for operating or servicing this equipment.

**IMPORTANT:** *Identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of the machine, process, or its surroundings*

**NOTE:** *Identifies points of particular interest for more efficient and convenient repair or operation.*

## 1.1.4 Safety signs

**WARNING:**
**Do not remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage. The actual location of the safety signs is illustrated at the end of this section.**

Keep signs clean by wiping off regularly. Use a mild soap and water solution if necessary.

If parts have been replaced or a used machine has been purchased, make sure all safety signs are present and in the correct location and can be read. Illustrations of safety sign locations are located at the rear of this section.

Replace any safety signs that can not be read, are damaged, or are missing. Clean the machine surface thoroughly with a mild soap and water solution before replacing signs. Replacement safety signs are available from your dealer.

## 1.1.5 A word to the operator

It is your responsibility to read and understand the safety section in this manual and the manual for all attachments before operating this machine. Remember you are the key to safety. Good safety practices not only protect you, but also the people around you.

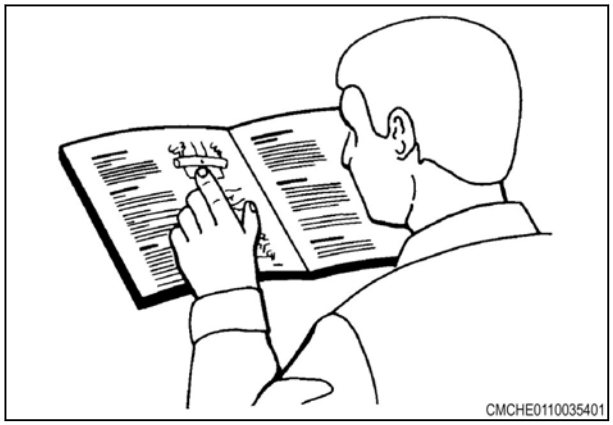


*Fig. 3*

Study the content in this manual and make the content a working part of your safety program. Keep in mind that this safety section is written only for this type of machine. Practice all other usual and customary safe working precautions, and above all remember - safety is your responsibility. You can prevent serious injury or death.

This safety section is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your machine. This section also suggests possible ways of dealing with these situations. This section is not a replacement for other safety practices featured in other sections of this manual.

Personal injury or death may result if these precautions are not followed.

Learn how to operate the machine and how to use the controls properly.

Do not let anyone operate the machine without instruction and training.

For your personal safety and the personal safety of others, follow all safety precautions and instructions found in the manuals and on safety signs affixed to the machine and all attachments.

Use only approved attachments and equipment.

Make sure your machine has the correct equipment needed by the local regulations.

**WARNING:**
**An operator should not use alcohol or drugs which can affect their alertness or coordination. An operator on prescription or 'over the counter' drugs needs medical advice on whether or not they can properly operate machines.**

**CAUTION:**
**If any attachments used on this equipment have a separate Operator Manual, see that manual for other important safety information.**

## 1.1.6 This manual

This manual covers general safety practices for this machine. The operator manual must always be kept with the machine.

Right-hand and left-hand, as used in this manual, are determined by facing the direction the machine will travel when in use.

The photos, illustrations, and data used in this manual were current at the time of printing, but due to possible in-line production changes, your machine can vary slightly in detail. The manufacturer reserves the right to redesign and change the machine as necessary without notification.

**WARNING:**
**In some of the illustrations and photos used in this manual, shields or guards may have been removed for clarity. Never operate the machine with any shields or guards removed. If the removal of shields or guards is necessary to make a repair, they must be replaced before operation.**

# 1.2 Operation

## 1.2.1 Prepare for operation

Read and understand all operating instructions and precautions in this manual before operating or servicing the machine.

Make sure you know and understand the positions and operations of all controls. Make certain all controls are in neutral and the parking brake is applied before starting the machine.

Make certain all people are well away from your area of work before starting and operating the machine. Check and learn all controls in an area clear of people and obstacles before starting your work. Be aware of the machine size and have enough space available to allow for operation. Never operate the machine at high speeds in crowded places.

Emphasize the importance of using correct procedures when working around and operating the machine. Do not let children or unqualified persons operate the machine. Keep others, especially children, away from your area of work. Do not permit others to ride on the machine.

Make sure the machine is in the proper operating condition as stated in the Operator Manual. Make sure the machine has the correct equipment required by local regulations.

## 1.2.2 Personal protective equipment

Wear all personal protective equipment (PPE) and protective clothing issued to you or called for by job conditions and country/local regulations. PPE includes, but is not limited to, equipment to protect eyes, lungs, ears, head, hands and feet when operating, servicing, or repairing equipment.

Always keep hands, feet, hair, and clothing away from moving parts. Do not wear loose clothing, jewelry, watches, or other items that could entangle in moving parts. Tie up long hair that can also entangle in moving parts.

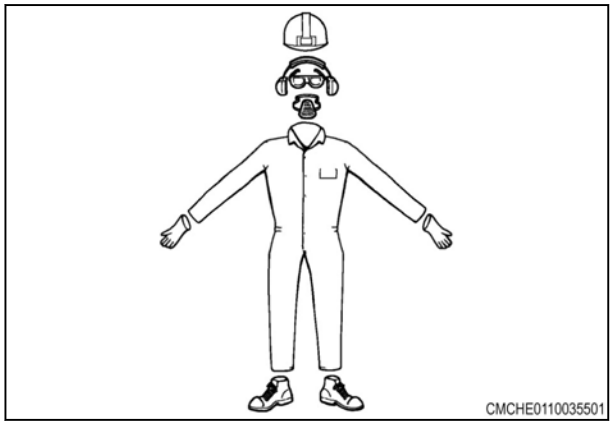


*Fig. 4*

## 1.2.3 Agricultural chemicals

Agricultural chemicals can be very hazardous. Improper use of fertilizer, fungicides, herbicides, insecticides and pesticides can injure people, plants, animals, soil and other people's property.

Always read and follow all manufacturers' instructions before opening any chemical container.

Even if you think you know the instructions, read and follow instructions each time you use a chemical.

Use the same precautions when adjusting, servicing, cleaning or storing the machine as used when installing chemicals into the hoppers or tanks.

Inform anyone who comes in contact with chemicals of the potential hazards involved and the safety precautions required.

Stand upwind and away from smoke from a chemical fire.

Store or dispose of all unused chemicals only in a manner as specified by the chemical manufacturer.

## 1.2.4 Travel on public roads

Make sure you understand the speed, brakes, steering, stability, and load characteristics of this machine before you travel on public roads.

Use good judgment when traveling on public roads. Maintain complete control of the machine at all times. Never coast down hills.

The maximum speed of farm equipment is governed by local regulations. Adjust travel speed to maintain control at all times.

Familiarize yourself with and obey all road regulations that apply to your machine. Consult your local law enforcement agency for local regulations regarding movement of farm equipment on public roads. Use head lamps, flashing warning lamps, tail lamps and turn signals, day and night, unless prohibited by local law.

Make sure all the flashers are operating prior to driving on the road. Make sure reflectors are correctly installed, in good condition, and wiped clean. Make sure the Slow Moving Vehicle (SMV) emblem is clean, visible, and correctly mounted on the rear of the machine.

Always travel with the loader as low as possible. Do not drive with loader up.

Lock brake pedals together (if equipped with dual brake pedals) so both wheel brakes will be applied at the same time.

Raise implements to transport position and lock in place. Place all implements into narrowest transport configuration.

Disengage the power takeoff and differential lock.

With towed implements, use a proper hitch pin with a clip retainer and safety transport chain.

Be aware of other traffic on the road. Keep well over to your own side of the road and pull over, whenever possible, to let faster traffic pass.

Be aware of the overall width, length, height, and weight of the machine. Be careful when transporting the machine on narrow roads and across narrow bridges.

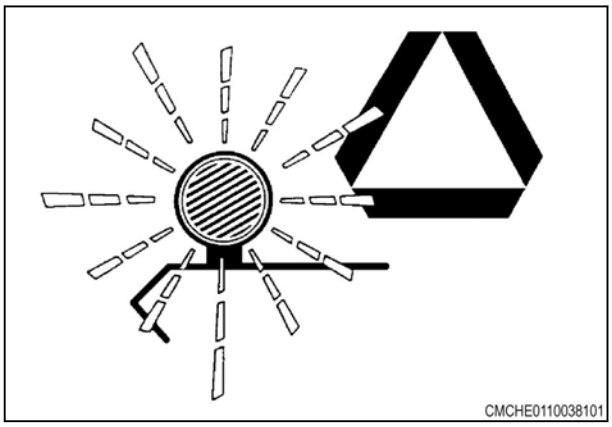


*Fig. 5*

Watch for overhead wires and other obstructions. Avoid contact with electrical power lines. Contact with electrical power lines can cause electrical shock, resulting in very serious injury or death.

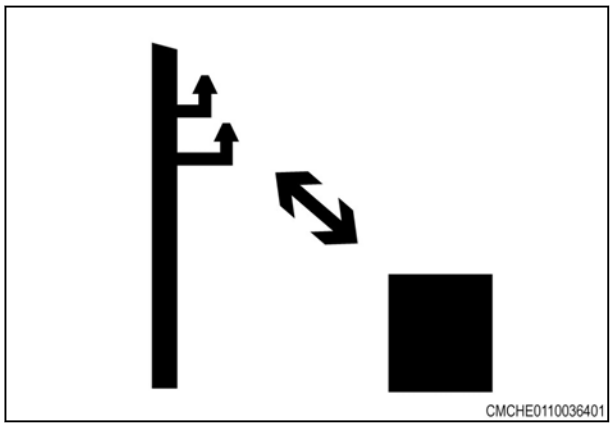


*Fig. 6*

# 1.3 Maintenance

## 1.3.1 Fire prevention and first aid

Be prepared for emergencies.

Keep a first aid kit handy for treatment of minor cuts and scratches.

Always carry one or more fire extinguishers of the correct type. Check fire extinguishers regularly as instructed by the manufacturer. Make sure fire extinguishers are properly charged and in operating condition.

Due to the nature of the crops this machine will operate in, the risk of fire is of concern. Use a water type fire extinguisher or other water source for a fire in crop.

For fires involving anything other than crop, such as oil or electrical components, use a dry chemical fire extinguisher with an ABC rating.

Mount fire extinguishers within easy reach of where fires can occur.

Frequently remove accumulated crop material from the machine and check for overheated components. Check the machine daily for any noises that are not normal. Such noises could indicate a failed component that can cause excess heat.

If any flame cutting, welding, or arc welding is to be done on the machine or attachments, make sure to clear any crop material or debris from around the area. Make sure the area below the work area is clear of any flammable material as falling molten metal or sparks can ignite the material.

If fire occurs stand upwind and away from smoke from the fire.

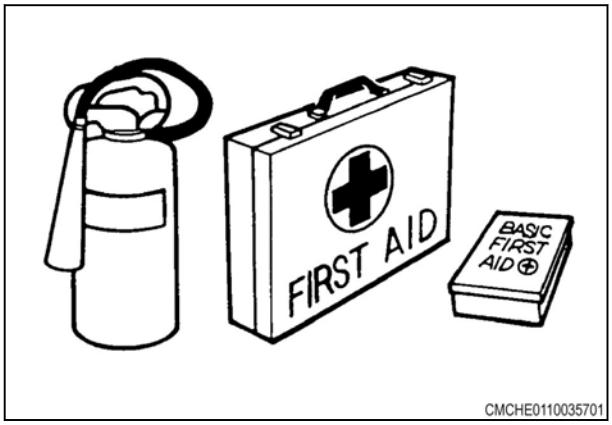


*Fig. 7*


*Fig. 8*

## 1.3.2 High pressure leaks

Fluid leaking from the hydraulic system or the fuel injection system under high pressure can be very hard to see. The fluid can go into the skin causing serious injury.

Fluid injected into the skin must be surgically removed within a few hours. If not removed immediately, serious infection or reaction can develop. Go immediately to a doctor who knows about this type of injury.

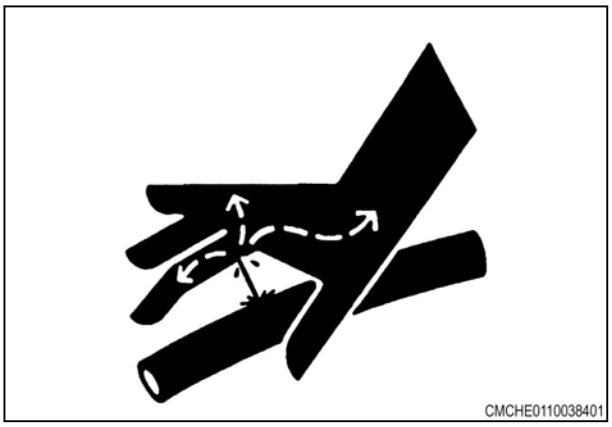


*Fig. 9*

Use a piece of cardboard or wood to search for possible leaks. Do not use your bare hand. Wear leather gloves for hand protection and safety goggles for eye protection.

Relieve all pressure before loosening any hydraulic lines. Relieve the pressure by lowering raised equipment, shutting off accumulator valve, if equipped, and shutting off the engine. Tighten all connections securely before applying pressure.

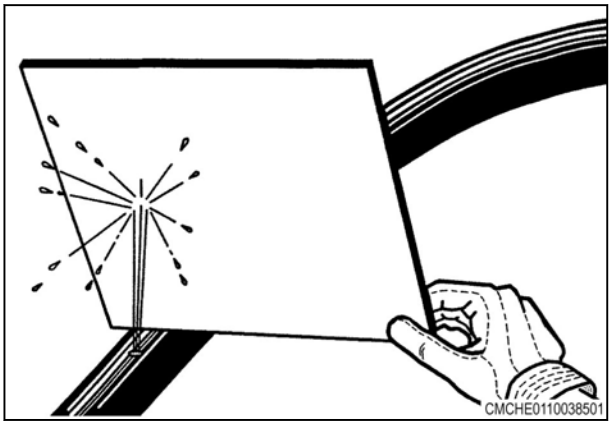


*Fig. 10*

## 1.3.3 Tire safety

Check tires for cuts, bulges, and correct pressure. Replace worn or damaged tires. When tire service is needed, have a qualified tire mechanic service the tire. Tire changing can be very hazardous and must be done by qualified tire mechanic using proper tools and equipment. See the Specifications Section for the correct tire size.

Tire explosion and/or serious injury can result from over inflation. Do not exceed the tire inflation pressures. See the Specifications Section for the correct tire pressure.

Do not inflate a tire that is seriously under inflated or has been run flat. Have the tire checked by qualified tire mechanic.

Do not weld on the rim when a tire is installed. Welding will make an air/gas mixture that can cause an explosion and burn with high temperatures. This danger applies to all tires, inflated or deflated. Removing air or breaking the bead is not enough. The tire must be completely removed from the rim prior to welding.


*Fig. 11*

When preparing a calcium chloride solution for fluid ballasting the tractor tires, never pour water onto the calcium chloride. A chlorine gas can be generated which is poisonous and explosive. This can be avoided by slowly adding calcium chloride flakes to water and stirring until they are dissolved.

When seating tire beads onto rims, never exceed 2.4 bar (35 psi) or the maximum inflation pressure specified on the tire. Inflation beyond this maximum pressure may break the bead, or even the rim, with explosive force.

## 1.3.4 Replacement parts

Where replacement parts are necessary for periodic maintenance and servicing, genuine replacement parts must be used to restore your equipment to original specifications.

The manufacturer will not accept responsibility for installation of unapproved parts and/or accessories and damages as a result of their usage.

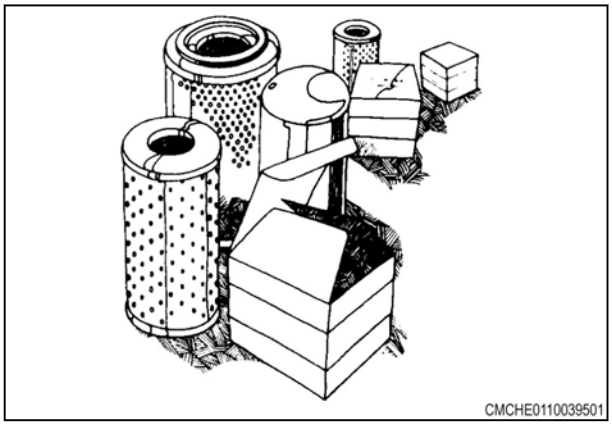


*Fig. 12*

## 1.4 Transport locks

The machine is equipped with transport locks. Use the transport locks in the operating position (1) when moving the machine on roads. When not in use, keep the transport locks in the storage position (2).

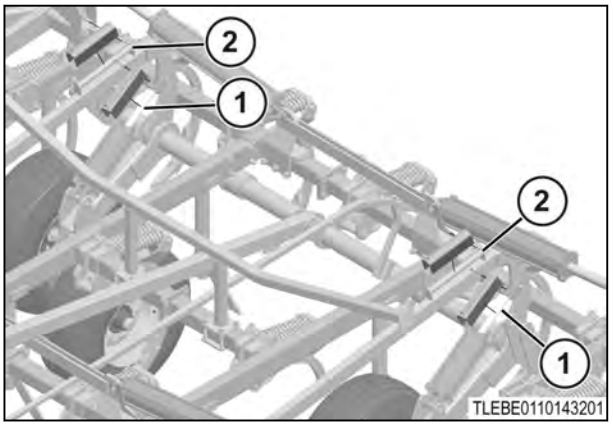


*Fig. 13*

## 1.5 Marker lamps

The machine has marker lamps that must be used when moving the machine on roads.

The machine is equipped with two red lamps (1) located toward the rear center of the machine.

The machine is equipped with two amber lamps (2) located at the outside edges of the folded machine.

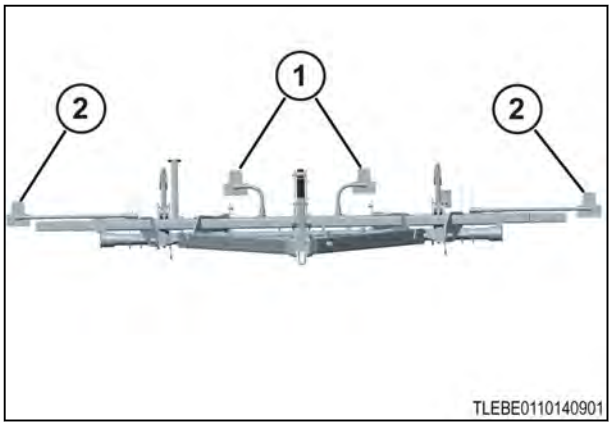


*Fig. 14*

## 1.6 Safety sign location

The following safety signs are installed on the machine.

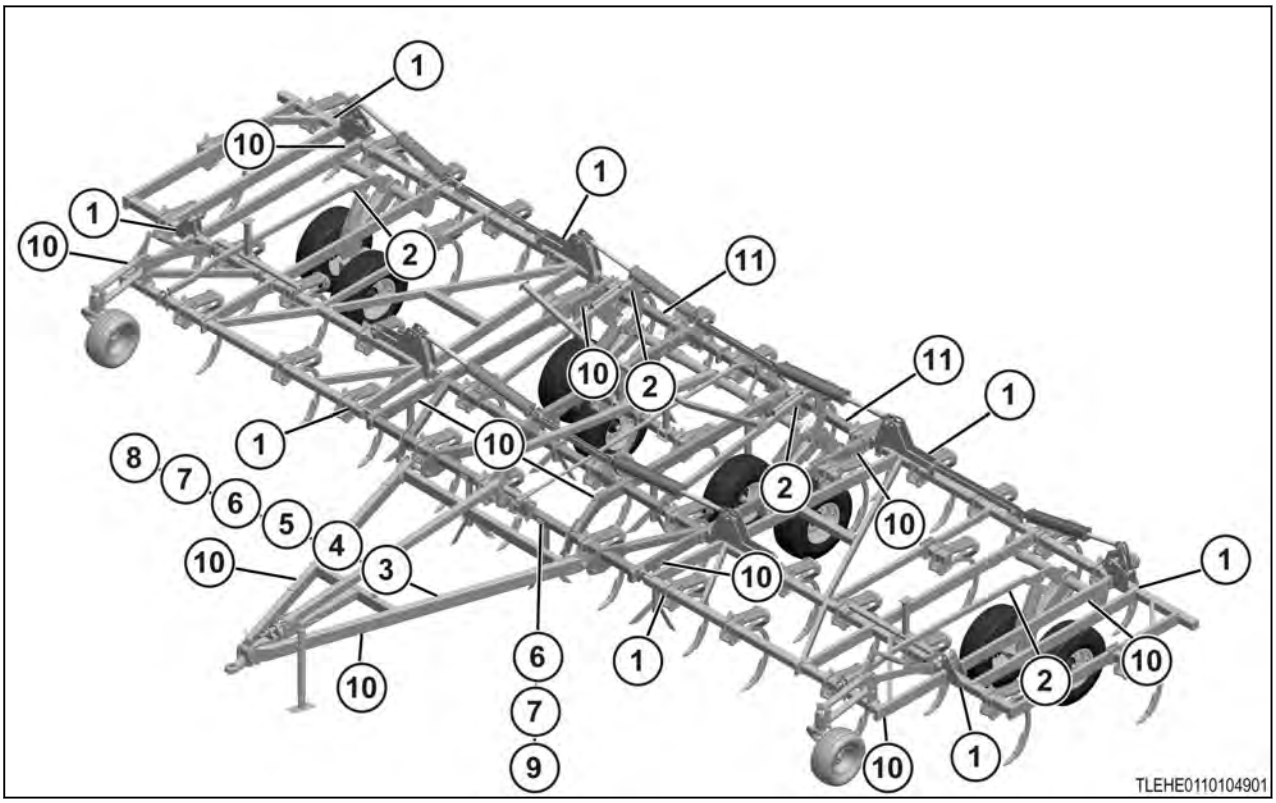


*Fig. 15*

| Item | Description |
|---|---|
| 1 | Danger / folding wings |
| 2 | Warning / lockout |
| 3 | Caution / safety chains |
| 4 | Warning / negative tongue weight |
| 5 | Warning / remove key |
| 6 | Warning / read Operator Manual |
| 7 | Danger / high line |
| 8 | Warning / hydraulic fluid pressure |
| 9 | Maximum speed |
| 10 | Reflector / yellow |
| 11 | Reflector / red |

Danger / folding wings(1)

**Hazard (A):** Crushing hazard from lowering or falling wing

**Avoidance (B):** Stay clear of this area while engine and machine are operating. For service work, install the wing lock pins before getting under wing.

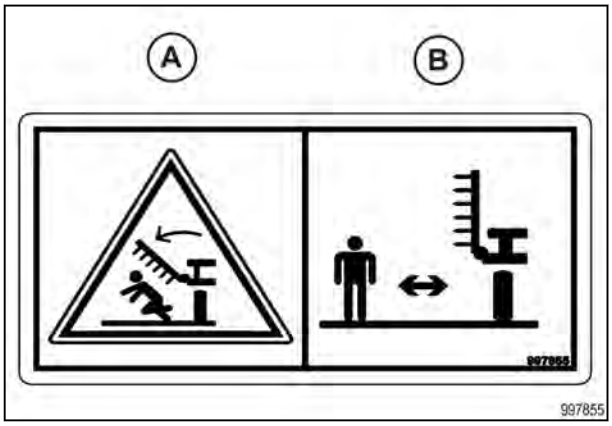


*Fig. 16*

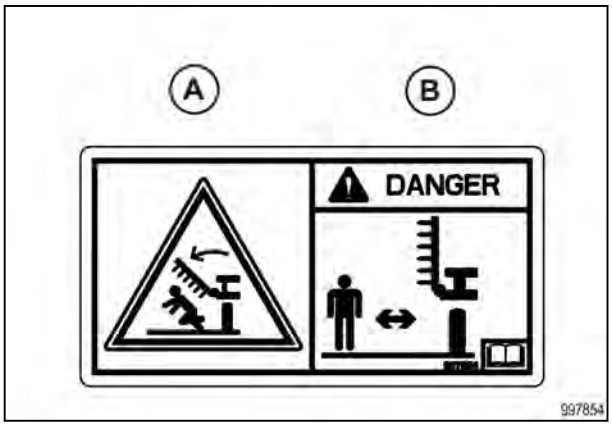


*Fig. 16*

Warning / lockout (2)

**Hazard (A):** Crushing hazard

**Avoidance (B):** Stay clear of this area while engine and machine are operating. For service work, install the wing lock pins before getting under wing.

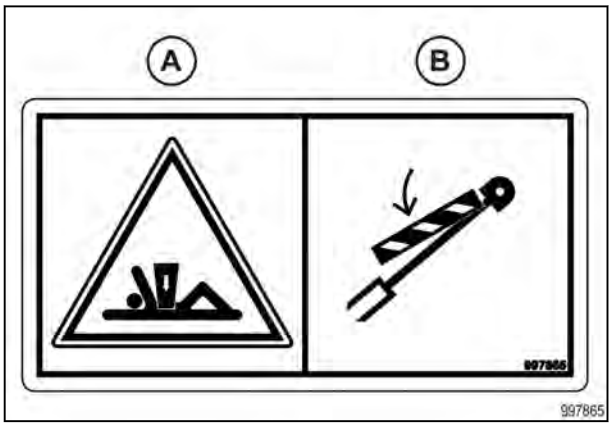


*Fig. 17*

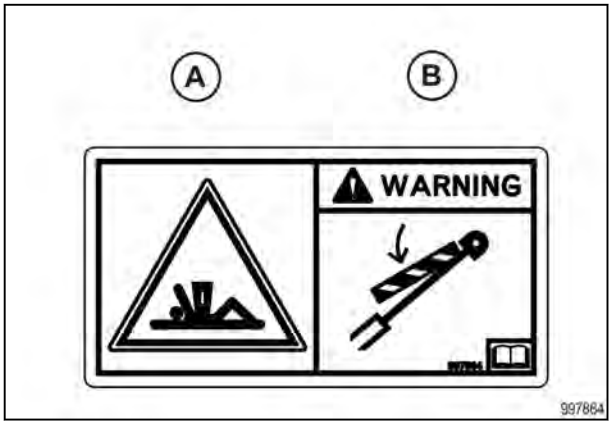


*Fig. 17*

Caution / safety chains (3)

**Hazard (A):** Lose of machine control

**Avoidance (B):** Install the safety chains when attaching the implement to the tractor. Read the Operator Manual for safety information and operating instructions before operating the machine.

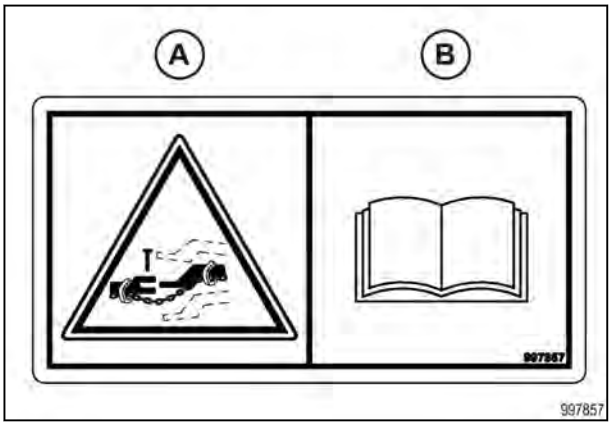


*Fig. 18*

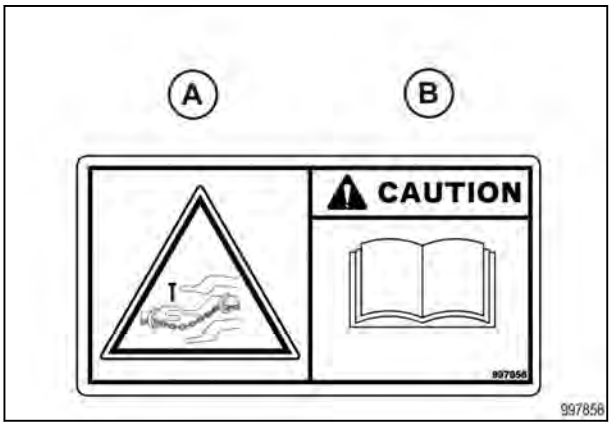


*Fig. 18*

Warning / negative tongue weight (4)

**Hazard (A):** Negative tongue weight will cause immediate elevation of the tongue.

**Avoidance (B):** Stay clear of the tongue when disconnecting the implement from the tractor. Read the Operator Manual for safety information and operating instructions before operating the machine.

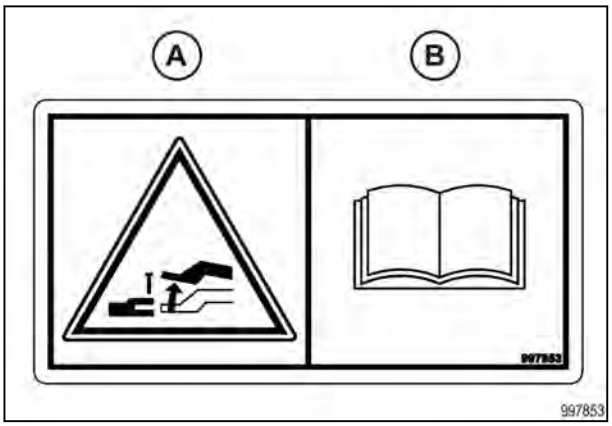


*Fig. 19*

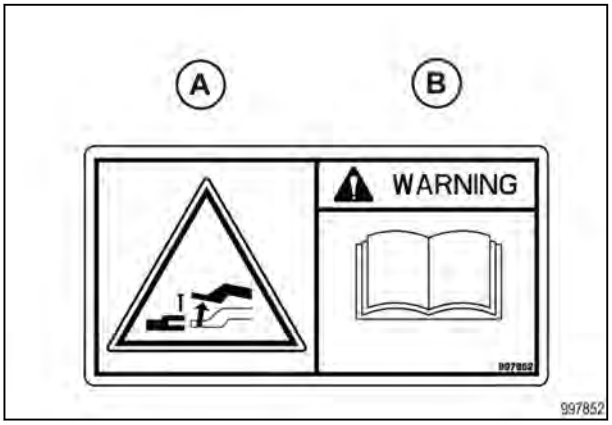


*Fig. 19*

Warning / remove key (5)

**Hazard (A):** General safety alert

**Avoidance (B):** Shut off machine and remove the key before performing maintenance or repair work.

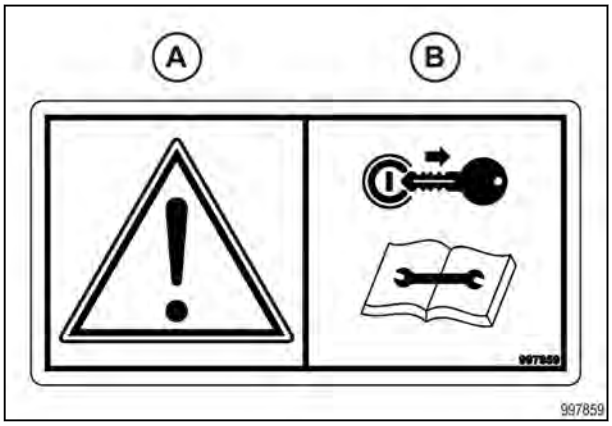


*Fig. 20*

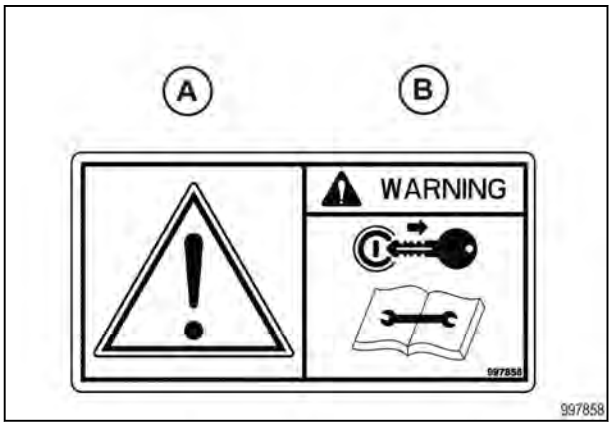


*Fig. 20*

Warning / read Operator Manual (6)

**Hazard (A):** General safety alert

**Avoidance (B):** Read and understand the Operator Manual before operating the machine.

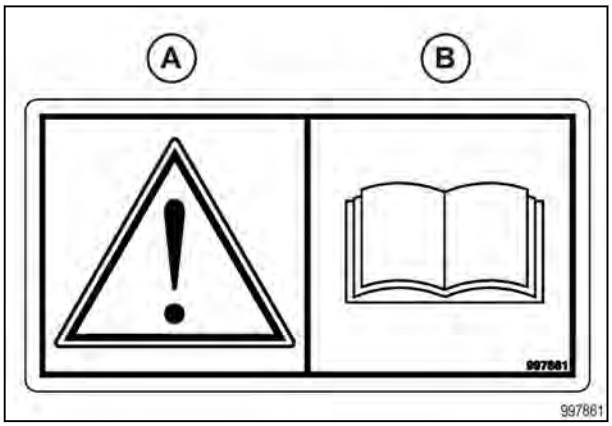


*Fig. 21*

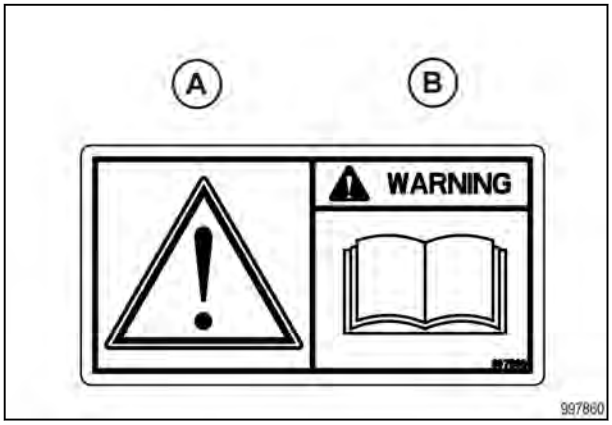


*Fig. 21*

Danger / high line (7)

**Hazard (A):** Electrical shock hazard - risk of personal injury and component damage

**Avoidance (B):** Keep sufficient distance away from electrical power lines.

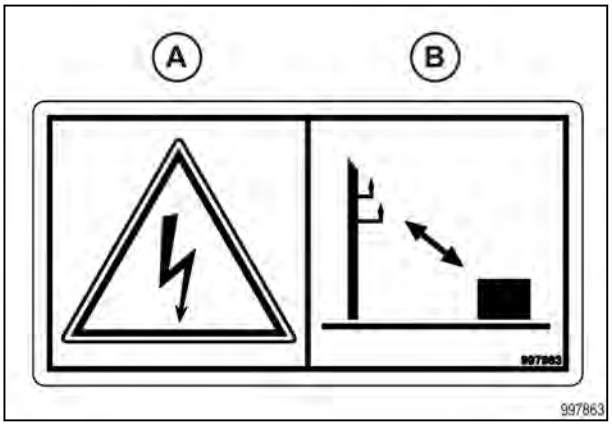


*Fig. 22*

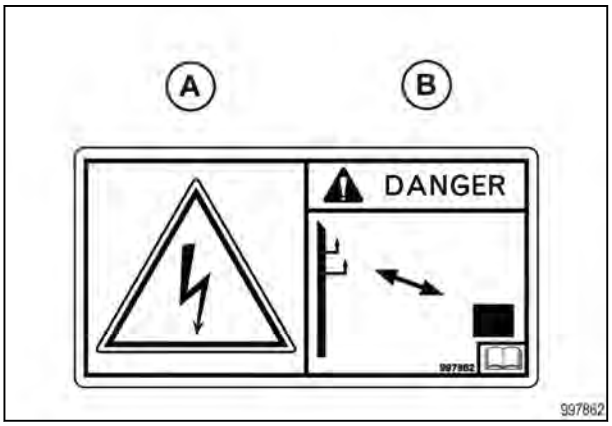


*Fig. 22*

Warning / hydraulic fluid pressure (8)

**Hazard (A):** Injection hazard into skin - escaping fluid under high pressure

**Avoidance (B):** Shut off engine, remove key, and relieve pressure before performing maintenance or repair work. Refer to the Operator Manual for proper service procedures.

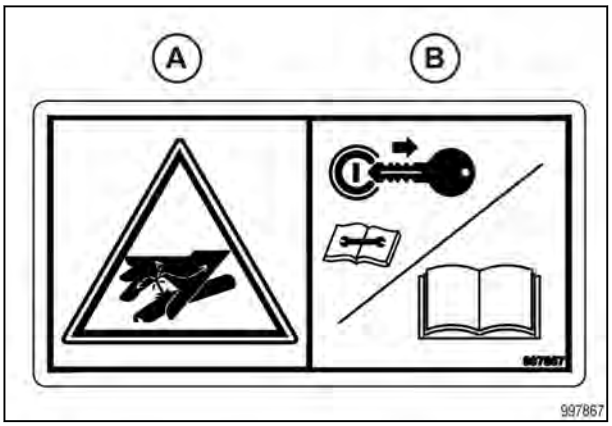


*Fig. 23*

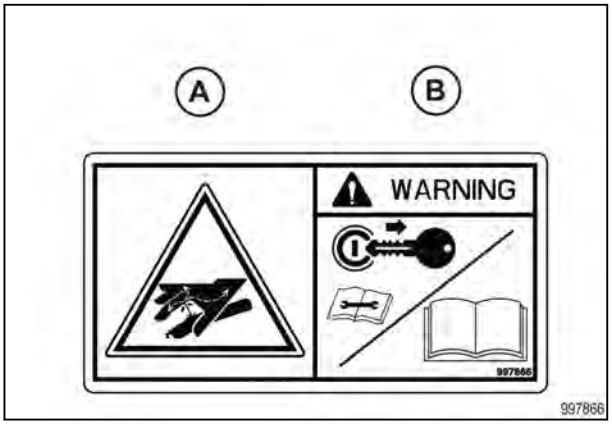


*Fig. 23*

Maximum speed (9)

The maximum speed safety sign displays the maximum speed the machine can be transported.


*Fig. 24*


*Fig. 24*

Reflector / yellow (10)

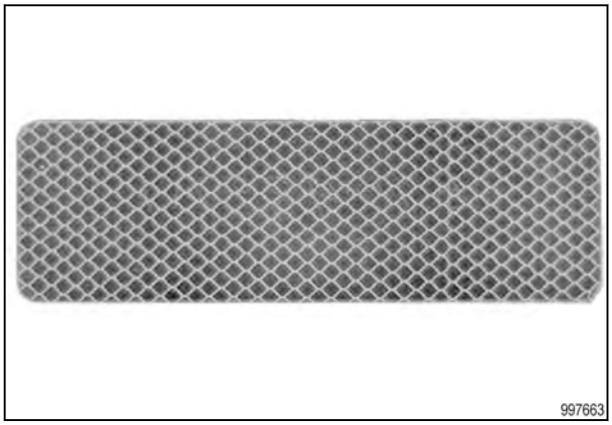


*Fig. 25*

Reflector / red (11)

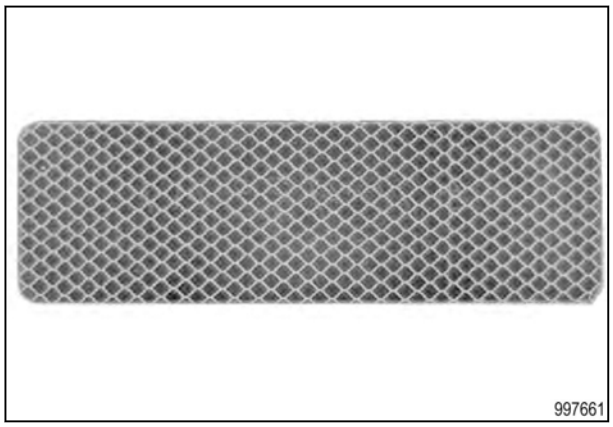


*Fig. 26*

# 2. Introduction

# 2.1 Introduction

**CAUTION:**
**In some of the illustrations used in this Operator Manual, panels or guards may have been removed for clarity. Never operate the tractor with these panels and guards removed. If the removal of a shield is necessary to make a repair, it must be replaced before operation.**

**CAUTION:**
**Read this book in its entirety prior to operating machine. Use only genuine replacement parts for repairs and/or replacement.**

This manual gives the operator the proper instructions needed for operation and maintenance. Read, understand, and follow these instructions for best machine performance and life. With proper maintenance and operation procedures, the machine will have better over all performance. Use normally available tools for maintenance on this machine.

All operators must read and understand this manual before operating this machine. Where possible, operators who have not operated the machine must receive instruction from an operator who has operated this machine. Your dealer can give instruction in machine operation. Keep this manual with the machine for future reference. If the original manual is damaged, order a replacement from your dealer.

See your dealer in for any service problems and adjustments. The dealer is equipped for all service work and to help with specific applications of the tractor in local conditions.

Left-hand and right-hand are determined by facing the direction the machine will travel when in use.

## 2.1.1 Intended use

This machine is designed solely for use in customary agricultural operations.

Do not use this machine for any application or purpose other than those described in this manual. The manufacturer accepts no liability for damage or injury resulting from misuse of this machine.

Compliance with the conditions of operation, service and repair as specified by the manufacturer constitute essential elements for the intended use of this machine.

This machine should be operated, serviced and repaired only by qualified persons familiar with its characteristics and familiar with the relevant safety rules and procedures.

All generally recognized safety regulations and road traffic regulations must be obeyed at all times.

Any unauthorized modifications performed on this machine will relieve the manufacturer of all liability for any resulting damage or injury.

## 2.1.2 Proper disposal of waste

Improper disposal of waste can pollute the environment and ecology. A few examples of potentially harmful equipment waste can include, but not limited to, items such as oil, fuel, coolant, brake fluid, filters, battery chemicals, tires, etc.

Use leak proof containers when draining fluids. Do not use food or beverage containers to collect waste fluids, as food or beverage container(s) may mislead someone into drinking from them.

Do not pour or spill waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire with local environmental or recycling center on the proper way to recycle or dispose waste.

## 2.2 Machine identification

Each machine is identified by a model and a serial number.

Record these numbers in the spaces given.

Give the model number and serial number to your dealer when parts or service are required.

| | |
|---|---|
| Machine model number: | |
| Machine serial number: | |

| | |
|---|---|
| Date of delivery: | |

| | |
|---|---|
| Dealer name: | |
| Dealer address: | |
| | |
| | |
| Dealer telephone number: | |
| Dealer e-mail address: | |
| Dealer fax number | |

### 2.2.1 Serial number plate location

The serial number plate (1) is located on the side of the main frame tube.

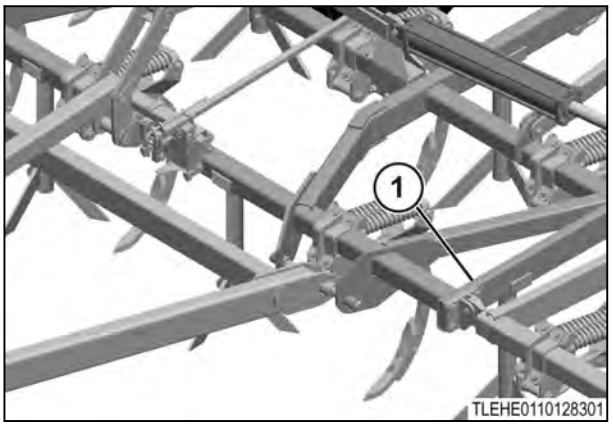


*Fig. 1*

### 2.2.2 Serial number description

Description of the serial number for model year 2010 and up.

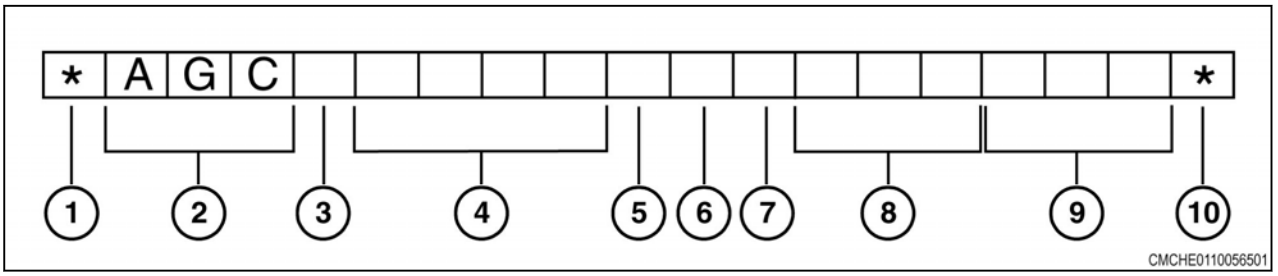


*Fig. 2*

(1) Beginning symbol
(2) World manufacturer code
(3) Brand code
(4) Model identifier (model number)
(5) Check letter (0 or used if model identifier is five digits)
(6) Model year code (A=2010, B=2011, C=2012, and on)
(7) Plant code
(8) Family code
(9) Unit number for the year
(10) Ending symbol

## 2.3 Chisel plough

Use the chisel plough for primary tillage operations.

The chisel plough is equipped with shanks that break up the soil and debris. The chisel plough can be used to loosen hard, dry soils prior to using regular plows.

### 2.3.1 Level-lift hitch

The level lift hitch is designed to keep the machine level during field operation and transport.

The operator can change the working depth while keeping the machine level from the front to the rear.

### 2.3.2 Floating hitch

The floating hitch pivots between the tractor and the main frame. This pivot point lets the unit to follow the contour of the ground. The front castering gauge wheels support the front of the main frame and wings. These gauge wheels are mechanically synchronized to the rear axle, keeping the unit at the same level working depth from front to rear.

## 2.4 Major components

The following are the major components of the machine.

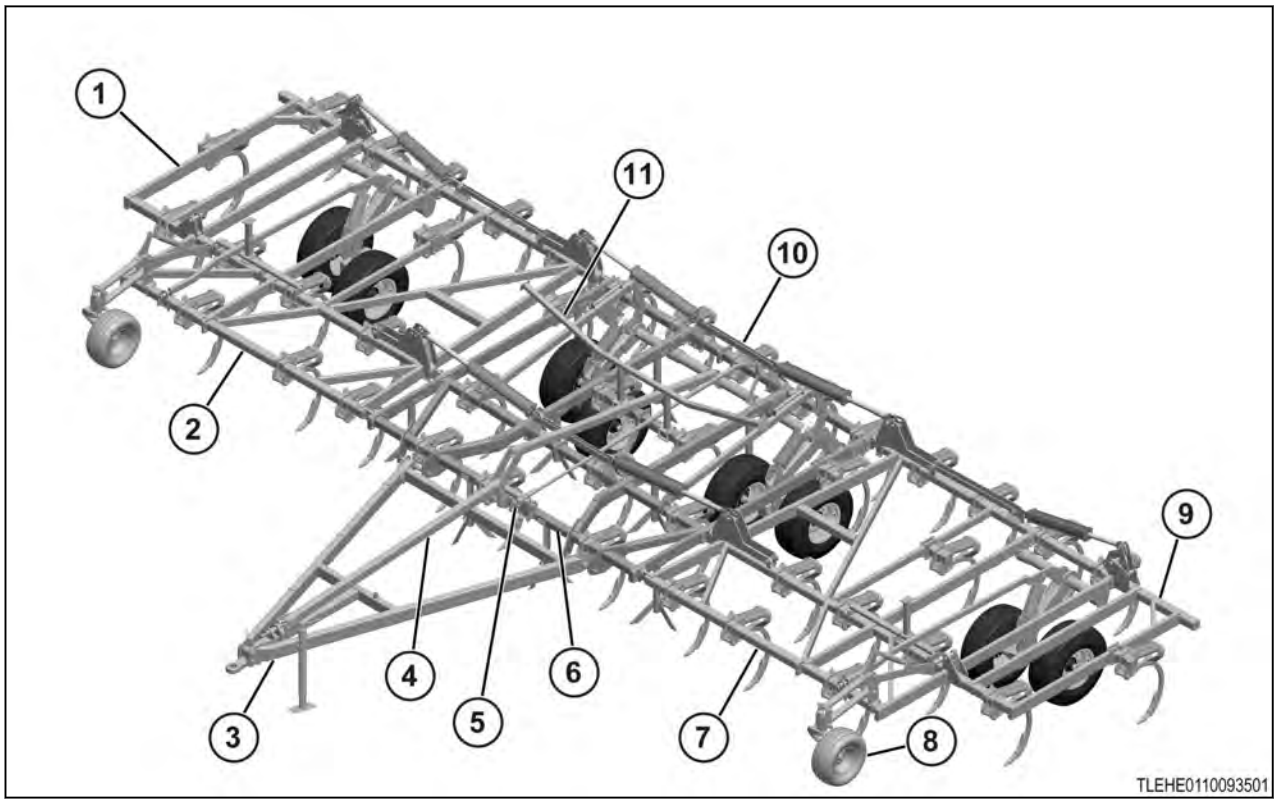


*Fig. 3*

(1) Right-hand outer wing
(2) Right-hand wing frame
(3) Tongue
(4) Leveler
(5) Single point depth control
(6) Center frame
(7) Left-hand wing frame
(8) Gauge wheel
(9) Left-hand outer wing
(10) Fold anchor
(11) Wing rest

## 2.5 Operator manual storage

The Operator Manual is located in the container (1) on the machine.


*Fig. 4*

# 3. Operation

## 3.1 Bleeding air from the hydraulic lift system

**Before starting the procedure**

**WARNING:**
**Leaking fluid under pressure can enter the skin causing serious injury. Release pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Wear correct hand and correct eye protection when looking for leaks. Use a piece of cardboard or paper instead of your hand. Any fluid injected into the skin can cause gangrene. The fluid must be removed by a doctor familiar with this type of injury.**

**WARNING:**
**Be careful of sweeps or blades when folded to prevent serious injury. Never keep the machine with the wings in the folded position.**

To bleed the air from the hydraulic lift system, connect the machine to a tractor that is the correct size to operate the machine. See the information for minimum tow vehicle weight.

Completely bleed the hydraulic system of air when:

The lift system is filled with hydraulic oil for the first time.

Air has entered the hydraulic system through a leak or through repair of the hydraulic system.

**Procedure**

1. Park the machine on a flat, level surface that is large enough for the machine when unfolded.
2. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).

   **IMPORTANT:** *If the hydraulic flow is set to more than 75.7 L/min (20 gal/min) the hydraulics will not operate correctly.*
3. Connect the lift system hoses to the tractor.
4. Make sure the tractor reservoir is full of the hydraulic oil required by the manufacturer.

   **IMPORTANT:** *Do not loosen any hydraulic fittings to bleed air from the system.*
5. Raise the machine. Continue to hold the tractor lever to let oil bypass and fill each wing lift cylinder.
6. Engage the hydraulics to remove any hydraulic transport locks if equipped.
7. Stop the engine, apply the parking brake and take the key with you.
8. Remove the transport locks when all lift cylinders are fully extended.
9. Lower the unit.

   Make sure the cylinders move at the same time through the cycle.
10. Hold the hydraulic lever with the cylinders fully extended.
11. If the cylinders are not operating together, cycle the cylinders to remove the remaining air.

    **IMPORTANT:** *Do not loosen any hydraulic fittings to bleed air from the system.*
12. Stop the engine, apply the parking brake, and take the key with you.
13. Check the tractor hydraulic oil reservoir to make sure the hydraulic oil is still within operating limits.
14. Make sure all lift cylinders are operating together before starting any field operation.
15. Fully raise the machine when making turns during field operation.

    This will make sure that the cylinders are operating together and keep the machine level during operation.

## 3.2 Bleeding air from the hydraulic fold system

**Before starting the procedure**

**WARNING:**
**Leaking fluid under pressure can enter the skin causing serious injury. Release pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Wear correct hand and correct eye protection when looking for leaks. Use a piece of cardboard or paper instead of your hand. Any fluid injected into the skin can cause gangrene. The fluid must be removed by a doctor familiar with this type of injury.**

**WARNING:**
**Be careful of sweeps or blades when folded to prevent serious injury. Never keep the machine with the wings in the folded position.**

**IMPORTANT:** *Do not fold or unfold the fold system before bleeding air from the fold system.*

To bleed the air from the hydraulic fold system, connect the machine to a tractor that is the correct size to operate the machine. See the information for minimum tow vehicle weight.

Completely bleed the hydraulic system of air when:

The fold system is filled with hydraulic oil for the first time.

Air has entered the hydraulic system through a leak or through repair of the hydraulic system.

**Procedure**

1. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).

   **IMPORTANT:** *If the hydraulic flow is set to more than 75.7 L/min (20 gal/min), the hydraulics will not operate correctly.*

   **NOTE:** *Restrictors are installed in the fold cylinders to prevent falling of the wings. Never remove the restrictors, or the machine will not fold correctly.*
2. Stop the engine, apply the parking brake, and take the key with you.
3. Connect the fold system hoses to the tractor.
4. Make sure the tractor reservoir is full of the hydraulic oil required by the manufacturer.

   **IMPORTANT:** *Do not loosen any hydraulic fittings to bleed air from the system.*
5. Remove the pins from the rod ends of the fold cylinders.
6. Make sure the rod ends of the fold cylinders will not come into contact with any obstructions.
   If a blockage is present, lift the rod ends of the fold cylinders.
7. Use the remote lever in the tractor to fully extend and retract the fold cylinders.
   Extend and retract multiple times.
8. If the fold cylinders are not operating together, cycle the fold cylinders to remove the remaining air.

   **IMPORTANT:** *Do not loosen any hydraulic fittings to bleed air from the system.*
9. Stop the engine, apply the parking brake, and take the key with you.
10. Check the tractor hydraulic oil reservoir to make sure the hydraulic oil reservoir is still within operating limits.
11. Connect the rod ends of the fold cylinders to the machine.
12. Find an area large enough for the machine when unfolded.
13. Park the machine on a solid, level surface. Stop the engine, apply the parking brake, and take the key with you.
14. With the tractor at a low idle, slowly engage the hydraulics to fold and unfold the machine.
15. Fully extend the fold cylinders to let the wings flex freely.

## 3.3 Connecting the machine to the tractor

**Procedure**

**1.** Make sure there are no persons, or obstructions between the tractor and the machine.

**2.** Use the hitch jack (1) on the front hitch of the machine to adjust the height of the hitch (2).

**NOTE:**
*The location of the hitch jack can vary.*

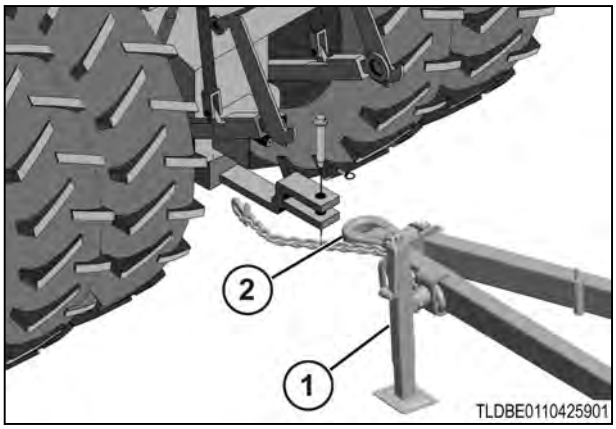


*Fig. 1*

**3.** Slowly reverse the tractor toward the hitch of the machine. Align the hitch on the tractor with the hitch on the machine when backing.

**4.** Stop the tractor when the hole of the tractor drawbar aligns with the hole in the machine hitch.

**5.** Stop the engine, apply the parking brake, and take the key with you.

**6.** Install the hitch pin (1) through the holes in the tractor draw bar (2) and the machine hitch. Install the keeper pin (3) in the hitch pin.

**7.** Connect the safety chains (4) from the front hitch of the machine to the tractor.

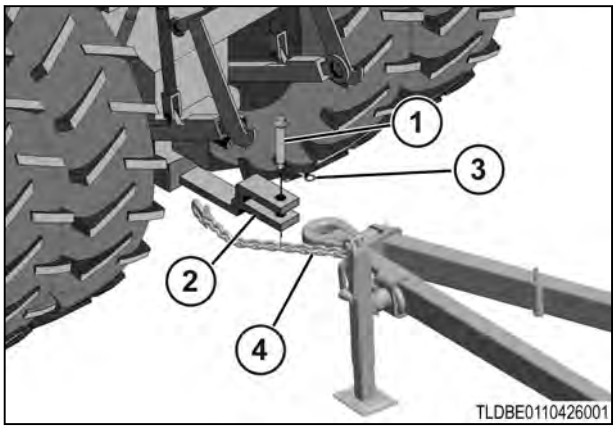


*Fig. 2*

**8.** Retract the hitch jack. Move the hitch jack to the storage position (1) and fasten with pin.

**NOTE:**
*The location and position of the storage location of the hitch jack can vary.*

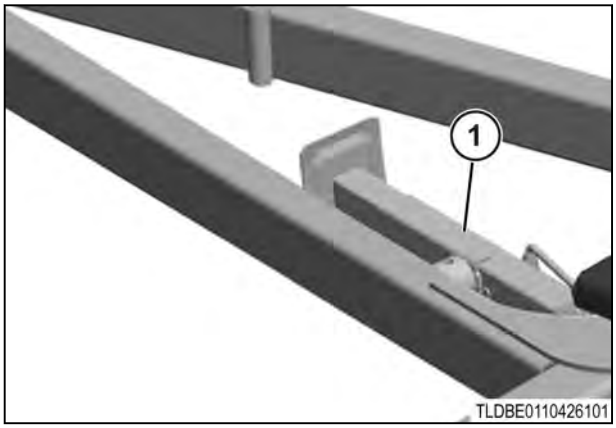


*Fig. 3*

**9.** Clean the ends of the hydraulic connections on the machine and the tractor.

**10.** Make the following connections between the tractor and the machine.

- Lift cylinder hydraulic hoses
- Wing fold cylinder hydraulic hoses
- Marker lamp harness

**11.** Start the tractor. Use the tractor hydraulics to lift the machine to the highest position.

**12.** If the wing frames were down during storage, connect the wing cylinders to the wing frames.

**13.** Use the tractor hydraulics to fully lift the wing frames.

**14.** Stop the engine, apply the parking brake, and take the key with you.

**15.** Remove the wheel chocks or blocks from in front of and behind the support tires.

**16.** Make sure all persons and obstructions are clear before moving the tractor and machine.

## 3.4 Disconnecting the machine from the tractor

**NOTE:** *Lower the wing frames for storage when possible.*

**Procedure**

1. Park the tractor and the machine on a solid level surface.
2. Use the tractor hydraulics to lower the wings to the ground if possible.
3. Stop the engine, apply the parking brake, and take the key with you.
4. Install wheel chocks or blocks in front of and behind the support wheels.
5. Move the hitch jack to the operating position (1) on the front hitch. Use the hitch jack to support the front hitch of the machine.

   **NOTE:**
   *The location of the hitch jack can vary.*

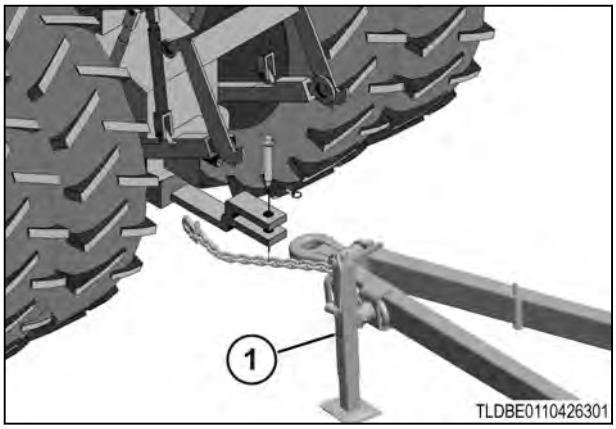


*Fig. 4*

6. Disconnect the following connections from the tractor:
   - Lift cylinder hydraulic hoses
   - Wing fold cylinder hydraulic hoses
   - Marker lamp harness
7. Clean the hydraulic connections between the machine and the tractor.
8. Install each of the hydraulic hose connections in the hose holder
9. Install the connector for the marker lamp harness in the plug holder.
10. Remove the safety chains (4) from the tractor.
11. Remove the keeper pin (3) from the hitch pin (1) . Remove the hitch pin from the hitch and drawbar (2).

    **IMPORTANT:**
    *Make sure there are no connections between the tractor and the machine.*
12. Make sure all persons and obstructions are clear of the tractor and machine.
13. Move the tractor away from the machine.

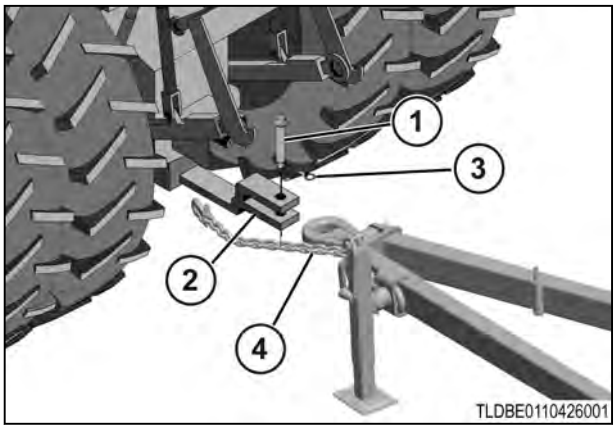


*Fig. 5*

## 3.5 Preparing the machine for transport

**Before starting the procedure**

Stop the tractor before preparing the machine for transport.

**Procedure**

1. Use the tractor hydraulics to lift the frame of the machine to the highest position.
2. Use the tractor hydraulics to completely fold the machine.
3. Stop the engine, apply the park brake, and take the key with you.
4. Remove the transport locks (1) and pins (2) from the storage position.

   **NOTE:** *The typical storage location is shown.*

   See the information for the transport locks for the correct locations.
5. Put the transport locks on the center frame cylinders (3) and fasten with pins.
6. Lower the machine down on the locks.

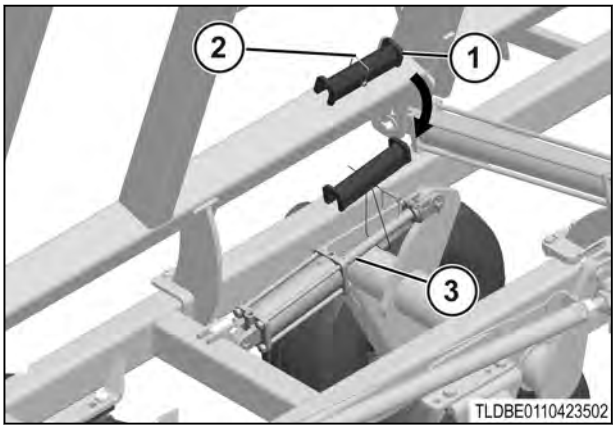


*Fig. 6*

## 3.6 Preparing the machine for field operation

Adjust the machine according to field conditions, before taking the machine to the field.

**Before starting the procedure**

**WARNING:**

**Avoidance hazard. Clearance. Serious personal injury can occur. Make sure all persons are clear of the area before operating the machine.**

**CAUTION:**
**Failure to remove the safety lock pins can damage the machine.**

The machine must be connected to a tractor that is the correct size for operation. Make sure there is enough area around the machine to completely lower the wings.

**Procedure**

1. Follow all safety instructions.
2. Set the tractor hydraulic flow to less than 75.7 L/min (20 gal/min).

   **IMPORTANT:** *If the hydraulic flow is set to more than 75.7 L/min (20 gal/min) the hydraulics will not operate correctly.*
3. Make sure the area below the machine is clear of persons and obstructions.
4. Use the tractor hydraulics to lift the frame of the machine to the highest position.
5. Stop the engine, apply the park brake, and take the key with you.
6. Remove the transport locks (1) and pins (2) from the center frame cylinders.
7. Put the transport locks in the storage location (3) and fasten with pins.

   **NOTE:** *The typical storage location is shown.*

   See the information for the transport locks for the correct locations.
8. Use the tractor hydraulics to completely unfold the machine.

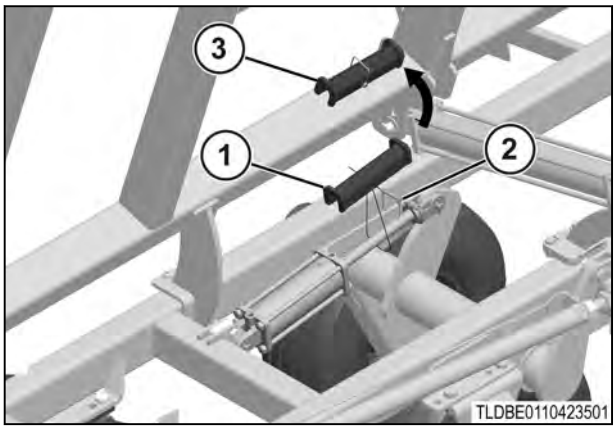


*Fig. 7*

9. Bleed any air from the lift and the fold cylinders.
10. Lubricate the machine at all points shown in the Maintenance Section .
11. Check tires for correct air pressure.
12. Make adjustments and service the machine according to the Operation Section of this manual.
13. Adjust the finishing attachment if necessary.
14. Level the machine from front to rear by adjusting the self-leveler.

    Level at or near ground height.
15. Lower the machine to the desired operating depth.
16. Adjust the stroke control for machine depth.
17. Level the wings to the center frame.
18. Adjust the gauge wheel to correct depth.

## 3.7 Beginning field operation

**Procedure**

1. Operate at a slight angle to the crop rows.
   This will let the machine operate level and give better residue clearance.
2. Raise the unit completely when making turns.

   **NOTE:** *Failure to raise the unit when turning will cause increased side loads on the machine.*
3. Monitor the ground worked by the machine and make sure the machine is operating level.
4. Adjust the machine as required.

### 3.7.1 Items to check after first operation

- Check all nuts and bolts, tighten if necessary.
- Check the lug nuts, tighten if necessary.
- Make sure the nuts on the hubs and spindles have the correct torque.
- Make sure all grease fittings are lubricated.
- Make sure the tire pressure is correct.

# 3.8 Leveling the machine

## 3.8.1 Leveling a machine with the level-lift hitch front to rear

**Before starting the procedure**

The machine must be connected to a tractor that is the correct size for operation. See the information for the minimum tow vehicle weight.

**Procedure**

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.
6. Remove the stop collars from all of the main lift cylinders and turn the screw stop collars up to the clevis end of the cylinders.
7. Use the tractor hydraulics to lower the machine so the front shovels or the spikes are 25 to 51 mm (1 to 2 in) above the ground.
8. Measure and record the frame height at the front corners from the ground to the bottom of the frame tube.
9. Measure and record the frame height at the rear corners from the ground to the of the frame tube.
10. Compare the front and rear measurements.
11. Set front frame height to the same as the rear frame height.
    a) Turn the adjusting nuts (1) clockwise to lengthen the lift tube.
    b) Turn the adjusting nuts counterclockwise to shorten the lift tube.
12. Check the measurements again and adjust as necessary.
13. Tighten the adjusting nuts.
14. Check the machine level in the working position and adjusted as necessary.

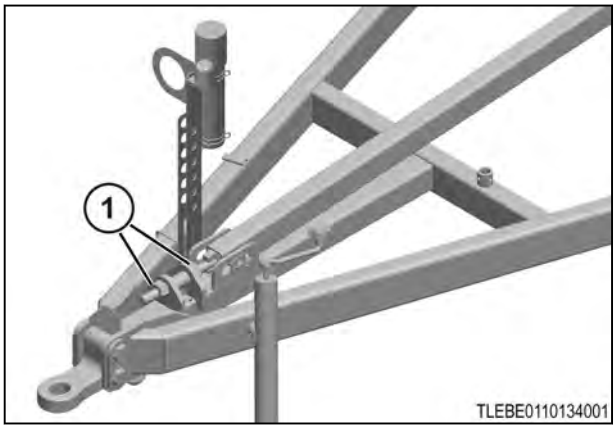


*Fig. 8*

## 3.8.2 Leveling a machine with the floating hitch front to rear

**Before starting the procedure**

The machine must be connected to a tractor that is the correct size for operation. See the information for the minimum tow vehicle weight.

**Procedure**

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.

6. Remove the stop collars from all of the main lift cylinders and turn the screw stop collars up to the clevis end of the cylinders.
7. Use the tractor hydraulics to lower the machine so the front shovels or the spikes are 25 to 51 mm (1 to 2 in) above the ground.
8. Measure and record the frame height at the front corners from the ground to the bottom of the frame tube.
9. Measure and record the frame height at the rear corners from the ground to the of the frame tube.
10. Compare the front and rear measurements.
11. Set front frame height to the same as the rear frame height.
    a) If the front of the machine is higher than the rear, turn the adjusting screw (1) counterclockwise.
    b) If the front of the machine is lower than the rear, turn the adjusting screw clockwise.
    c) Make sure both front adjusting screws are set to the same length.
    d) The gauge wheels will carry the weight of the machine.
12. Check the measurements again and adjust as necessary.
13. Tighten the jam nut.
14. Check the machine level in the operating position and adjusted as necessary.

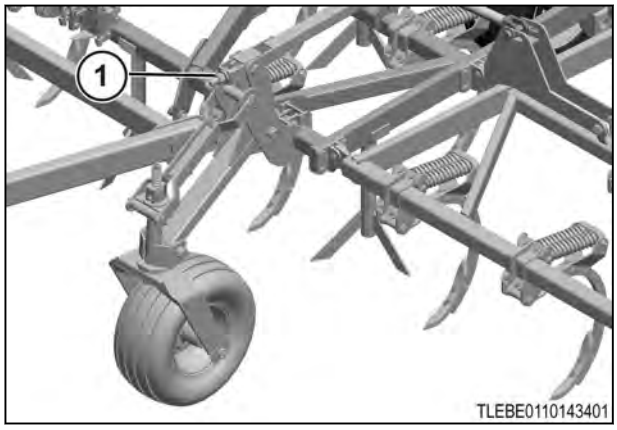

*Fig. 9*

## 3.8.3 Leveling the wings to the center frame

**Before starting the procedure**

The machine must be connected to a tractor that is the correct size for operation. See the information for the minimum tow vehicle weight.

The wheels of the machine must always be in contact with the ground during field operation to operate correctly.

**Procedure**

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.
6. Measure and record the height from the ground to the bottom of the wing frame tubes on the front and rear of the wing.
7. Compare the measurements of wing to the main frame.

   If the measurement for the wing is:

   - more than the main frame measurement, lower the wing
   - less than the main frame measurement, raise the wing.

**8.** Adjust the adjusting screw (1) to raise or lower the wing.
   a) To raise the wing, loosen the jam nut (2) and turn the adjusting screw clockwise.
   b) To lower the wing, loosen the jam nut and turn the adjusting screw counterclockwise.

**9.** Tighten the jam nut.

**10.** Follow the same procedure for the wing on the other side.

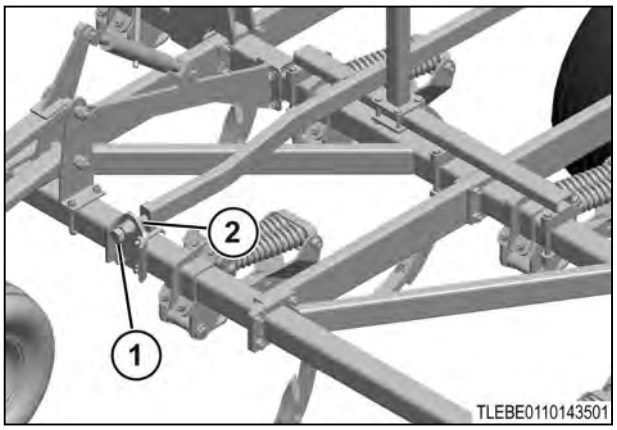


*Fig. 10*

# 3.9 Adjusting the gauge wheels

## 3.9.1 Adjusting the gauge wheels - ratchet adjust

The gauge wheels only touch the ground when the machine is in the operating position.

**Before starting the procedure**

Depth and leveling adjustments, both front to rear and side to side, must be complete before adjusting the gauge wheels.

The gauge wheels must be adjusted to carry some of the weight of the machine. Do not over adjust to prevent the machine from reaching the correct operating depth or carry the weight of the complete machine.

**Procedure**

1. Find a solid, level surface large enough for the machine when unfolded.
2. Unfold the machine and fully raise the machine. Continue holding the hydraulic lever to let the oil cycle through the lift system.
3. Hold the lift cylinder hydraulic lever in the raised position for one to five minutes to make sure all cylinders are bled of air and fully extended.
4. Stop the tractor engine, apply the park brake, and take the key with you.
5. Remove the transport locks.
6. Lower the machine to the operating position.
7. Drive forward with the machine in the ground at the desired operating depth.
8. Stop the tractor, stop the engine, apply the park brake, and take the key with you. Leave the machine in the ground.
9. Check the position of the front corner of each wing.
10. Adjust the ratchet jack (1) as necessary.
    - If the wing is too deep in the ground, raise the front corner of the wing by extending the ratchet jack.
    - If the wing is not deep enough, lower the front corner of the wing by shortening the ratchet jack.
11. Measure and record the length of each ratchet jack. The length of the ratchet jack is measured from pin (2) to pin (3).

    **IMPORTANT:**
    *Make all height adjustments with the machine in the ground at the desired operating depth. A gauge wheel adjustment that is not correct can change the leveling of the machine.*
12. Compare the ratchet jack measurements.
    - If the measurements are the same, the adjustment is complete.
    - If the measurements are not the same, adjust the ratchet jacks as necessary.

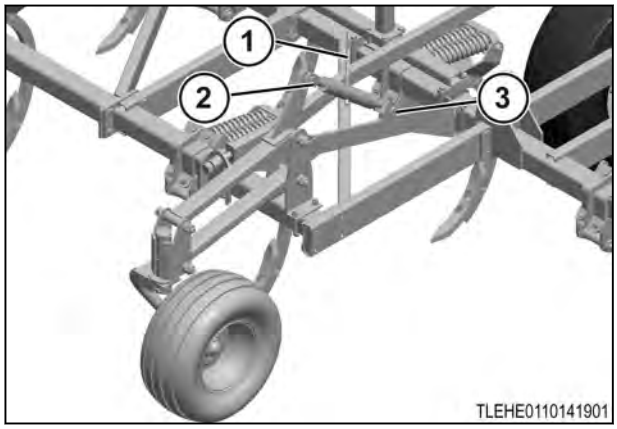

*Fig. 11*

## 3.9.2 Adjusting the gauge wheels - hydraulic

The hydraulic gauge wheel adjustment is part of the leveling of a machine with the floating hitch.

If the hydraulic gauge wheels are not level, see the information from leveling the machine with a floating hitch front to rear.

## 3.10 Operating depth

Adjust the adjustment crank on the single point depth control to adjust the operating depth.

### 3.10.1 Single point depth control

On units equipped with single point depth control (1), the stroke control valve (2) is used to control the depth of the unit. This stroke control valve controls the amount of oil in the main lift cylinders. The stop collars on all cylinders can be put as close as possible to the clevis end of the cylinder. To set a maximum depth of the unit, adjust the stop collars to the maximum depth setting to function as a backup for a possible single point depth control malfunction.

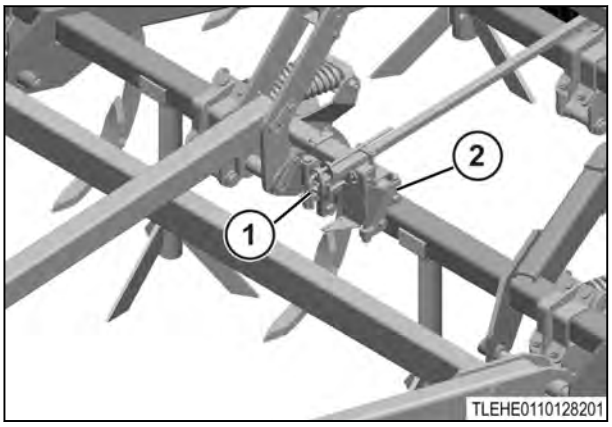


*Fig. 12*

## 3.11 Spring shanks

Two sizes of shank assemblies are available:

- 454 kg (1000 lb) compression spring edge-on shank
- 395 kg (650 lb) extension spring shank

Each shank assembly uses a spring (1) to keep forward pressure against the soil while protecting the shank when hitting a solid object.

The mounting bolts (2) and shank bolts (3) must be kept tight.

The mounting bolts must be kept tight and still let the shank move.

For the395 kg (650 lb) shank assemblies only, the spring adjust bolt (4) must be tightened just enough to crack the paint between the spring coils. If more pressure is required the spring adjust bolt can be tightened.

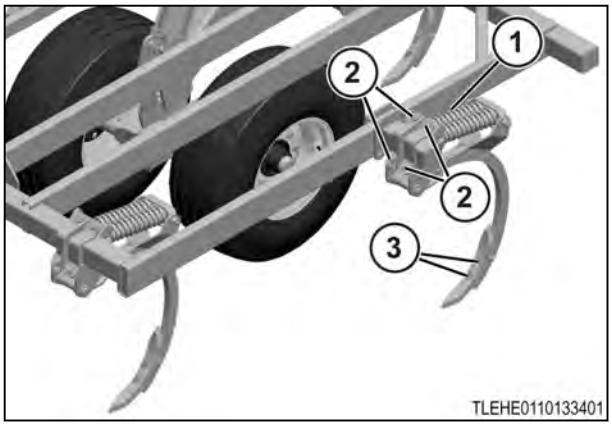


*Fig. 13 454 kg (1000 lb) compression spring edge-on shank*

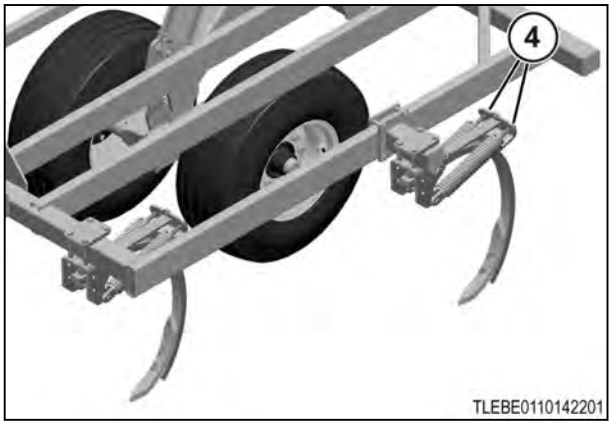


*Fig. 14 395 kg (650 lb) extension spring shank*

# 4. Maintenance

## 4.1 Lubrication and maintenance chart

See the specifications for the correct type of lubricant.

| 10 hours or daily | 50 hours or weekly | 1000 hours or yearly | |
|---|---|---|---|
| X | | | Lubricate the gauge wheel hubs. |
| X | | | Lubricate the gauge wheel pivots. One lubrication fitting is standard on each ratchet gauge wheel. Five lubrication fittings are standard on the hydraulic gauge wheels. |
| | X | | Lubricate the wheel hub bearings, one lubrication fitting per hub. |
| | X | | Inspect all hardware installed on the machine for the correct torque. |
| | X | | Inspect all wheel lug bolts and nuts for the correct torque. |
| | X | | Check air pressure of all tires. Inflate tire to correct pressure. |
| | X | | Clean any dirt or grease from moving parts. |
| | | X | Remove and clean the bearings from each hub assembly. Fill the bearings and hubs with new grease. |
| | | X | Remove and clean the bearings from each walking tandem. Fill the bearings with new grease. |
| | | X | Inspect all hydraulic hoses and fittings for cracks or leaks. Replace any hoses or fittings as necessary. |

## 4.2 Lubrication fitting locations

**Ratchet gauge wheel**

Find the one lubrication fitting (1) on the front of each ratchet gauge wheel.

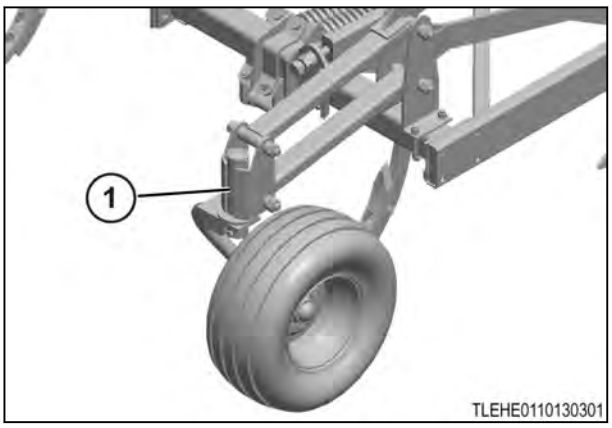


*Fig. 1*

**Hydraulic gauge wheel**

Find the lubrication fittings (1) on each hydraulic gauge wheel.

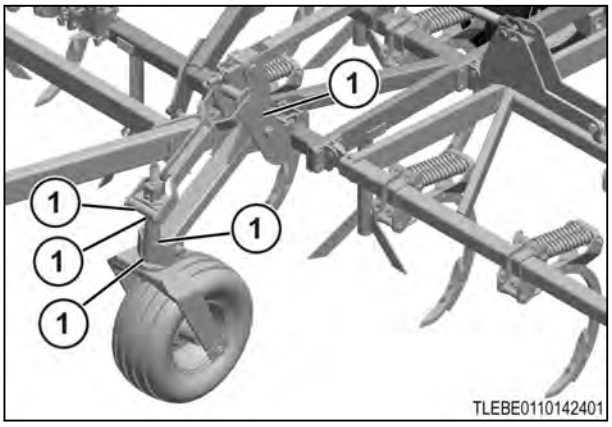


*Fig. 2*

**Gauge wheel hub**

Find the one lubrication fitting (1) for each gauge wheel hub.

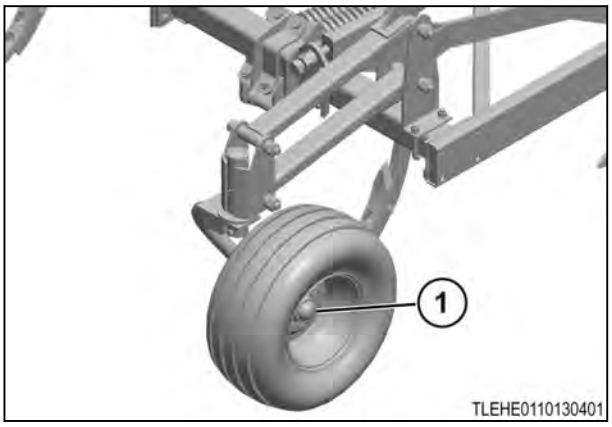


*Fig. 3*

**Wheel hub**

Find the one lubrication fitting (1) for each wheel hub.

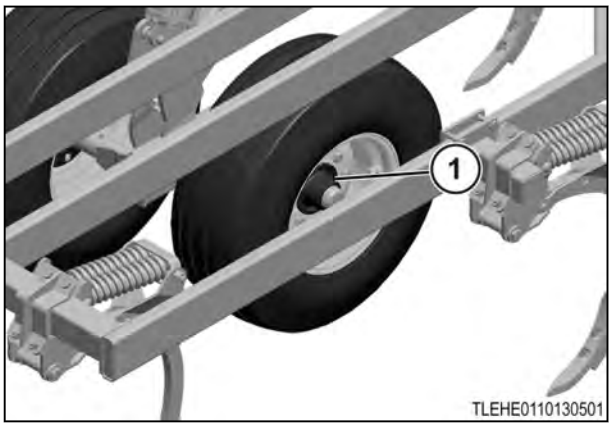


*Fig. 4*

## 4.3 Servicing the wheel bearings

Each wheel hub is equipped with a grease fitting and must be lubricated every 50 hours of use. Apply grease to the hubs until grease pushes out through the seal. The triple lip seal lets the grease through without damaging the seal.

Clean and fill the wheel hubs yearly. Cleaning and filling the hubs removes all dirt and supplies fresh grease. The following procedure is necessary to correctly install the triple lip seal. The seal lips must be showing away from the hub if dirt is to be kept out.

**Procedure**

1. Remove the dust cap, cotter pin, nut and washer.
2. Remove the hub and clean the bearing and bearing cavity.
3. Replace any damaged or worn parts.
4. Fill the hubs with grease.
5. Install the seal on the spindle shaft.

   Do not try to put the hub on the spindle with the seal in the hub.
6. Replace the hubs with inner bearings in position.
7. Replace the outer bearing, washer and nut on the wheel spindle.
8. Adjust the bearings by tightening the nut until there is a resistance to turning.
9. Loosen the nut until the hub can turn freely by hand without end play.
10. Put the cotter pin through the spindle and nut and replace the dust cap.
11. Slide the seal (1) down the spindle. Turn the seal on the spindle so the seal lips will point away from the hub.
12. Install the seal in the hub.

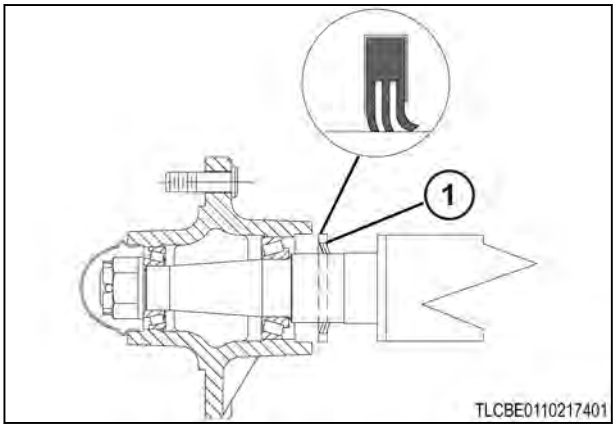


*Fig. 5*

## 4.4 Servicing the tandem pivot bearings

Clean and fill pivot bearings yearly. Cleaning and filling the bearings removes all dirt and supplies fresh grease. The following procedure is necessary to correctly fill the bearings.

**Procedure**

1. Remove the wheels and the tandem axle spindles.
2. Remove the seals and bearings from the pivot hub.
3. Clean the parts and hub cavity to remove all dirt.
4. Fill the bearings with a good grade wheel bearing grease.
5. Replace the bearings in the hubs in the correct sequence.
6. Apply grease around the outside of the inner bearings.

   Apply enough quantity to fill the space between the inner bearings and the grease seals after assembly.
7. Install seals in the hubs.

   The metal side must be on the outside of the hub.
8. Install the tandem axle spindle and replace the pivot.
9. Tighten the nuts until there is a small amount of drag. Loosen the nuts until the cotter pins can be installed.
10. Replace the wheels.

# 4.5 Storage

## 4.5.1 Preparing the machine for storage

Prepare the machine for storage at the end of each season. When possible, store the machine in a covered location with the wings lowered. Preventing rust will lengthen the life and assist in performance.

**Procedure**

1. Park the machine on a solid, level surface, away from other machines.
2. Use the tractor hydraulics to lower the wings of the machine.
3. Clean the machine of any dirt, grease, or other materials.
4. Put a protective layer of heavy oil or grease on all earth engaging parts to prevent rust.
5. Paint any damaged surfaces, surfaces with paint removed, or surfaces with rust.
6. Inspect the machine for any loose parts or hardware.
   a) Replace any worn parts.
   b) Tighten any loose hardware.
7. Lubricate all components of the machine.
8. Raise the machine and transport the machine to the area where the machine is to be kept. The area must be level and away from other machines.
9. Use the tractor hydraulics to lower the wings of the machine.
10. Stop the engine, apply the park brake, and take the key with you.
11. Remove the hardware that fastens the cylinder rod (1) of the wing lift cylinders to the wing frame. If equipped with folding wing extensions, remove the pins fastening the rod end of the wing lift cylinders to the wing extension frame.
12. Put boards under the gangs or shanks.
13. Start the tractor. Use the tractor hydraulics to retract the wing lift cylinders.
14. Stop the engine, apply the parking brake, and take the ignition key with you.
15. Block up the machine to remove the weight from the tires.
16. Use the front hitch jack (1) to support the front hitch of the machine.
17. Disconnect the machine from the tractor. See the information for disconnecting the machine from the tractor.
18. Apply grease to the surfaces of the cylinder rods that are still showing.

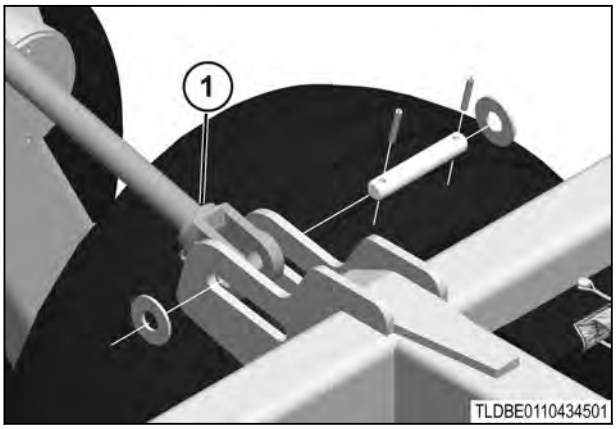


*Fig. 6*

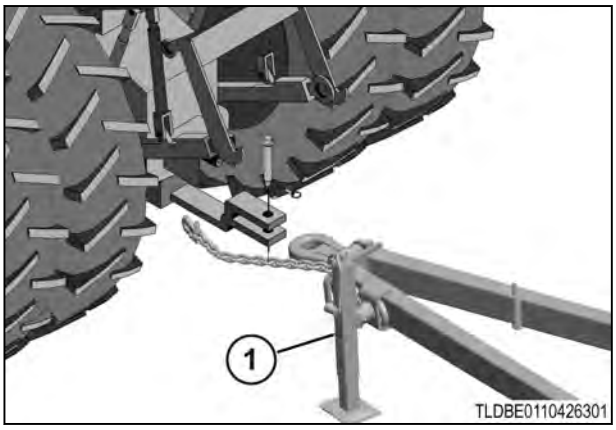


*Fig. 7*

## 4.5.2 Preventing corrosion of extended hydraulic cylinders

Store the machine with the cylinders in the retracted position. If the machine is stored with cylinders in the extended position, periodically cycle the cylinder. If a cylinder must be stored in the extended position without being cycled, the following corrosion prevention must be done.

**Procedure**

1. Use a dry cloth or cloth with solvent to clean any dirt from the cylinder shaft.
2. Prepare a mixture of 60 percent oil based rust inhibitor and 40 percent Kerosene.
3. Use a cloth to apply a thin layer of this mixture to the surface of the chrome plated shaft.

   Number one fuel oil can be replaced with Kerosene. A good grade purpose made product can be used for this procedure.
4. Follow manufacturer instructions for applying purpose made products.
5. Inspect and apply the mixture again at three to six month intervals.

## 4.5.3 Removing the machine from storage

Complete the following steps to remove the machine from storage.

**Procedure**

1. Connect the machine to the tractor.
2. Use the tractor hydraulics to extend the wing fold cylinders. Extend the wing fold cylinders until the holes in the end of the wing fold cylinders align with the holes in the mounts.
3. Stop the engine, apply the tractor parking brake, and take the key with you.
4. Install the cylinder rod (1) of the wing fold cylinders to the mount on the wing frames. Use the existing hardware to fasten the wing fold cylinders.
5. Check the air pressure in all the tires.
6. Inspect all the hydraulic hoses and the connections for leaks and repair as necessary.
7. Make sure the safety signs are visible and not damaged.

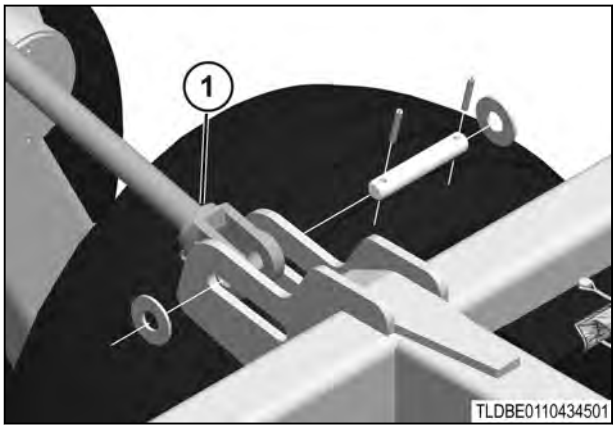


*Fig. 8*

# 5. Troubleshooting

## 5.1 Troubleshooting

| The lift cylinders are not in phase. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The system is not bled of air | Bleed the system of air |
| The cylinders are not installed correctly | The wing cylinders must be smaller than the center frame cylinders. The cylinders must be connected in series. Start with the largest and reduce in diameter. The cylinders must point up so the air can release through the ports. |
| Hydraulic hoses are not installed correctly | Correctly install the hydraulic hoses |

| The wing lift cylinders are losing pressure and permitting the wings to lower. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| Pressure is flowing past the pistons in the cylinders | Install a new seal kit in the leaking cylinder |

| The lift cylinders are losing pressure and permitting the wings to lower. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The depth valve is leaking | Install a cartridge assembly in the depth control valve |

| The wings are raising or the center is losing pressure permitting the center to lower. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| Pressure is flowing past the piston in the master cylinder | Install a new seal kit in the master cylinder |

| The machine is not pulling evenly. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The depth is not even | Level the wings to the center frame |
| Shank location is not correct | Check the shanks for correct location |

| The depth is not even. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The machine is not level when under power in the field | Level the machine from front to rear |

| The wing(s) are bouncing. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The machine is operating too fast | Reduce speed |
| The outer end of the wing is operating too deep | Adjust the wing wheels to reduce depth |
| The gauge wheel is not supporting the wing | Lower the gauge wheel |

| The machine is not cutting into the soil. | |
|---|---|
| **Cause(s)** | **Solution(s)** |
| The machine is not level | Level the machine front to rear and side to side |
| The wheels are not in contact with the ground | Level the disc and/or set the depth adjustment |
| The gauge wheels are adjusted too deep | Adjust the gauge wheels |
| Shovel points are worn | Adjust stop collar of the main lift cylinder(s) for wear. Replace shovels if wear is severe |
| Sweep stem angle is not correct | Use 50 degree sweeps |
| Leveling adjustments are not correct on the main frame or the wings | See the information for leveling the implement |
| | Make sure the wing fold cylinders are fully extended |
| Hydraulic malfunction - air in the lines, cylinder or hoses leaking or not installed correctly. | Check for leaks in the cylinders, hoses, and fittings. Make sure all cylinders and hoses are correctly installed. |

# 6. Specifications

## 6.1 Specifications

| | | 2510 - 13 | 2510 - 13-15 | 2510 - 13-17 |
|---|---|---|---|---|
| **Rigid model - with tandem axle (level lift hitch)** | | | | |
| Working width | 305 mm (12 in) shank spacing | 4 m (13 ft) | 4.6 m (15 ft) | 5.2 m (17 ft) |
| | 381 mm (15 in) shank spacing | 3.8 m (12.5 ft) | | 5.3 m (17.5 ft) |
| Number of shanks | 305 mm (12 in) shank spacing | 13 | 15 | 17 |
| | 381 mm (15 in) shank spacing | 10 | 12 | 14 |
| Weight - approximate | | 2998 kg (6610 lb) | 3144 kg (6932 lb) | 3337 kg (7356 lb) |

| | | 2530 - 19 | 2530 - 19-21 | 2530 - 19-23 |
|---|---|---|---|---|
| **Folding model with 3-foot wings and tandem axle (level lift hitch)** | | | | |
| Working width | 305 mm (12 in) shank spacing | 5.8 m (19 ft) | 6.4 m (21 ft) | 7 m (23 ft) |
| | 381 mm (15 in) shank spacing | N/A | 6.1 m (20 ft) | 6.7 m (22.5 ft) |
| Number of shanks | 305 mm (12 in) shank spacing | 19 | 21 | 23 |
| | 381 mm (15 in) shank spacing | N/A | 16 | 18 |
| Inner Wing | | 0.9 m (3 ft) | | |
| Weight - approximate | | 3886 kg (8566 lb) | 4032 kg (8888 lb) | 4224 kg (9313 lb) |

| | | 2530 - 25 | 2530 - 25-27 | 2530 - 25-29 |
|---|---|---|---|---|
| **Folding model with 6-foot wings and tandem axle (level lift hitch)** | | | | |
| Working width | 305 mm (12 in) shank spacing | 7.6 m (25 ft) | 8.2 m (27 ft) | 8.8 m (29 ft) |
| | 381 mm (15 in) shank spacing | | 8.4 m (27.6 ft) | 9.1 m (30 ft) |
| Number of shanks | 305 mm (12 in) shank spacing | 25 | 27 | 29 |
| | 381 mm (15 in) shank spacing | 20 | 22 | 24 |
| Inner Wing | | 1.8 m (6 ft) | | |
| Weight - approximate | | 5112 kg (11271 lb) | 5259 kg (11593 lb) | 5451 kg (12017 lb) |

| | | 2530 - 31 | 2530 - 31-33 | 2530 - 31-35 | 2530 - 31-37 | 2530 - 31-39 | 2530 - 31-41 |
|---|---|---|---|---|---|---|---|
| **Folding model with 9-foot wings and tandem axle (level lift hitch or floating lift hitch)** | | | | | | | |
| Working width | 305 mm (12 in) shank spacing | 9.4 m (31 ft) | 10.1 m (33 ft) | 10.7 m (35 ft) | 11.3 m (37 ft) | 11.9 m (39 ft) | 12.5 m (41 ft) |
| | 381 mm (15 in) shank spacing | 9.1 m (30 ft) | 9.9 m (32.5 ft) | | 11.4 m (37.5 ft) | 12.2 m (40 ft) | 13 m (42.5 ft) |
| Number of shanks | 305 mm (12 in) shank spacing | 31 | 33 | 35 | 37 | 39 | 41 |
| | 381 mm (15 in) shank spacing | 24 | 26 | 28 | 30 | 32 | 34 |
| Inner Wing | | 2.7 m (9 ft) | | | 2.7 m (9 ft) and 0.9 m (3 ft) | | |
| Weight - approximate | Level lift hitch | 6811 kg (15016 lb) | 7004 kg (15440 lb) | 7199 kg (15872 lb) | 7792 kg (17178 lb) | 7942 kg (17508 lb) | 8138 kg (17940 lb) |
| | Floating lift hitch | 7434 kg (16390 lb) | 7627 kg (16814 lb) | 7823 kg (17246 lb) | 8415 kg (18552 lb) | 8565 kg (18882 lb) | 8761 kg (19314 lb) |

| | | 2530 - 37 | 2530 - 37-39 | 2530 - 37-43 | 2530 - 37-45 | 2530 - 37-47 |
|---|---|---|---|---|---|---|
| **Folding model with 12-foot wings and tandem axle (level lift hitch or floating lift hitch)** | | | | | | |
| Working width | (12 in) shank spacing | 11.3 m (37 ft) | 11.9 m (39 ft) | 13.1 m (43 ft) | 13.7 m (45 ft) | 14.3 m (47 ft) |
| | (15 in) shank spacing | 11.4 m (37.5 ft) | 12.2 m (40 ft) | 13 m (42.5 ft) | | 14.5 m (47.5 ft) |
| Number of shanks | (12 in) shank spacing | 37 | 39 | 43 | 45 | 47 |
| | (15 in) shank spacing | 30 | 32 | 34 | 36 | 38 |
| Inner Wing | | 3.7 m (12 ft) | | 3.7 m (12 ft) and 0.9 m (3 ft) | | |
| Weight - approximate | Level lift hitch | 7507 kg (16550 lb) | 7657 kg (16881 lb) | 8468 kg (18668 lb) | 8617 kg (18998 lb) | 8814 kg (19431 lb) |
| | Floating lift hitch | 8130 kg (17924 lb) | 8280 kg (18255 lb) | 9091 kg (20042 lb) | 9241 kg (20372 lb) | 9437 kg (20805 lb) |

## 6.2 Transport dimensions

| | 2510 - 13 | 2510 - 13-15 | 2510 - 13-17 |
|---|---|---|---|
| **Rigid Model - with tandem axle (level lift hitch)** | | | |
| Width - approximate | 4.1 m (13.5 ft) | 4.5 m (14.8 ft) | 5.2 m (17.1 ft) |
| Height - approximate | 2.1 m (6.8 ft) | | |

| | 2530 - 19 | 2530 - 19-21 | 2530 - 19-23 |
|---|---|---|---|
| **Folding Model with 3-foot wings and tandem axle (level lift hitch)** | | | |
| Width - approximate | 4.3 m (14.1 ft) | | |
| Height - approximate | 2.97 m (9.75 ft) | 3 m (9.92 ft) | 3.07 m (10.1 ft) |

| | 2530 - 25 | 2530 - 25-27 | 2530 - 25-29 |
|---|---|---|---|
| **Folding Model with 6-foot wings and tandem axle (level lift hitch)** | | | |
| Width - approximate | 4.3 m (14.1 ft) | | |
| Height - approximate | 3.4 m (11.1 ft) | 3.5 m (11.5 ft) | 3.6 m (11.8 ft) |

| | 2530 - 31 | 2530 - 31-33 | 2530 - 31-35 | 2530 - 31-37 | 2530 - 31-39 | 2530 - 31-41 |
|---|---|---|---|---|---|---|
| **Folding Model with 9-foot wings and tandem axle (level lift hitch or floating lift hitch)** | | | | | | |
| Width - approximate | 5.9 m (19.2 ft) | | | | | |
| Height - approximate | 3.8 m (12.6 ft) | 4.1 m (13.5 ft) | 4.4 m (14.5 ft) | 3.8 m (12.6 ft) | | |

| | 2530 - 37 | 2530 - 37-39 | 2530 - 37-43 | 2530 - 37-45 | 2530 - 37-47 |
|---|---|---|---|---|---|
| **Folding Model with 12-foot wings and tandem axle (level lift hitch or floating lift hitch)** | | | | | |
| Width - approximate | 5.9 m (19.2 ft) | | | | |
| Height - approximate | 4.7 m (15.5 ft) | 5 m (16.5 ft) | | | |

## 6.3 Minimum tow vehicle weight

**NOTE:** *Machine weight shown with the two-row HD coil tine and reel attachment.*

| Model | Machine weight | Minimum tow vehicle weight |
|---|---|---|
| 2510 - 13 with level lift hitch | 3526 kg (7773 lb) | 2351 kg (5182 lb) |
| 2510 - 13-15 with level lift hitch | 3717 kg (8194 lb) | 2478 kg (5463 lb) |
| 2510 - 13-17 with level lift hitch | 4067 kg (8967 lb) | 2712 kg (5978 lb) |
| 2530 - 19 with level lift hitch | 4779 kg (10535 lb) | 3186 kg (7023 lb) |
| 2530 - 19-21 with level lift hitch | 4970 kg (10957 lb) | 3313 kg (7305 lb) |
| 2530 - 19-23 with level lift hitch | 5277 kg (11633 lb) | 3518 kg (7755 lb) |
| 2530 - 25 with level lift hitch | 6252 kg (13784 lb) | 4168 kg (9189 lb) |
| 2530 - 25-27 with level lift hitch | 6442 kg (14202 lb) | 4295 kg (9468 lb) |
| 2530 - 25-29 with level lift hitch | 6680 kg (14726 lb) | 4453 kg (9817 lb) |
| 2530 - 31 with floating hitch | 8713 kg (19208 lb) | 5808 kg (12805 lb) |
| 2530 - 31-33 with floating hitch | 9106 kg (20076 lb) | 6071 kg (13384 lb) |
| 2530 - 31-35 with floating hitch | 9347 kg (20607 lb) | 6231 kg (13738 lb) |
| 2530 - 31-37 with floating hitch | 10072 kg (22206 lb) | 6715 kg (14804 lb) |
| 2530 - 31-39 with floating hitch | 10254 kg (22606 lb) | 6836 kg (15071 lb) |
| 2530 - 31-41 with floating hitch | 10564 kg (23289 lb) | 7042 kg (15526 lb) |
| 2530 - 37 with floating hitch | 9781 kg (21563 lb) | 6521 kg (14375 lb) |
| 2530 - 37-39 with floating hitch | 9976 kg (21993 lb) | 6651 kg (14662 lb) |
| 2530 - 37-43 with floating hitch | 11123 kg (24523 lb) | 7416 kg (16349 lb) |
| 2530 - 37-45 with floating hitch | 11300 kg (24912 lb) | 7533 kg (16608 lb) |
| 2530 - 37-47 with floating hitch | 11606 kg (25586 lb) | 7737 kg (17057 lb) |

## 6.4 Maximum transport speed

**Maximum speed:**

40 km/h (25 mph)

## 6.5 Lubrication specifications

| Model | Lubrication fitting |
|---|---|
| All | No. 2 multi-purpose lithium grease |

## 6.6 Tire air pressure

**WARNING:**
**Serious injury or death can result from tire failure because of misapplication, incorrect inflation, overloading, or exceeding the maximum speed.**

| Tire size | Ply/load rating | Maximum air pressure |
|---|---|---|
| 16.5 x 6.50 x 8 | 6 (C) | 483 kPa (70 psi) |
| 20.5 x 8.00 x 10 | 4 (E) | 621 kPa (90 psi) |
| 6.70 x 15 | 6 (C) | 303 kPa (44 psi) |
| 7.60 x 15 | 6 (C) | 276 kPa (40 psi) |
| 9.5L x 15 | 8 (D) | 303 kPa (44 psi) |
| 9.5L x 15 | 12 (F) | 441 kPa (64 psi) |
| 11L x 15 | 8 (D) | 248 kPa (36 psi) |
| 11L x 15 | 12 (F) | 359 kPa (52 psi) |
| 11L x 15 FI* | 12 (F) | 621 kPa (90 psi) |
| 11L x 15 | 18 | 524 kPa (76 psi) |
| 12.5L x 15 | 10 (E) | 303 kPa (44 psi) |
| 12.5L x 15 | 12 (F) | 359 kPa (52 psi) |
| 12.5L x 15 FI* | 12 (F) | 621 kPa (90 psi) |
| 12.5L x 15 | 16 | 483 kPa (70 psi) |
| 12.5L x 15* | 20 | 621 kPa (90 psi) |
| 380/55R x 16.5 | 150 A8/B | 503 kPa (73 psi) |
| 12 R22.5 x 8.25 | H | 621 kPa (90 psi) |
| VF295 x 75R22.5 | 145D | 359 kPa (52 psi) |
| 13.5 x 15 | F | 517 kPa (75 psi) |
| *Use with special heavy duty rim only | | |

# 7. Assembly

## 7.1 Preparing for assembly

Read this section carefully before assembly. Refer to the Parts Catalog for additional component illustrations while assembling the machine.

Carefully remove all the parts and hardware included. Make sure nothing was damaged or missing.

Tighten all hardware according to standard torque values unless specified in these instructions. Always replace hardware with the same grade or class.

Use all the nuts and bolts in the correct locations. This will prevent damage to the machine.

**IMPORTANT:** *When two or more bolts are being used on a part, always insert the bolts and loosely tighten the nuts. Once the correct location has been reached, tighten the nuts evenly to prevent misalignment or distortion of the parts. Tighten all U-bolt nuts evenly and to the same torque to prevent misalignment or distortion.*

Select a large, flat, and hard surface for assembly of machine.

**IMPORTANT:** *Keep all parts in the assigned containers until the parts are to be used.*

**NOTE:** *Some items will be assembled at the factory.*

Right-hand and left-hand, as used in this manual, are determined by facing the direction the machine will travel when in use.

### 7.1.1 Service parts

The illustrations and part numbers in this publication are supplied for component identification only when assembling the machine. When ordering replacement parts, always use the part numbers from the parts catalog.

For a complete list of available service parts, go to www.agcopartsbooks.com or contact your dealer.

## 7.2 Assembling the center frame

**Procedure**

**1.** Put the center frame assemblies on stands rated for more than the weight of the machine.

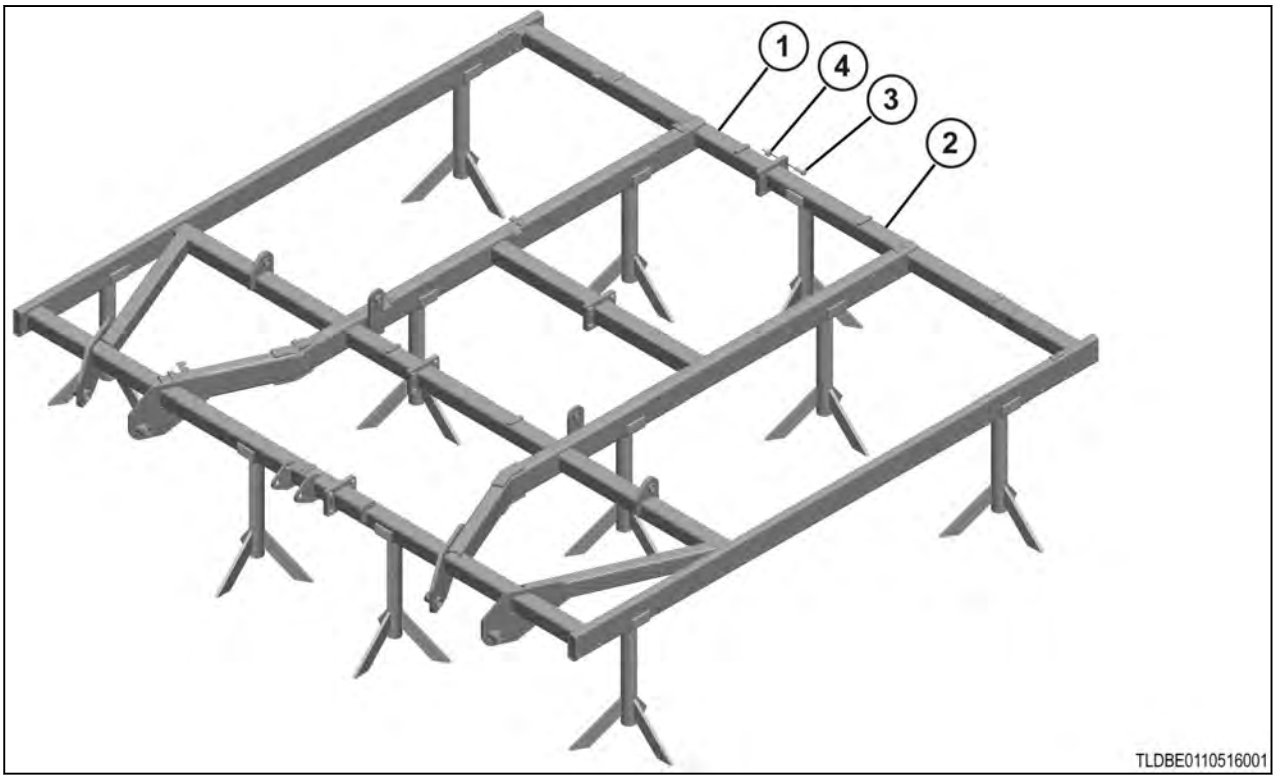


*Fig. 1*

**2.** Connect the center frame assemblies.

| | | |
|---|---|---|
| (1) | 248397 | Right-hand center frame |
| (2) | 248396 | Left-hand center frame |
| (3) | 88290 | 3/4 x 2 hex bolt |
| (4) | 88356 | 3/4 lock nut |

## 7.2.1 Installing the center lift

**Procedure**

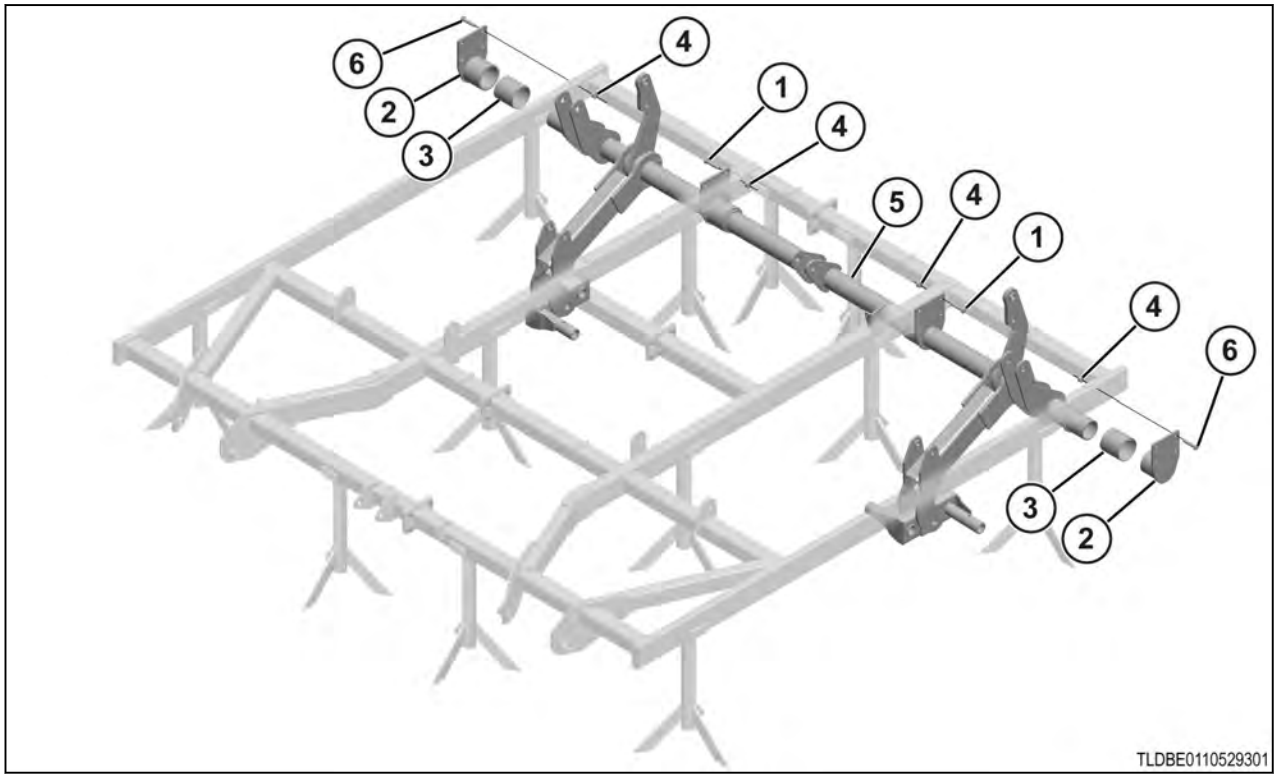


*Fig. 2*

Install the center lift as shown.

| | | |
|---|---|---|
| (1) | 88953 | 3/4 x 4 1/2 hex bolt |
| (2) | 248409 | Bearing cap |
| (3) | 351762 | Plastic bearing |
| (4) | 88356 | 3/4 lock nut |
| (5) | 351730 | Center lift |
| (6) | 89495 | 3/4 x 3 1/2 hex bolt |

## 7.2.2 Installing the center lift hubs and wheels

**Procedure**

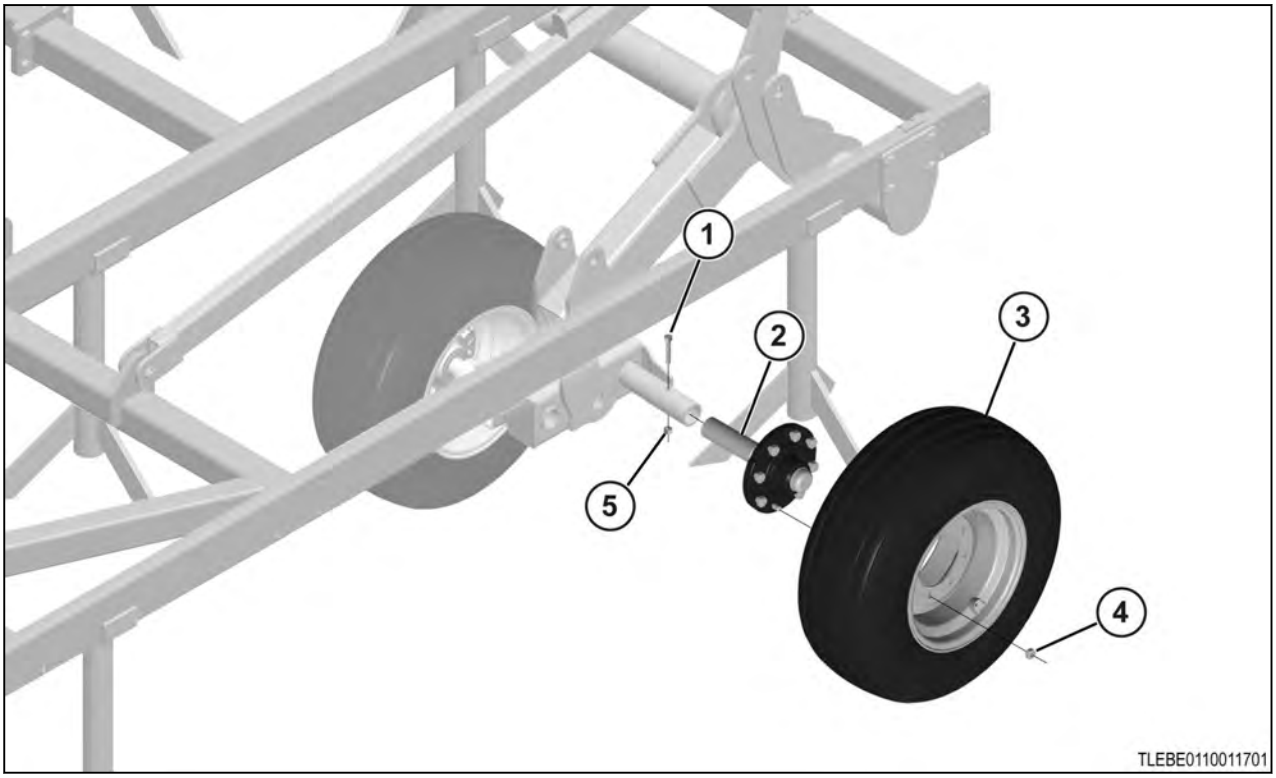


*Fig. 3*

Install the hub and wheels as shown.

| | | |
|---|---|---|
| (1) | 88298 | 5/8 x 4 hex bolt |
| (2) | 247987 | Hub and spindle |
| (3) | 353477 (used) | Wheel assembly |
| | 354507 (new) | |
| (4) | W103636 | Stud nut |
| (5) | 88369 | 5/8 lock nuts |

## 7.2.3 Installing the center frame mast tubes

**Procedure**

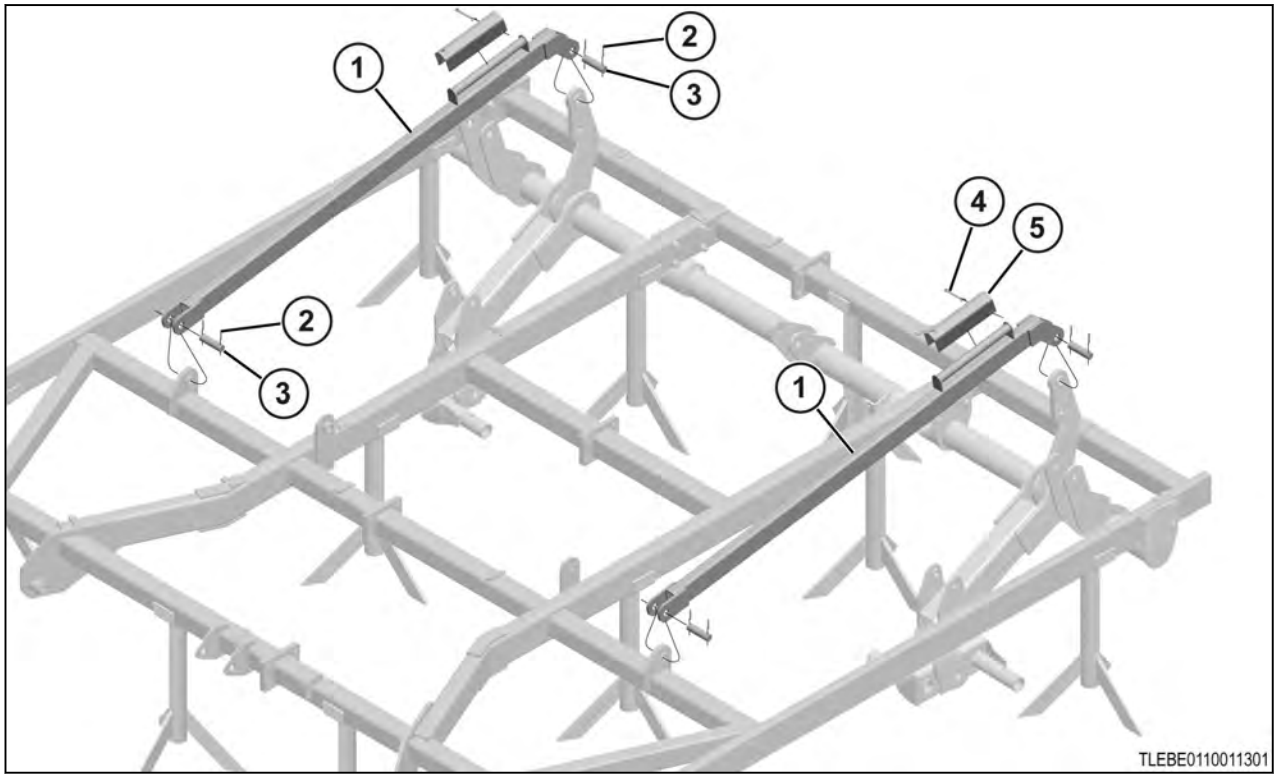


*Fig. 4*

Install the center frame mast tubes as shown.

| | | |
|---|---|---|
| (1) | 248393 | Center frame mast tube |
| (2) | 42484 | 1/4 x 2 pin |
| (3) | 67854 | 1 1/4 x 4 1/2 pin |
| (4) | 88133 | Cotter pin |
| (5) | 353940 | Transport lock |

## 7.2.4 Installing the 19 to 29 ft fold anchors

**Procedure**

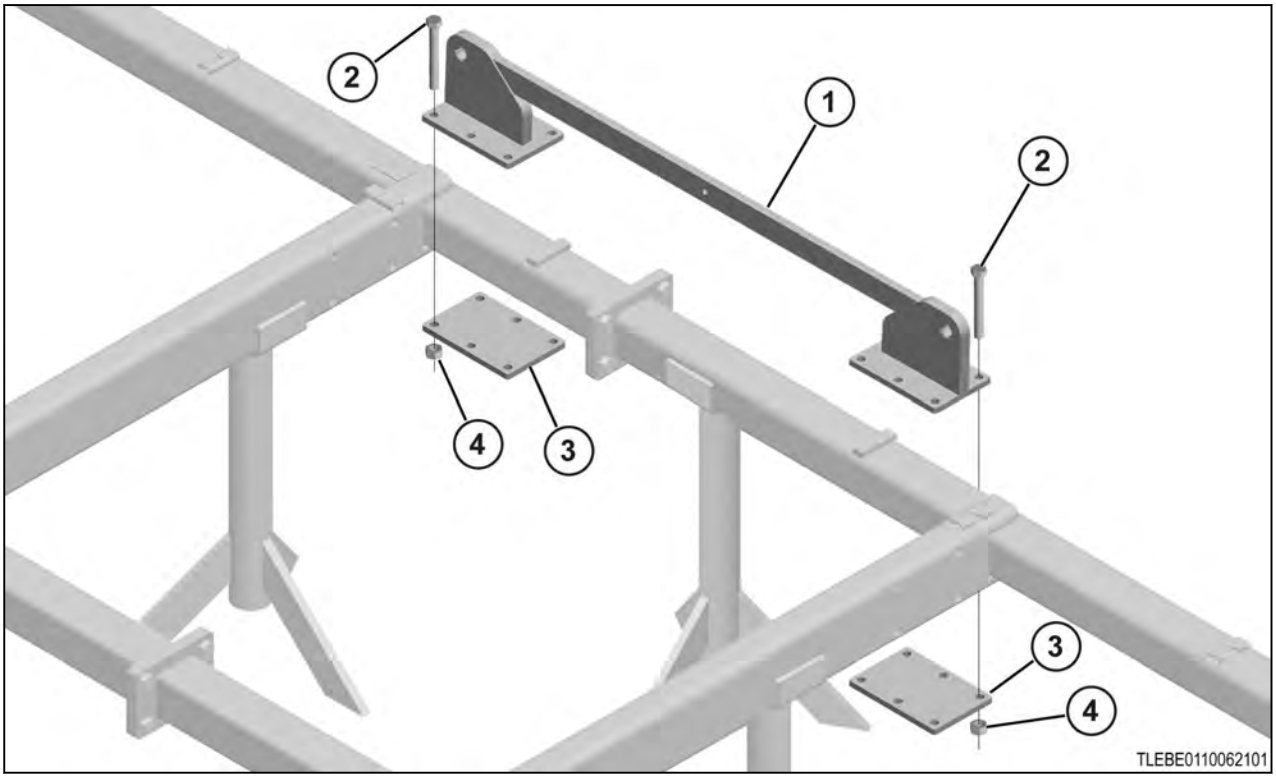


*Fig. 5*

Install the fold anchor as shown.

| | | |
|---|---|---|
| (1) | 352344 | Small wing fold anchor |
| (2) | 88295 | 5/8 x 6 hex bolt |
| (3) | 353422 | Fold anchor plate |
| (4) | 88369 | 5/8 lock nut |

## 7.2.5 Installing the 31 to 47 ft fold anchors

**Procedure**

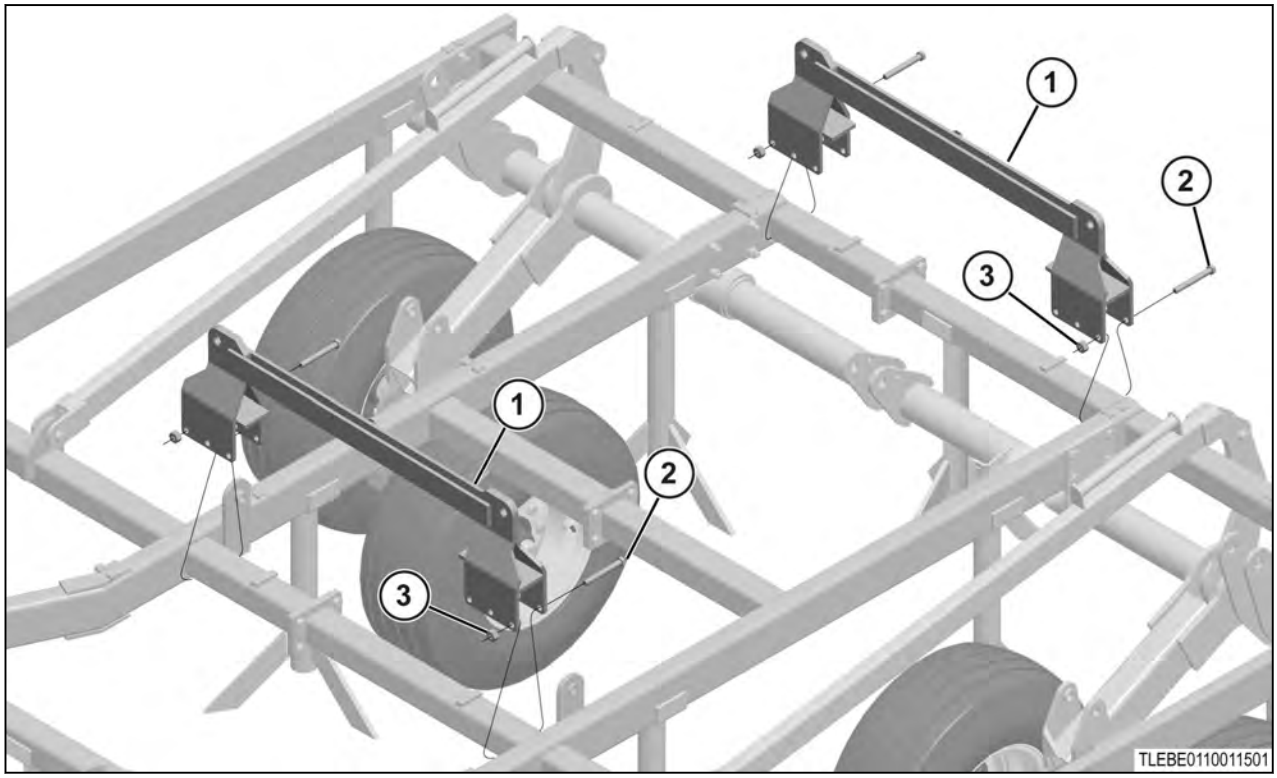


*Fig. 6*

Install the fold anchors as shown.

| | | |
|---|---|---|
| (1) | 350544 | Fold anchor |
| (2) | 88295 | 5/8 x 6 hex bolt |
| (3) | 88356 | 3/4 lock nut |

## 7.2.6 Installing the 19 to 29 ft wing rests

**Procedure**

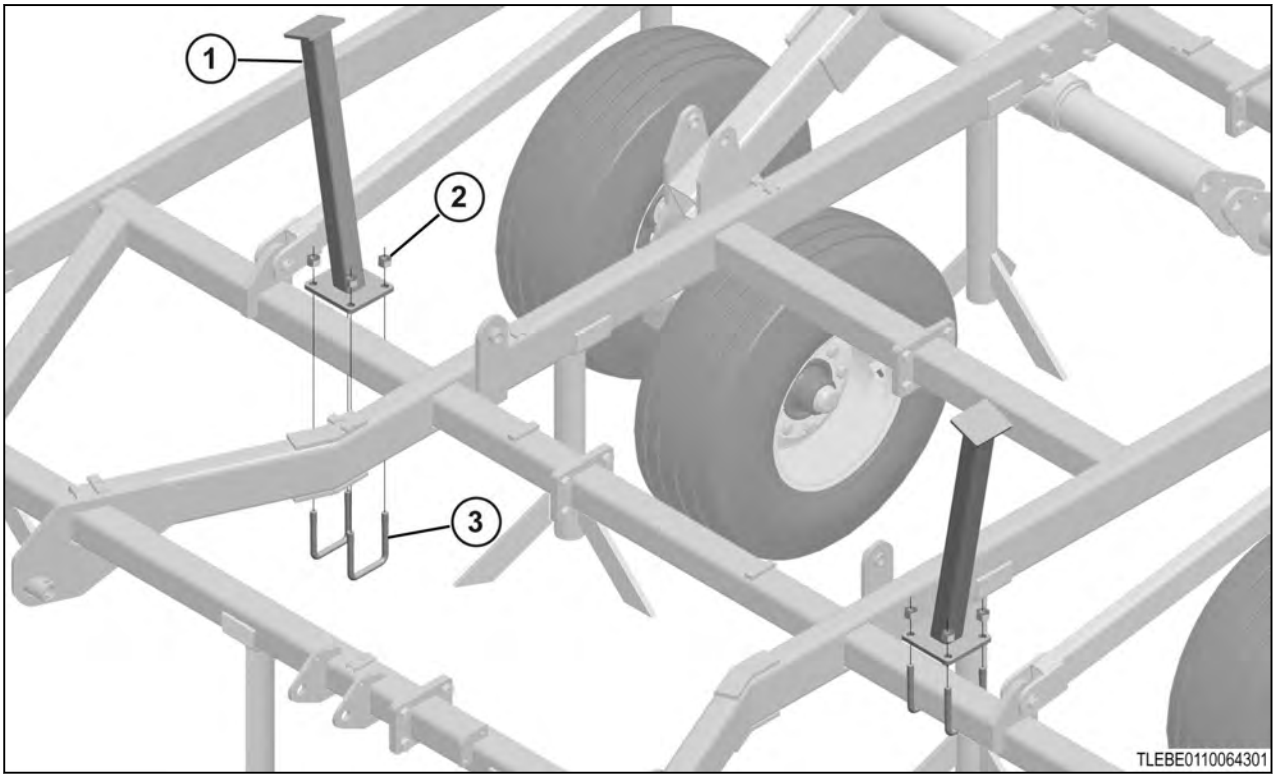


*Fig. 7*

Install the wing rests as shown.

| | | |
|---|---|---|
| (1) | 352395 | Wing rest - for the 19 ft, 21 ft, and 23 ft models |
| | 353453 | Wing rest - 6 ft - for the 25 ft, 27 ft, and 29 ft models |
| (2) | 88369 | 5/8 lock nut |
| (3) | 88145 | 5/8 x 5 1/4 U-bolt |

## 7.2.7 Installing the 31 to 47 ft wing rest

**Procedure**

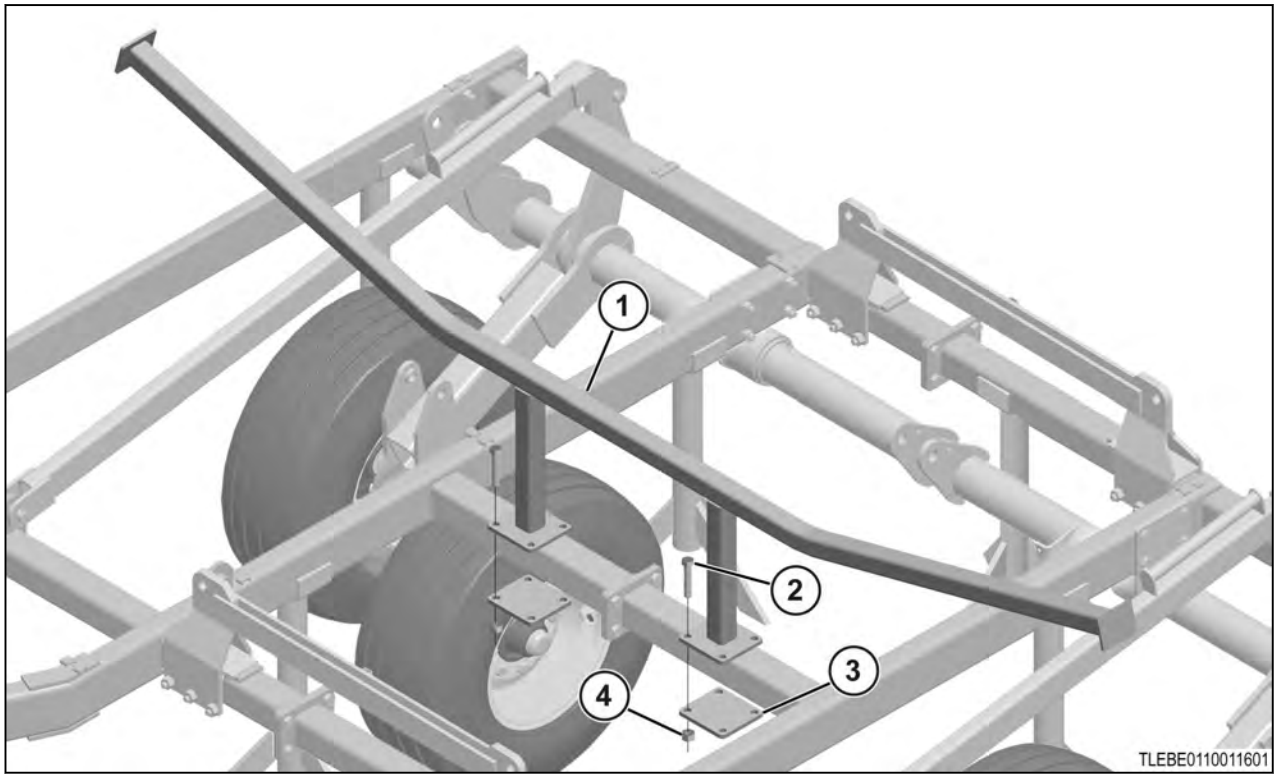


*Fig. 8*

Install the wing rest as shown.

| | | |
|---|---|---|
| (1) | 352286 | Wing rest |
| (2) | 88947 | 3/4 x 6 hex bolt |
| (3) | 233234 | Plate |
| (4) | 88356 | 3/4 lock nut |

# 7.3 Assembling the tongue

## 7.3.1 Installing the 13 to 29 ft tongue

**Procedure**

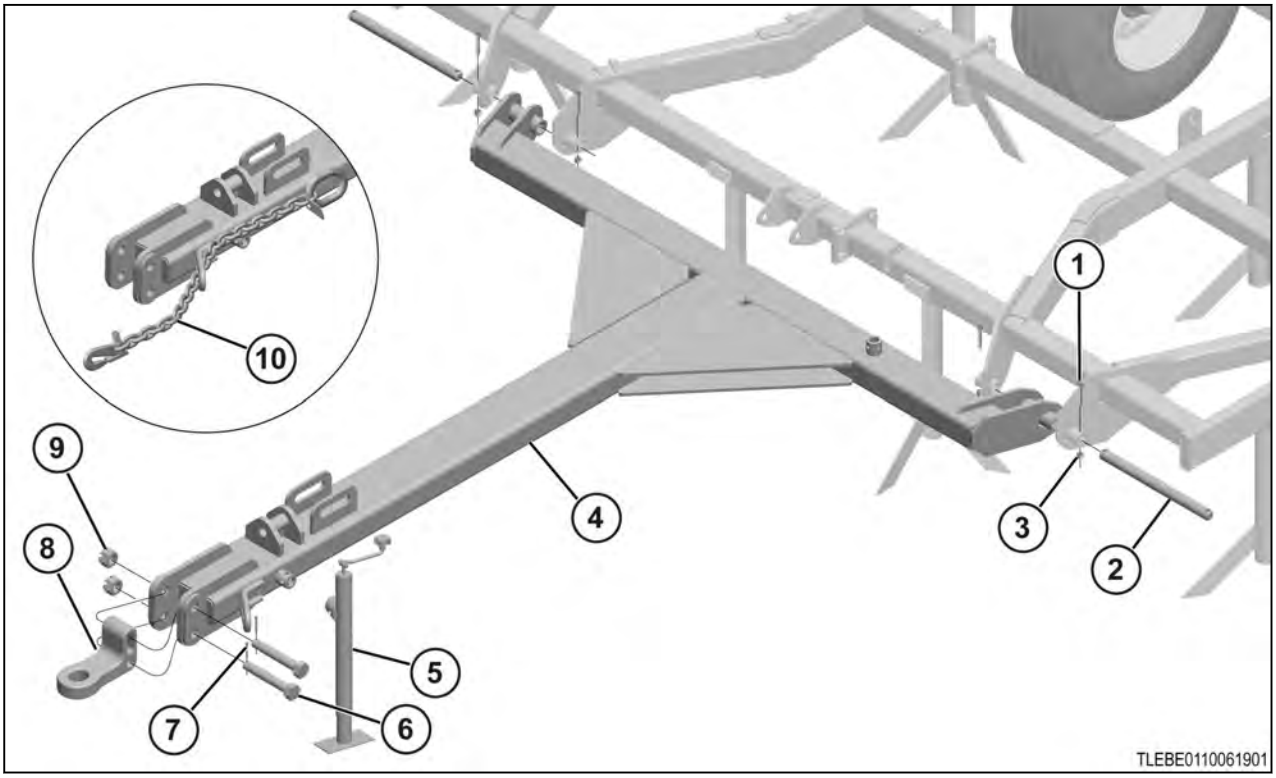


*Fig. 9*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 88541 | 1/2 x 3 hex bolt |
| (2) | 350569 | 19 in pin |
| (3) | 88363 | 1/2 lock nut |
| (4) | 248384 | Tongue |
| (5) | 24415 | Jack |
| (6) | 246372 | 1 1/4 x 8 hex bolt |
| (7) | 88133 | Cotter pin |
| (8) | 246795 | Category 5 hitch |
| (9) | 88350 | 1 1/4 slotted nut |
| (10) | 24459 | Safety chain |

## 7.3.2 Installing the 31 to 47 ft tongue

**Procedure**

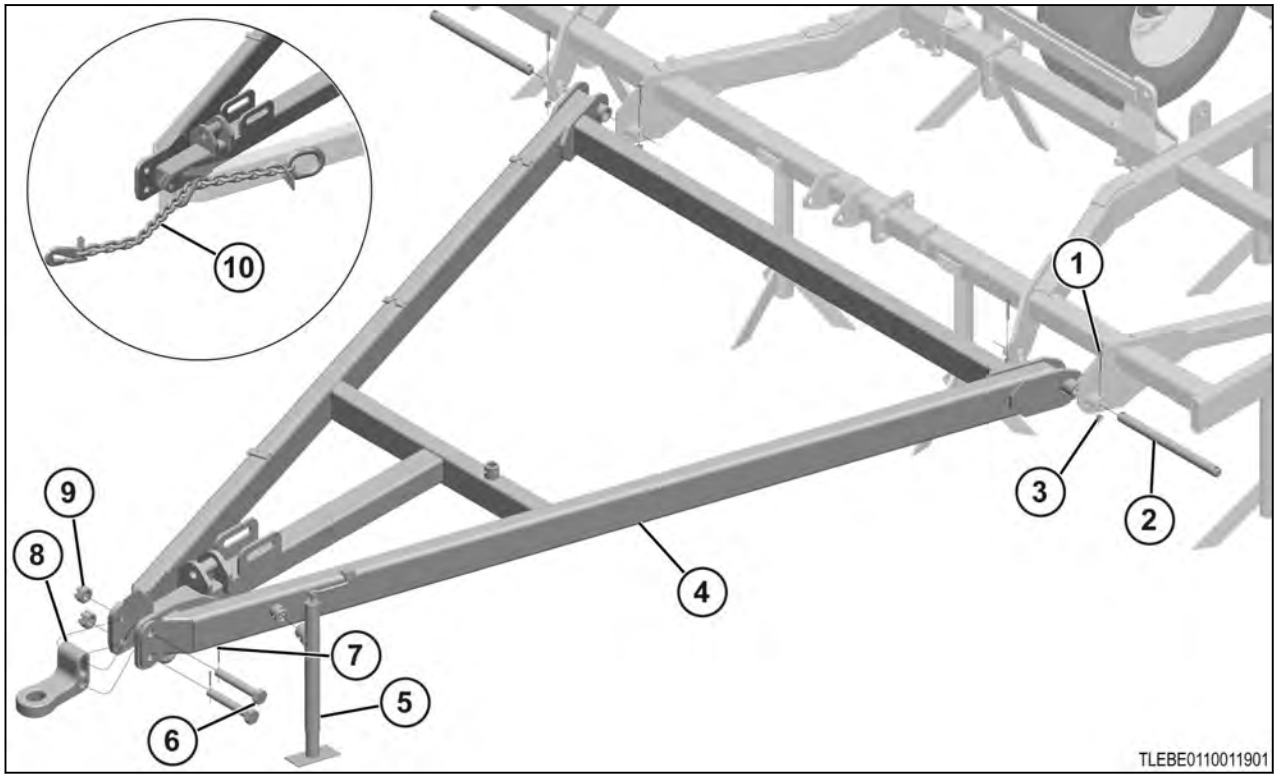


*Fig. 10*

Install the tongue as shown.

| | | |
|---|---|---|
| (1) | 88541 | 1/2 x 3 hex bolt |
| (2) | 350569 | 19 in pin |
| (3) | 88363 | 1/2 lock nut |
| (4) | 352315 | Tongue |
| (5) | 24415 | Jack |
| (6) | 246372 | 1 1/4 x 8 hex bolt |
| (7) | 88133 | Cotter pin |
| (8) | 246795 | Category 5 hitch |
| (9) | 88350 | 1 1/4 slotted nut |
| (10) | 24459 | Safety chain |

## 7.3.3 Installing the utility pole

**Procedure**

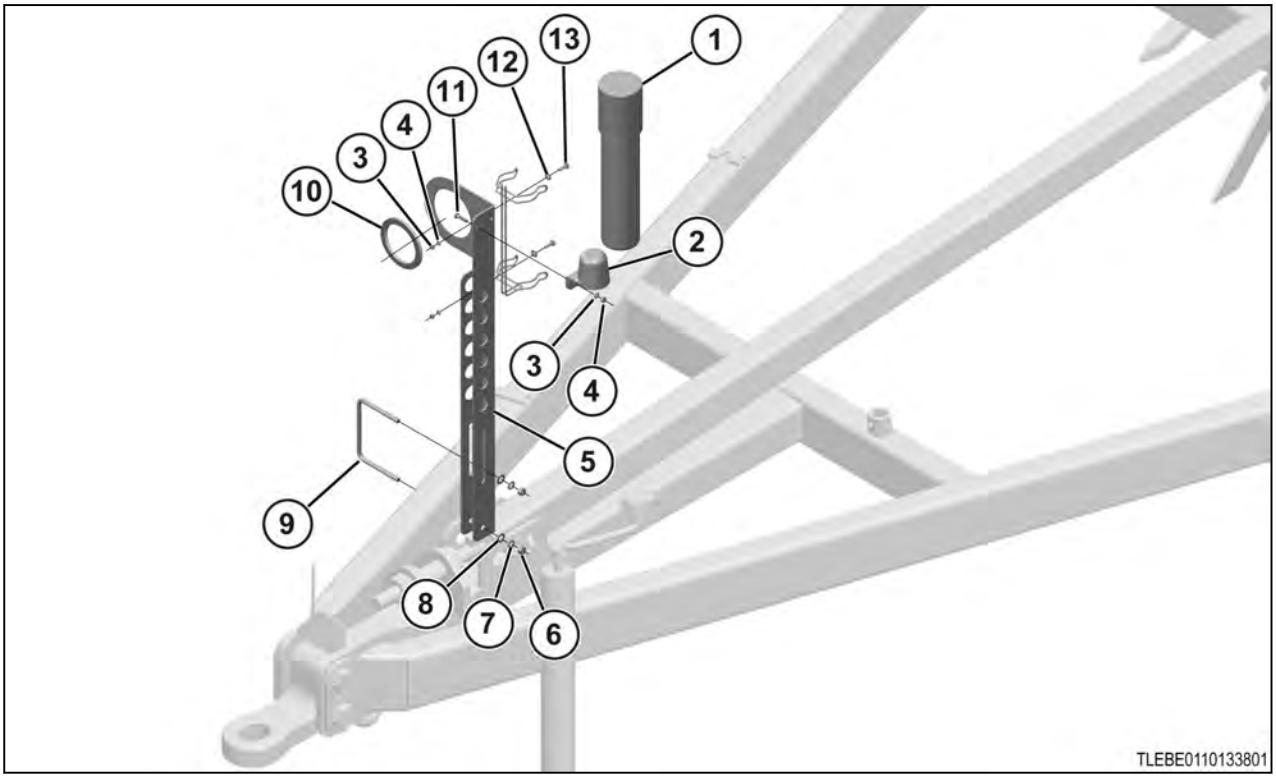


*Fig. 11*

Install the utility pole as shown.

| | | |
|---|---|---|
| (1) | 234313 | Storage tube |
| (2) | 223329 | Plug |
| (3) | 88262 | 1/4ID washer |
| (4) | 88172 | 1/4 hex nut |
| (5) | 236142 | Hydraulic hose bracket |
| (6) | 88103 | 3/8 hex nut |
| (7) | 88362 | 3/8ID washer |
| (8) | 88282 | 3/8 flat washer |
| (9) | 89069 | 3/8 x 5 U-bolt |
| (10) | 236092 | Rubber edge cover |
| (11) | 88203 | 1/4 x 1 hex bolt |
| (12) | 88261 | 1/4 flat washer |
| (13) | 88993 | 1/4 x 3/4 hex bolt |

## 7.4 Installing the shank extension

**Procedure**

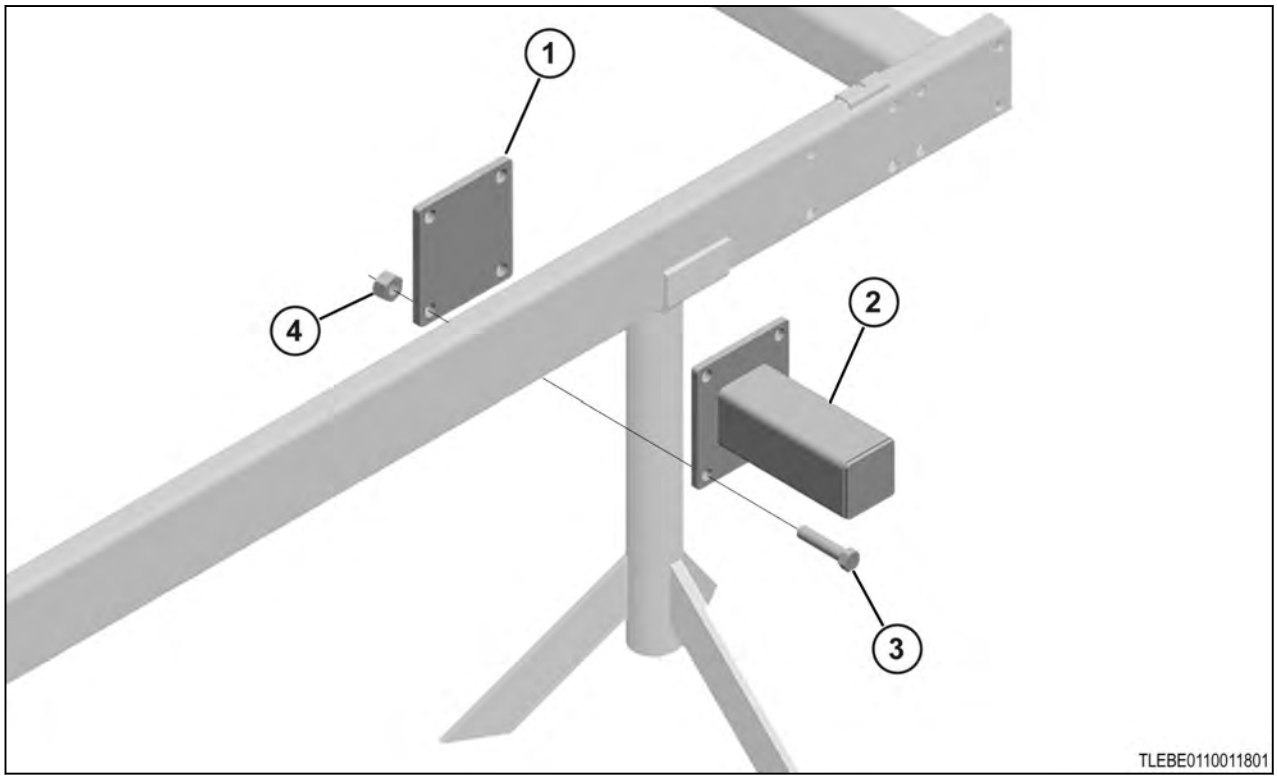


*Fig. 12*

Install the shank extension as shown.

| | | |
|---|---|---|
| (1) | 353413 | Plate - 4.75 x 6.75 |
| (2) | 353440 | Shank extension |
| (3) | 88272 | 3/4 x 4 hex bolt |
| (4) | 88356 | 3/4 lock nut |

# 7.5 Installing the center frame shanks

## 7.5.1 Installing the 650 lb shanks

**Procedure**

**1.** See the shank location information for the correct shank locations.

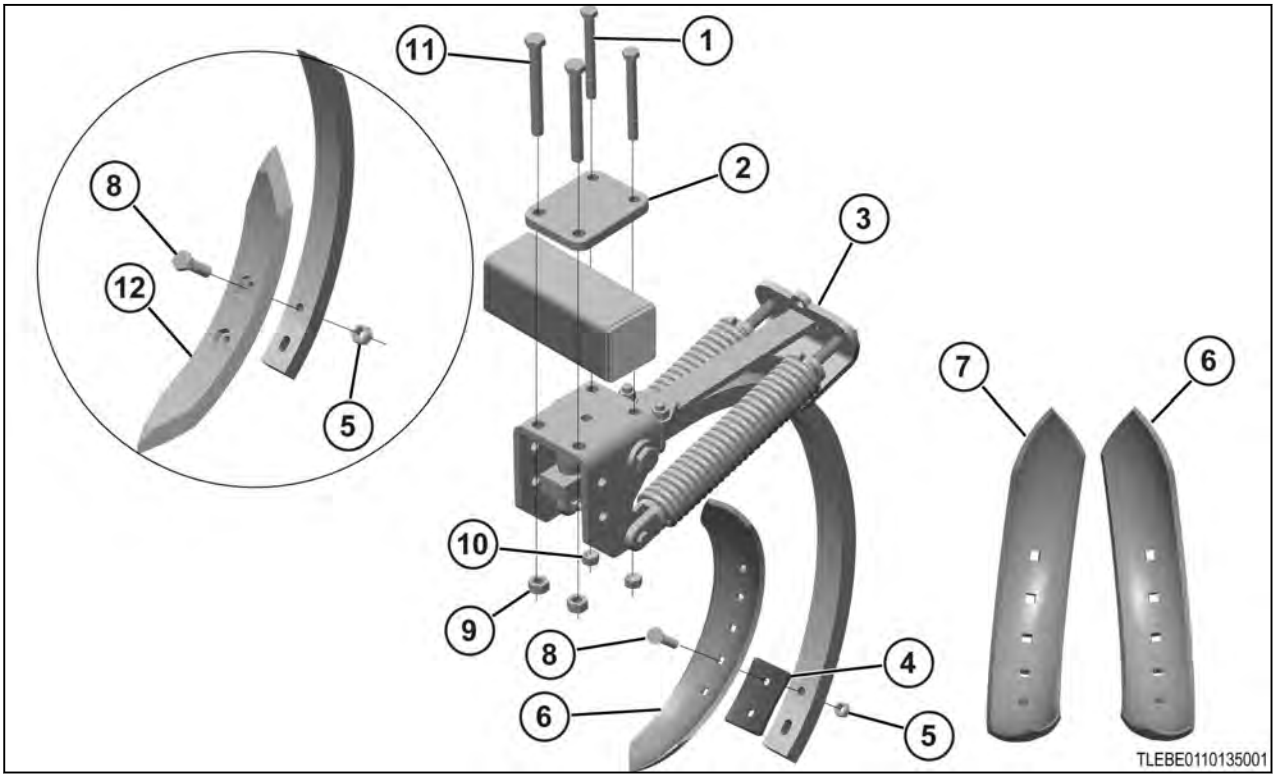


*Fig. 13*

**2.** Install the shanks as shown.

| | | |
|---|---|---|
| (1) | 89433 | 3/4 x 2 1/4 hex bolt |
| (2) | 234084 | Top plate |
| (3) | 3151662 | Spring retainer |
| (4) | 598CA-R | Twist adapter - right-hand side |
| | 598CA-L | Twist adapter - left-hand side |
| (5) | 88346 | 1/2 nut |
| (6) | 598C-R | 3 in twist - right-hand side |
| (7) | 598C-L | 3 in twist - left-hand side |
| (8) | 89468 | 1/2 x 2 1/2 bolt |
| (9) | 89386 | 3/4 nut |
| (10) | 88369 | 5/8 lock nut |
| (11) | 89385 | 3/4 x 6 1/2 hex bolt |
| (12) | 247912 | 7/8 x 2 x 19 1/2 spike |

## 7.5.2 Installing the 1000 lb shanks

**Procedure**

**1.** See the shank location information for the correct shank locations.

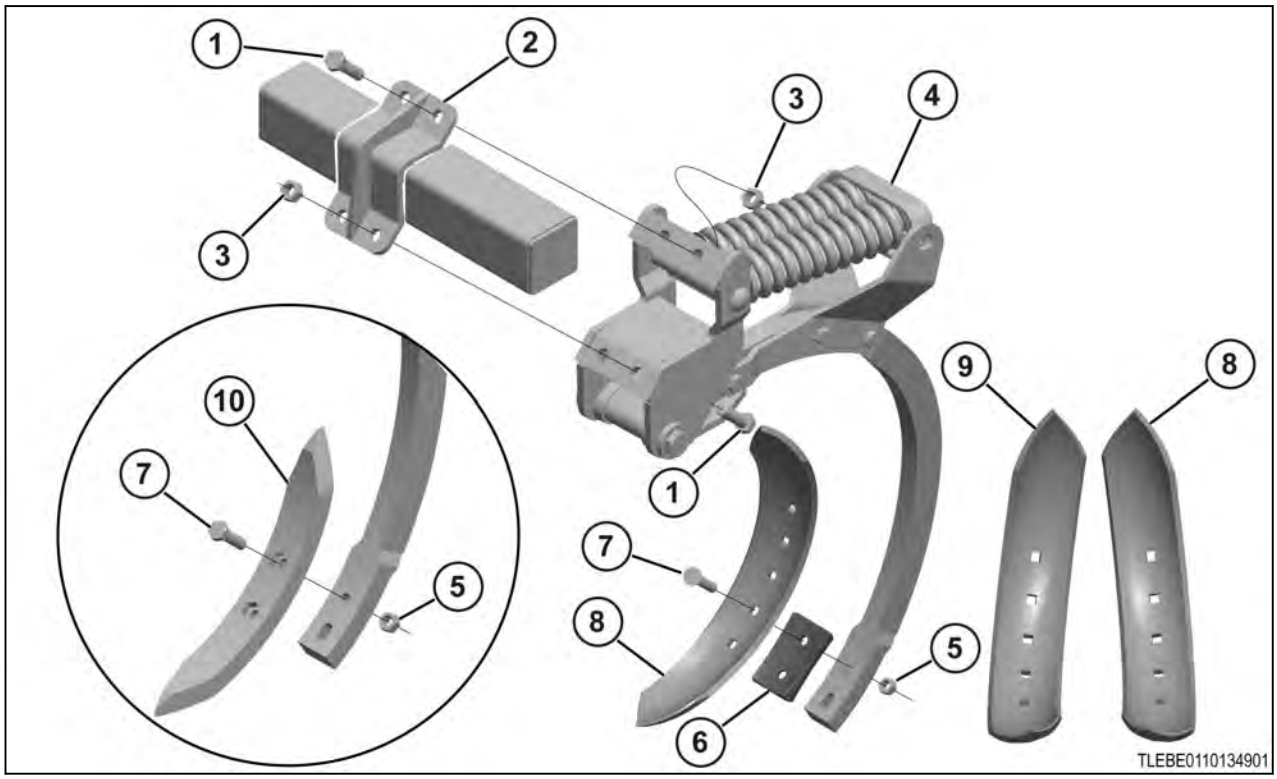


*Fig. 14*

**2.** Install the shanks as shown.

| | | |
|---|---|---|
| (1) | 89433 | 3/4 x 2 1/4 hex bolt |
| (2) | 235768 | Bracket |
| (3) | 88665 | 3/4 lock nut |
| (4) | 65373C | Spring retainer |
| (5) | 88346 | 1/2 nut |
| (6) | 598CA-R | Twist adapter - right-hand side |
| | 598CA-L | Twist adapter - left-hand side |
| (7) | 89468 | 1/2 x 2 1/2 bolt |
| (8) | 598C-R | 3 in twist - right-hand side |
| (9) | 598C-L | 3 in twist - left-hand side |
| (10) | 247912 | 7/8 x 2 x 19 1/2 spike |

# 7.6 Installing the wings

## 7.6.1 Mounting the 19 to 23 ft wing frame hinges

**Procedure**

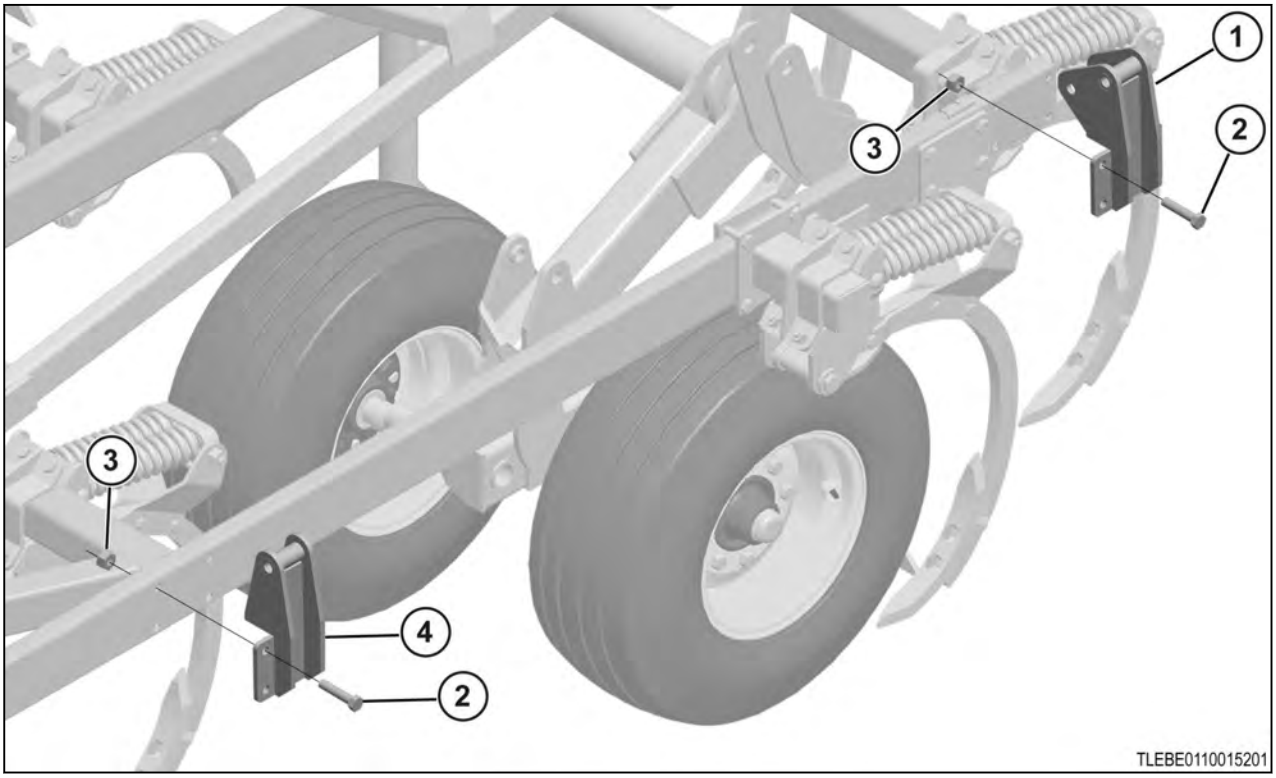


*Fig. 15*

Install the wing frame hinges as shown.

| | | |
|---|---|---|
| (1) | 350552 | Outer rear wing hinge |
| (2) | 89495 | 3/4 x 3 1/2 hex bolt |
| (3) | 88356 | 3/4 lock nut |
| (4) | 248451 | Front hinge mount |

## 7.6.2 Installing the 19 to 23 ft wing frames - 3 ft wing

**Procedure**

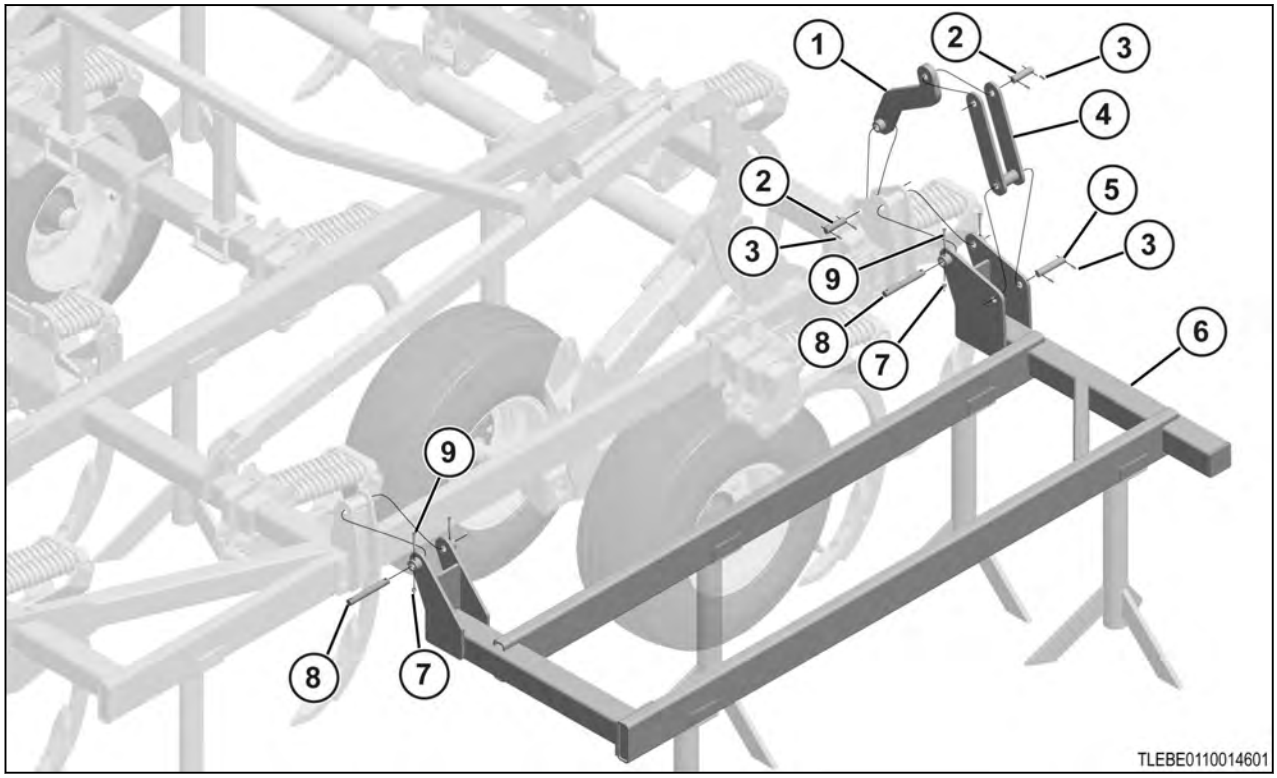


*Fig. 16*

Install the wing frame as shown.

| | | |
|---|---|---|
| (1) | 350554 | Outer wing fold link |
| (2) | 222338 | 1 x 4 1/8 pin |
| (3) | 42484 | 1/4 x 2 pin |
| (4) | 350562 | Wing fold link |
| (5) | 68033 | 1 x 6.38 pin |
| (6) | 350549 (right) | Right-hand wing frame - 3 ft |
| | 350564 (left) | Left-hand wing frame - 3 ft |
| (7) | 88162 | 3/8 lock nut |
| (8) | 69826 | 1 x 7 1/4 pin |
| (9) | 89012 | 3/8 x 2 1/2 pin |

## 7.6.3 Mounting the 25 to 29 ft wing frame hinges

**Procedure**

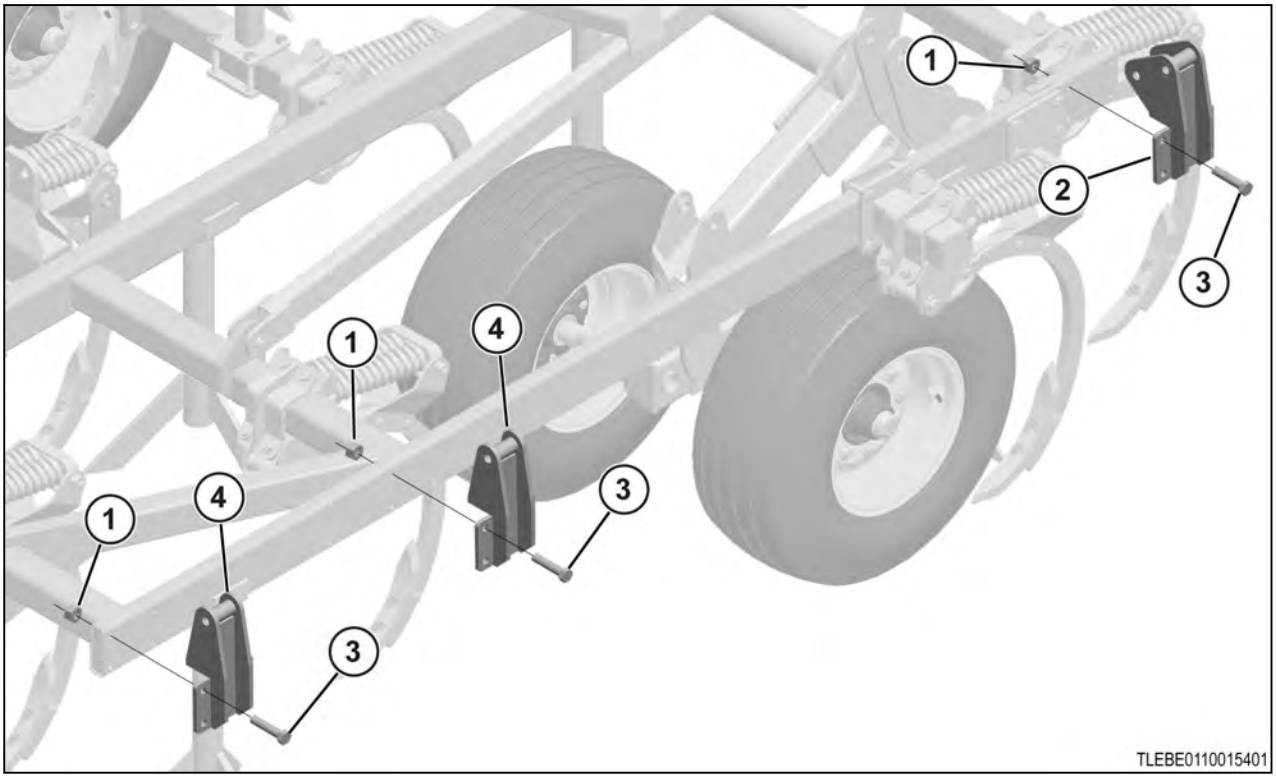


*Fig. 17*

Install the wing frame hinges as shown.

| | | |
|---|---|---|
| (1) | 88356 | 3/4 lock nut |
| (2) | 350552 | Outer rear wing hinge |
| (3) | 89495 | 3/4 x 3 1/2 hex bolt |
| (4) | 248451 | Front hinge mount |

## 7.6.4 Installing the 25 to 29 ft wing frames - 6 ft wing

**Procedure**

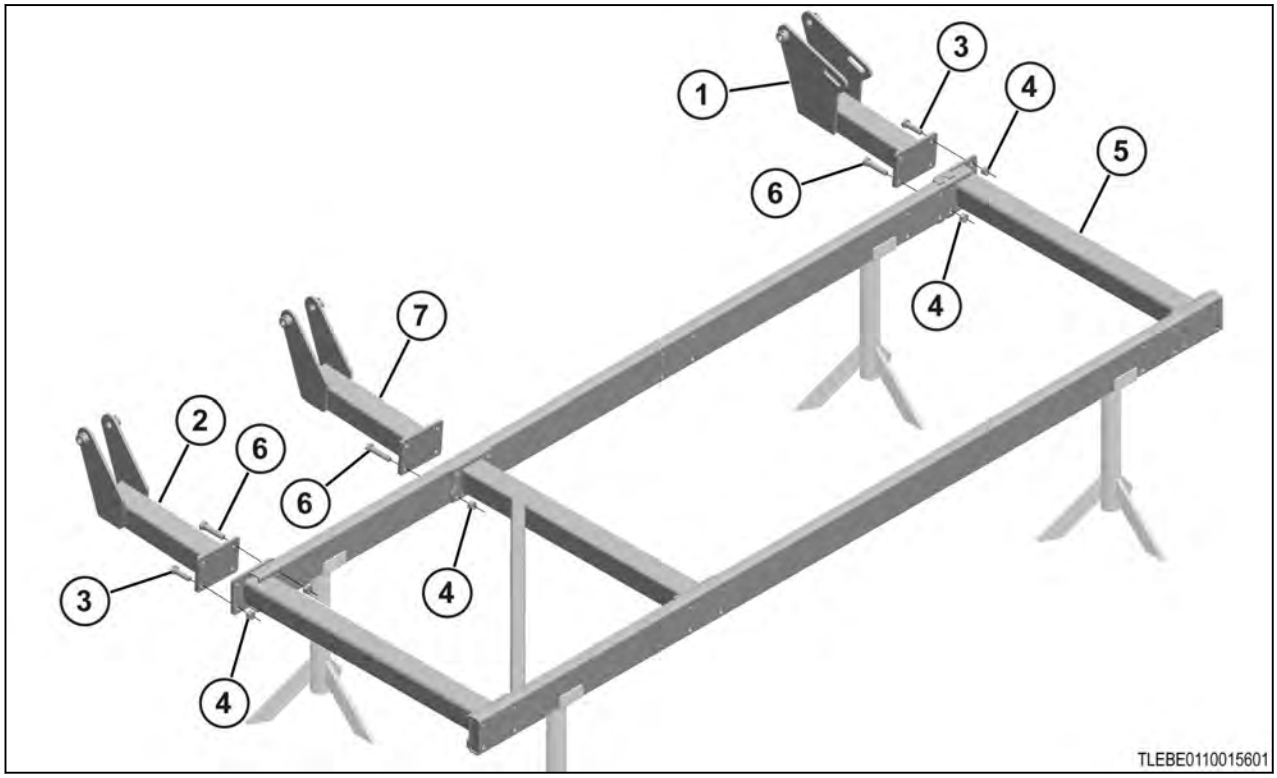


*Fig. 18*

**1.** Install the hinges as shown.

| | | |
|---|---|---|
| (1) | 352332 | Rear wing hinge - 6 ft |
| (2) | 352333 | Front wing hinge - 6ft |
| (3) | 88290 | 3/4 x 2 hex bolt |
| (4) | 88356 | 3/4 lock nut |
| (5) | 248443 | Wheel well |
| (6) | 88298 | 5/8 x 4 hex bolt |
| (7) | 352350 | Middle wing hinge - 6 ft |

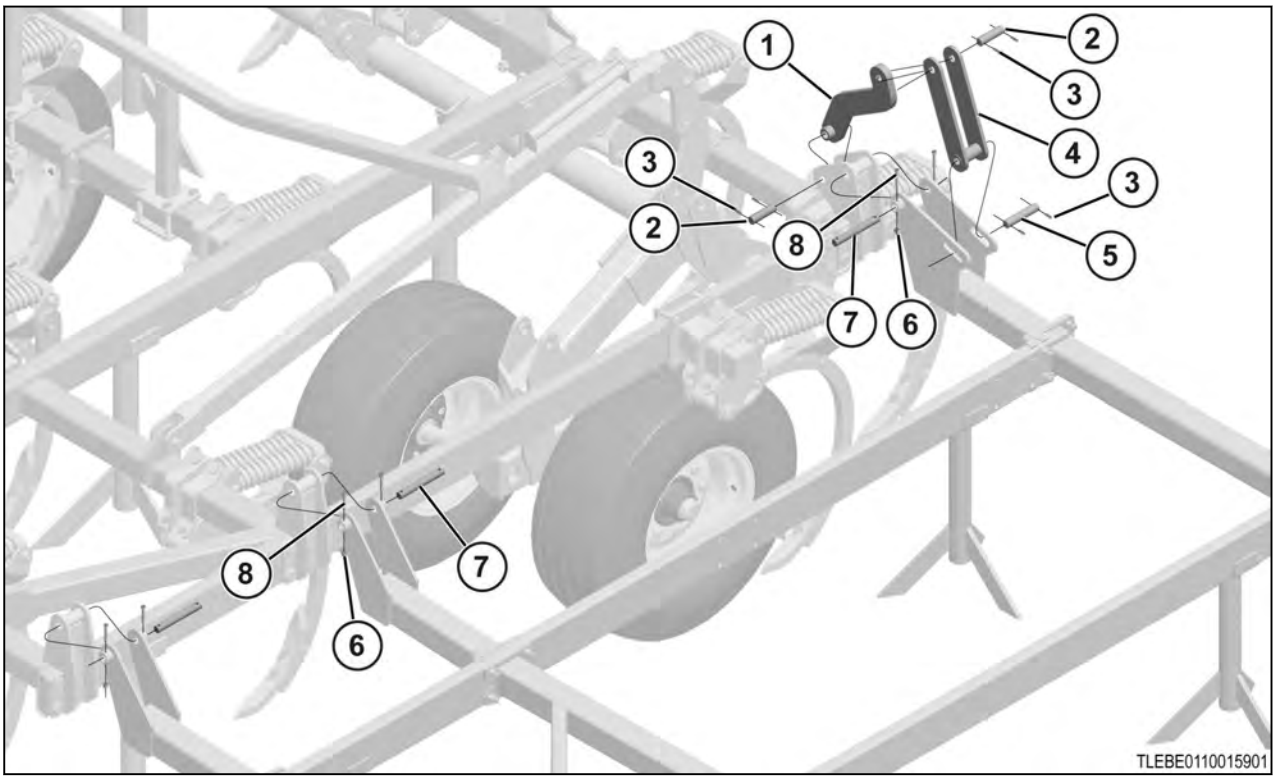


*Fig. 19*

**2.** Install the wing frames as shown.

| | | |
|---|---|---|
| (1) | 350554 | Outer wing fold link |
| (2) | 222338 | 1 x 4 1/8 pin |
| (3) | 42484 | 1/4 x 2 1/4 pin |
| (4) | 350562 | Wing fold link |
| (5) | 68033 | 1 x 6.38 pin |
| (6) | 88162 | 3/8 lock nut |
| (7) | 69826 | 1 x 7 1/4 pin |
| (8) | 89012 | 3/8 x 2 1/2 pin |

## 7.6.5 Mounting the 31 to 47 ft wing frame hinges

**Procedure**

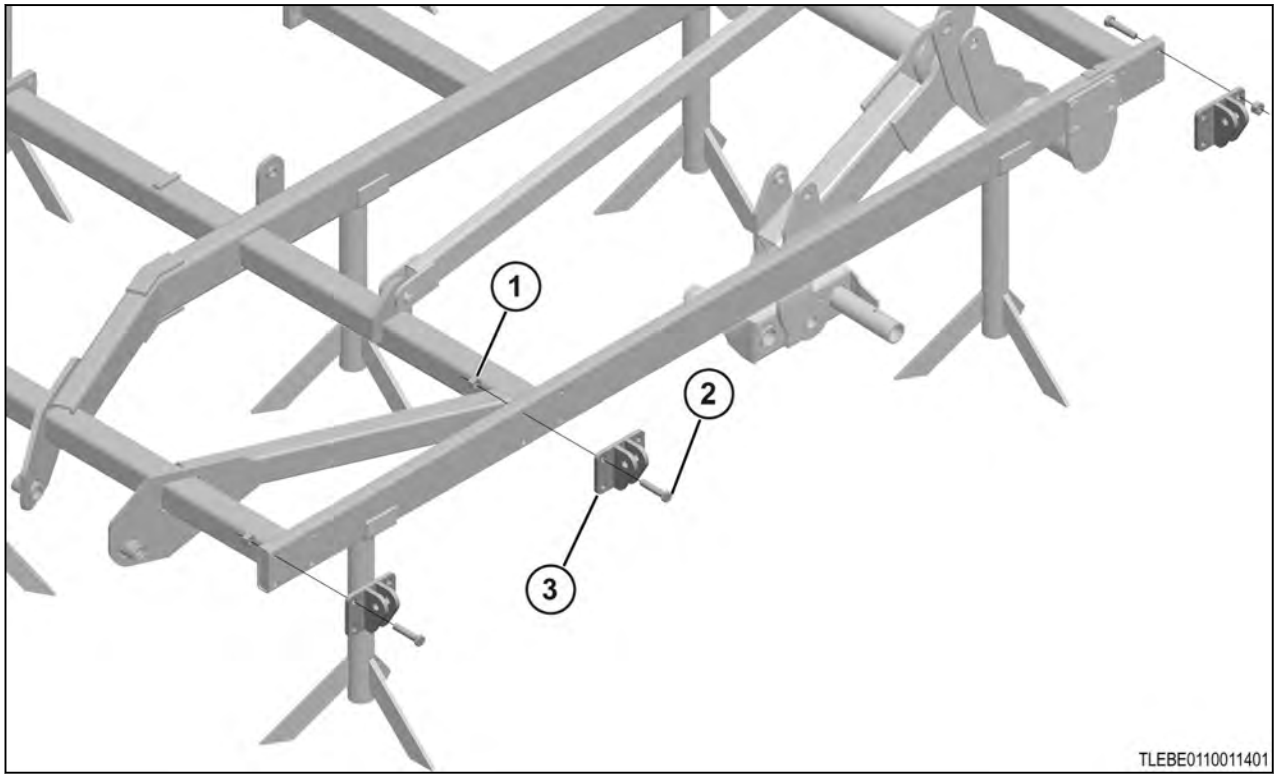


*Fig. 20*

Install the wing frame hinges as shown.

| | | |
|---|---|---|
| (1) | 88356 | 3/4 lock nut |
| (2) | 89495 | 3/4 x 3 1/2 hex bolt |
| (3) | 248424 | Outer wing hinge |

## 7.6.6 Installing the 31 to 41 ft wing frames - 9 ft wing

**Procedure**

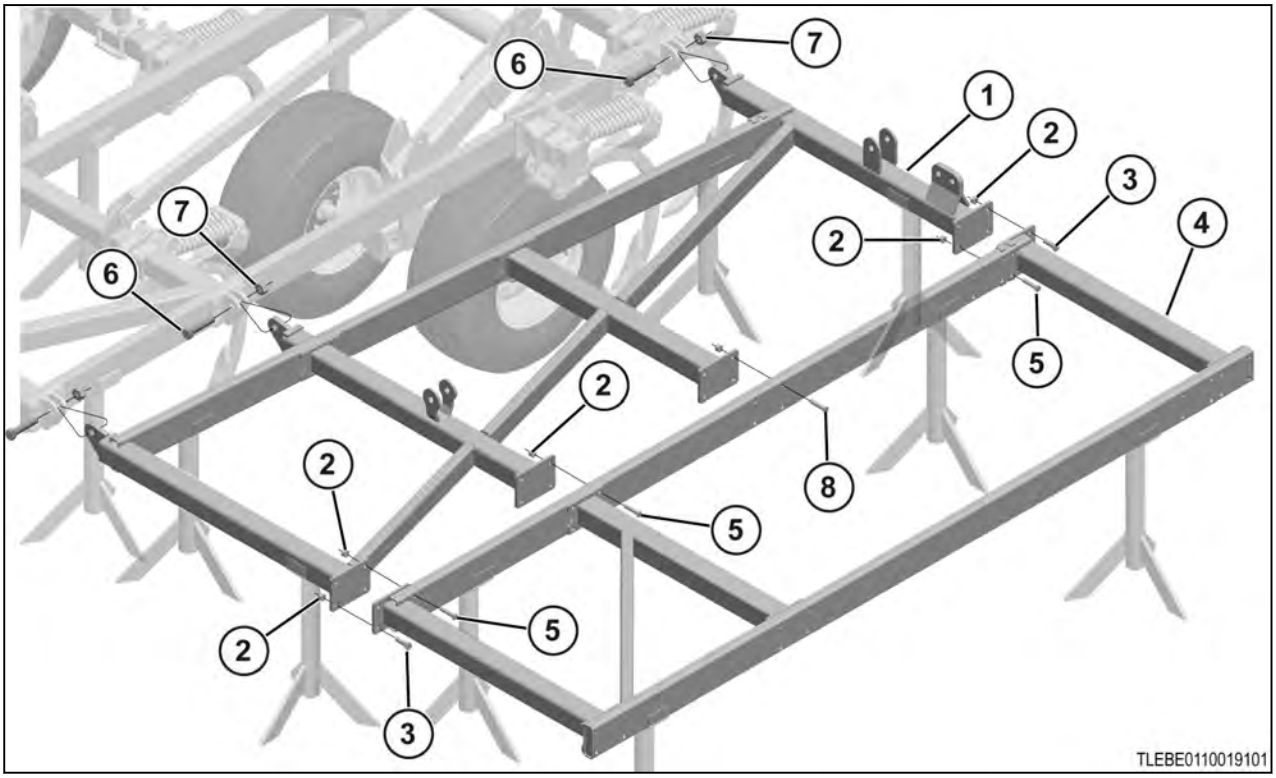


*Fig. 21*

Install the wing frames as shown.

| | | |
|---|---|---|
| (1) | 248380 | Right-hand inner wing - 9 ft |
| | 248446 | Left-hand inner wing - 9 ft |
| (2) | 88356 | 3/4 lock nut |
| (3) | 88290 | 3/4 x 2 hex bolt |
| (4) | 248443 | Wheel well |
| (5) | 88298 | 5/8 x 4 hex bolt |
| (6) | 88580 | 1 x 4 1/2 hex bolt |
| (7) | 88348 | 1 lock nut |
| (8) | 88945 | 5/8 x 4 hex bolt |

## 7.6.7 Installing the 37 to 47 ft wing frames - 12 ft wing

**Procedure**

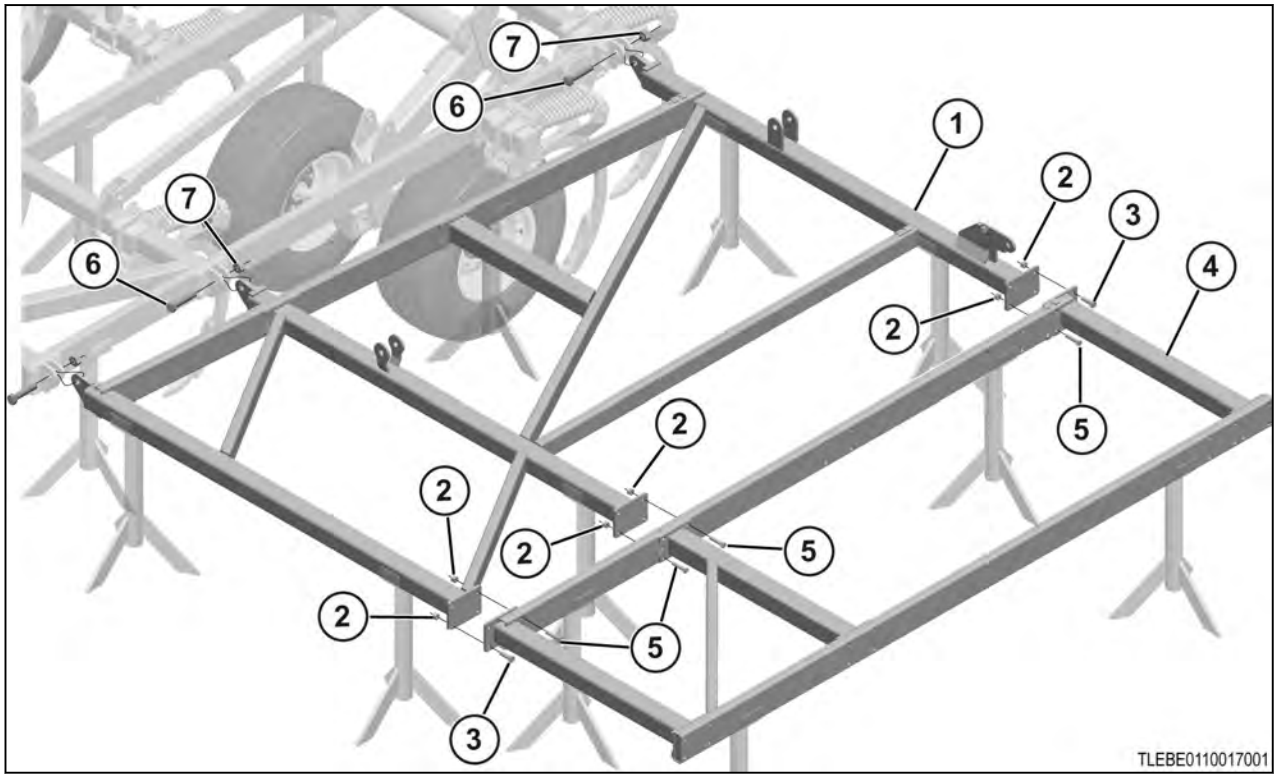


*Fig. 22*

Install the wing frames as shown.

| | | |
|---|---|---|
| (1) | 248438 | Right-hand inner wing - 12 ft |
| | 248430 | Left-hand inner wing - 12 ft |
| (2) | 88356 | 3/4 lock nut |
| (3) | 88290 | 3/4 x 2 hex bolt |
| (4) | 248443 | Wheel well |
| (5) | 88298 | 5/8 x 4 hex bolt |
| (6) | 88580 | 1 x 4 1/2 hex bolt |
| (7) | 88348 | 1 lock nut |

## 7.6.8 Mounting the 31 to 47 ft outer wing frame hinges

**Procedure**

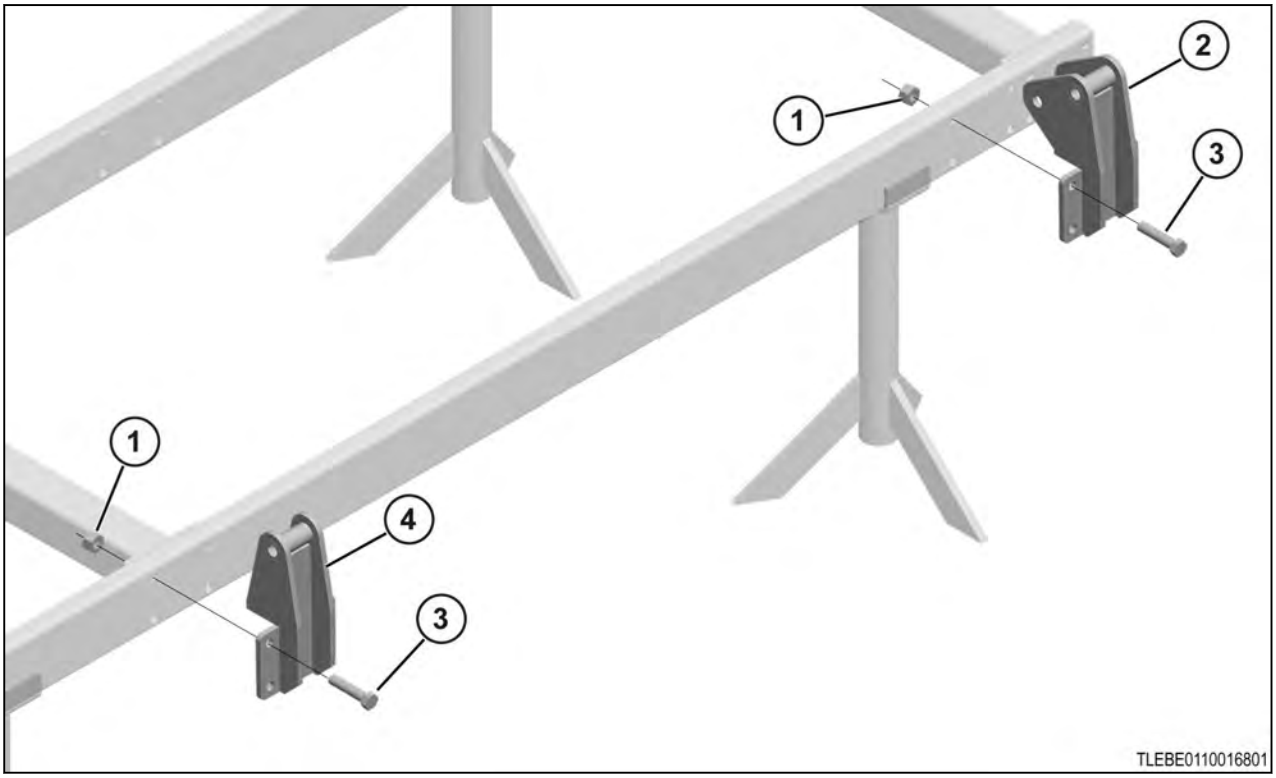


*Fig. 23*

Install the wing frame hinges as shown.

| | | |
|---|---|---|
| (1) | 88356 | 3/4 lock nut |
| (2) | 350552 | Outer rear wing hinge |
| (3) | 89495 | 3/4 x 3 1/2 hex bolt |
| (4) | 248451 | Front hinge mount |

## 7.6.9 Installing the 31 to 47 ft outer wing frames - 3 ft wing

**Procedure**

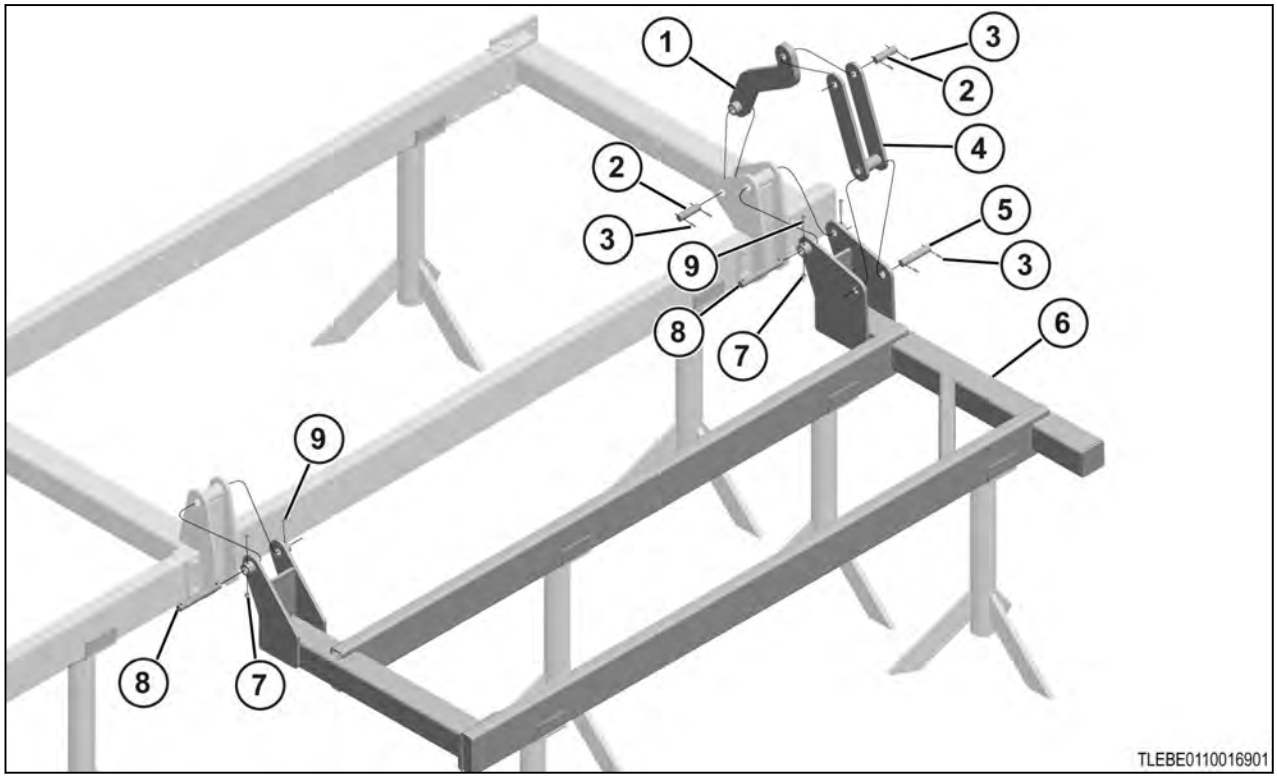


*Fig. 24*

Install the wing frames as shown.

| | | |
|---|---|---|
| (1) | 350554 | Outer wing fold link |
| (2) | 222338 | 1 x 4 1/8 pin |
| (3) | 42484 | 1/4 x 2 pin |
| (4) | 350562 | Wing fold link |
| (5) | 68033 | 1 x 6.38 pin |
| (6) | 350549 | Right-hand wing frame - 3 ft |
| | 350564 | Left-hand wing frame - 3 ft |
| (7) | 88162 | 3/8 lock nut |
| (8) | 69826 | 1 x 7 1/4 pin |
| (9) | 89012 | 3/8 x 2 1/2 pin |

# 7.7 Installing the wing frame shanks

## 7.7.1 Installing the 650 lb shanks

**Procedure**

**1.** See the shank location information for the correct shank locations.

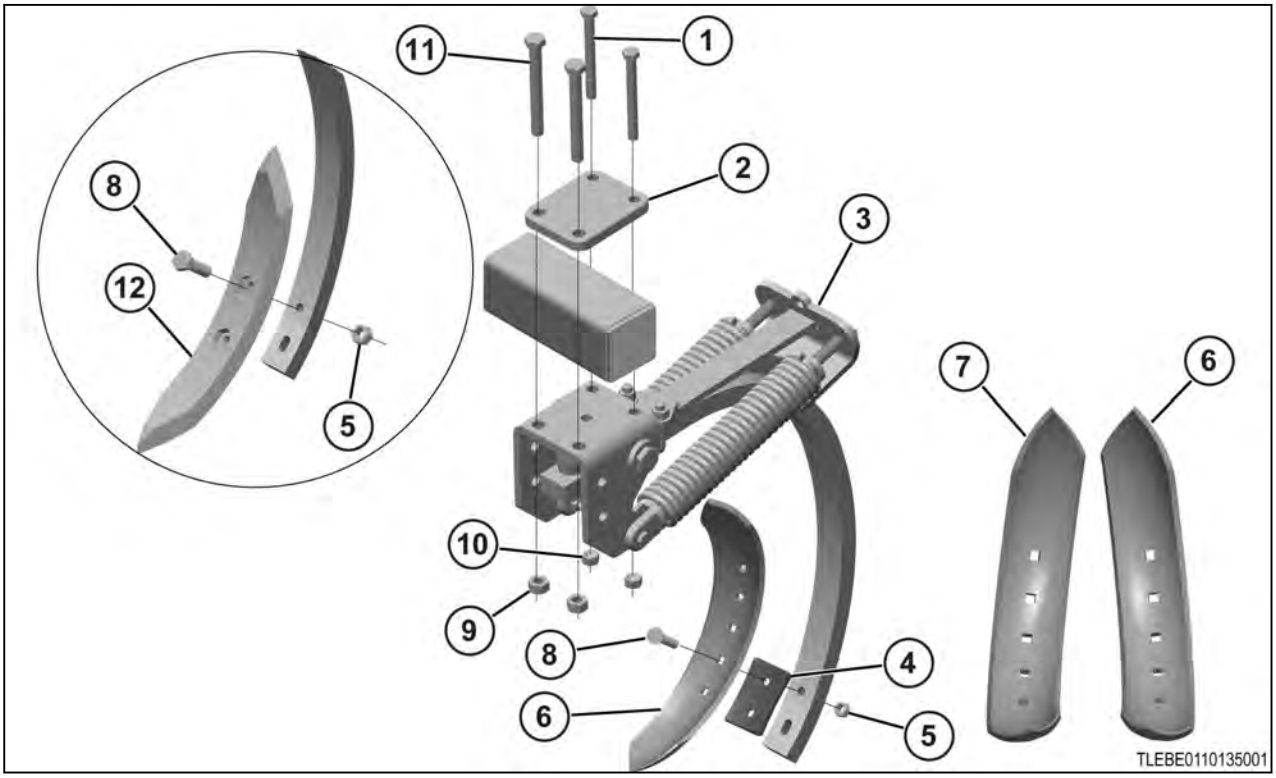


*Fig. 25*

**2.** Install the shanks as shown.

| | | |
|---|---|---|
| (1) | 89433 | 3/4 x 2 1/4 hex bolt |
| (2) | 234084 | Top plate |
| (3) | 3151662 | Spring retainer |
| (4) | 598CA-R | Twist adapter - right-hand side |
| | 598CA-L | Twist adapter - left-hand side |
| (5) | 88346 | 1/2 nut |
| (6) | 598C-R | 3 in twist - right-hand side |
| (7) | 598C-L | 3 in twist - left-hand side |
| (8) | 89468 | 1/2 x 2 1/2 bolt |
| (9) | 89386 | 3/4 nut |
| (10) | 88369 | 5/8 lock nut |
| (11) | 89385 | 3/4 x 6 1/2 hex bolt |
| (12) | 247912 | 7/8 x 2 x 19 1/2 spike |

## 7.7.2 Installing the 1000 lb shanks

**Procedure**

**1.** See the shank location information for the correct shank locations.

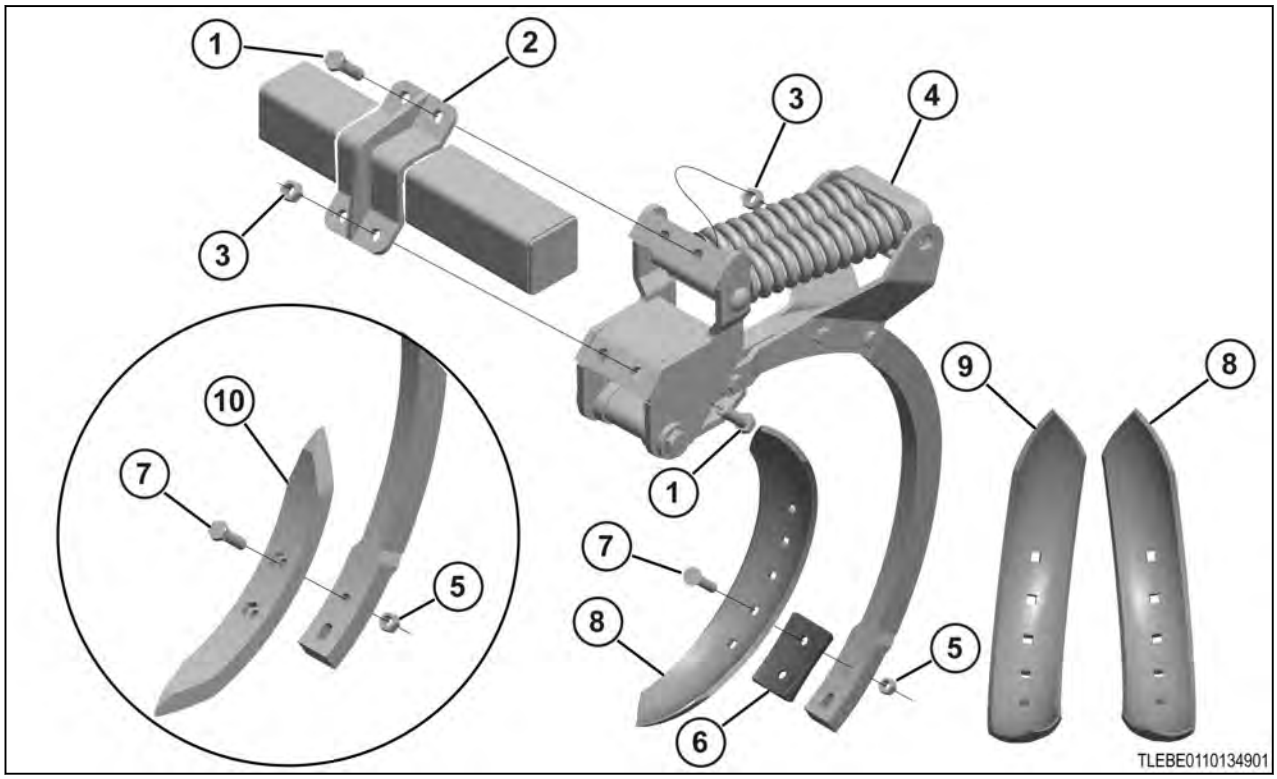


*Fig. 26*

**2.** Install the shanks as shown.

| | | |
|---|---|---|
| (1) | 89433 | 3/4 x 2 1/4 hex bolt |
| (2) | 235768 | Bracket |
| (3) | 88665 | 3/4 lock nut |
| (4) | 65373C | Spring retainer |
| (5) | 88346 | 1/2 nut |
| (6) | 598CA-R | Twist adapter - right-hand side |
| | 598CA-L | Twist adapter - left-hand side |
| (7) | 89468 | 1/2 x 2 1/2 bolt |
| (8) | 598C-R | 3 in twist - right-hand side |
| (9) | 598C-L | 3 in twist - left-hand side |
| (10) | 247912 | 7/8 x 2 x 19 1/2 spike |

## 7.8 Installing the wing lifts

**Procedure**

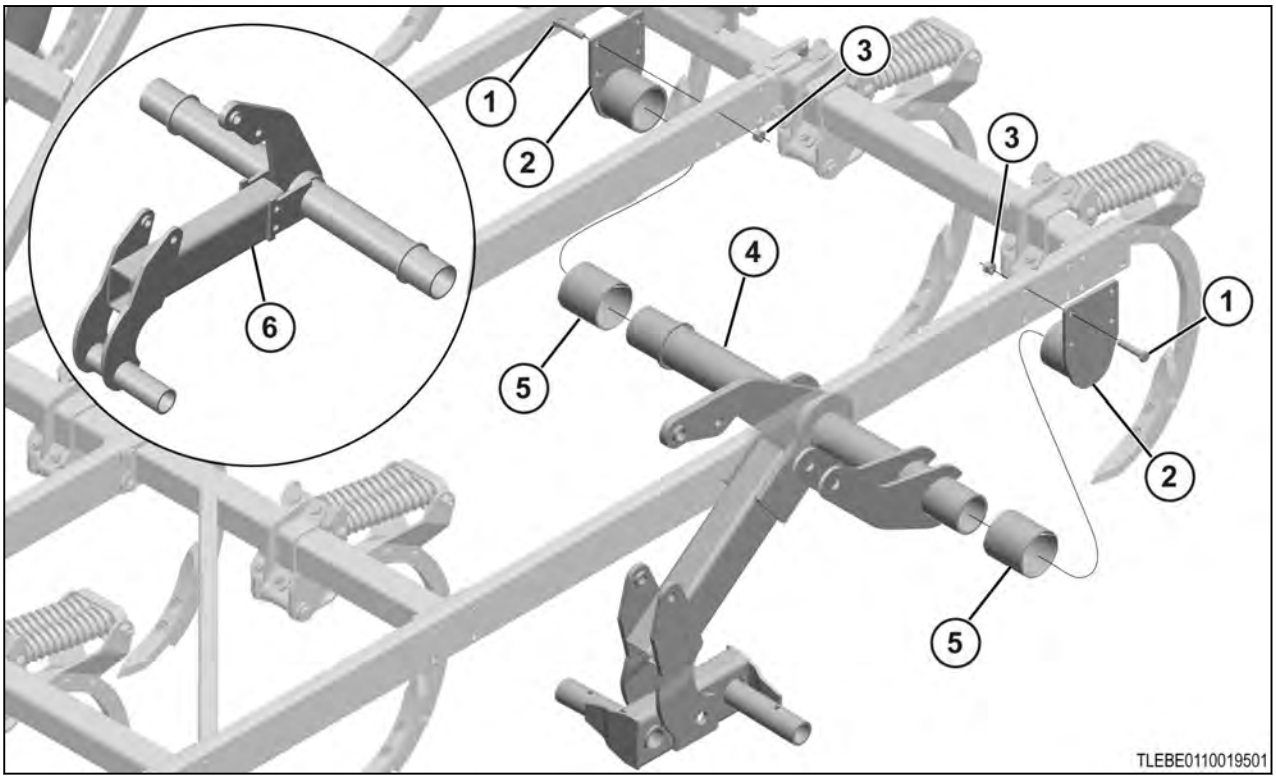


*Fig. 27*

Install the wing lifts as shown.

| | | |
|---|---|---|
| (1) | 89495 | 3/4 x 3 1/2 hex bolt |
| (2) | 248409 | Bearing cap |
| (3) | 88356 | 3/4 lock nut |
| (4) | 351759 | Right-hand lift assembly |
| | 351760 | Left-hand lift assembly |
| (5) | 351762 | Plastic bearing |
| (6) | 352336 | Right-hand single lift assembly |
| | 325341 | Left-hand single lift assembly |

## 7.8.1 Installing the wing lift hubs and wheels

**Procedure**

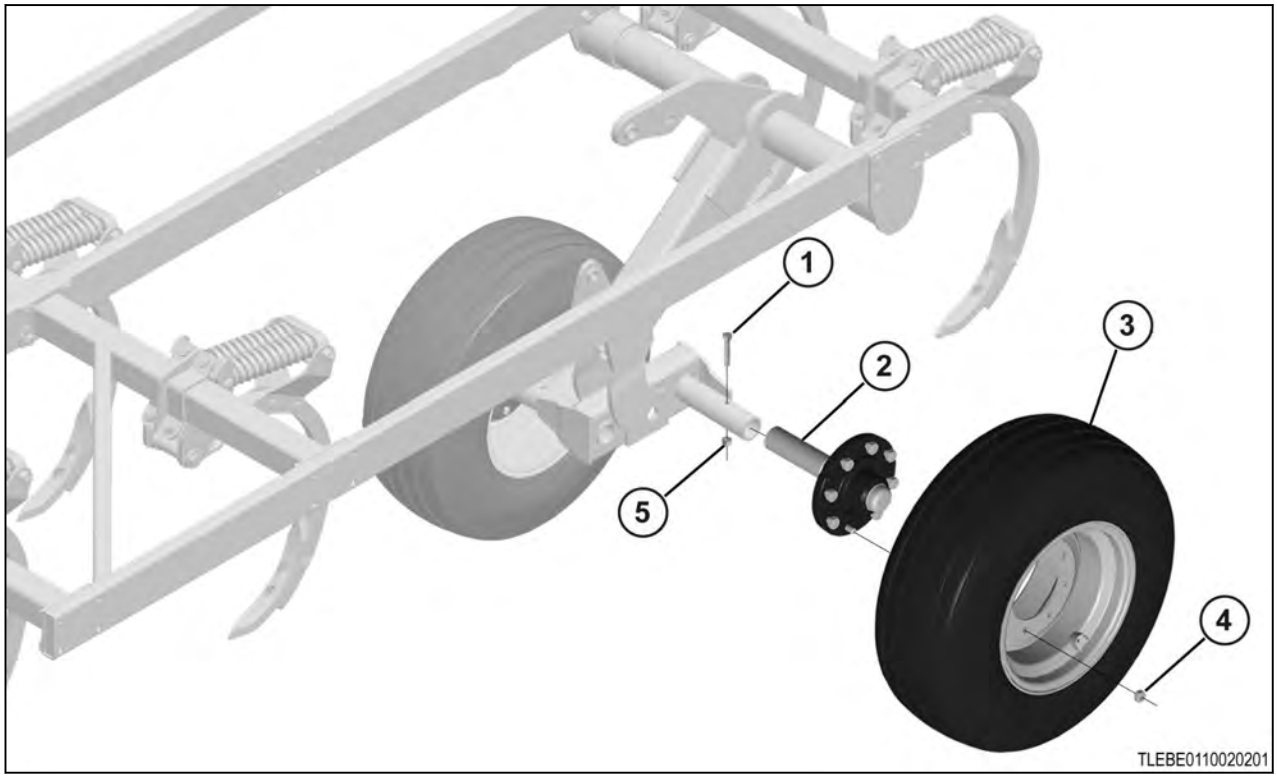


*Fig. 28*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 88298 | 5/8 x 4 hex bolt |
| (2) | 247987 | Hub and spindle |
| (3) | 353477 (used) | Wheel assembly |
| | 354507 (new) | |
| (4) | W103636 | Stud nut |
| (5) | 88369 | 5/8 lock nuts |

## 7.9 Mounting the front lift tube

**Procedure**

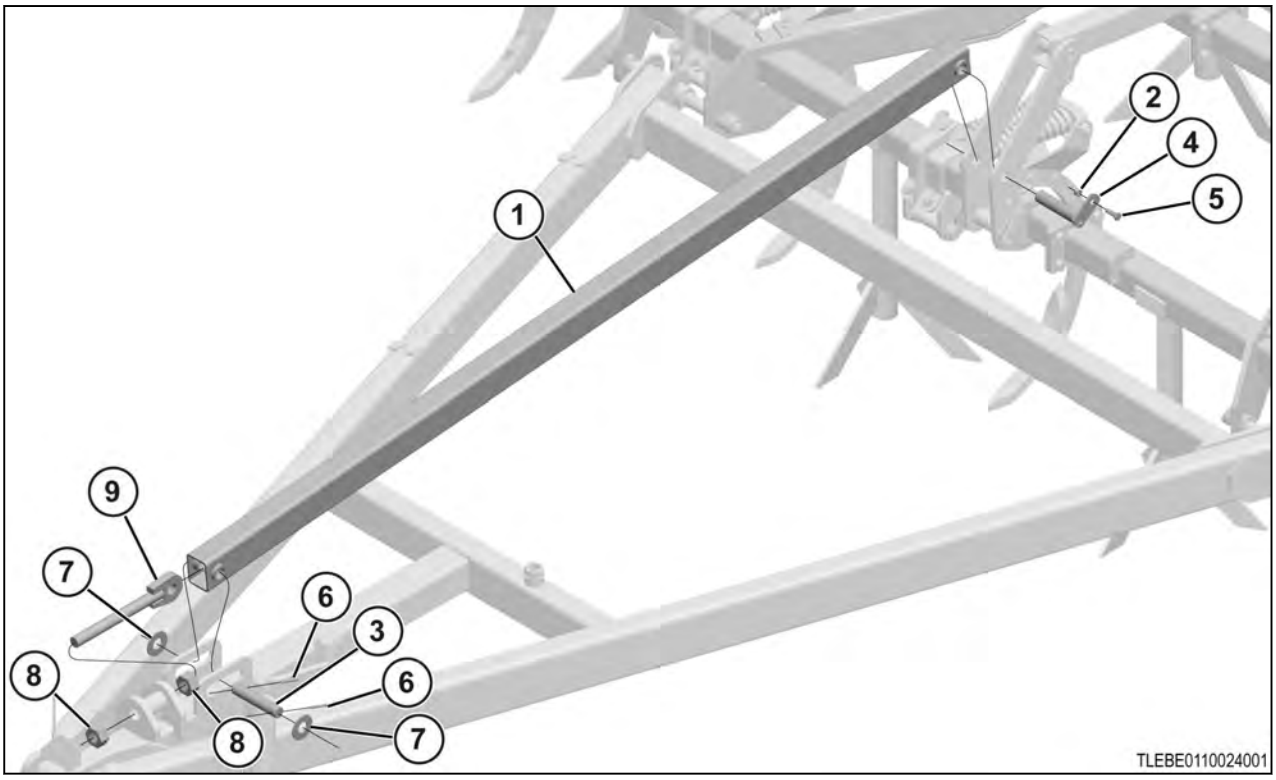


*Fig. 29*

Install the front lift tube as shown.

| | | |
|---|---|---|
| (1) | 350511 | Front lift tube |
| (2) | 88363 | 1/2 lock nut |
| (3) | 42484 | 1/4 x 2 1/4 pin |
| (4) | 350573 | Pivot pin - zinc |
| (5) | 88475 | 1/2 x 1 1/2 hex bolt |
| (6) | 42484 | 1/4 x 2 1/4 pin |
| (7) | 88602 | 1 1/4 washer |
| (8) | 88613 | 1 1/4 hex nut |
| (9) | 350515 | Front adjust rod |

## 7.10 Mounting the rear lift tube

**Procedure**

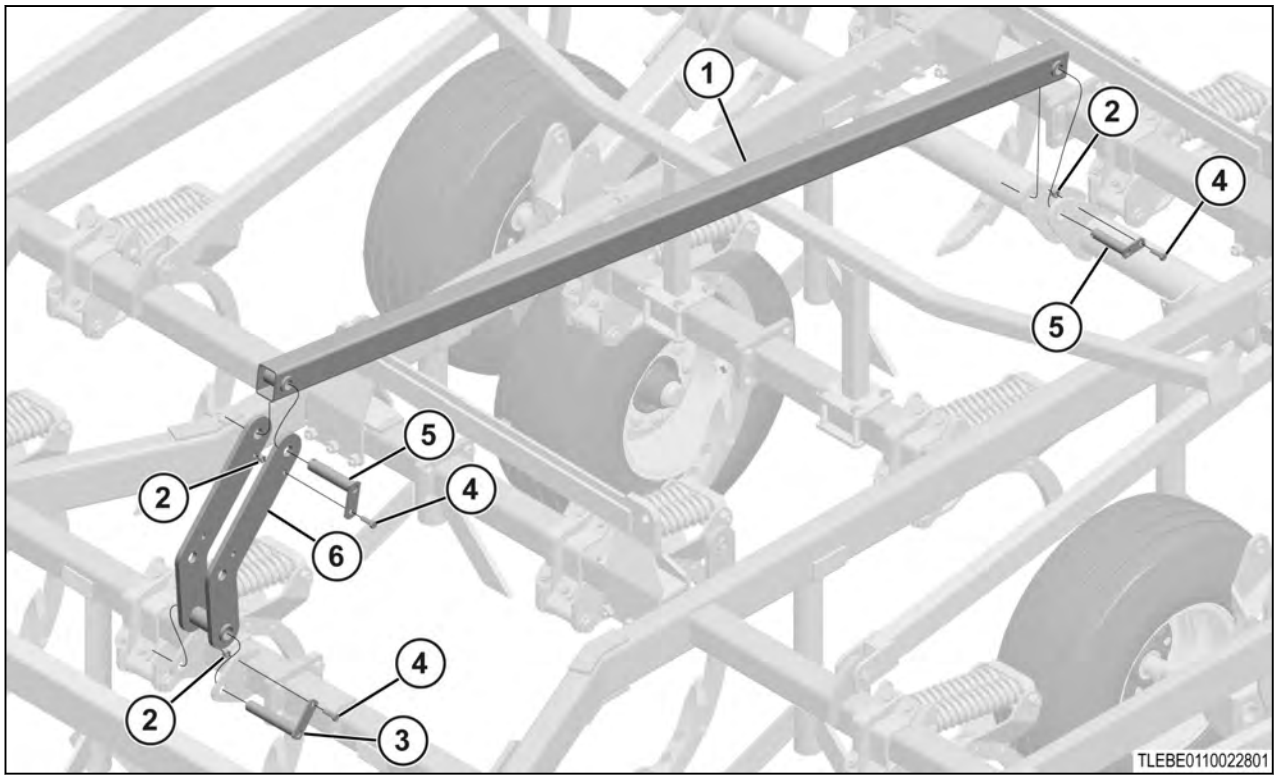


*Fig. 30*

Install the rear lift tube as shown.

| | | |
|---|---|---|
| (1) | 350506 | Rear lift tube |
| (2) | 88363 | 1/2 lock nut |
| (3) | 350573 | Pivot pin - zinc |
| (4) | 88475 | 1/2 x 1 1/2 hex bolt |
| (5) | 233357 | 1 1/4 x 5 3/16 linkage pin |
| (6) | 350737 | Level lift link |

# 7.11 Installing the frame tie straps

## 7.11.1 Installing the 31 to 47 ft center frame strap - level lift hitch

**Procedure**

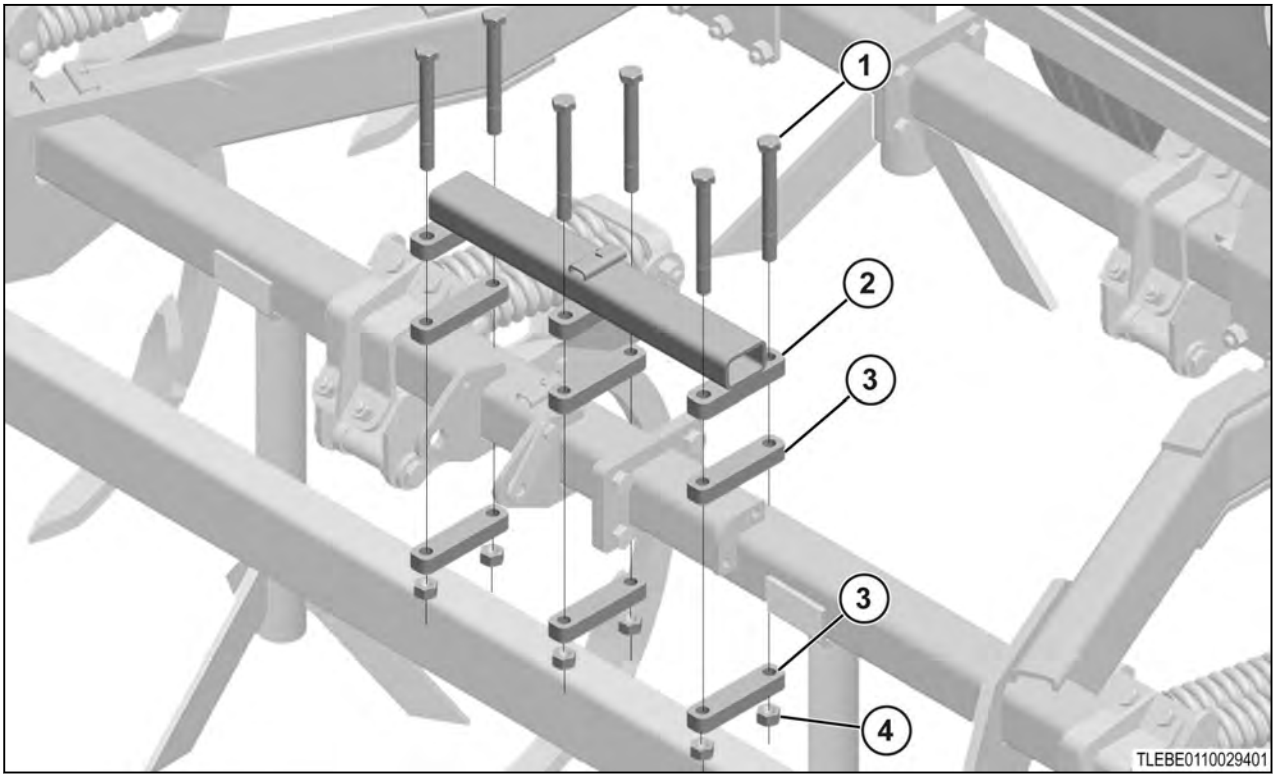


*Fig. 31*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 89409 | 3/4 x 7 hex bolt |
| (2) | 353447 | Frame strap |
| (3) | 352367 | Mount plate |
| (4) | 88356 | 3/4 lock nut |

## 7.11.2 Installing the 37 to 47 ft inner wing frame strap

**Procedure**

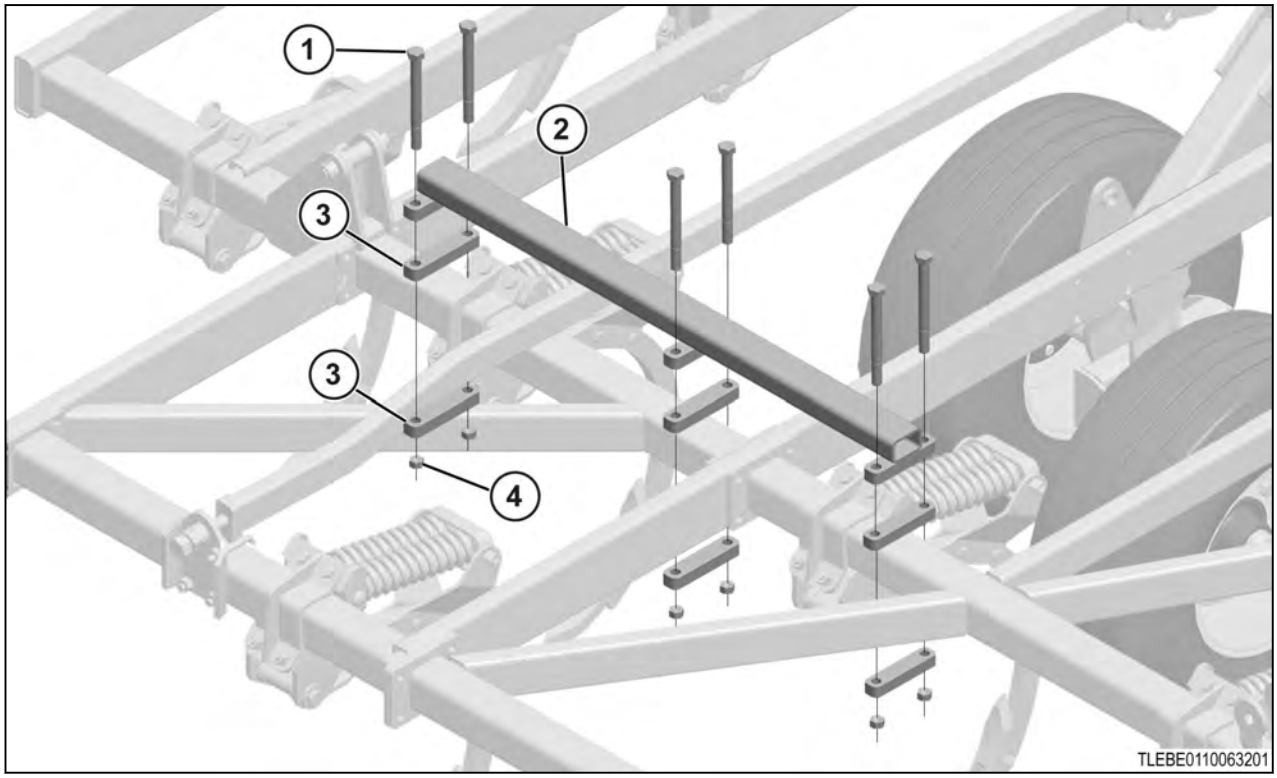


*Fig. 32*

Install the inner wing frame strap as shown.

| | | |
|---|---|---|
| (1) | 89408 | 3/4 x 8 hex bolt |
| (2) | 352366 | Frame brace tube |
| (3) | 352367 | Mount plate |
| (4) | 88356 | 3/4 lock nut |

## 7.12 Installing the 37 to 47 ft outer wing rest

**Procedure**

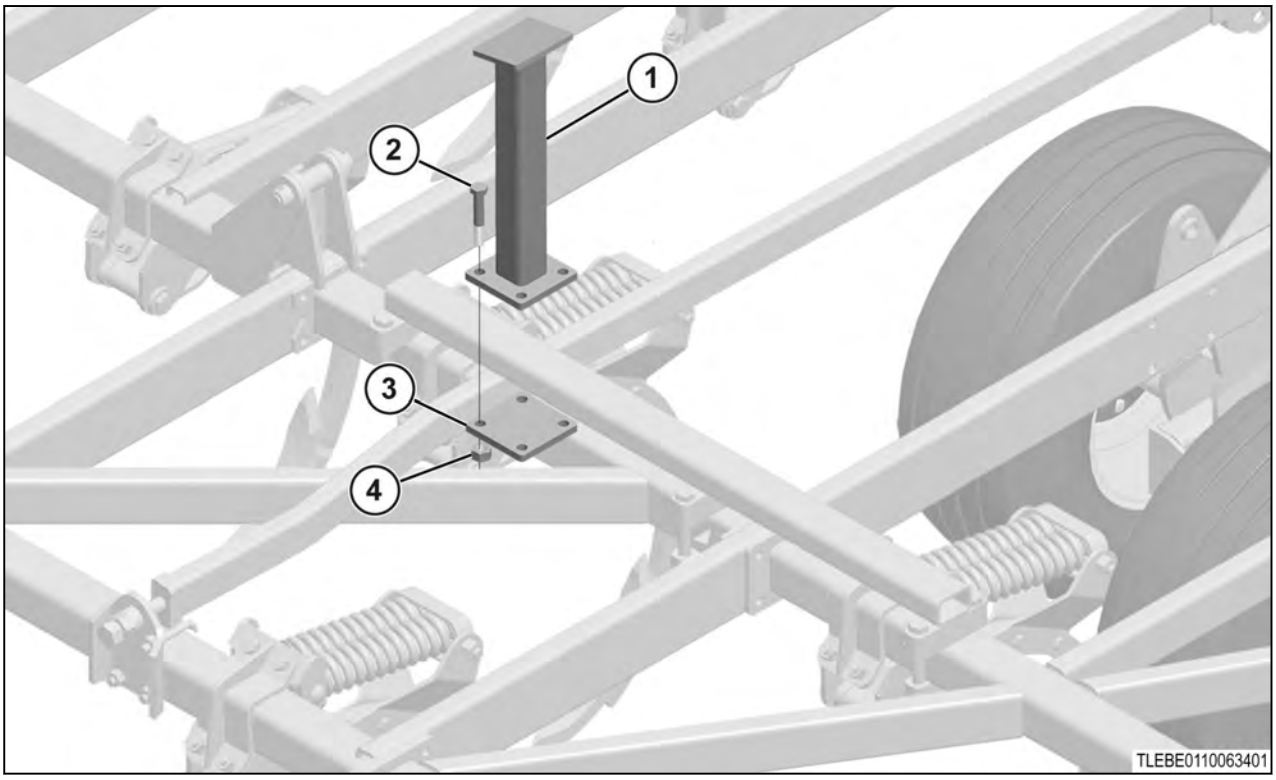


*Fig. 33*

Install the outer wing rest as shown.

| | | |
|---|---|---|
| (1) | 353449 | Wing rest - outer wing |
| (2) | 88298 | 5/8 x 4 hex bolt |
| (3) | 353965 | Plate |
| (4) | 88369 | 5/8 lock nut |

# 7.13 Installing the fold brackets

## 7.13.1 Mounting the 31 to 41 ft wing fold brackets - 9 ft wing

**Procedure**

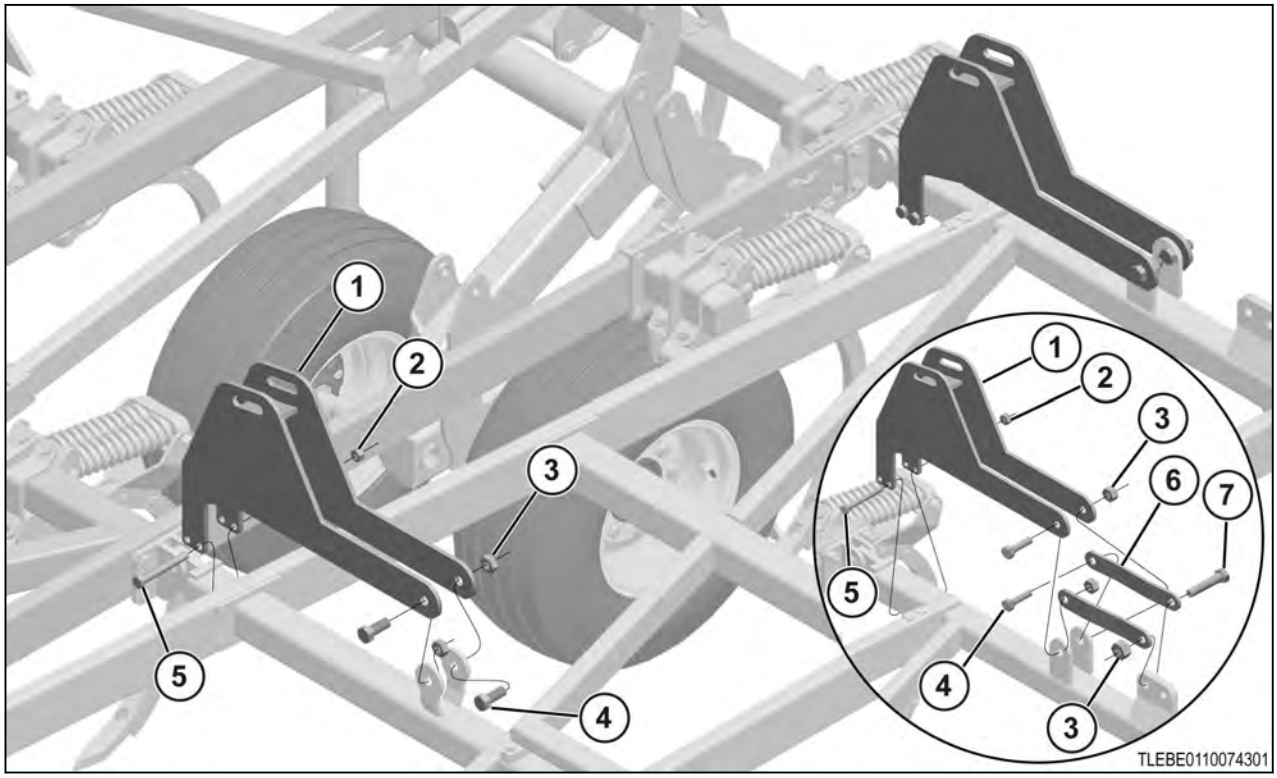


*Fig. 34*

Install the wing fold brackets as shown.

| | | |
|---|---|---|
| (1) | 350540 | Wing fold bracket |
| (2) | 88356 | 3/4 lock nut |
| (3) | 88348 | 1 lock nut |
| (4) | 88393 | 1 x 2 1/2 hex bolt |
| (5) | 88947 | 3/4 x 6 hex bolt |
| (6) | 351765 | Wing link<br>**NOTE:** *The wing link is only used when a 3 ft outer wing is installed.* |
| (7) | 88447 | 1 x 3 1/2 hex bolt |

## 7.13.2 Mounting the 37 to 47 ft wing fold brackets - 12 ft wing

**Procedure**

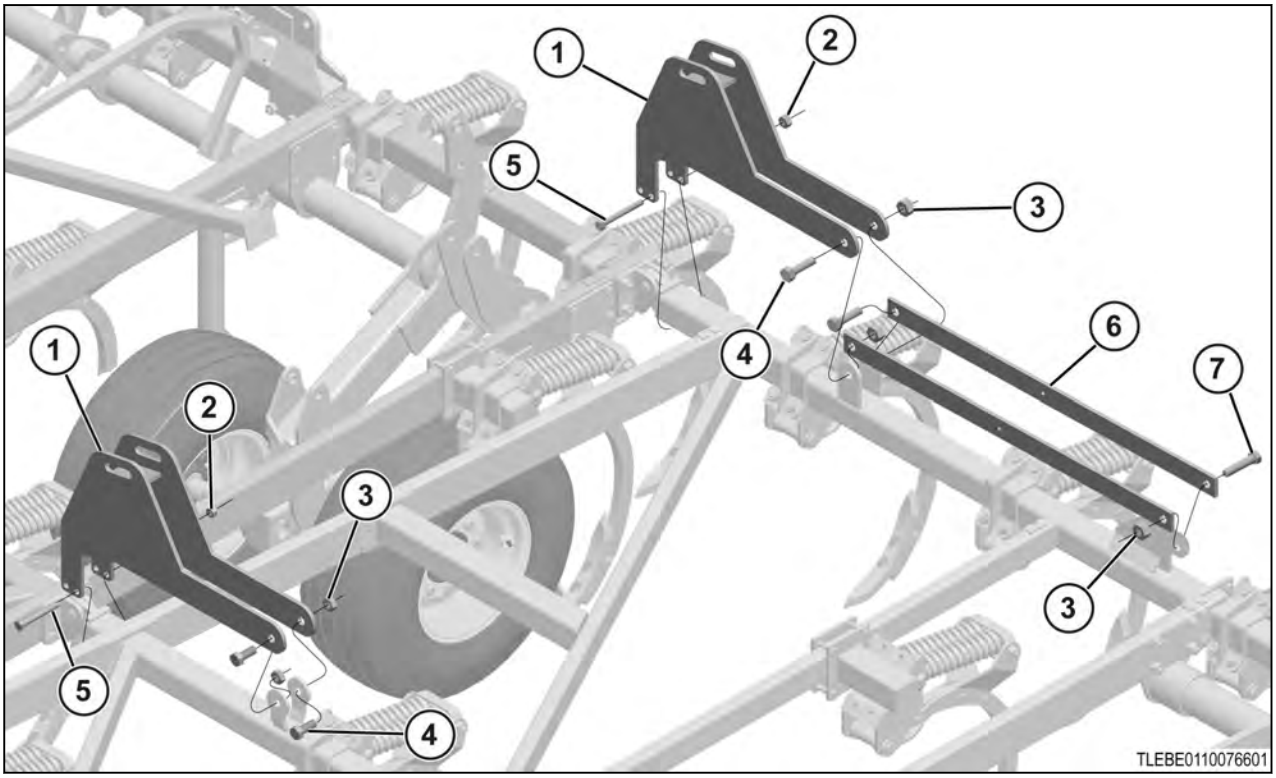


*Fig. 35*

Install the wing fold brackets as shown.

| | | |
|---|---|---|
| (1) | 350540 | Wing fold bracket |
| (2) | 88356 | 3/4 lock nut |
| (3) | 88348 | 1 lock nut |
| (4) | 88393 | 1 x 2 1/2 hex bolt |
| (5) | 88947 | 3/4 x 6 hex bolt |
| (6) | 350576 | Wing tie strap<br>**NOTE:** *The wing tie strap is only used when a 3 ft outer wing is installed.* |
| (7) | 88447 | 1 x 3 1/2 hex bolt |

## 7.14 Installing the wing mast tubes

**Procedure**

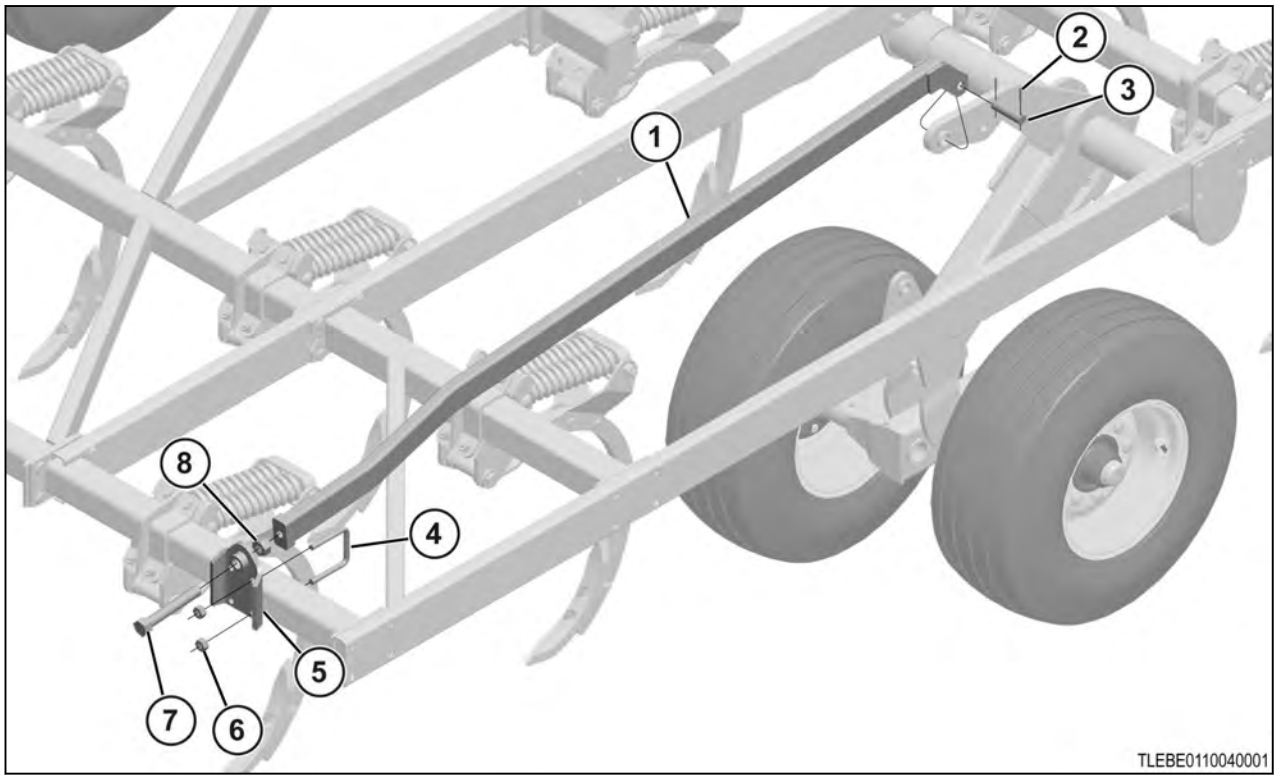


*Fig. 36*

Install the wing mast tube as shown.

| | | |
|---|---|---|
| (1) | 248426 | Right-hand wing mast tube |
| | 352358 | Left-hand wing mast tube |
| (2) | 42484 | 1/4 x 2 1/4 pin |
| (3) | 67854 | 1 1/4 x 4 1/2 pin |
| (4) | 88145 | 5/8 x 5 1/4 U-bolt |
| (5) | 350500 | Wing mast anchor |
| (6) | 88369 | 5/8 lock nut |
| (7) | 69799 | Adjuster rod |
| (8) | 88613 | 1 1/4 hex nut |

# 7.15 Installing the stroke control assembly

## 7.15.1 Mounting the stroke control valve

**Procedure**

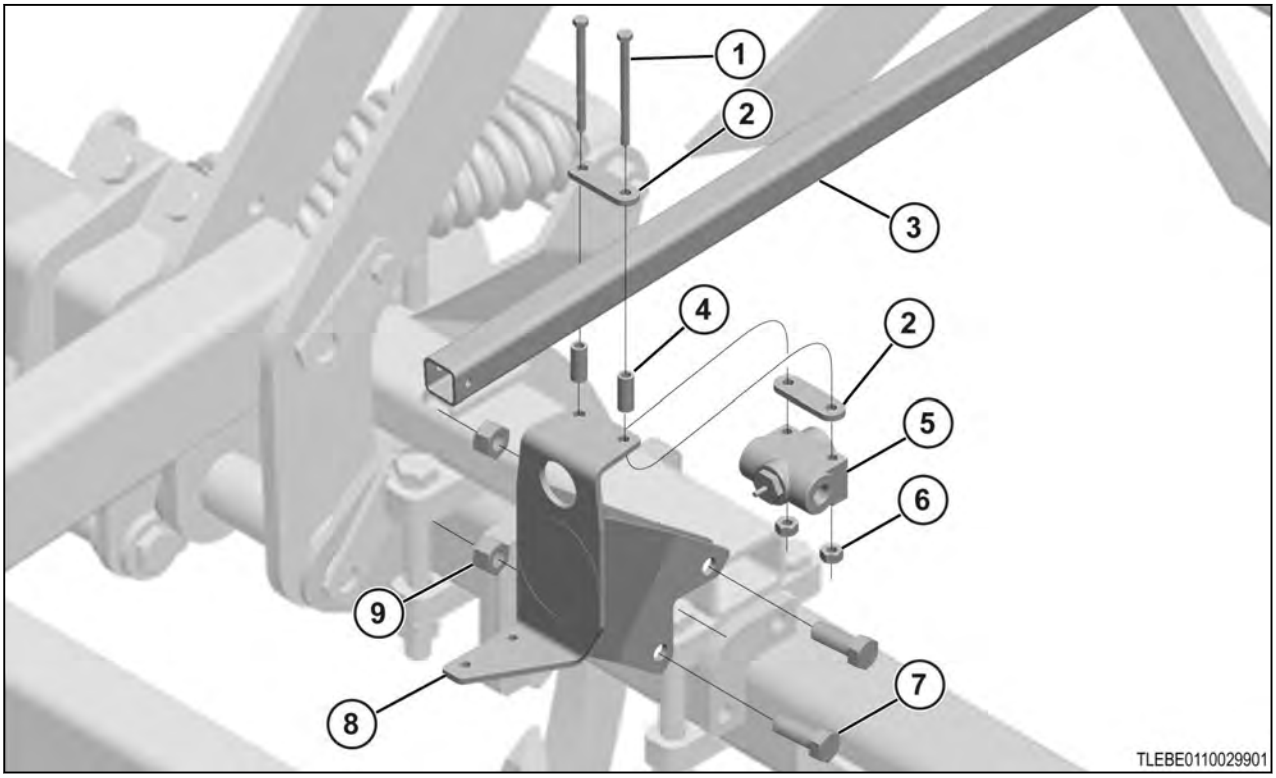


*Fig. 37*

Install the stroke control valve as shown.

| | | |
|---|---|---|
| (1) | 88812 | 5/16 x 4 1/2 hex bolt |
| (2) | 238636 | Valve spacer |
| (3) | 241488 | Single point inner tube |
| (4) | 238637 | Spacer tube |
| (5) | 247429 | Stroke control valve |
| (6) | 88540 | 5/16 lock nut |
| (7) | 88825 | 1/2 x 2 1/4 hex bolt |
| (8) | 238638 | Single point bracket |
| (9) | 88363 | 1/2 lock nut |

## 7.15.2 Mounting the front of the stroke control

**Procedure**

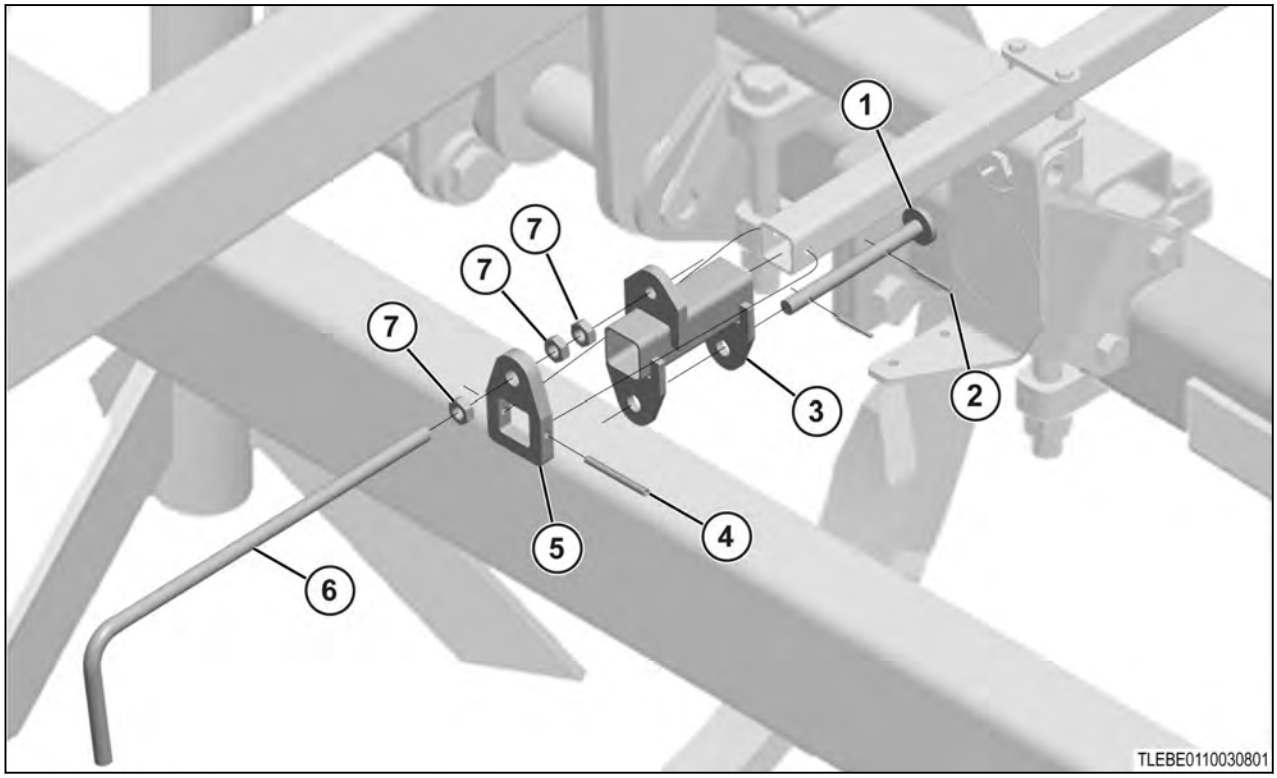


*Fig. 38*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 222180 | Spring pin |
| (2) | 89078 | 3/16 x 1 3/4 pin |
| (3) | 222111 | Slide adjust |
| (4) | 88767 | 1/4 x 2 1/2 pin |
| (5) | 222107 | Adjust ear |
| (6) | 238657 | Adjust crank |
| (7) | 88561 | 1/2 jam nut |

## 7.15.3 Mounting the rear of the stroke control

**Procedure**

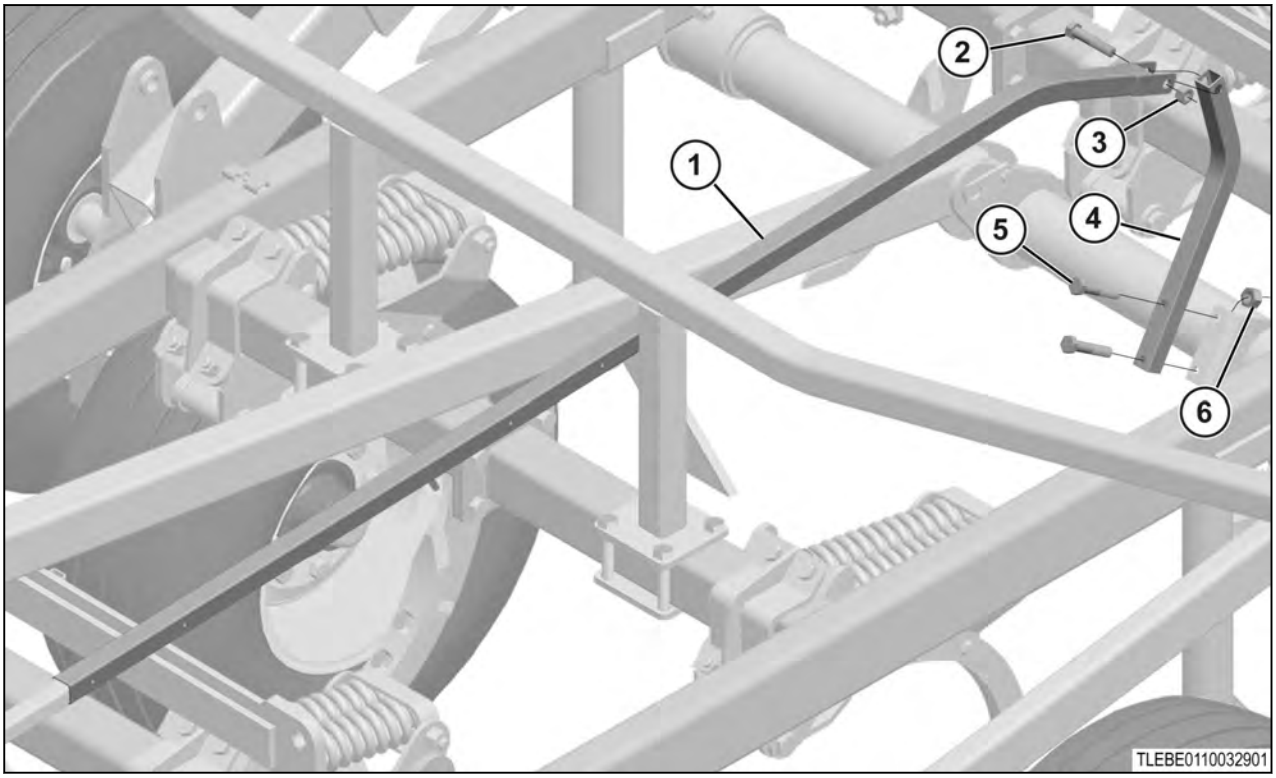


*Fig. 39*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 241487 | Single point bent tube |
| (2) | 88408 | 5/8 x 3 hex bolt |
| (3) | 88369 | 5/8 lock nut |
| (4) | 238652 | Single point short tube |
| (5) | 88825 | 1/2 x 2 1/4 hex bolt |
| (6) | 88363 | 1/2 lock nut |

# 7.16 Installing the ratchet adjust gauge wheels

## 7.16.1 Installing the gauge wheel mount - ratchet adjust

**Procedure**

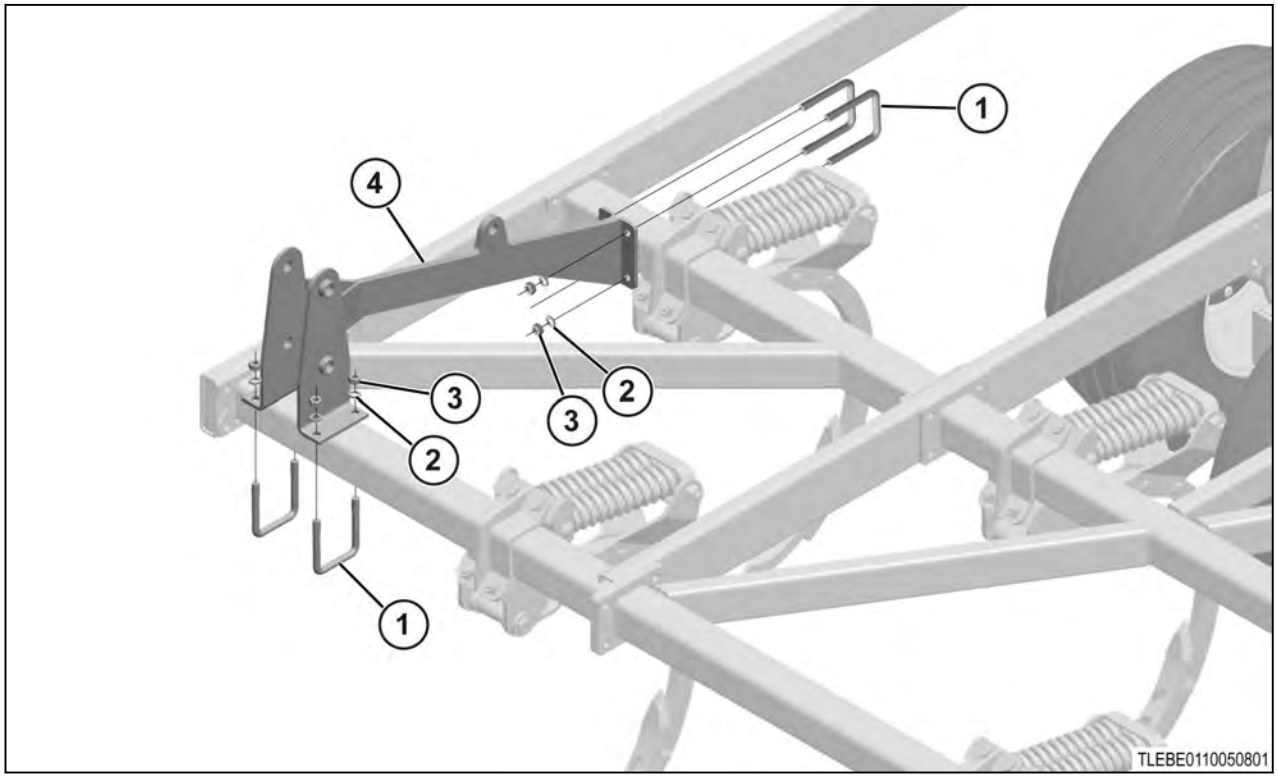


*Fig. 40*

Install the pivot gauge wheel mount as shown.

| | | |
|---|---|---|
| (1) | 88145 | 5/8 x 5 1/4 U-bolt |
| (2) | 88129 | 5/8 washer |
| (3) | 88126 | 5/8 hex nut |
| (4) | 351795 | Pivot gauge wheel mount |

## 7.16.2 Installing the gauge wheel jack and arms - ratchet adjust

**Procedure**

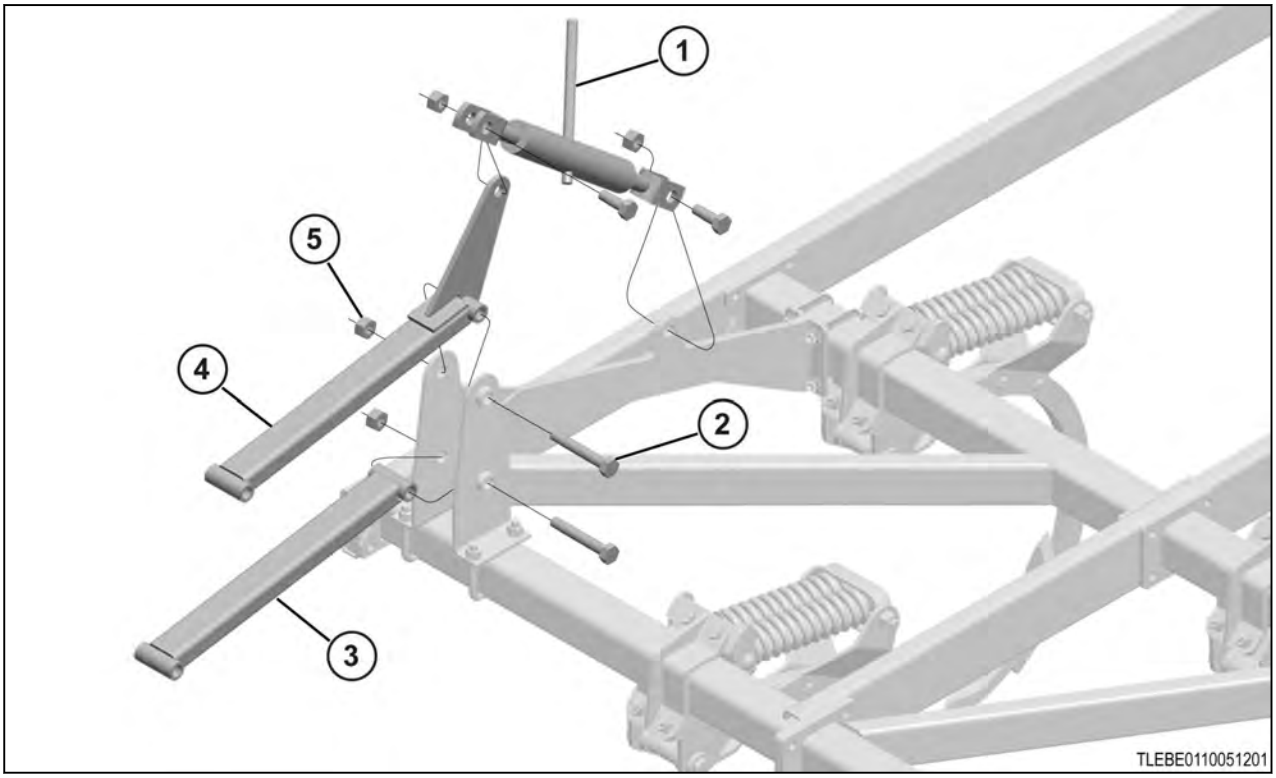


*Fig. 41*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 33104 | Jack extension |
| (2) | 350988 | 1 x 7.35 hex bolt |
| (3) | 233235 | Top gauge wheel tube |
| (4) | 233227 | Top gauge wheel arm |
| (5) | 88348 | 1 lock nut |

## 7.16.3 Assembling the gauge wheel pivot bracket - ratchet adjust

**Procedure**

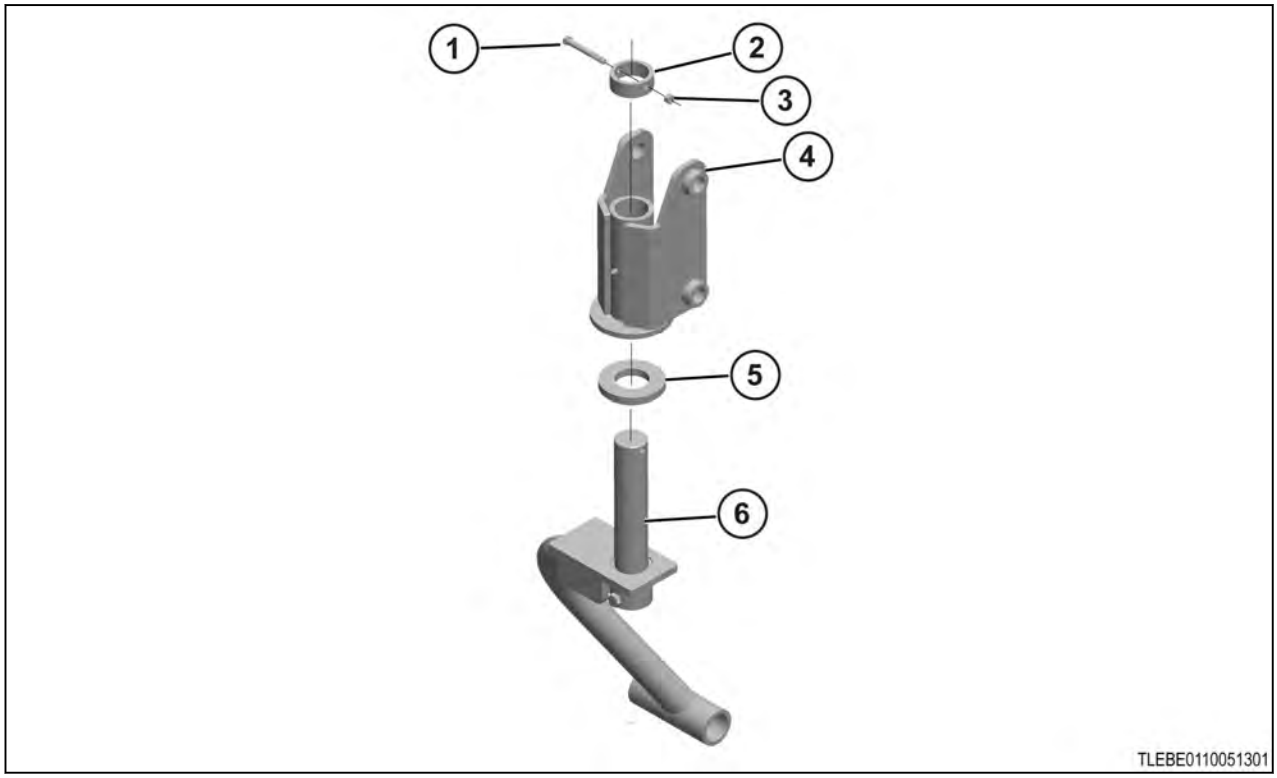


*Fig. 42*

Assembly the gauge wheel pivot bracket as shown.

| | | |
|---|---|---|
| (1) | 88531 | 3/8 x 3 hex bolt |
| (2) | 14189 | Link arm stop collar |
| (3) | 88162 | 3/8 lock nut |
| (4) | 233230 | Gauge wheel pivot bracket |
| (5) | 19262 | Shim |
| (6) | 240360 | Caster wheel leg |

## 7.16.4 Fastening the gauge wheel pivot bracket to the arms - ratchet adjust

**Procedure**

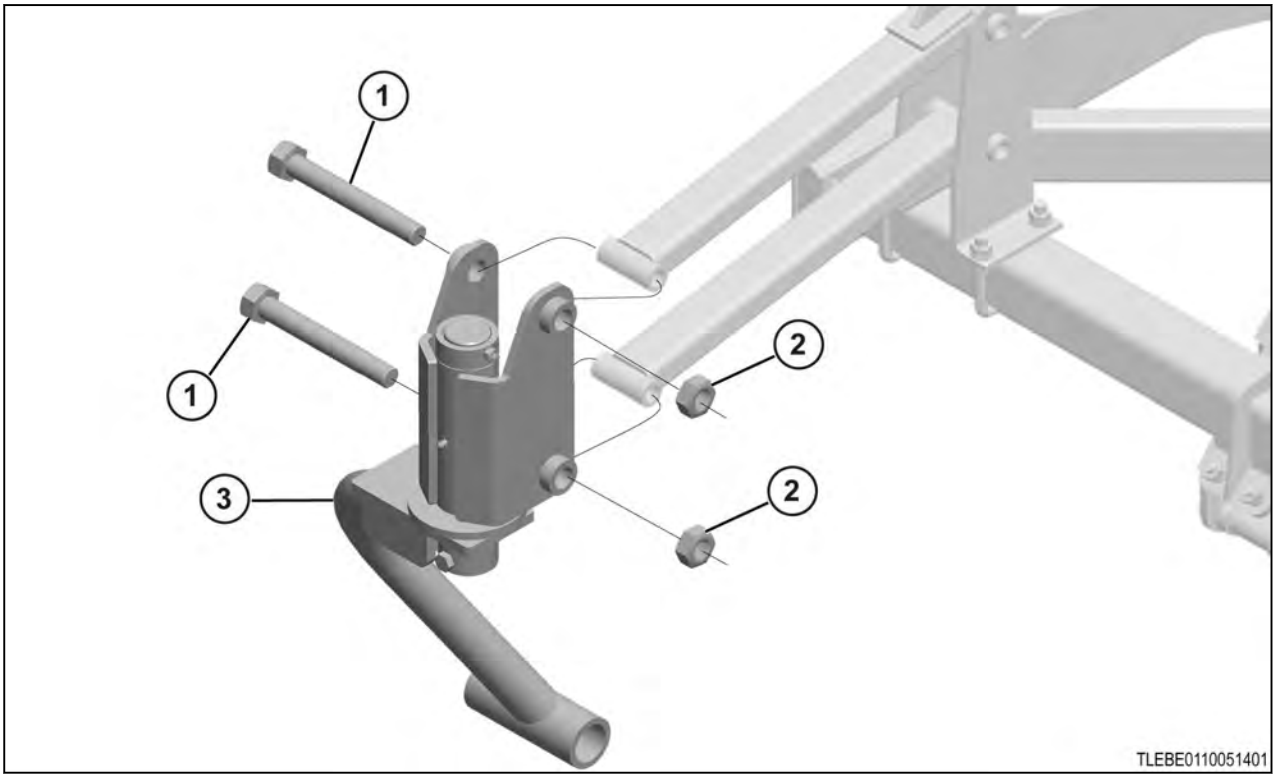


*Fig. 43*

Install the parts as shown.

| | | |
|---|---|---|
| (1) | 350988 | 1 x 7.35 hex bolt |
| (2) | 88348 | 1 lock nut |
| (3) | 240360 | Caster wheel leg |

## 7.16.5 Installing the gauge wheel hubs and wheels - ratchet adjust

**Procedure**

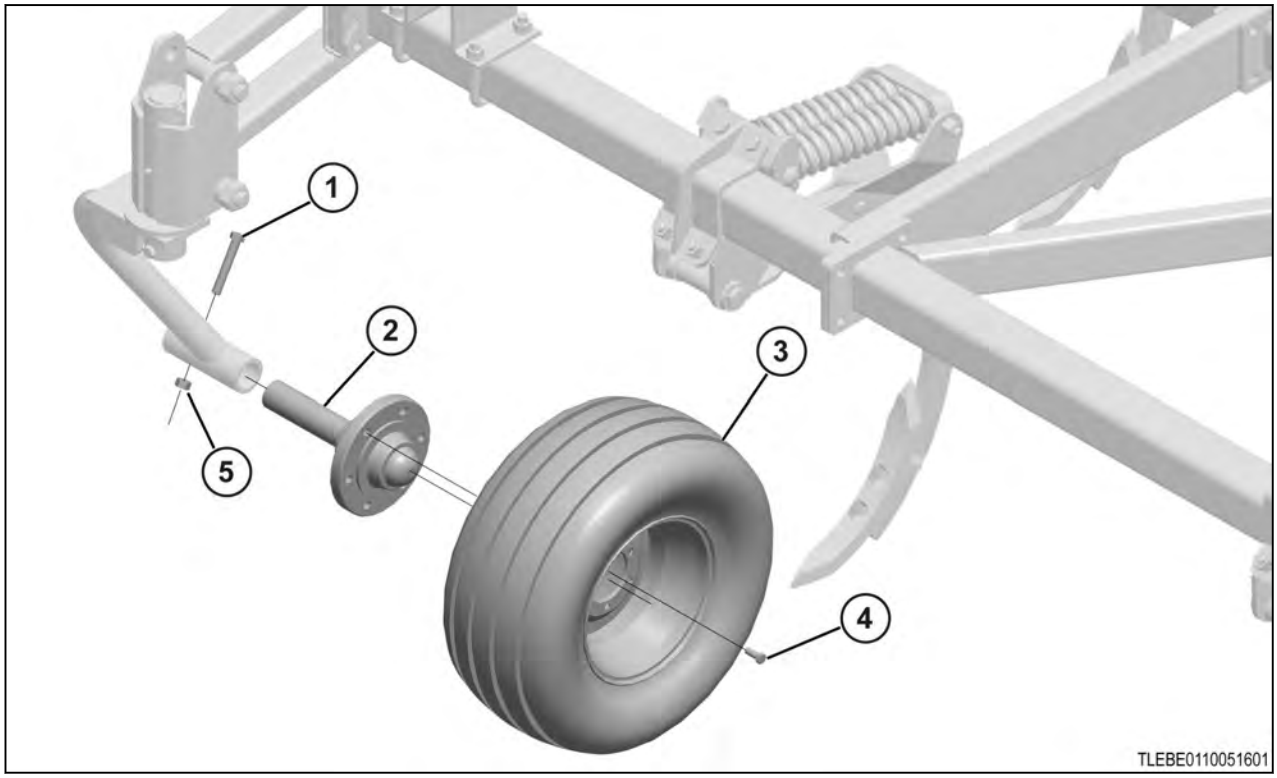


*Fig. 44*

Install the wheel hubs and wheels as shown.

| | | |
|---|---|---|
| (1) | 88429 | 1/2 x 3 1/4 hex bolt |
| (2) | 41234 | 1 3/4 hub and spindle |
| (3) | 16290 | Wheel assembly |
| (4) | 88142 | 1/2 x 1 fine thread wheel bolt |
| (5) | 88304 | 1/2 fine thread lock nut |

# 7.17 Installing the hydraulic gauge wheels

## 7.17.1 Installing the center frame gauge wheel mount - hydraulic

**Procedure**

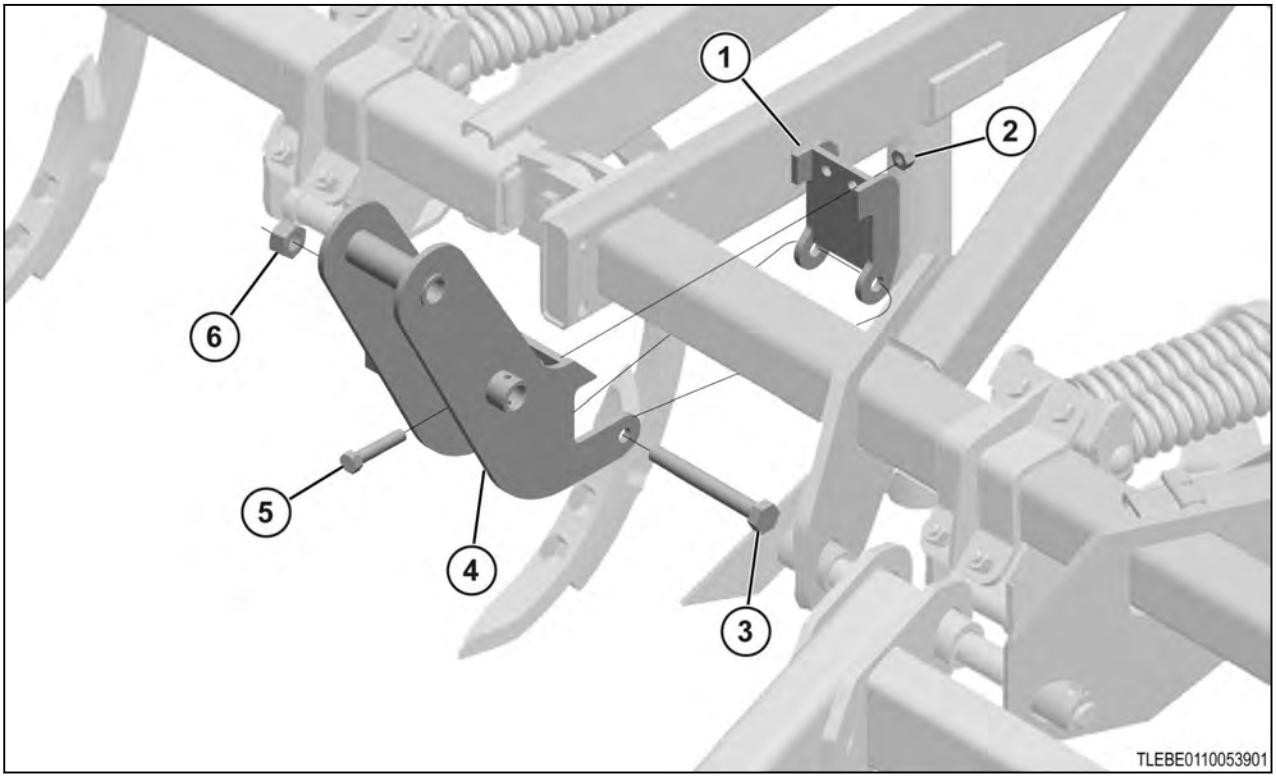


*Fig. 45*

Install the gauge wheel mount as shown.

| | | |
|---|---|---|
| (1) | 353493 | Caster wheel tube clamp |
| (2) | 88356 | 3/4 lock nut |
| (3) | 89359 | 1 x 8 hex bolt |
| (4) | 248417 | Front lift mast |
| (5) | 88947 | 3/4 x 6 hex bolt |
| (6) | 88348 | 1 lock nut |

## 7.17.2 Installing the center frame gauge wheel linkage - hydraulic

**Procedure**

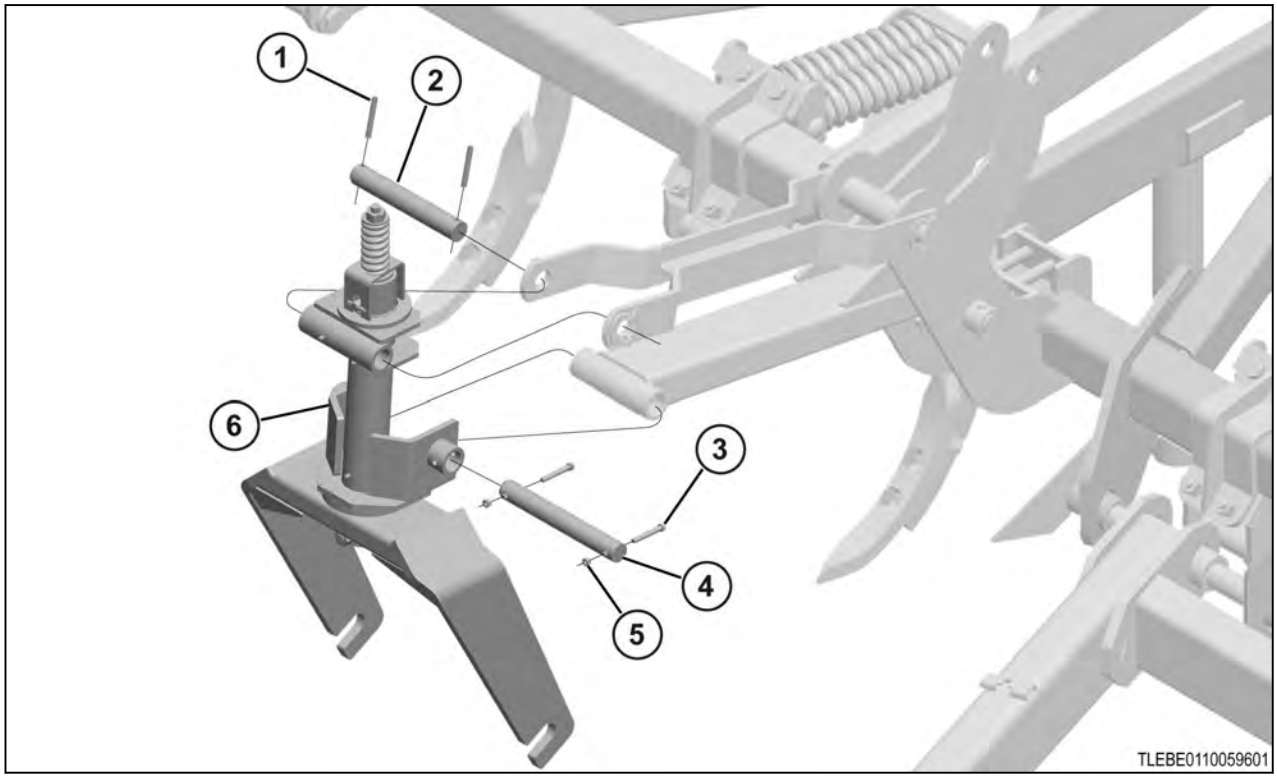


*Fig. 46*

install the gauge wheel linkage as shown.

| | | |
|---|---|---|
| (1) | 88628 | 1/4 x 1 3/4 pin |
| (2) | 350775 | Pivot pin |
| (3) | 88582 | 3/8 x 2 3/4 hex bolt |
| (4) | 54595 | 1 1/2 x 9 19/32 pin |
| (5) | 88659 | 3/8 lock nut |
| (6) | 54571 | Gauge wheel pivot |

## 7.17.3 Assembling the center frame gauge wheel axle - hydraulic

**Procedure**

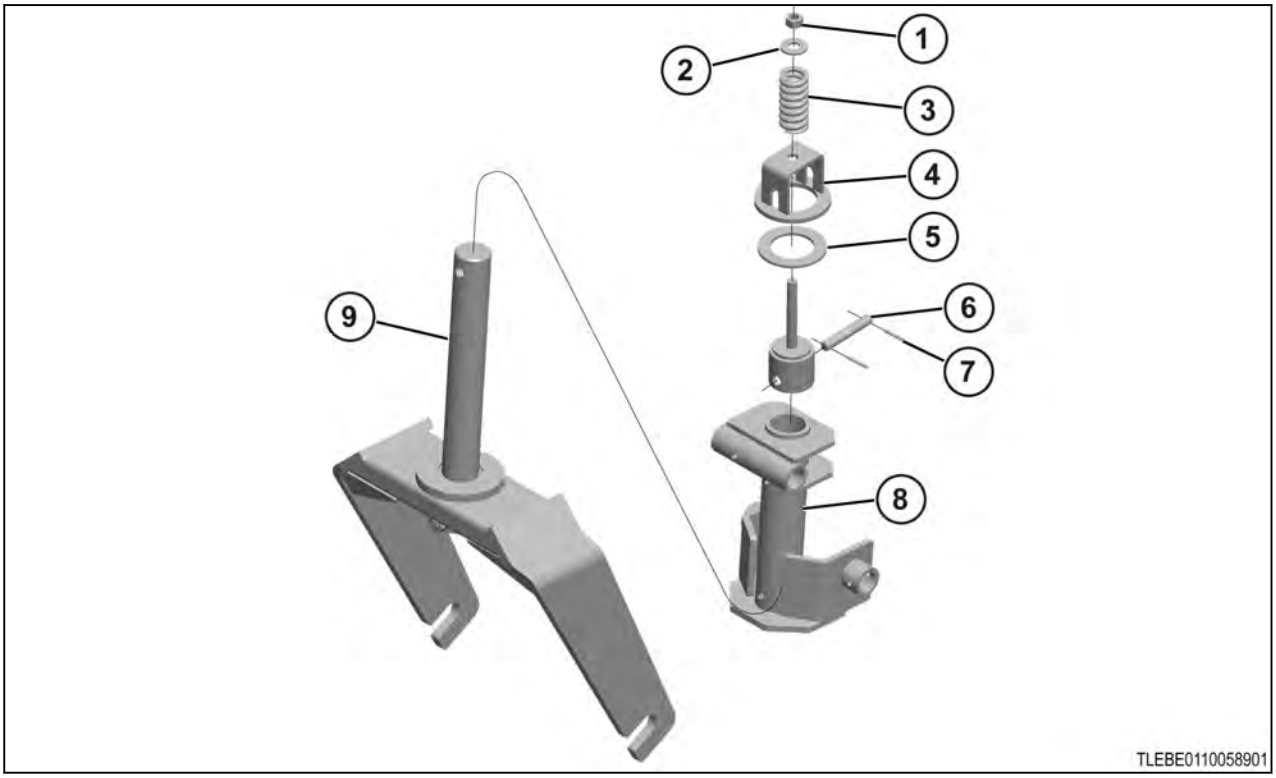


*Fig. 47*

Assemble the gauge wheel axle as shown.

| | | |
|---|---|---|
| (1) | 88611 | 3/4 lock nut |
| (2) | 88131 | 3/4 washer |
| (3) | 54834 | Compressor spring - 4 1/2 |
| (4) | 233748 | Top damper bracket |
| (5) | 233742 | Damper brake pad |
| (6) | 233749 | Pin |
| (7) | 88628 | 1/4 x 1 3/4 pin |
| (8) | 54571 | Gauge wheel pivot |
| (9) | 246786 | Gauge wheel yoke |

## 7.17.4 Installing the center frame gauge wheel axle - hydraulic

**Procedure**

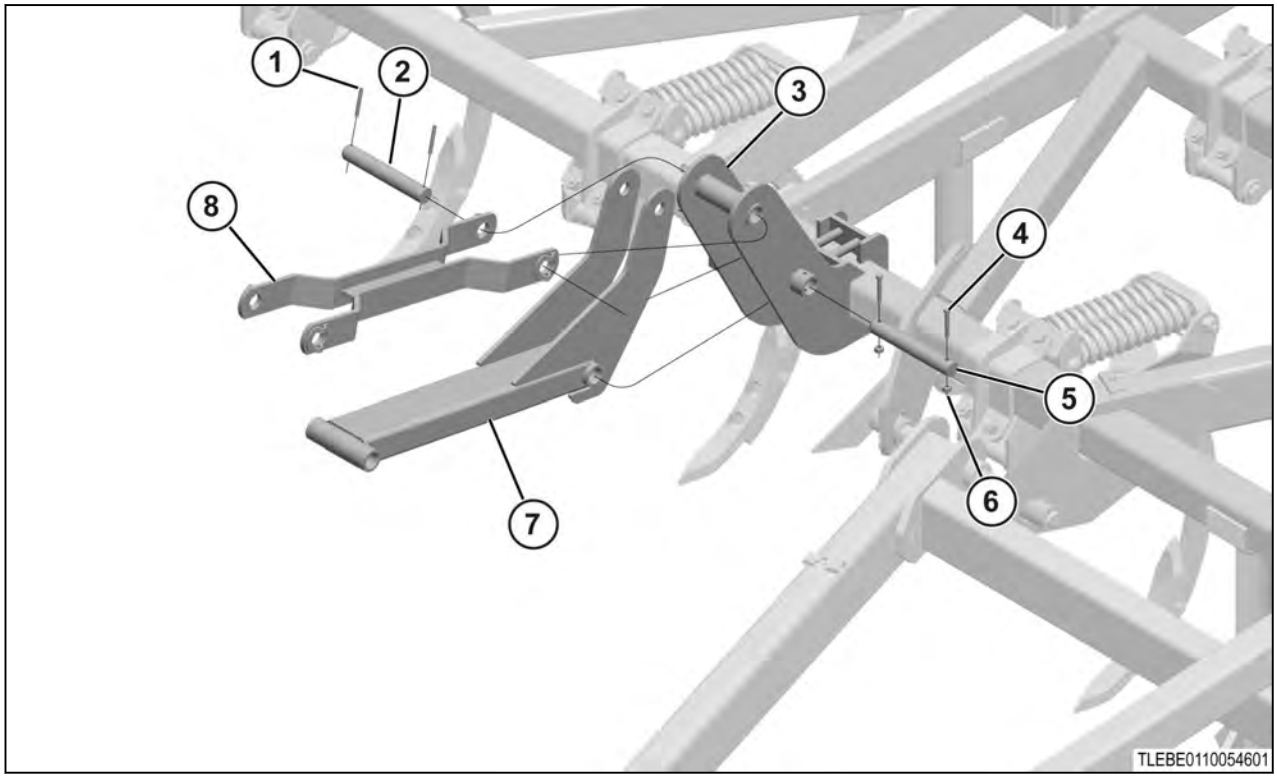


*Fig. 48*

Install the center frame gauge wheel axle as shown.

| | | |
|---|---|---|
| (1) | 88771 | 3/8 x 3 pin |
| (2) | 350775 | Pivot pin |
| (3) | 248417 | Front lift mast |
| (4) | 88582 | 3/8 x 2 3/4 hex bolt |
| (5) | 235801 | Pivot pin - 1 1/2 x 10 |
| (6) | 88659 | 3/8 lock nut |
| (7) | 350529 | Bottom lift arm |
| (8) | 350527 | Top link arm |

## 7.17.5 Installing the wing frame gauge wheel mount - hydraulic

**Procedure**

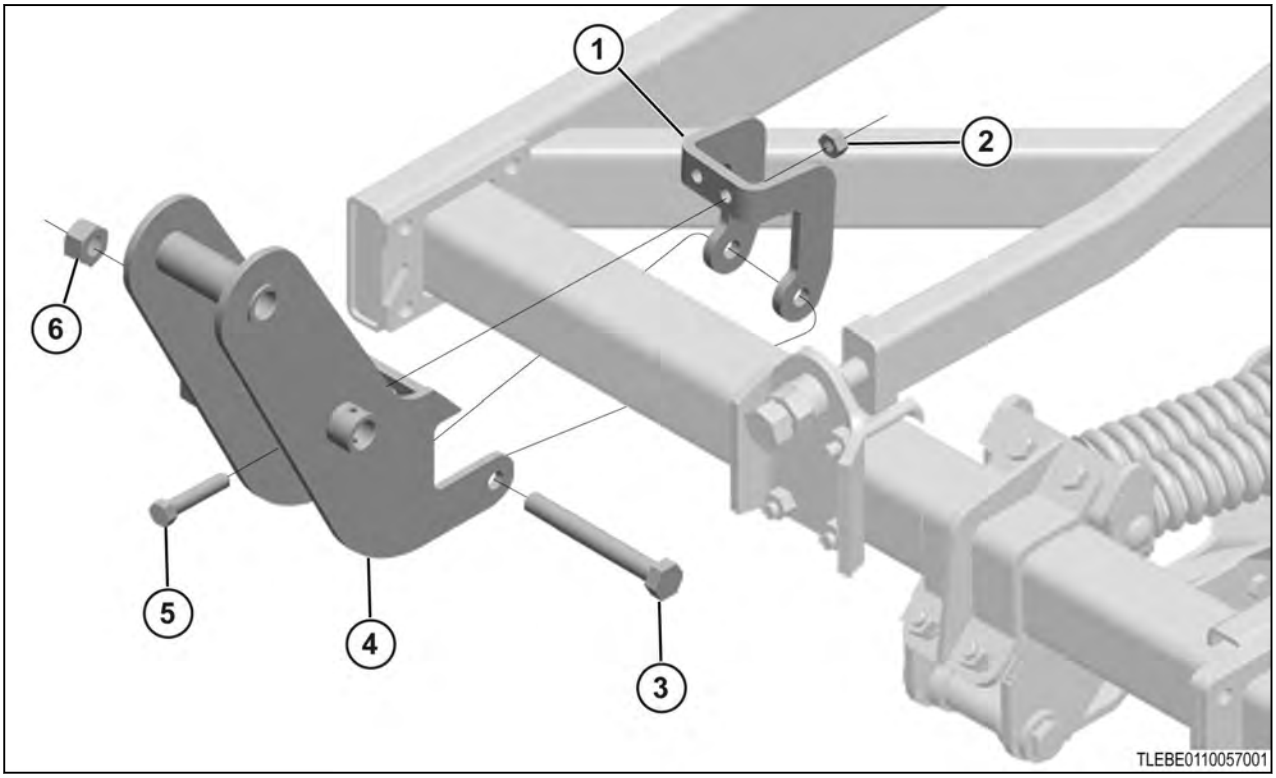


*Fig. 49*

Install the wing frame gauge wheel mount as shown.

| | | |
|---|---|---|
| (1) | 353493 | Caster wheel tube clamp |
| (2) | 88356 | 3/4 lock nut |
| (3) | 89359 | 1 x 8 hex bolt |
| (4) | 248417 | Front lift mast |
| (5) | 88955 | 3/4 x 3 hex bolt |
| (6) | 88348 | 1 lock nut |

## 7.17.6 Installing the wing frame gauge wheel linkages - hydraulic

**Procedure**

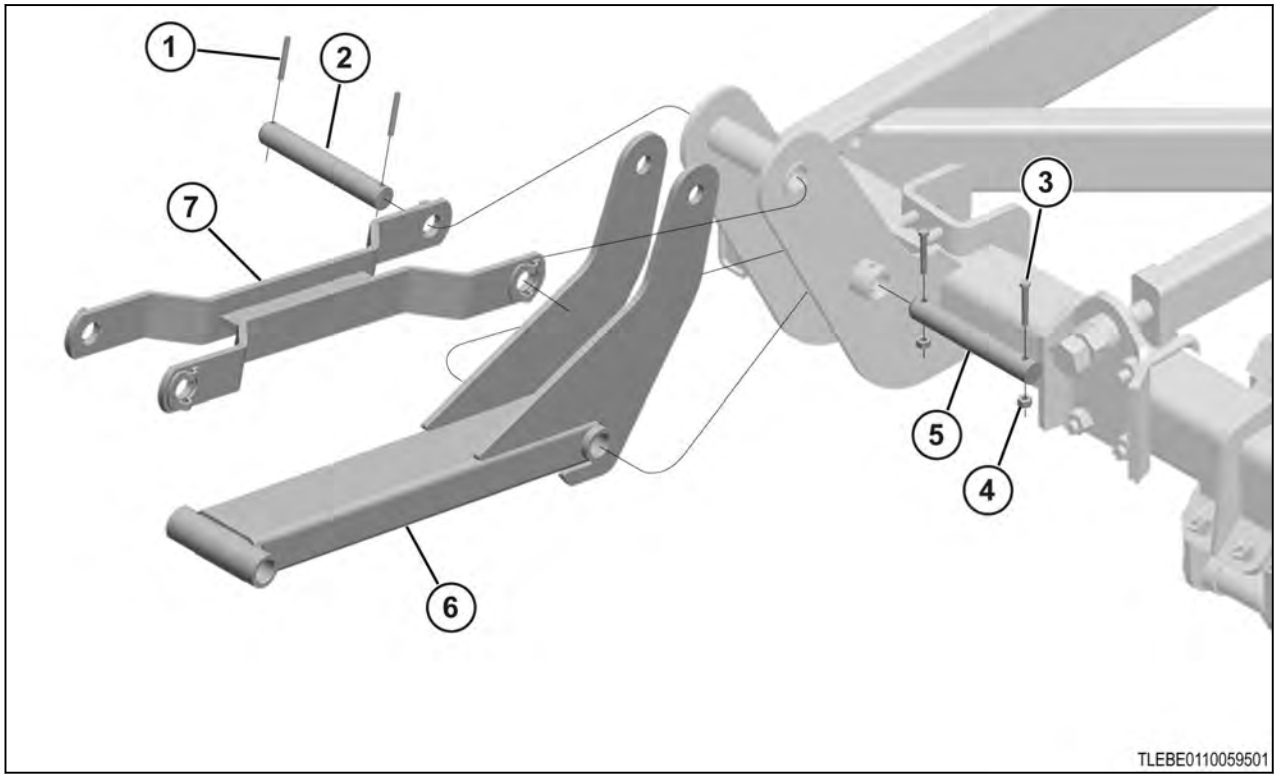


*Fig. 50*

Install the wing frame gauge wheel linkages as shown.

| | | |
|---|---|---|
| (1) | 88771 | 3/8 x 3 pin |
| (2) | 350775 | Pivot pin |
| (3) | 88582 | 3/8 x 2 3/4 hex bolt |
| (4) | 88659 | 3/8 lock nut |
| (5) | 235801 | Pivot pin - 1 1/2 x 10 |
| (6) | 350529 | Bottom lift arm |
| (7) | 350527 | Top link arm |

## 7.17.7 Assembling the wing frame gauge wheel axle - hydraulic

**Procedure**

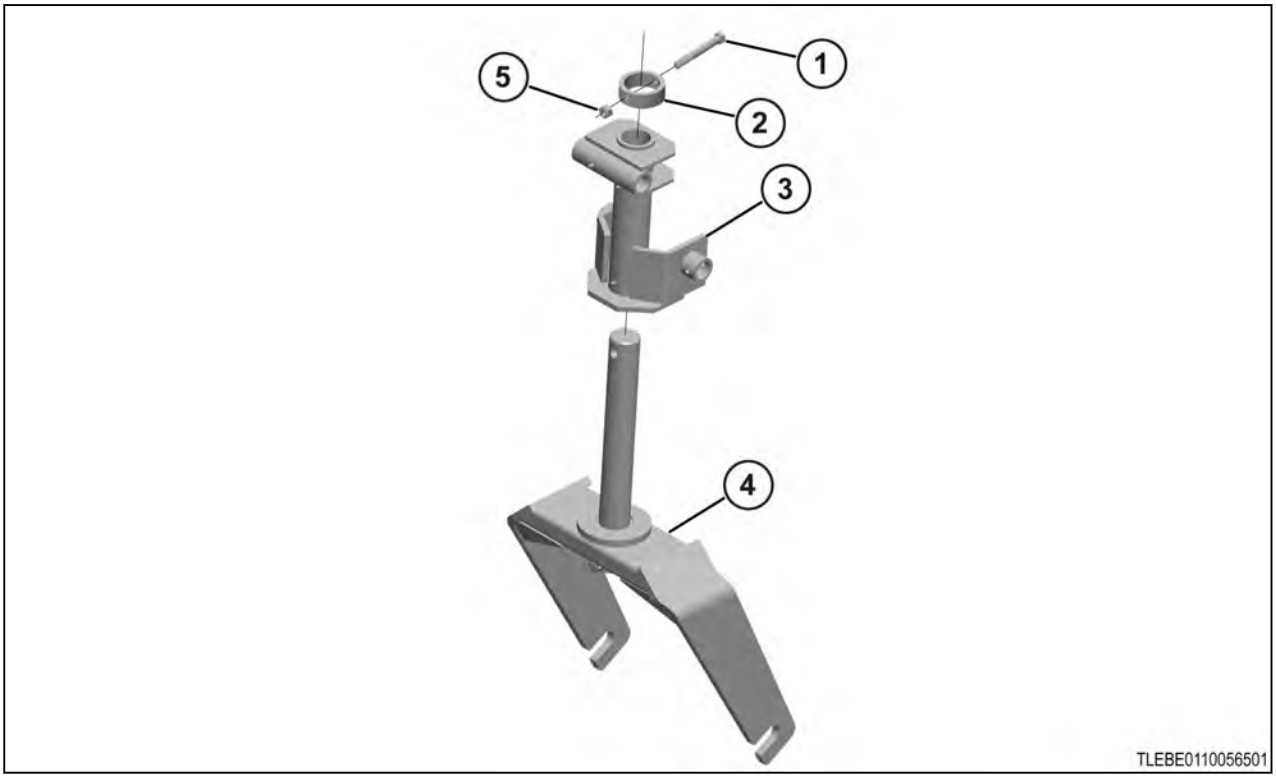


*Fig. 51*

Assembly to gauge wheel axle as shown.

| | | |
|---|---|---|
| (1) | 88272 | 3/4 x 4 hex bolt |
| (2) | 16009 | Collar |
| (3) | 54571 | Gauge wheel pivot |
| (4) | 246786 | Gauge wheel yoke |
| (5) | 88356 | 3/4 lock nut |

## 7.17.8 Installing the wing frame gauge wheel axle assembly - hydraulic

**Procedure**

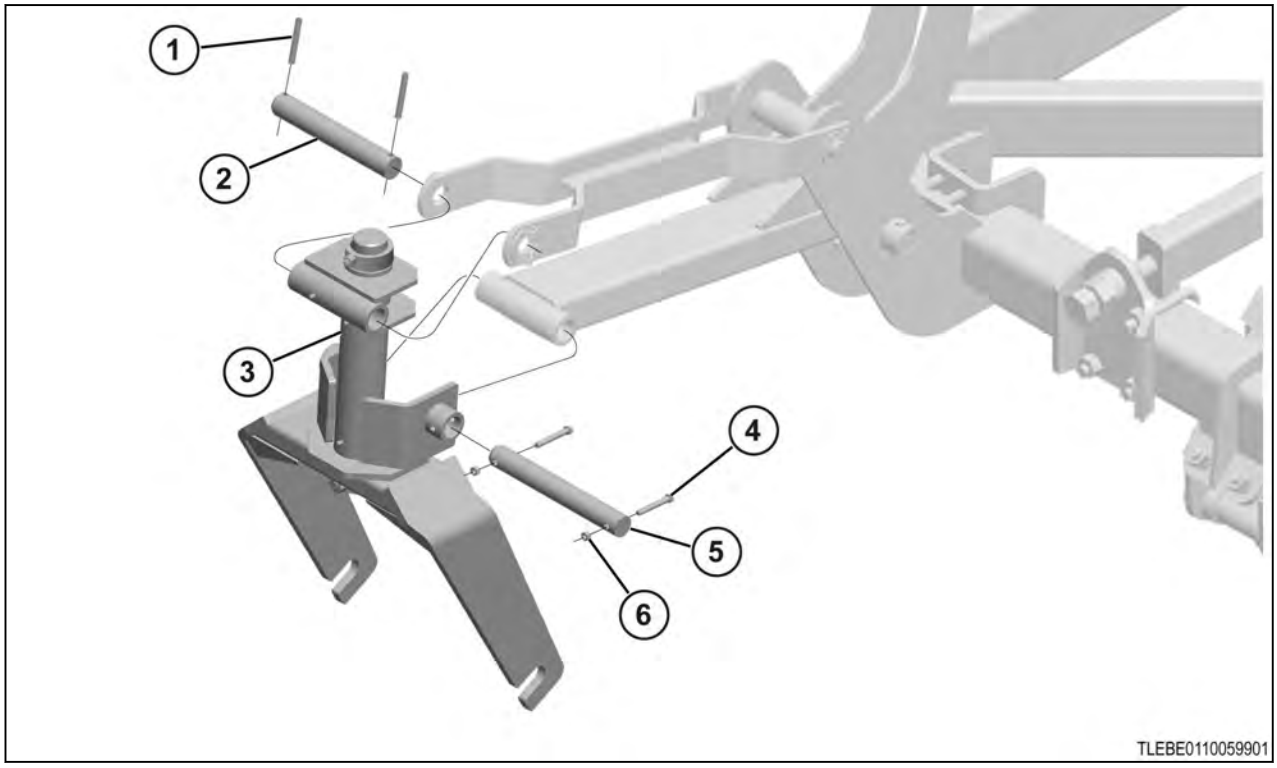


*Fig. 52*

Install the gauge wheel axle assembly as shown.

| | | |
|---|---|---|
| (1) | 88628 | 1/4 x 1 3/4 pin |
| (2) | 350775 | Pivot pin |
| (3) | 54571 | Gauge wheel pivot |
| (4) | 88582 | 3/8 x 2 3/4 hex bolt |
| (5) | 54595 | 1 1/2 x 9 19/32 pin |
| (6) | 88659 | 3/8 lock nut |

## 7.17.9 Installing the gauge wheel hubs and wheels - hydraulic

**Procedure**

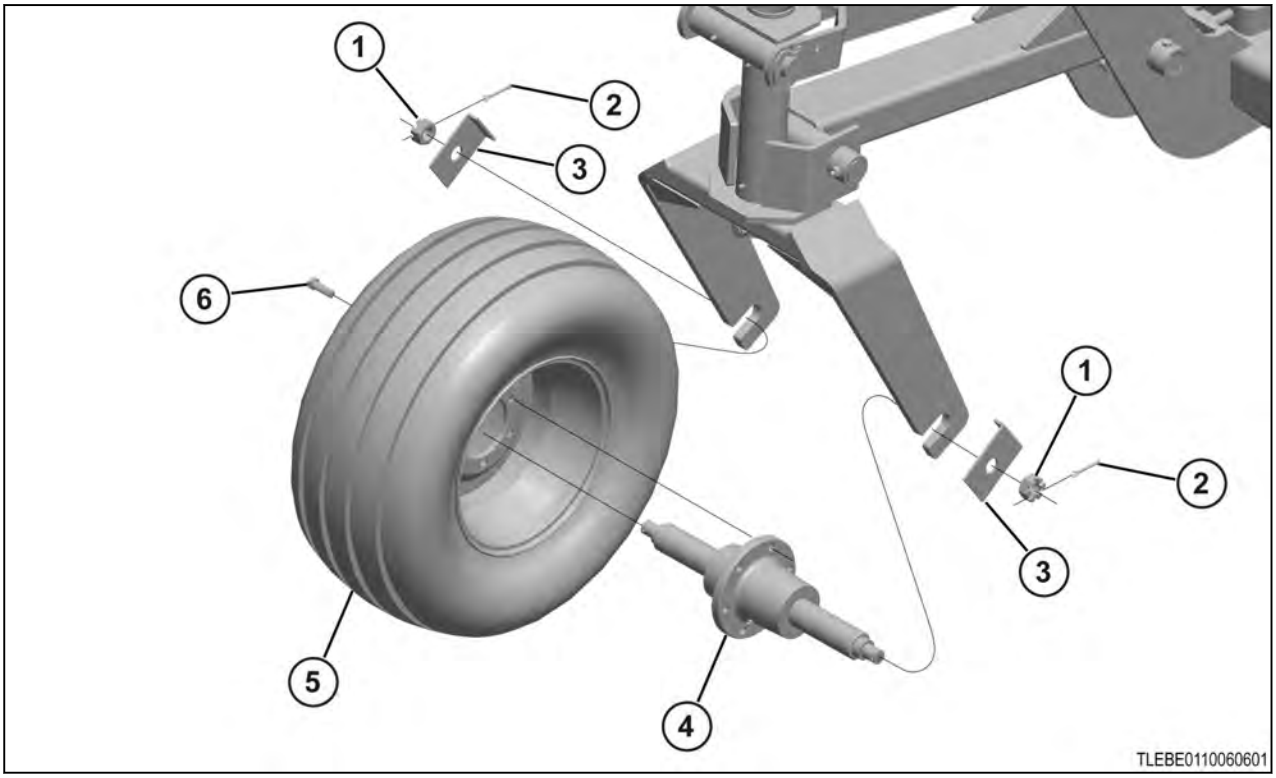


*Fig. 53*

Install the wheel hubs and wheels as shown.

| | | |
|---|---|---|
| (1) | 88299 | 1 slotted nut |
| (2) | 88133 | Cotter pin |
| (3) | 55150 | Spindle lock |
| (4) | 58294 | Yoke hub assembly |
| (5) | 222087 | Wheel assembly - 31 x 13.5 |
| (6) | 63831 | 9/16 x 1 1/2 wheel bolt |

## 7.17.10 Installing the gauge wheel lift tubes - hydraulic

**Procedure**

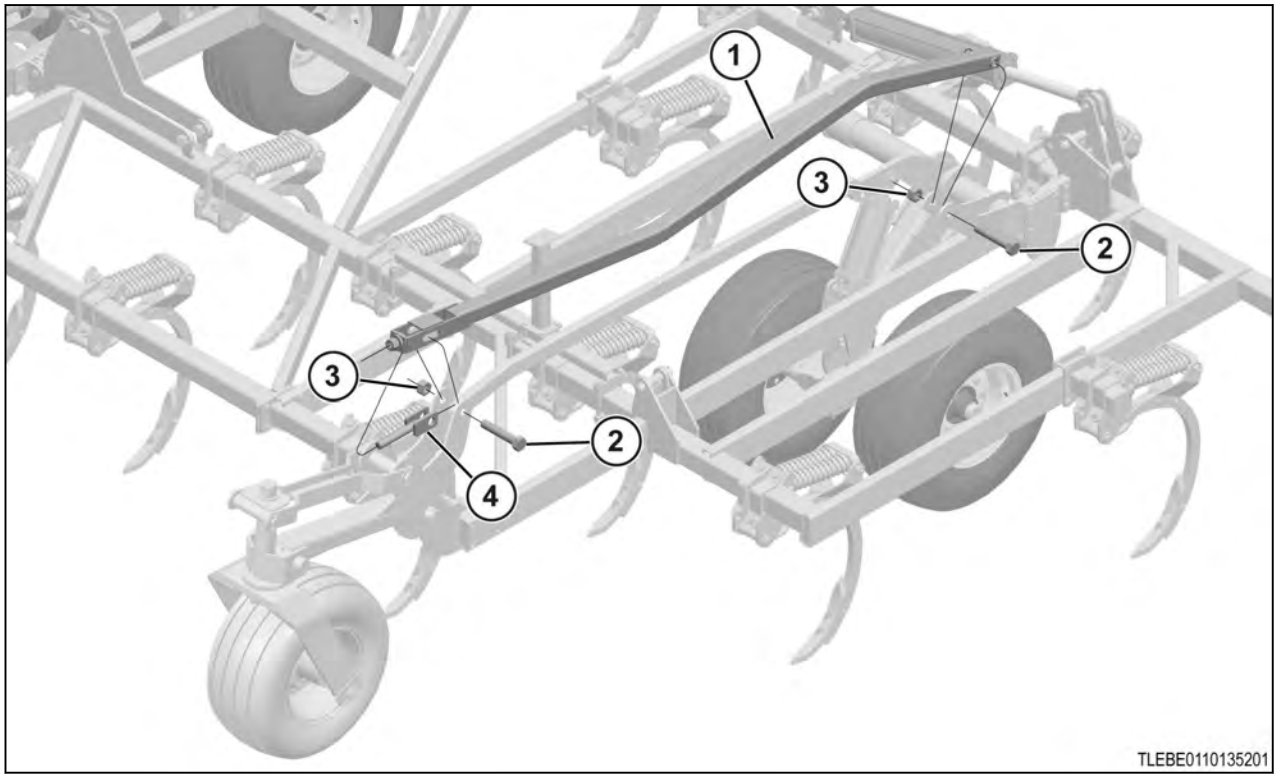


*Fig. 54*

Install the gauge wheel lift tubes as shown.

| | | |
|---|---|---|
| (1) | 351748 | Front lift tube - wing |
| | 350532 | Front lift tube - center |
| (2) | 88349 | 1 1/4 x 6 1/2 hex bolt |
| (3) | 88430 | 1 1/4 lock nut |
| (4) | 236377 | Adjustment link |

## 7.18 Installing the marker lamps

**Procedure**

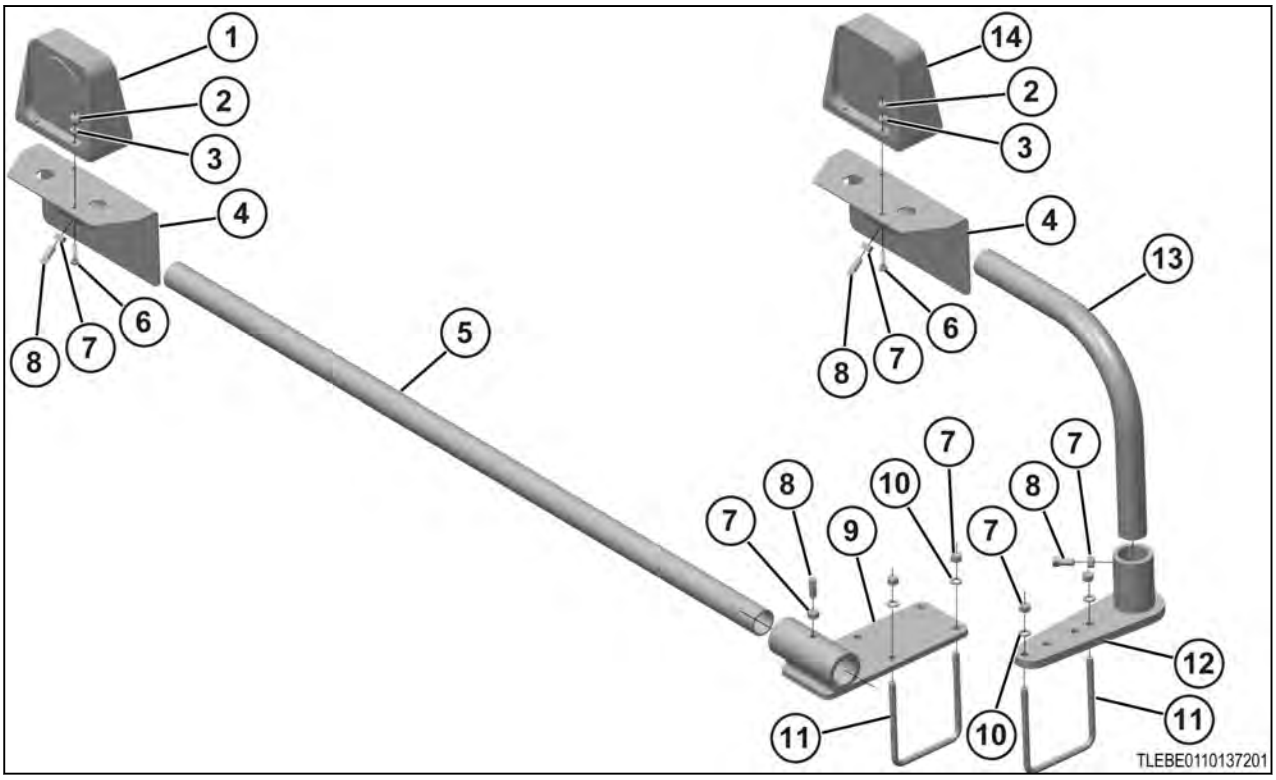


*Fig. 55*

Install the marker lamps as shown.

| | | |
|---|---|---|
| (1) | 223143 | Amber lamp |
| (2) | 88172 | 1/4 hex nut |
| (3) | 88262 | 1/4ID washer |
| (4) | 223126 | Lamp bracket |
| (5) | 108528 | Lamp arm - 48 in |
| (6) | 88203 | 1/4 x 1 hex bolt |
| (7) | 88103 | 3/8 hex nut |
| (8) | 88702 | 3/8 x 3/4 screw |
| (9) | 353989 | Lamp tube bracket |
| (10) | 88362 | 3/8ID washer |
| (11) | 88385 | 3/8 x 4 x 5 U-bolt |
| (12) | 223130 | Short base pivot |
| (13) | 223140 | Lamp arm |
| (14) | 223144 | Red lamp |

## 7.18.1 Installing the marker lamp harness

**Procedure**

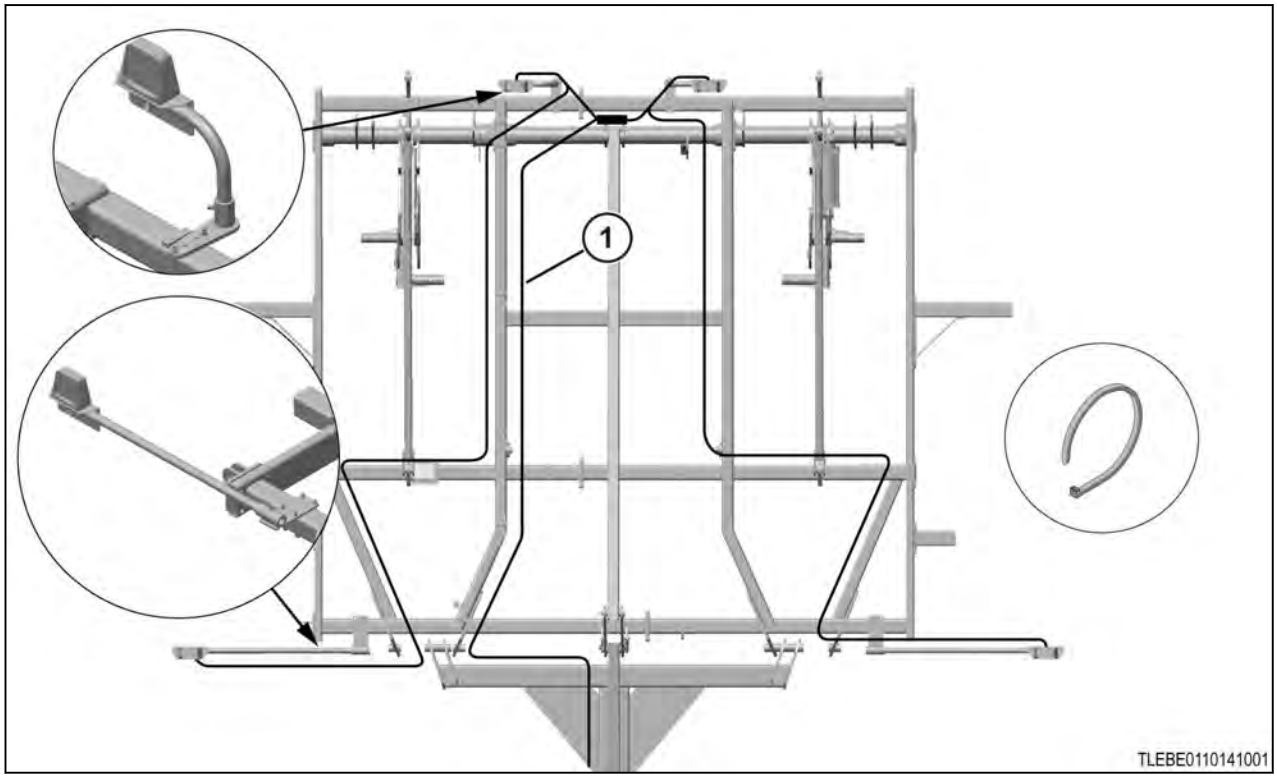


*Fig. 56*

Install the marker lamp harness as shown.

| | | |
|---|---|---|
| (1) | 223330 | Marker lamp harness |

## 7.19 Installing the rear tow hitch

**Procedure**

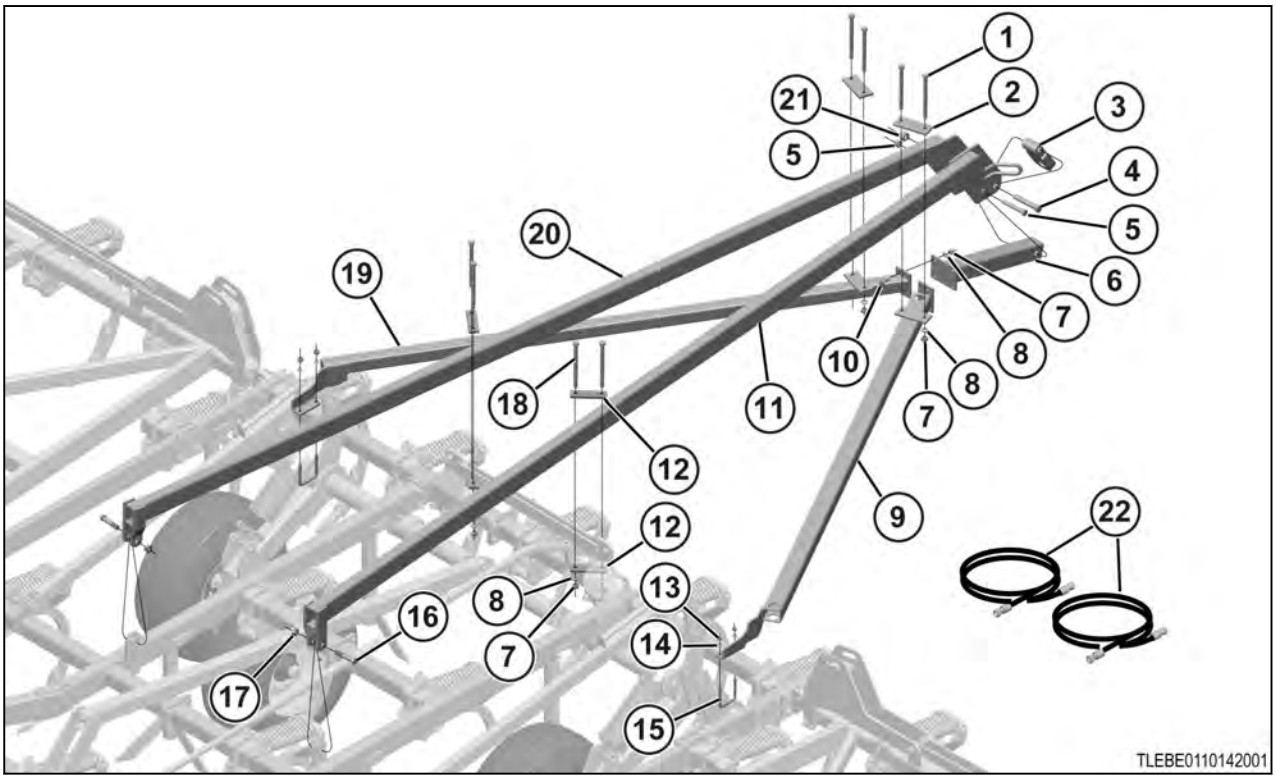


*Fig. 57*

Install the rear tow hitch as shown.

| | | |
|---|---|---|
| (1) | 88335 | 3/4 x 7 hex bolt |
| (2) | 233406 | Tie plate |
| (3) | 18237 | Hitch |
| (4) | 89134 | 1 1/4 x 7 hex bolt |
| (5) | 88666 | 1 x 6 1/2 hex bolt |
| (6) | 353498 | Hitch down tube |
| (7) | 88110 | 3/4 hex nut |
| (8) | 88130 | 3/4ID washer |
| (9) | 233401 | Left-hand outer hitch brace |
| (10) | 88290 | 3/4 x 2 hex bolt |
| (11) | 353495 | Left-hand inner hitch brace |
| (12) | 353496 | Plate |
| (13) | 88126 | 5/8 hex nut |
| (14) | 88129 | 5/8 washer |
| (15) | 88145 | 5/8 x 4 x 5 1/4 U-bolt |
| (16) | 88580 | 1 x 4 1/2 hex bolt |
| (17) | 88658 | 1 lock nut |
| (18) | 88867 | 3/4 x 10 hex bolt |

| | | |
|---|---|---|
| (19) | 233400 | Right-hand outer hitch brace |
| (20) | 353494 | Right-hand inner hitch brace |
| (21) | 88430 | 1 1/4 lock nut |
| (22) | 238618 | Hose - 3/8 x 420 |

# 7.20 Installing the hydraulics

**Before starting the procedure**

**WARNING:**
**The cylinders are not filled with oil and must be bled of air before field operation. Failure to do so will cause unwarrantable machine damage and/or personal injury. See the information for bleeding air from the hydraulic lift system and hydraulic fold system.**

**WARNING:**
**Leaking fluid under pressure can enter the skin causing serious injury. Release pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keeps hands and body away from pinholes and nozzles which eject fluids under high pressure. Wear correct hand and correct eye protection when looking for leaks. Use a piece of cardboard or paper instead of your hand. Any fluid injected into the skin can cause gangrene. The fluid must be removed by a doctor familiar with this type of injury.**

To bleed the air from the hydraulic lift system the machine must be connected to a tractor that is the correct size to operate the machine.

**Procedure**

1. Use the illustrations and parts tables on the following pages to install the hydraulics.
2. Set the tractor hydraulic flow to less than 75.7 l/min (20 gal/min (US)).
3. Bleed the cylinders of air before initial field operation. See the information for bleeding air from the lift hydraulics and fold hydraulics.

## 7.20.1 Installing the center lift cylinders

**Procedure**

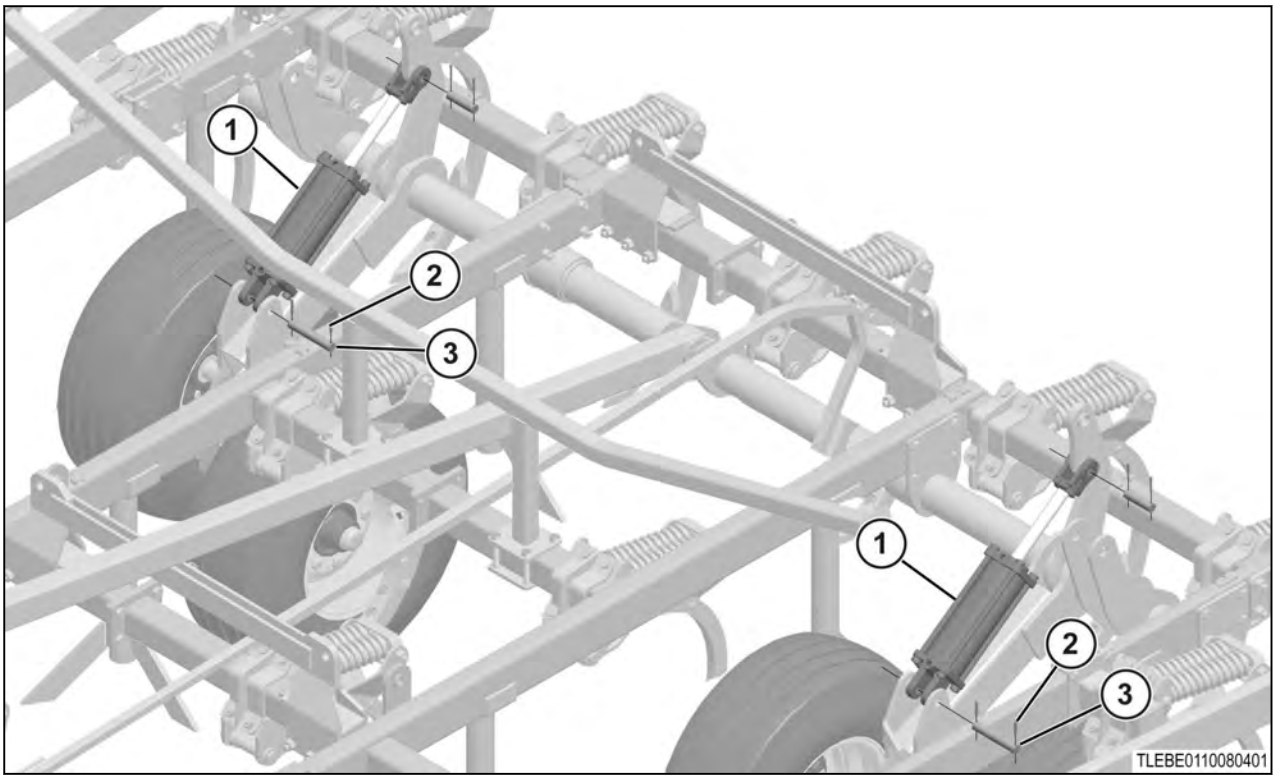


*Fig. 58*

Install the center lift cylinders as shown.

| | | |
|---|---|---|
| (1) | 351601 | 4 1/2 x 10 cylinder |
| (2) | 42484 | 1/4 x 2 1/4 pin |
| (3) | 68033 | 1 x 6.38 pin |

## 7.20.2 Installing the wing lift cylinders

**Procedure**

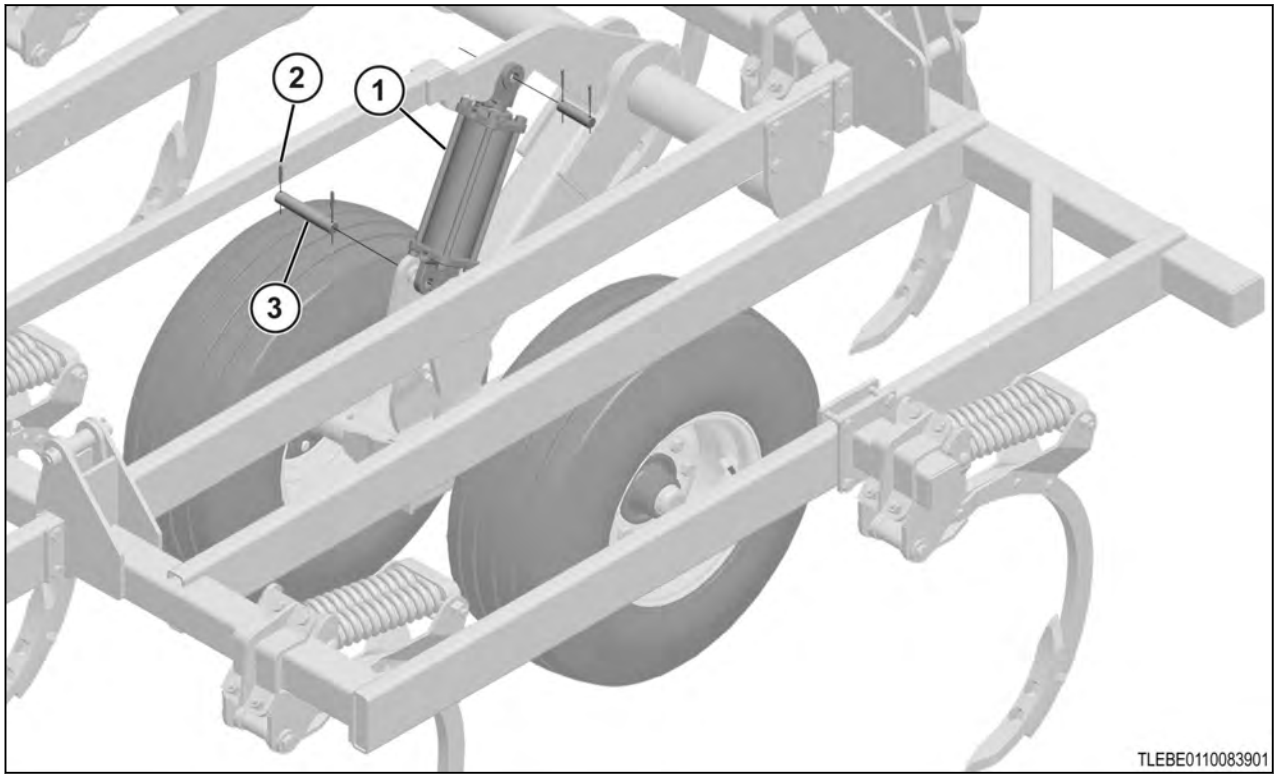


*Fig. 59*

Install the wing lift cylinder as shown.

| | | |
|---|---|---|
| (1) | 351602 | 4 x 10 cylinder |
| (2) | 42484 | 1/4 x 2 1/4 pin |
| (3) | 68033 | 1 x 6.38 pin |

## 7.20.3 Installing the 19 to 23 ft lift hydraulics

**Procedure**

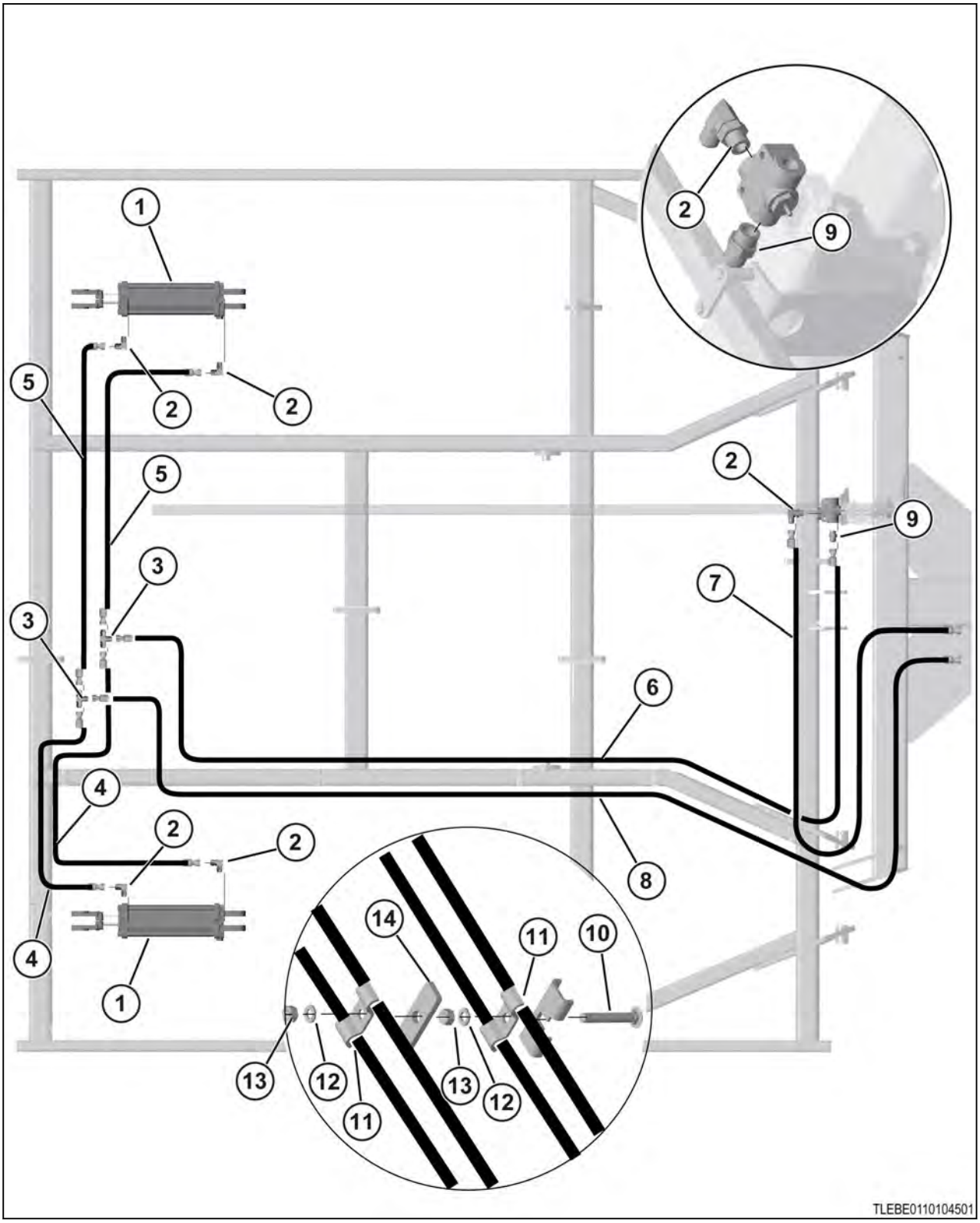


*Fig. 60*

Install the hydraulics as shown.

| | | |
|---|---|---|
| (1) | 351601 | 4 1/2 x 10 cylinder |
| (2) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (3) | 13238 | Tee fitting |
| (4) | 13265 | Hose - 3/8 x 56 |
| (5) | 13482 | Hose - 3/8 x 108 |
| (6) | 208612 | Hose - 1/2 x 204 |
| (7) | 240611 | Hose - 3/8 x 360 |
| (8) | 241494 | Hose - 1/2 x 276 |
| (9) | 24024 | Adapter fitting |
| (10) | 89473 | Carriage bolt - 3/8 x 2 1/2 |
| (11) | 13215 | Clamp |
| (12) | 88362 | 3/8ID washer |
| (13) | 88103 | 3/8 hex nut |
| (14) | 15543 | Base plate |

## 7.20.4 Installing the 25 to 29 ft lift hydraulics

**Procedure**

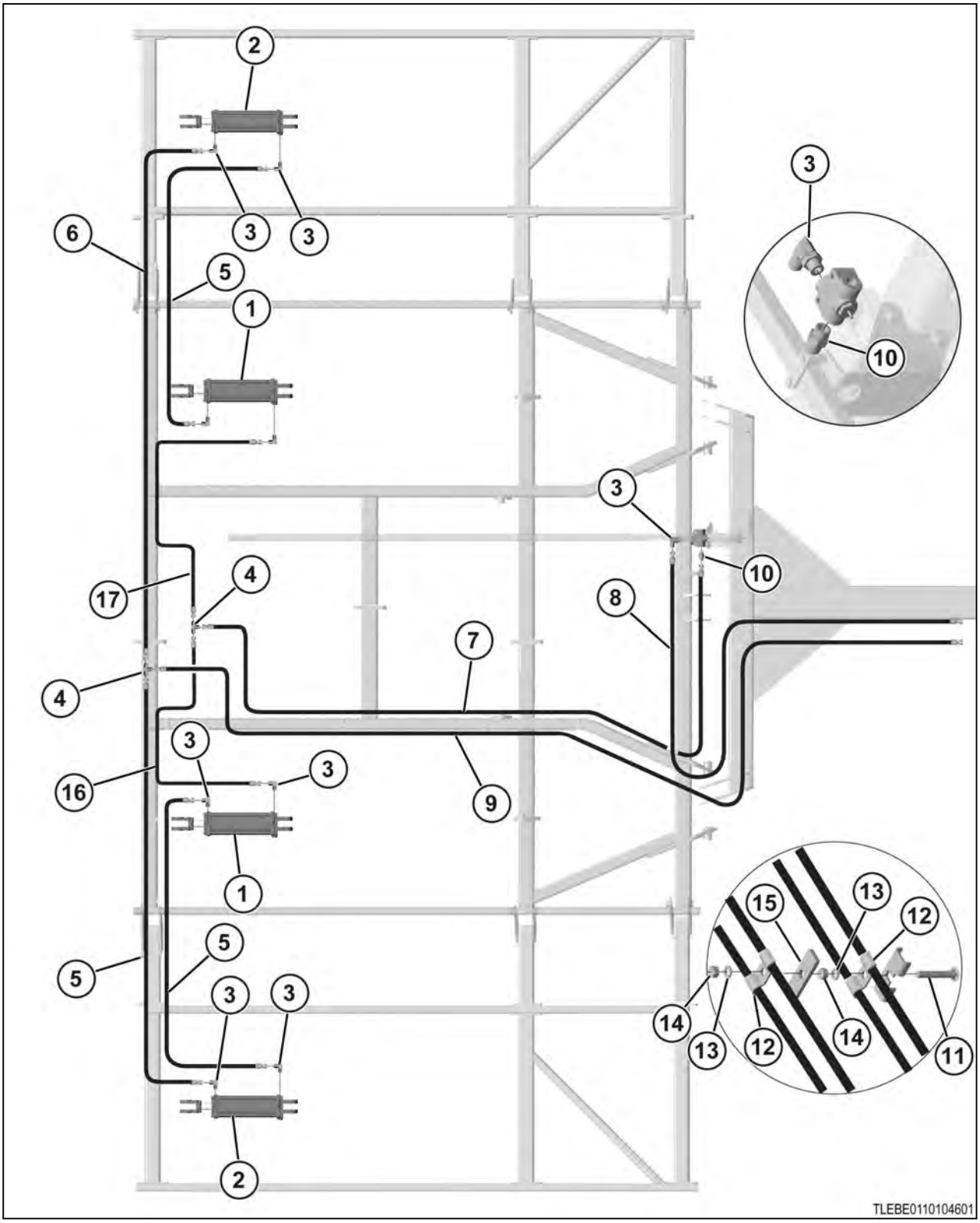


*Fig. 61*

Install the hydraulics as shown.

| | | |
|---|---|---|
| (1) | 351601 | 4 1/2 x 10 cylinder |
| (2) | 351602 | 4 x 10 cylinder |
| (3) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (4) | 13238 | Tee fitting |
| (5) | 67634 | Hose - 3/8 x 132 |
| (6) | 59909 | Hose - 3/8 x 168 |
| (7) | 208612 | Hose - 1/2 x 204 |
| (8) | 240611 | Hose - 3/8 x 360 |
| (9) | 241494 | Hose - 1/2 x 276 |
| (10) | 24024 | Adapter fitting |
| (11) | 89473 | Carriage bolt - 3/8 x 2 1/2 |
| (12) | 13215 | Clamp |
| (13) | 88362 | 3/8ID washer |
| (14) | 88103 | 3/8 hex nut |
| (15) | 15543 | Base plate |
| (16) | 13265 | Hose - 3/8 x 56 |
| (17) | 13482 | Hose - 3/8 x 108 |

## 7.20.5 Installing the 31 to 41 ft lift hydraulics

**Procedure**

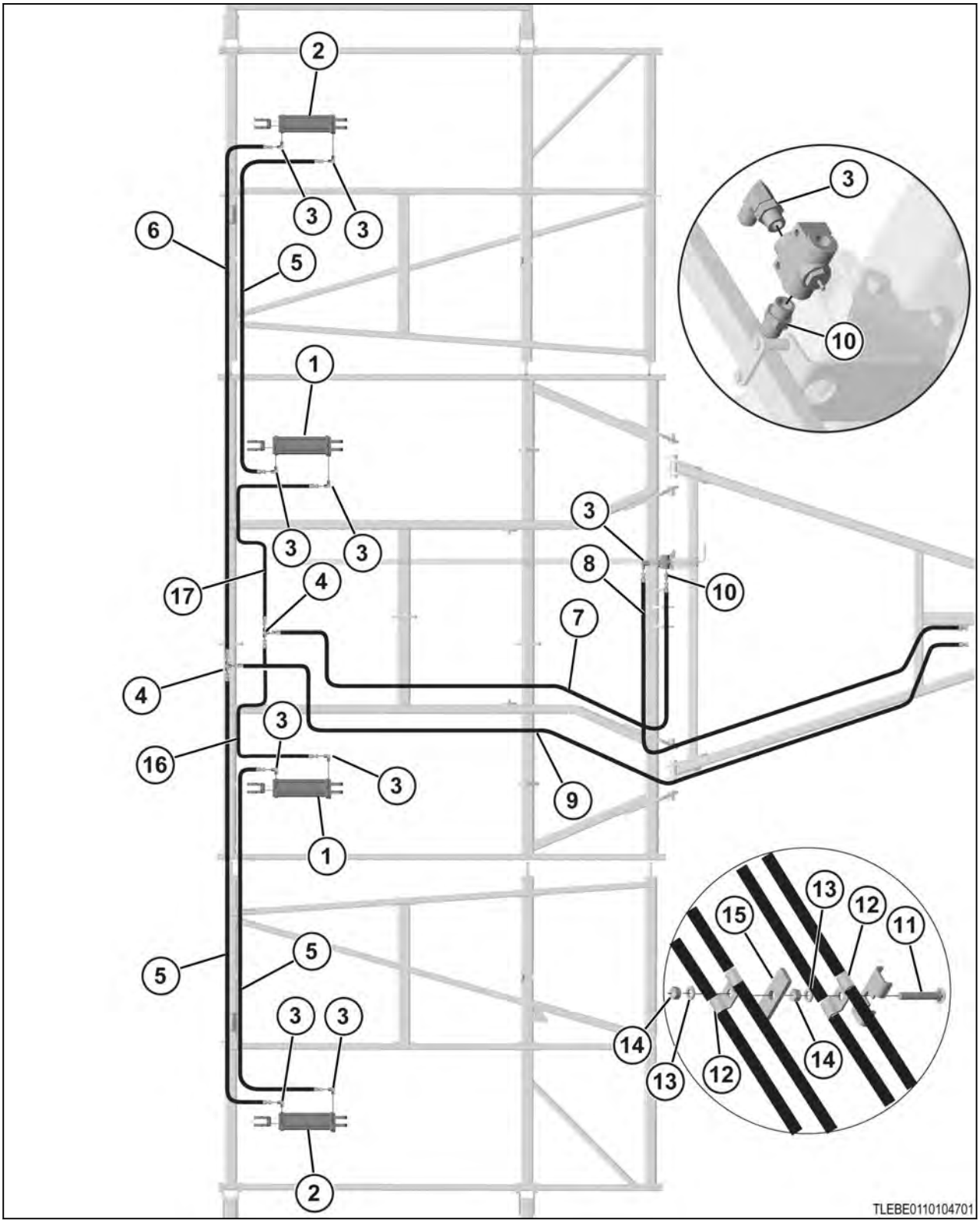


*Fig. 62*

Install the hydraulics as shown.

| | | |
|---|---|---|
| (1) | 351601 | 4 1/2 x 10 cylinder |
| (2) | 351602 | 4 x 10 cylinder |
| (3) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (4) | 13238 | Tee fitting |
| (5) | 13484 | Hose - 3/8 x 156 |
| (6) | 234947 | Hose - 3/8 x 194 |
| (7) | 208612 | Hose - 1/2 x 204 |
| (8) | 240611 | Hose - 3/8 x 360 |
| (9) | 241494 | Hose - 1/2 x 276 |
| (10) | 24024 | Adapter fitting |
| (11) | 89473 | Carriage bolt - 3/8 x 2 1/2 |
| (12) | 13215 | Clamp |
| (13) | 88362 | 3/8ID washer |
| (14) | 88103 | 3/8 hex nut |
| (15) | 15543 | Base plate |
| (16) | 13265 | Hose - 3/8 x 56 |
| (17) | 13482 | Hose - 3/8 x 108 |

## 7.20.6 Installing the 37 to 47 ft lift hydraulics

**Procedure**

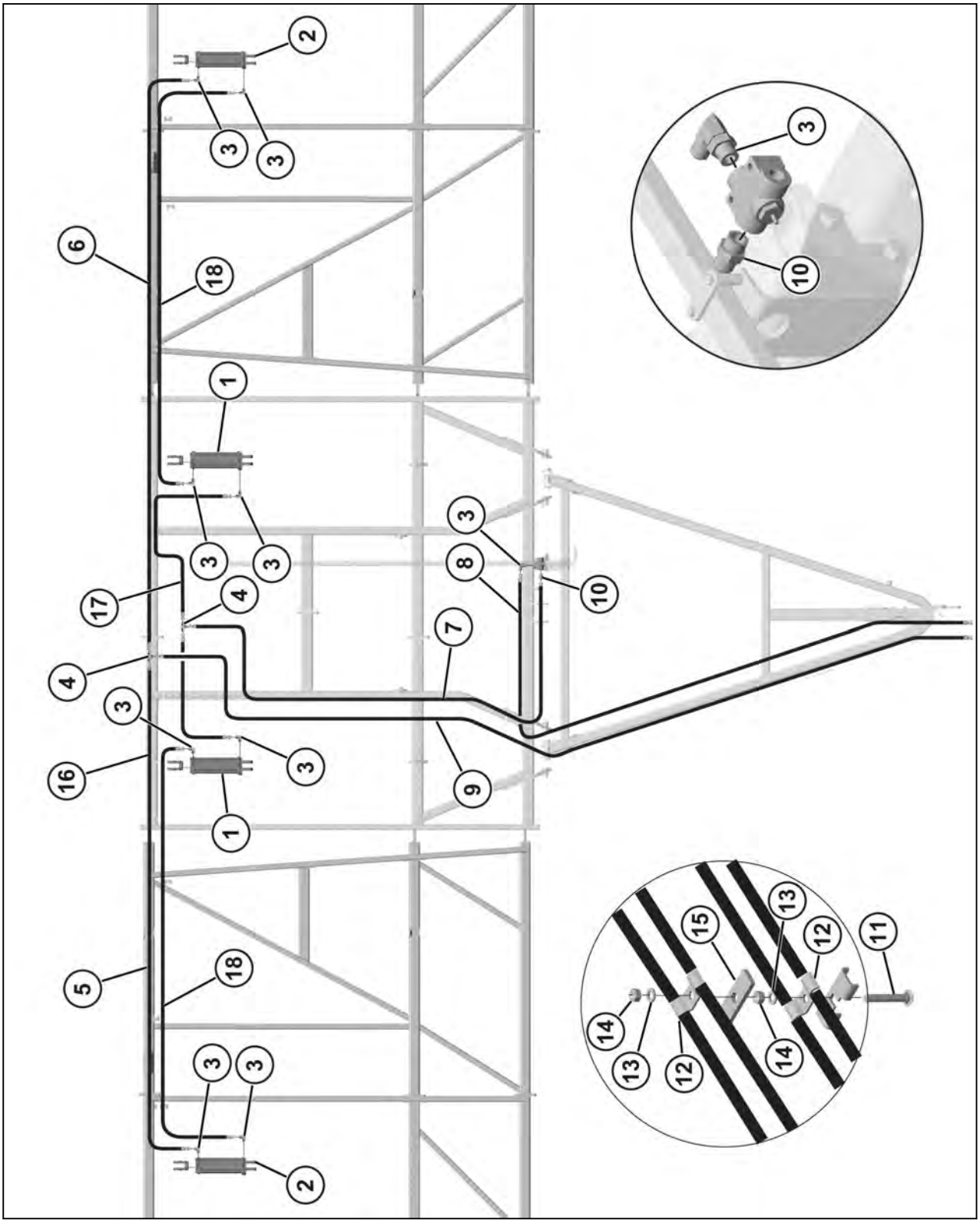


*Fig. 63*

Install the hydraulics as shown.

| | | |
|---|---|---|
| (1) | 351601 | 4 1/2 x 10 cylinder |
| (2) | 351602 | 4 x 10 cylinder |
| (3) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (4) | 13238 | Tee fitting |
| (5) | 237155 | Hose - 3/8 x 244 |
| (6) | 247431 | Hose - 3/8 x 232 |
| (7) | 208612 | Hose - 1/2 x 204 |
| (8) | 240611 | Hose - 3/8 x 360 |
| (9) | 241494 | Hose - 1/2 x 276 |
| (10) | 24024 | Adapter fitting |
| (11) | 89473 | Carriage bolt - 3/8 x 2 1/2 |
| (12) | 13215 | Clamp |
| (13) | 88362 | 3/8ID washer |
| (14) | 88103 | 3/8 hex nut |
| (15) | 15543 | Base plate |
| (16) | 13265 | Hose - 3/8 x 56 |
| (17) | 13482 | Hose - 3/8 x 108 |
| (18) | 234947 | Hose - 3/8 x 194 |

## 7.20.7 Installing the 19 to 29 ft fold cylinders

**Procedure**

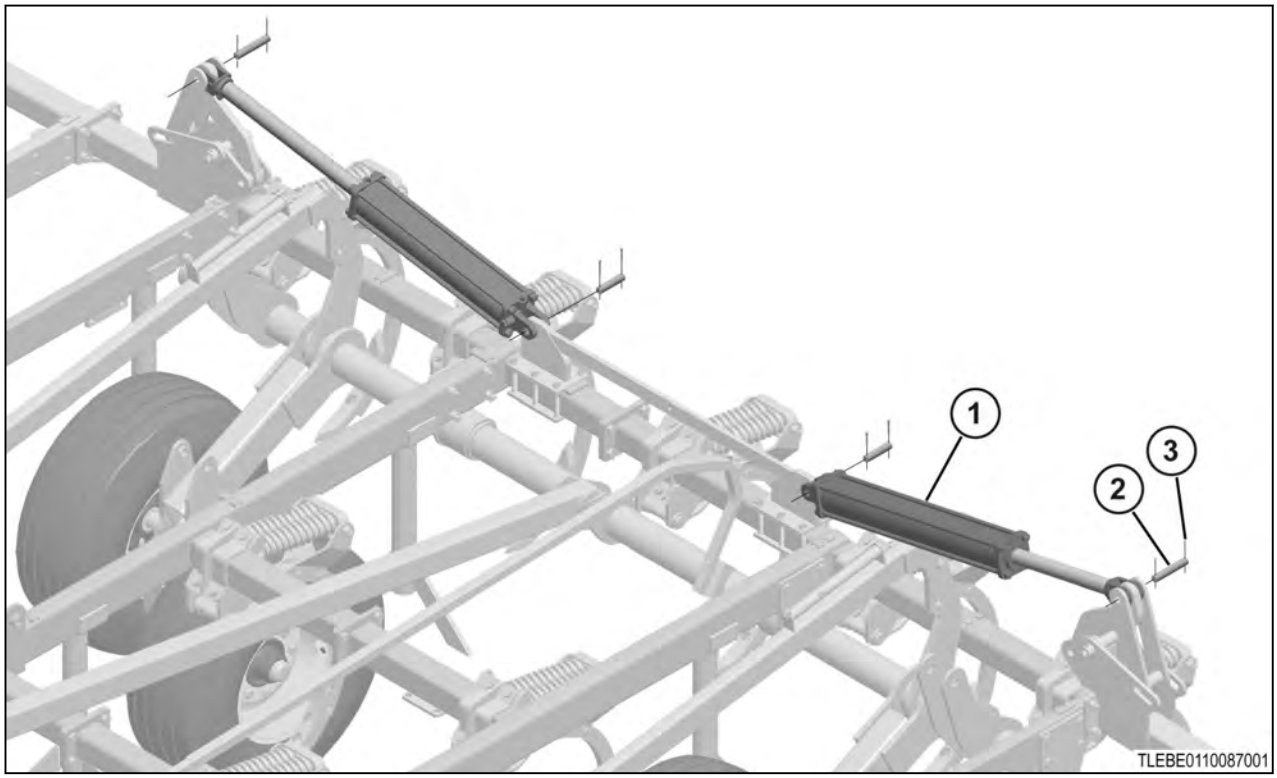


*Fig. 64*

Install the fold cylinders as shown.

| | | |
|---|---|---|
| (1) | 247830 | 4 x 24 cylinder (with base pins) |
| (2) | 222338 | 1 x 4 1/8 pin |
| (3) | 42484 | 1/4 x 2 1/4 pin |

## 7.20.8 Installing the 31 to 47 ft center fold cylinders

**Procedure**

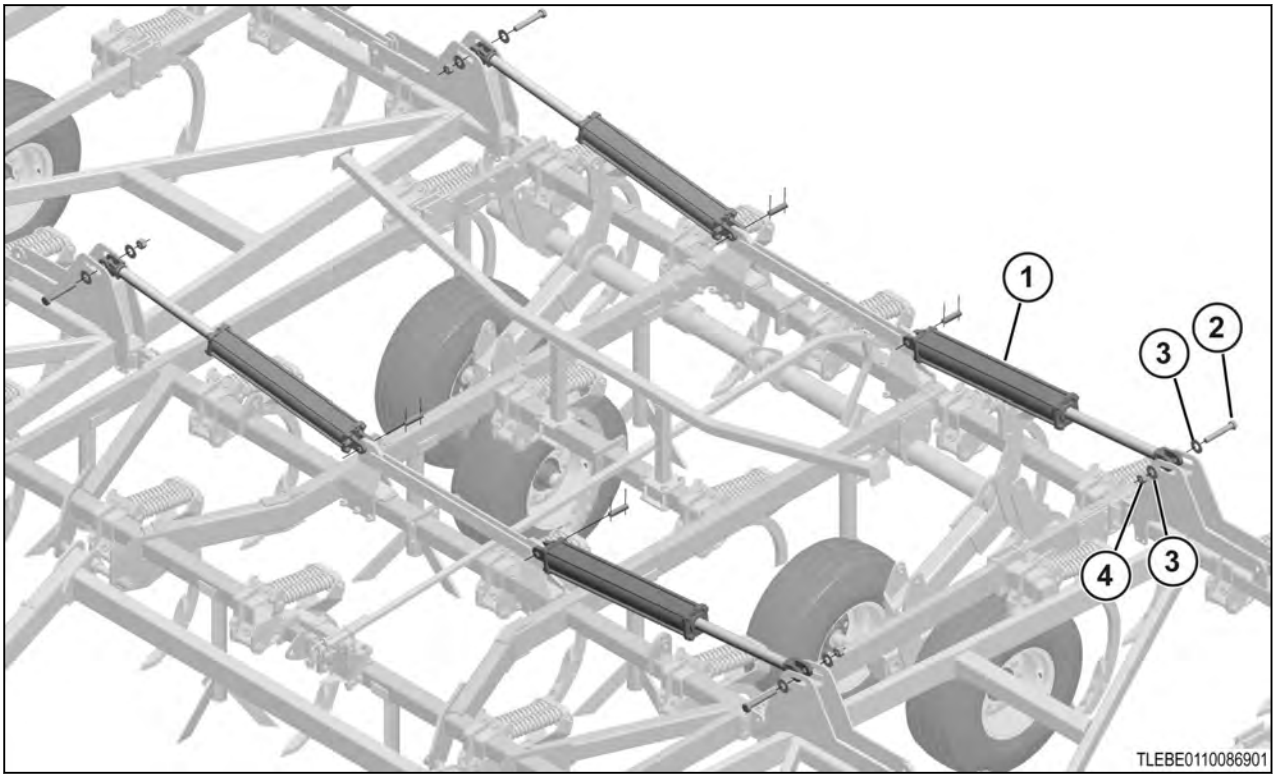


*Fig. 65*

Install the center fold cylinders as shown.

| | | |
|---|---|---|
| (1) | 247831 | 4 x 30 cylinder (with base pins) |
| (2) | 88666 | 1 x 6 1/2 hex bolt |
| (3) | 88196 | 1 washer |
| (4) | 88348 | 1 lock nut |

## 7.20.9 Installing the 31 to 47 ft outer fold cylinders

**Procedure**

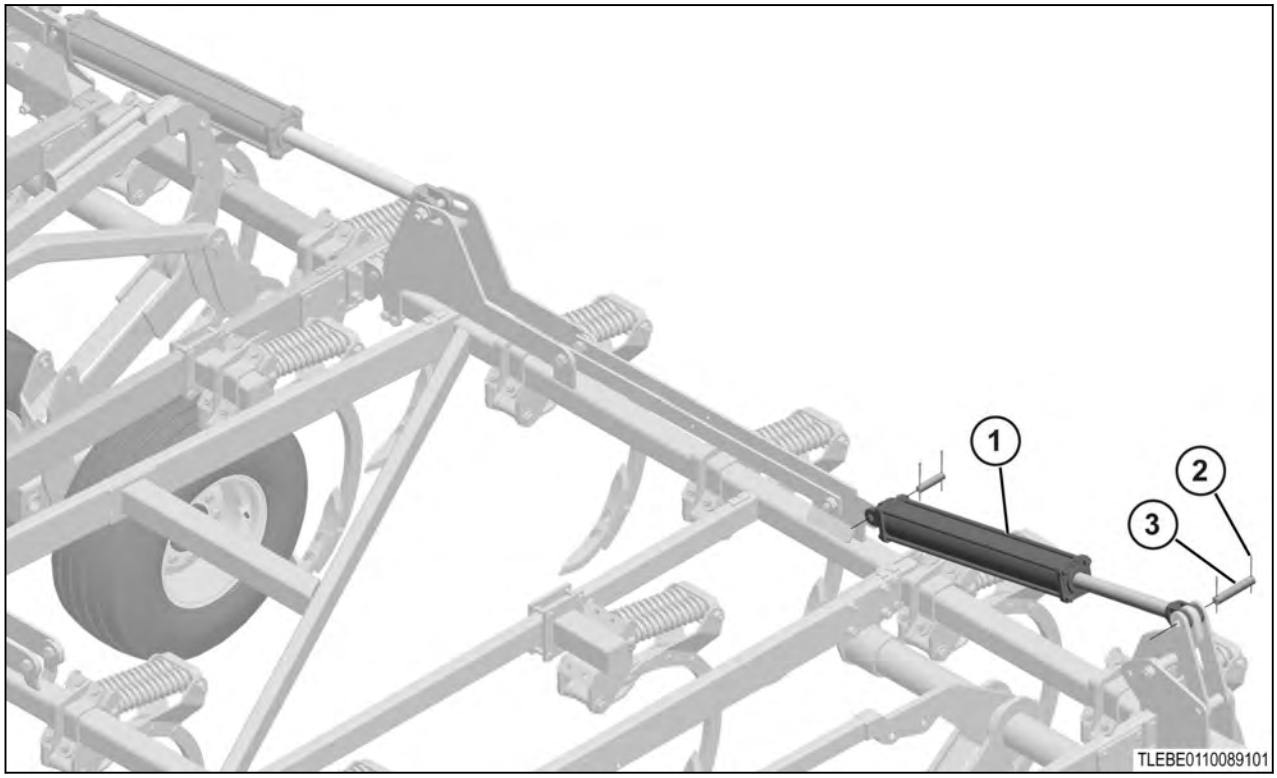


*Fig. 66*

Install the fold cylinders as shown.

| | | |
|---|---|---|
| (1) | 247830 | 4 x 24 cylinder (with base pins) |
| (2) | 42484 | 1/4 x 2 1/4 pin |
| (3) | 222338 | 1 x 4 1/8 pin |

## 7.20.10 Installing the 19 to 29 ft fold hydraulics

**Procedure**

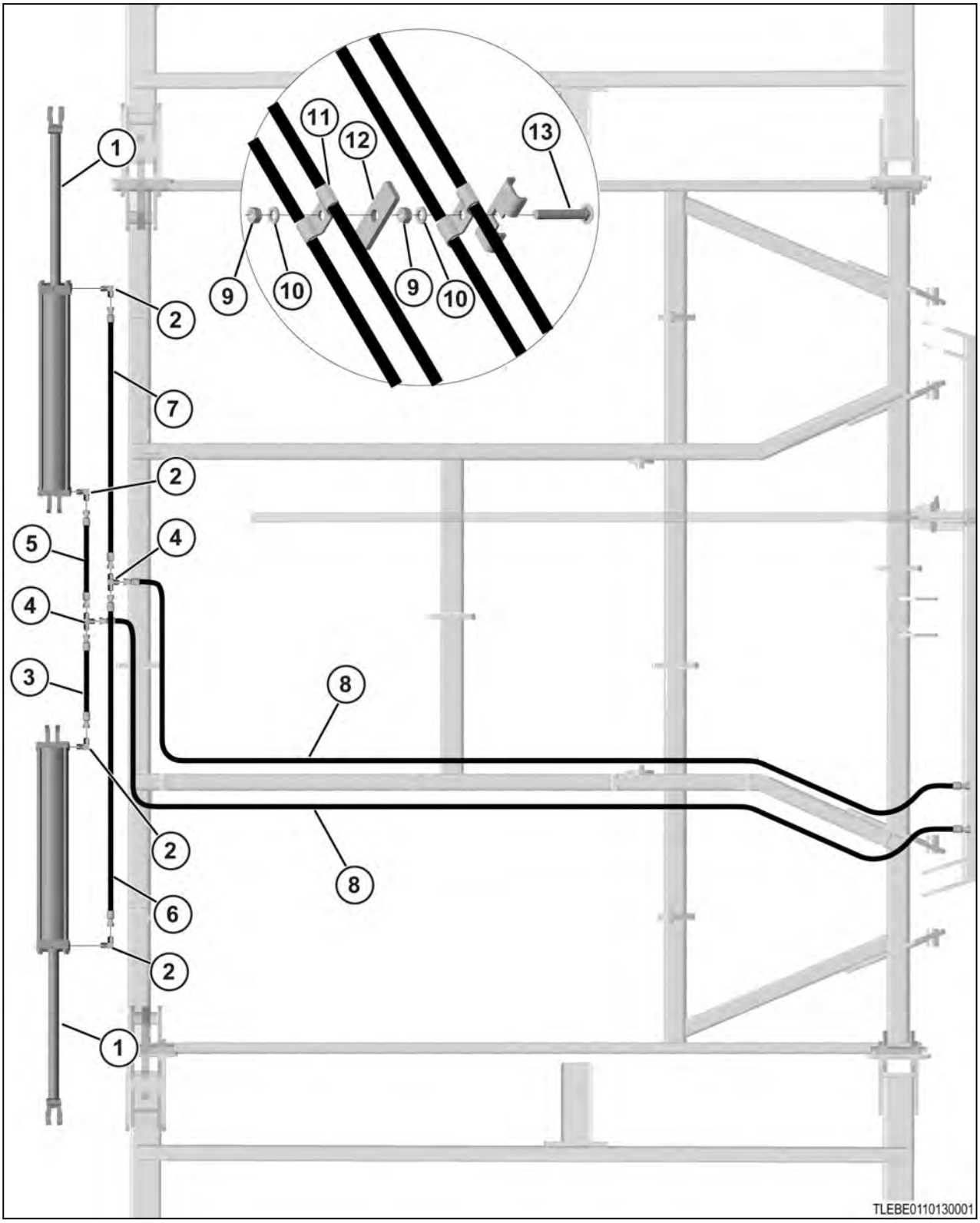


*Fig. 67*

Install the fold hydraulics as shown.

| | | |
|---|---|---|
| (1) | 247830 | 4 x 24 cylinder (with base pins) |
| (2) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (3) | 13423 | Hose - 3/8 x 24 |
| (4) | 13238 | Tee fitting |
| (5) | 13265 | Hose - 3/8 x 56 |
| (6) | 25597 | Hose - 3/8 x 40 |
| (7) | 56540 | Hose - 3/8 x 89 |
| (8) | 240611 | Hose - 3/8 x 360 |
| (9) | 88103 | 3/8 hex nut |
| (10) | 88362 | 3/8ID washer |
| (11) | 13215 | Clamp |
| (12) | 15543 | Base plate |
| (13) | 89473 | Carriage bolt - 3/8 x 2 1/2 |

## 7.20.11 Installing the 31 to 39 ft fold hydraulics - no outer wing

**Procedure**

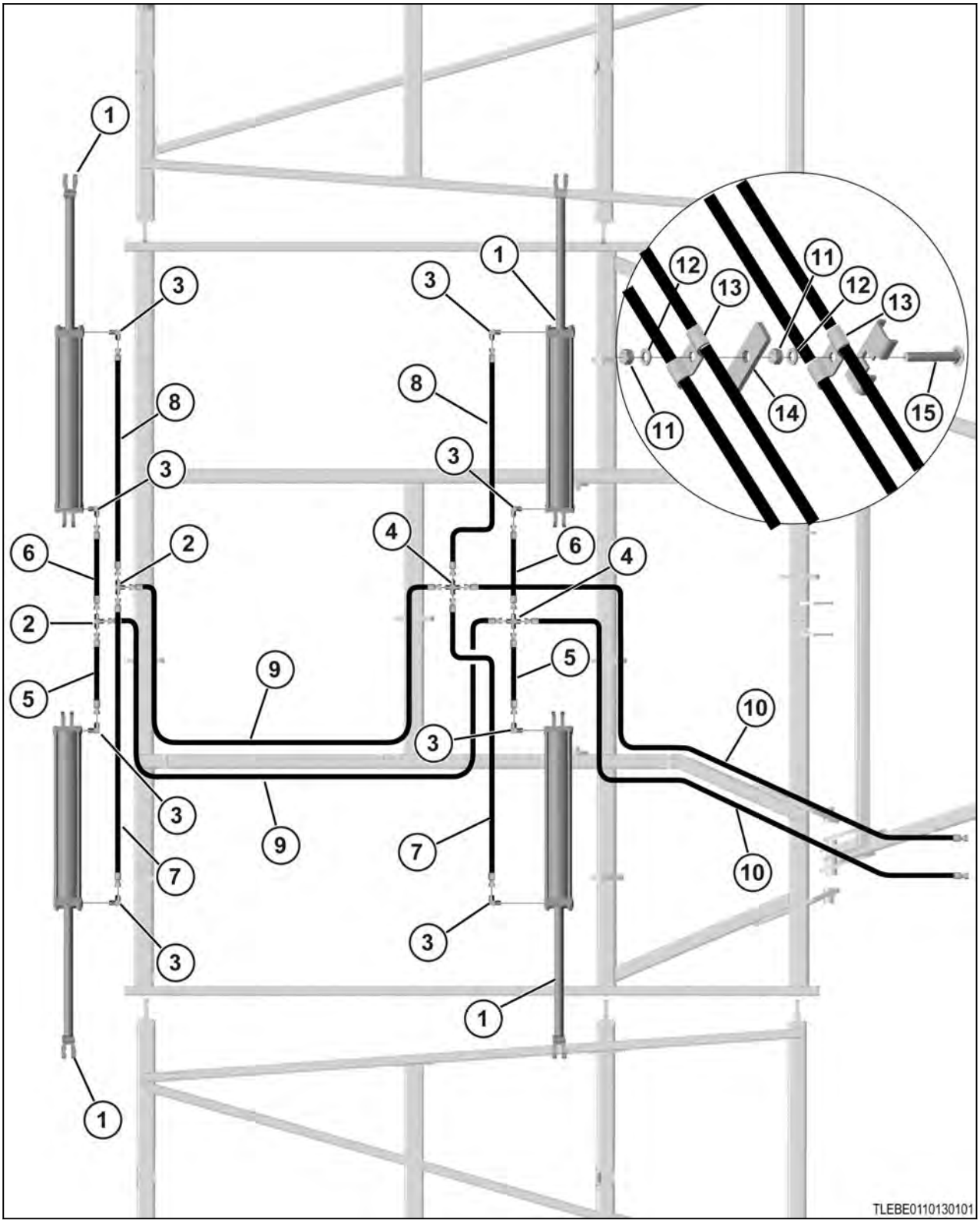


*Fig. 68*

Install the fold hydraulics as shown.

| | | |
|---|---|---|
| (1) | 247830 | 4 x 24 cylinder (with base pins) |
| (2) | 13238 | Tee fitting |
| (3) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (4) | 15910 | Cross fitting |
| (5) | 13423 | Hose - 3/8 x 24 |
| (6) | 15515 | Hose - 3/8 x 62 |
| (7) | 56539 | Hose - 3/8 x 50 |
| (8) | 56540 | Hose - 3/8 x 89 |
| (9) | 235388 | Hose - 3/8 x 102 |
| (10) | 247428 | Hose - 3/8 x 264 |
| (11) | 88103 | 3/8 hex nut |
| (12) | 88362 | 3/8ID washer |
| (13) | 13215 | Clamp |
| (14) | 15543 | Base plate |
| (15) | 89473 | Carriage bolt - 3/8 x 2 1/2 |

## 7.20.12 Installing the 37 to 47 ft fold hydraulics - with outer wing

**Procedure**

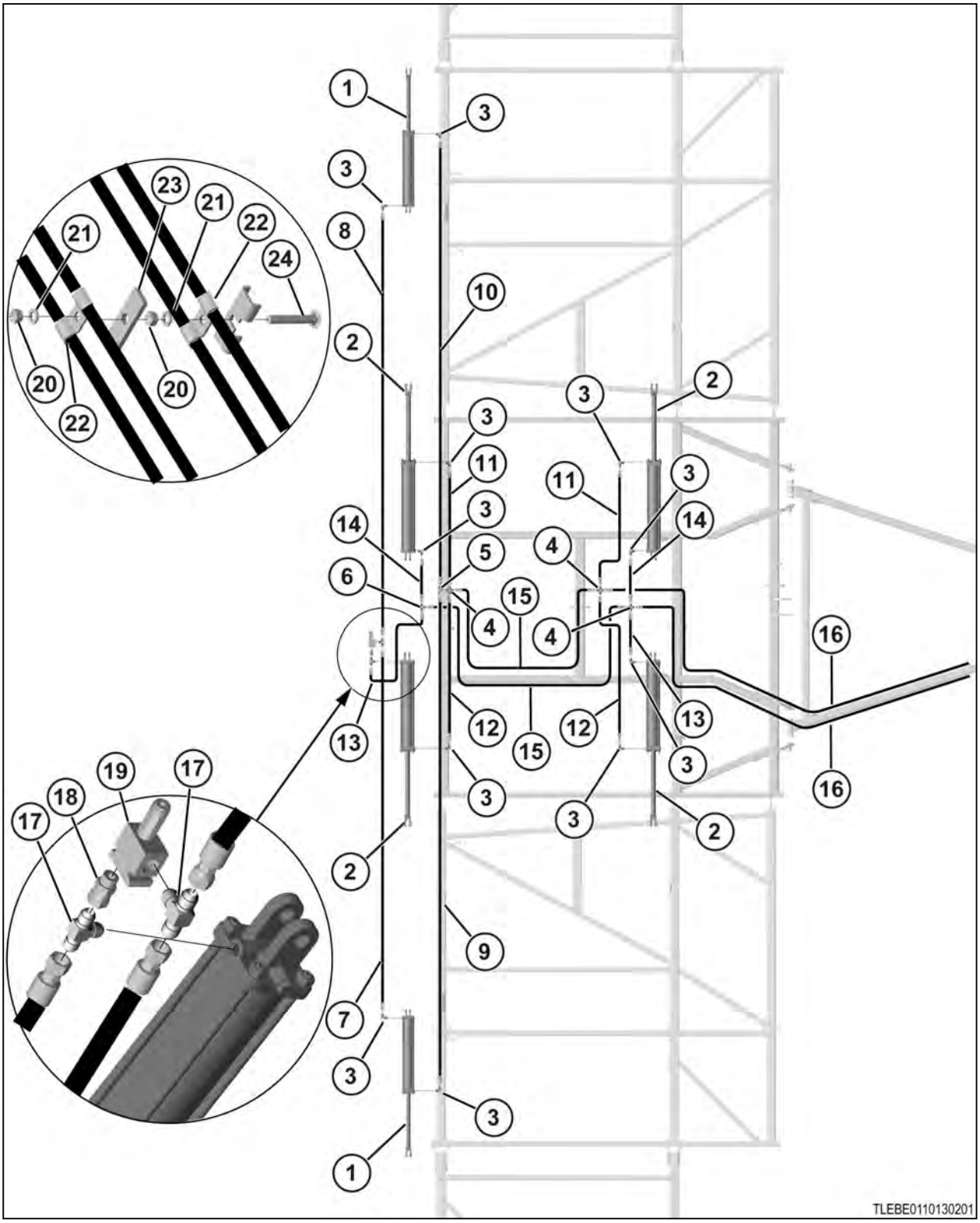


*Fig. 69*

Install the fold hydraulics as shown.

| | | |
|---|---|---|
| (1) | 247830 | 4 x 24 cylinder (with base pins) |
| (2) | 247831 | 4 x 30 cylinder (with base pins) |
| (3) | 25580 | Elbow fitting - 8MORB x 8MJ |
| (4) | 15910 | Cross fitting |
| (5) | 69080 | Tee fitting |
| (6) | 13238 | Tee fitting |
| (7) | 13483 | Hose - 3/8 x 120 - 9 ft wing |
| | 13484 | Hose - 3/8 x 156 - 12 ft wing |
| (8) | 233689 | Hose - 3/8 x 180 - 9 ft wing |
| | 238204 | Hose - 3/8 x 210 - 12 ft wing |
| (9) | 13484 | Hose - 3/8 x 156 - 9 ft wing |
| | 233689 | Hose - 3/8 x 180 - 12 ft wing |
| (10) | 238204 | Hose - 3/8 x 210 - 9 ft wing |
| | 237155 | Hose - 3/8 x 244 - 12 ft wing |
| (11) | 56540 | Hose - 3/8 x 89 |
| (12) | 56539 | Hose - 3/8 x 50 |
| (13) | 13423 | Hose - 3/8 x 24 |
| (14) | 15515 | Hose - 3/8 x 62 |
| (15) | 235388 | Hose - 3/8 x 102 |
| (16) | 247428 | Hose - 3/8 x 264 |
| (17) | 56534 | Tee fitting |
| (18) | 24004 | Adapter fitting |
| (19) | 65870 | Sequence valve |
| (20) | 88103 | 3/8 hex nut |
| (21) | 88362 | 3/8ID washer |
| (22) | 13215 | Clamp |
| (23) | 15543 | Base plate |
| (24) | 89473 | Carriage bolt - 3/8 x 2 1/2 |

# 7.21 Shank locations - 12 inch spacing

## 7.21.1 13 ft shank locations - 12 inch spacing

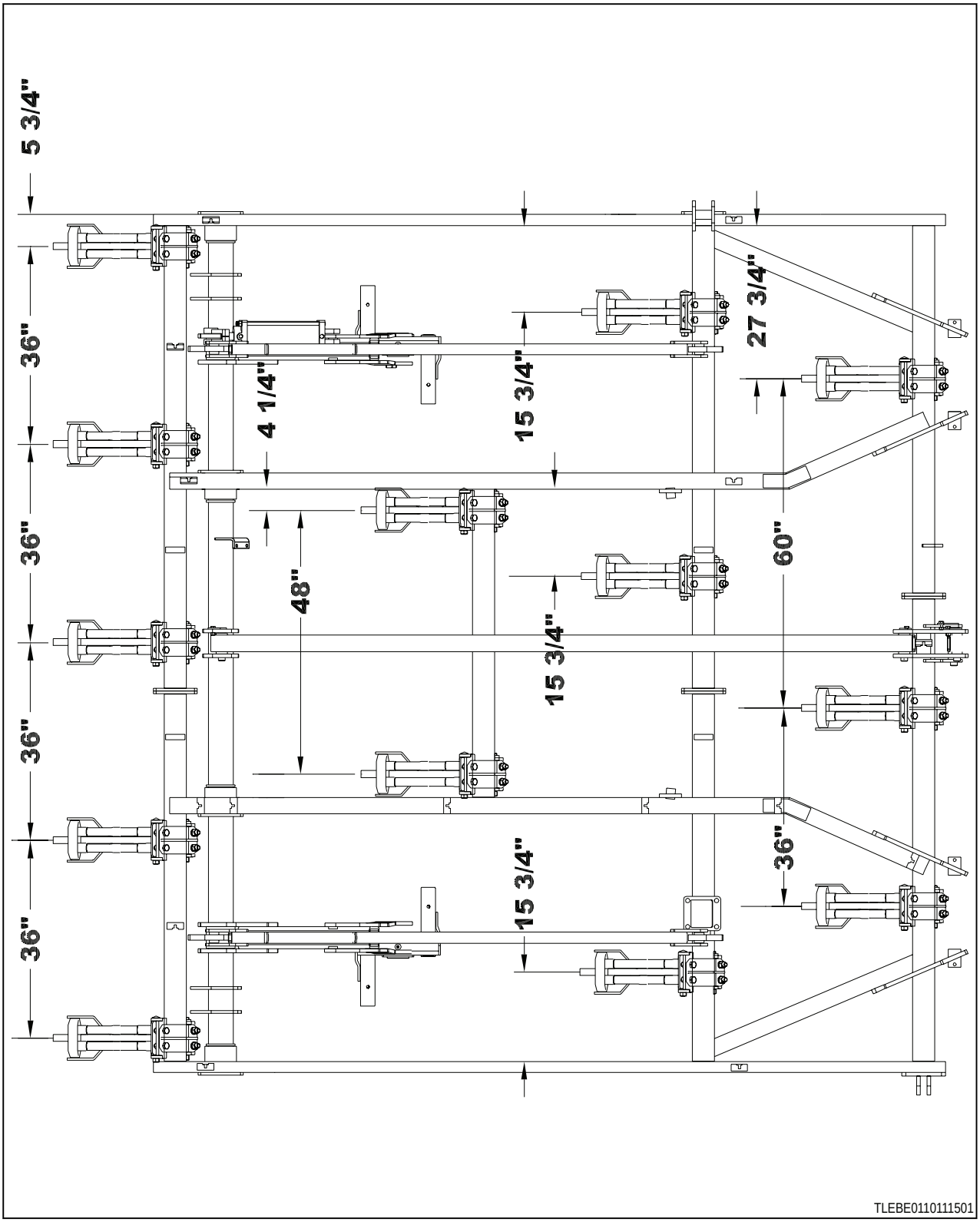


*Fig. 70*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.2 15 ft shank locations - 12 inch spacing

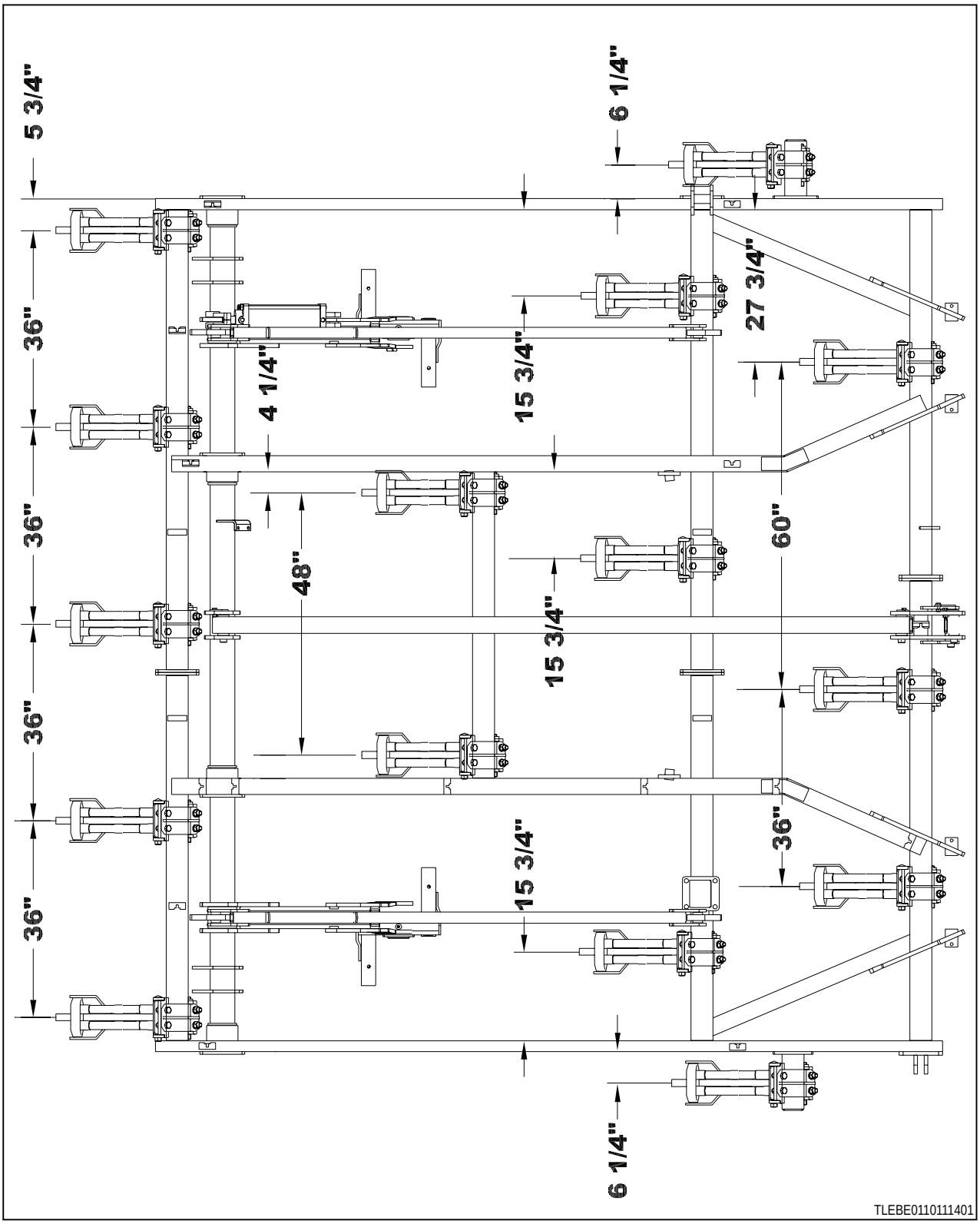


*Fig. 71*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 6 1/4" | 159 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.3 17 ft shank locations - 12 inch spacing

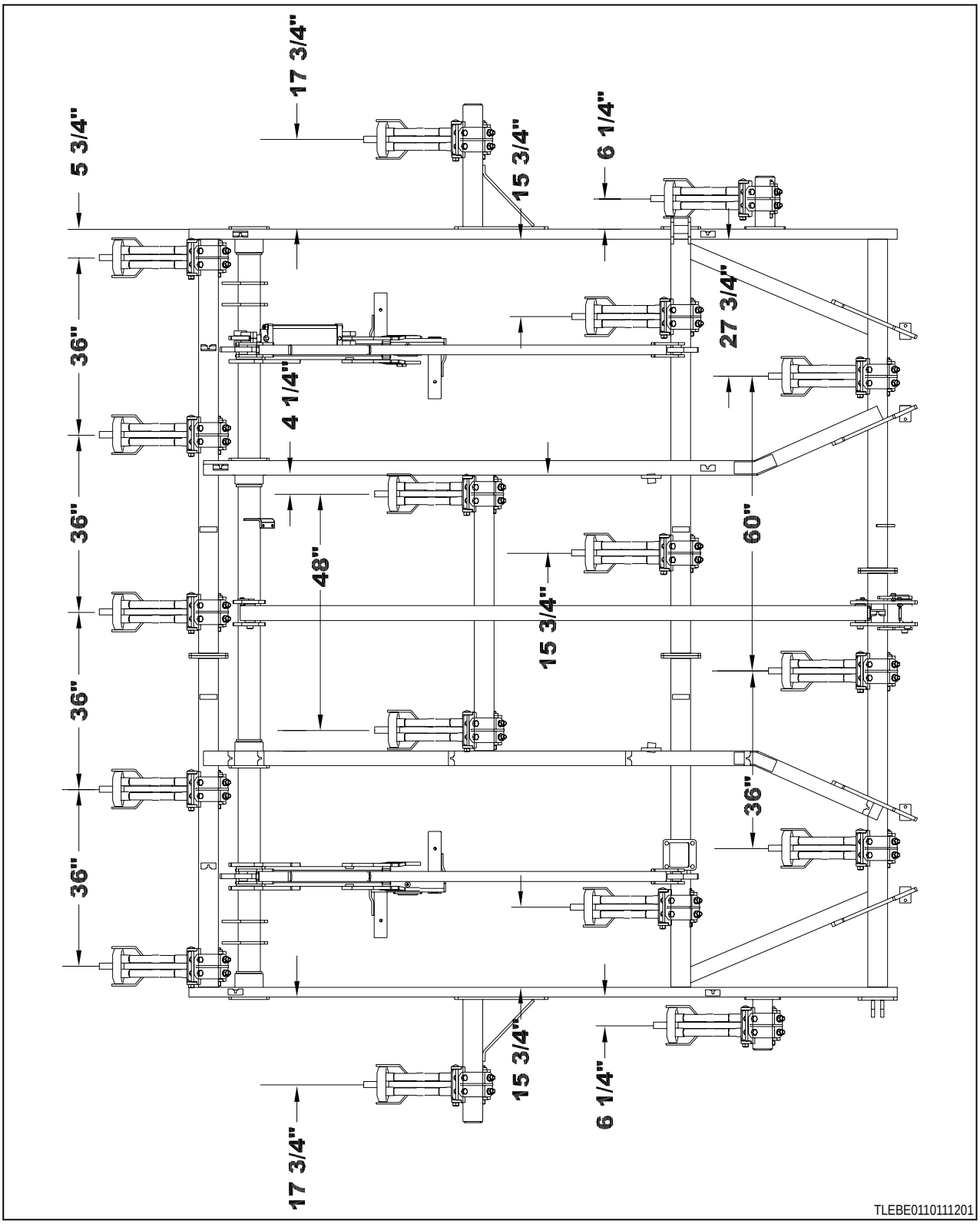


*Fig. 72*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 6 1/4" | 159 mm |
| 15 3/4" | 400 mm |
| 17 3/4" | 451 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.4 19 ft shank locations - 12 inch spacing

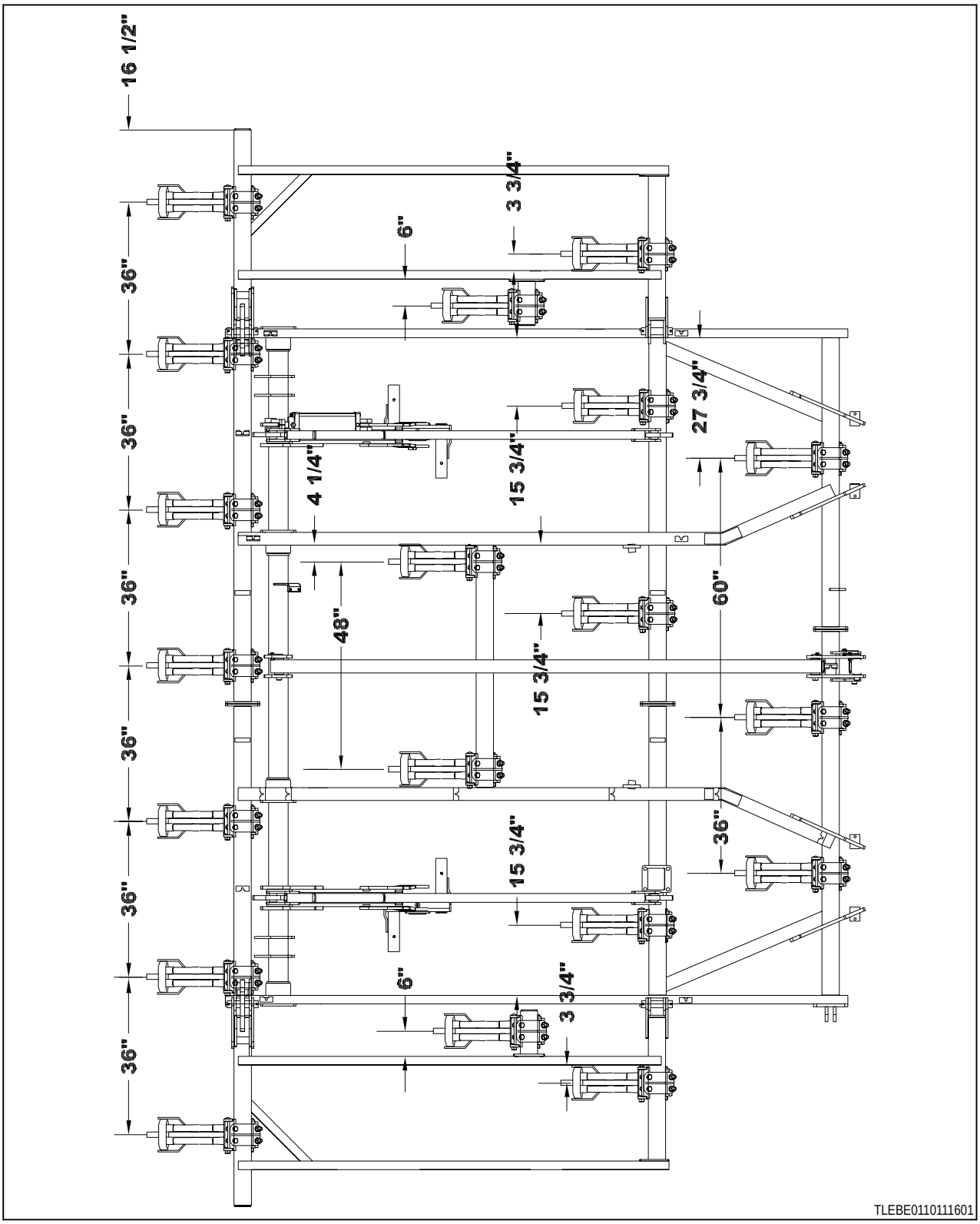


*Fig. 73*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 3 3/4" | 95 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.5 21 ft shank locations - 12 inch spacing

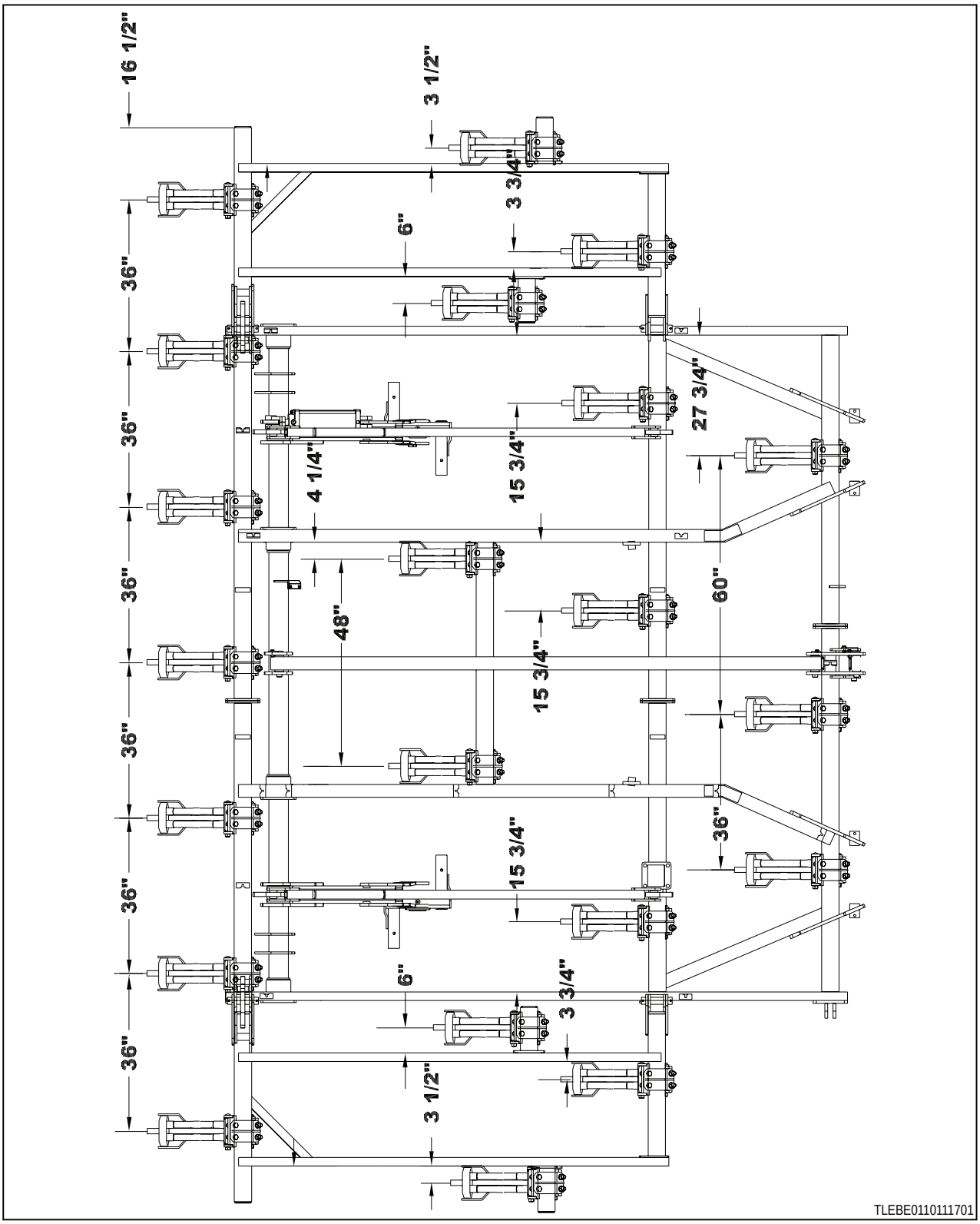


*Fig. 74*

| English measurement | Metric measurement |
|---|---|
| 3 1/2" | 89 mm |
| 3 3/4" | 95 mm |
| 4 1/4" | 108 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.6 23 ft shank locations - 12 inch spacing

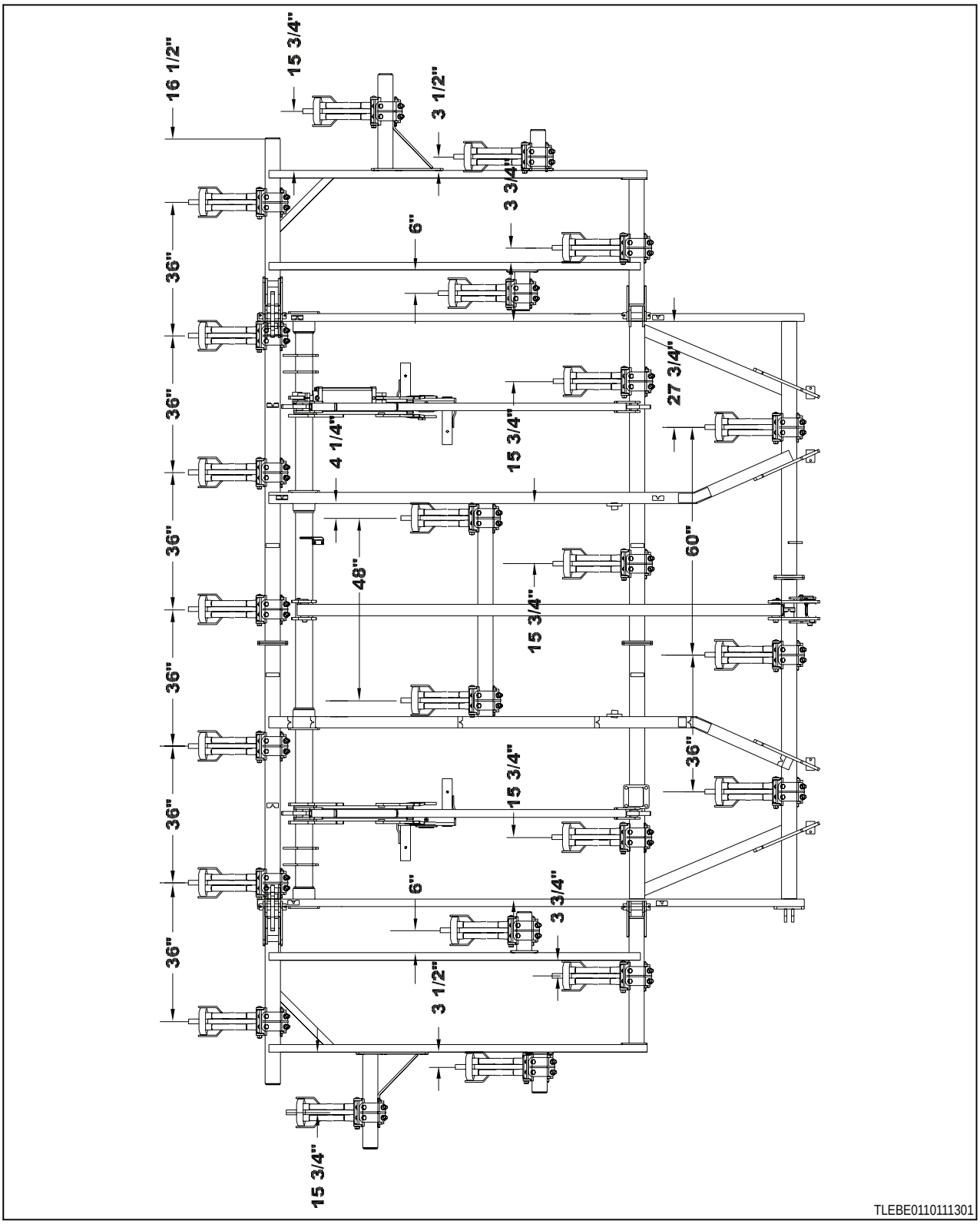


*Fig. 75*

| English measurement | Metric measurement |
|---|---|
| 3 1/2" | 89 mm |
| 3 3/4" | 95 mm |
| 4 1/4" | 108 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 16 1/2" | 419 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.7 25 ft shank locations - 12 inch spacing

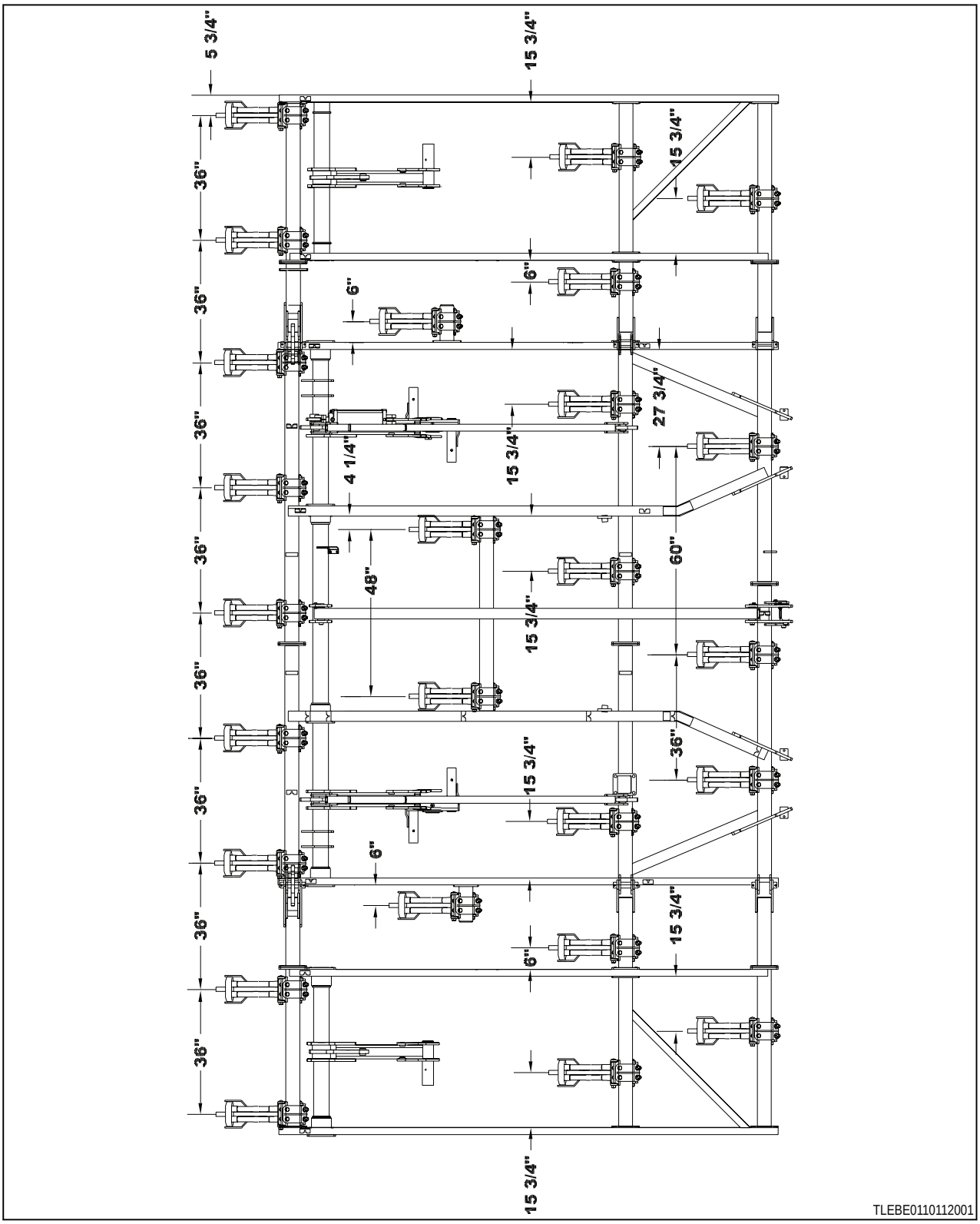


*Fig. 76*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5 3/4" | 146 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.8 27 ft shank locations - 12 inch spacing

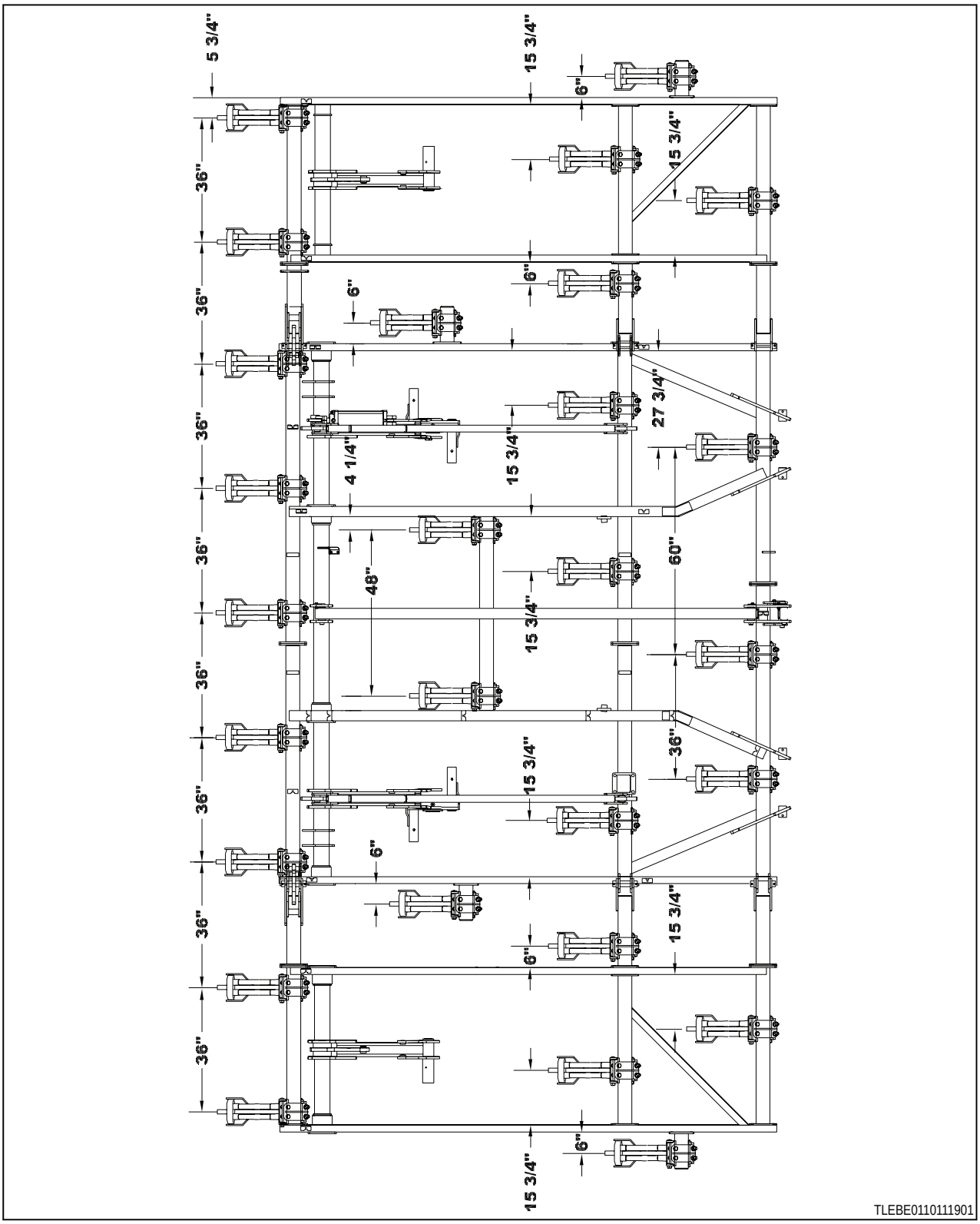


*Fig. 77*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5 3/4" | 146 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.9 29 ft shank locations - 12 inch spacing

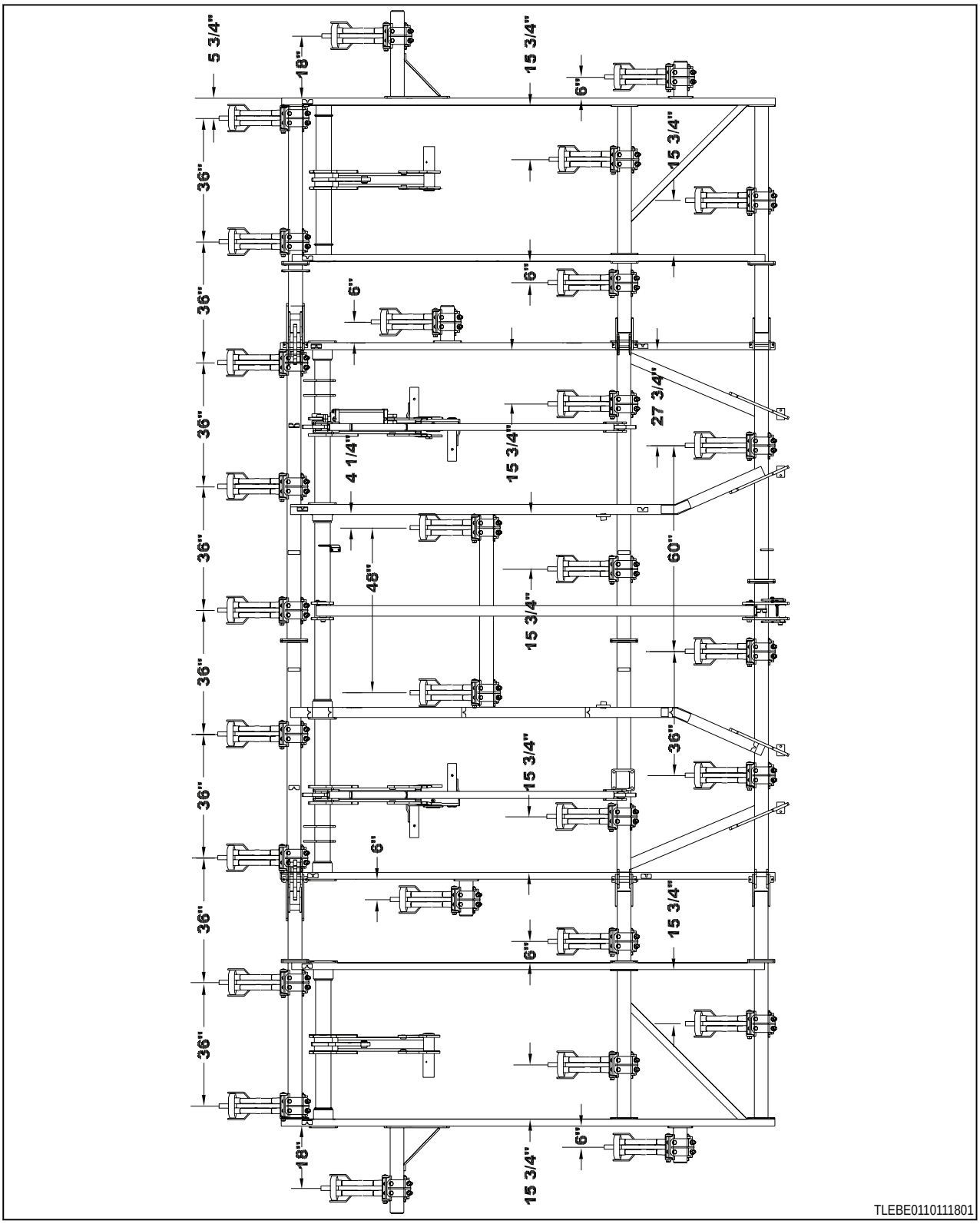


*Fig. 78*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5 3/4" | 146 mm |
| 6" | 152 mm |
| 15 3/4" | 400 mm |
| 18" | 457 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.10 31 ft shank locations - 12 inch spacing

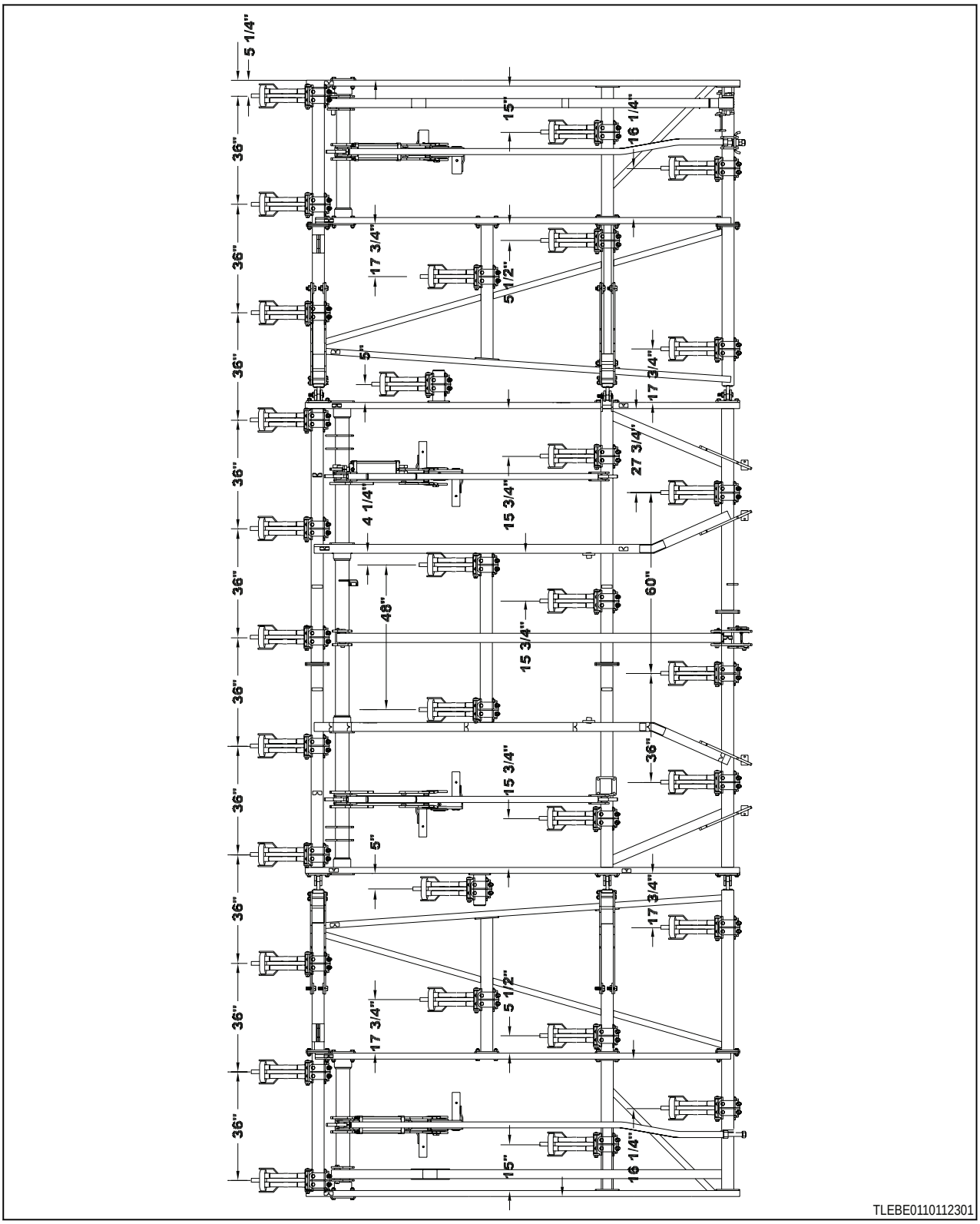


*Fig. 79*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 15" | 381 mm |
| 15 3/4" | 400 mm |
| 16 1/4" | 413 mm |
| 17 3/4" | 451 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.11 33 ft shank locations - 12 inch spacing

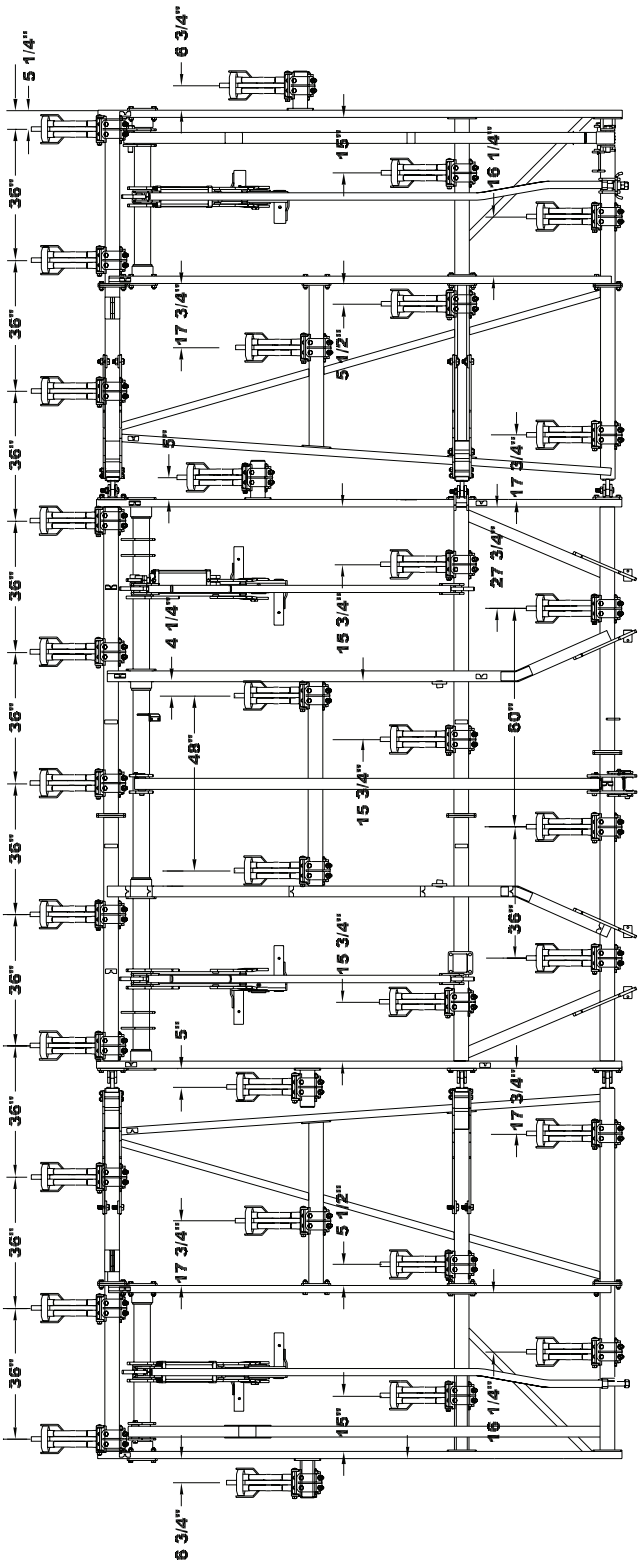


*Fig. 80*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 15" | 381 mm |
| 15 3/4" | 400 mm |
| 16" | 406 mm |
| 16 1/4" | 413 mm |
| 17 3/4" | 451 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.12 35 ft shank locations - 12 inch spacing

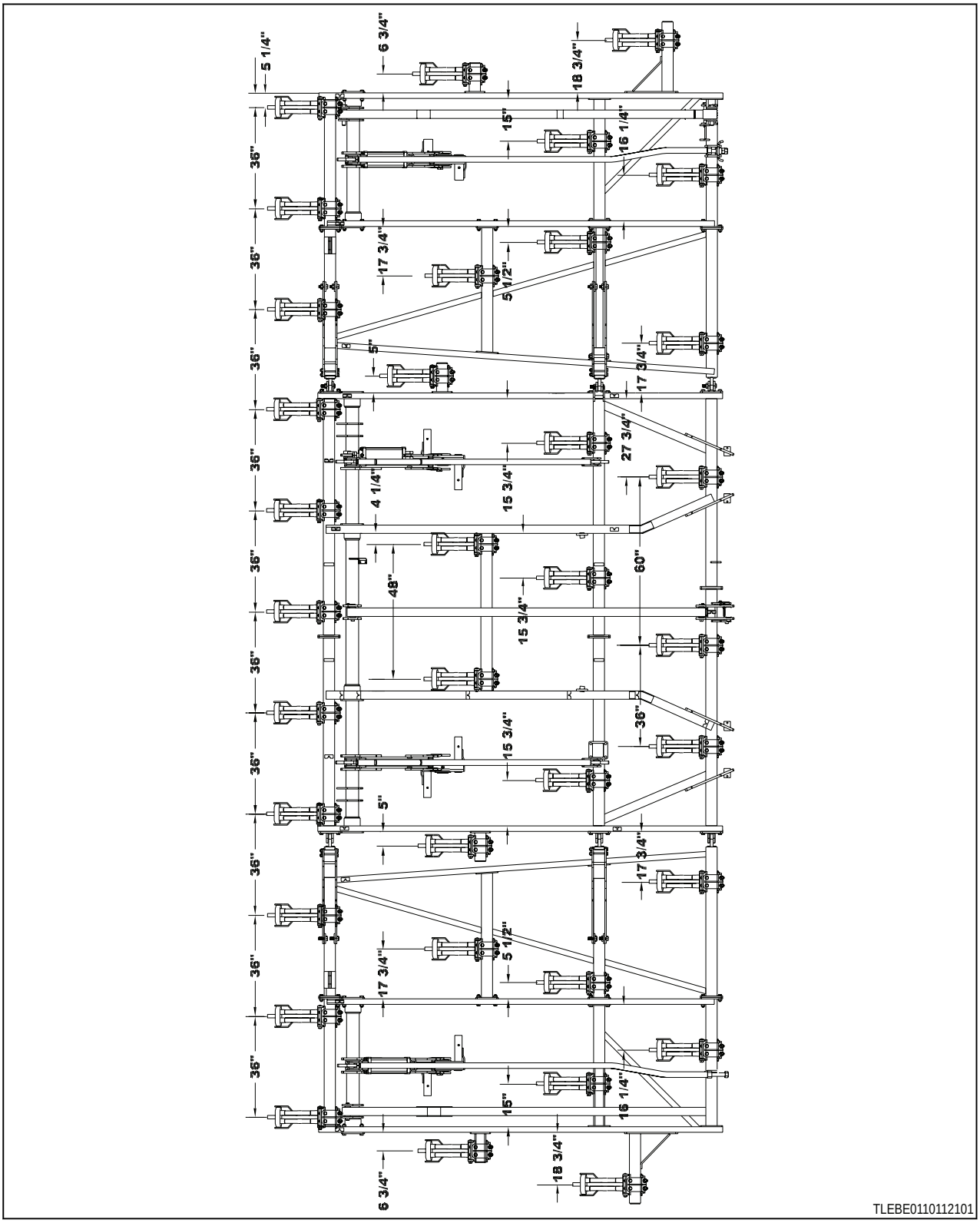


*Fig. 81*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 15" | 381 mm |
| 15 3/4" | 400 mm |
| 16 1/4" | 413 mm |
| 16 3/4" | 426 mm |
| 17 3/4" | 451 mm |
| 27 3/4" | 705 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.13 37 ft shank locations - 9 ft wing - 12 inch spacing

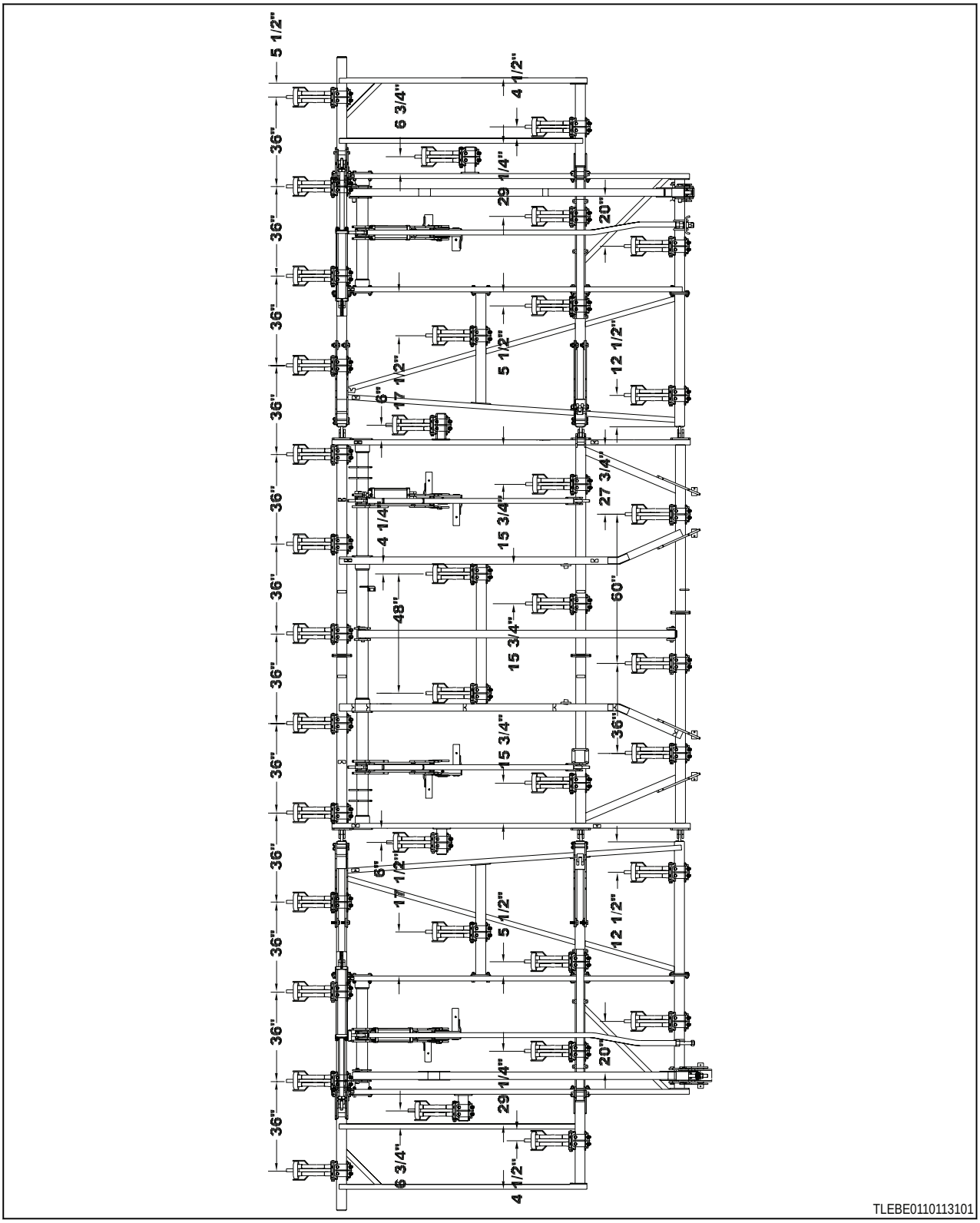


*Fig. 82*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 3/4" | 172 mm |
| 12 1/2" | 318 mm |
| 15 3/4" | 400 mm |
| 17 1/2" | 445 mm |
| 20" | 508 mm |
| 27 3/4" | 705 mm |
| 29 1/4" | 743 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.14 37 ft shank locations - 12 ft wing - 12 inch spacing

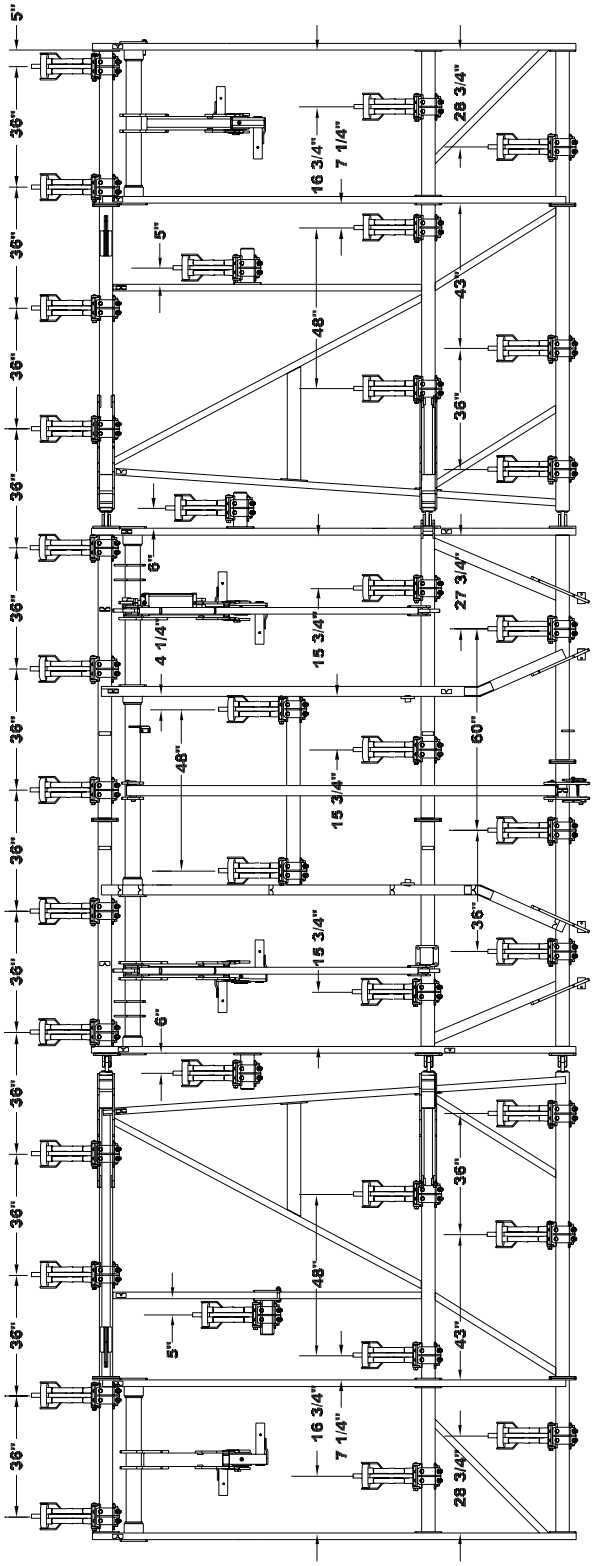


*Fig. 83*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 6" | 152 mm |
| 7 1/4" | 184 mm |
| 15 3/4" | 400 mm |
| 16 3/4" | 426 mm |
| 27 3/4" | 705 mm |
| 28 3/4" | 730 mm |
| 36" | 914 mm |
| 43" | 1092 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.15 39 ft shank locations - 9 ft wing - 12 inch spacing

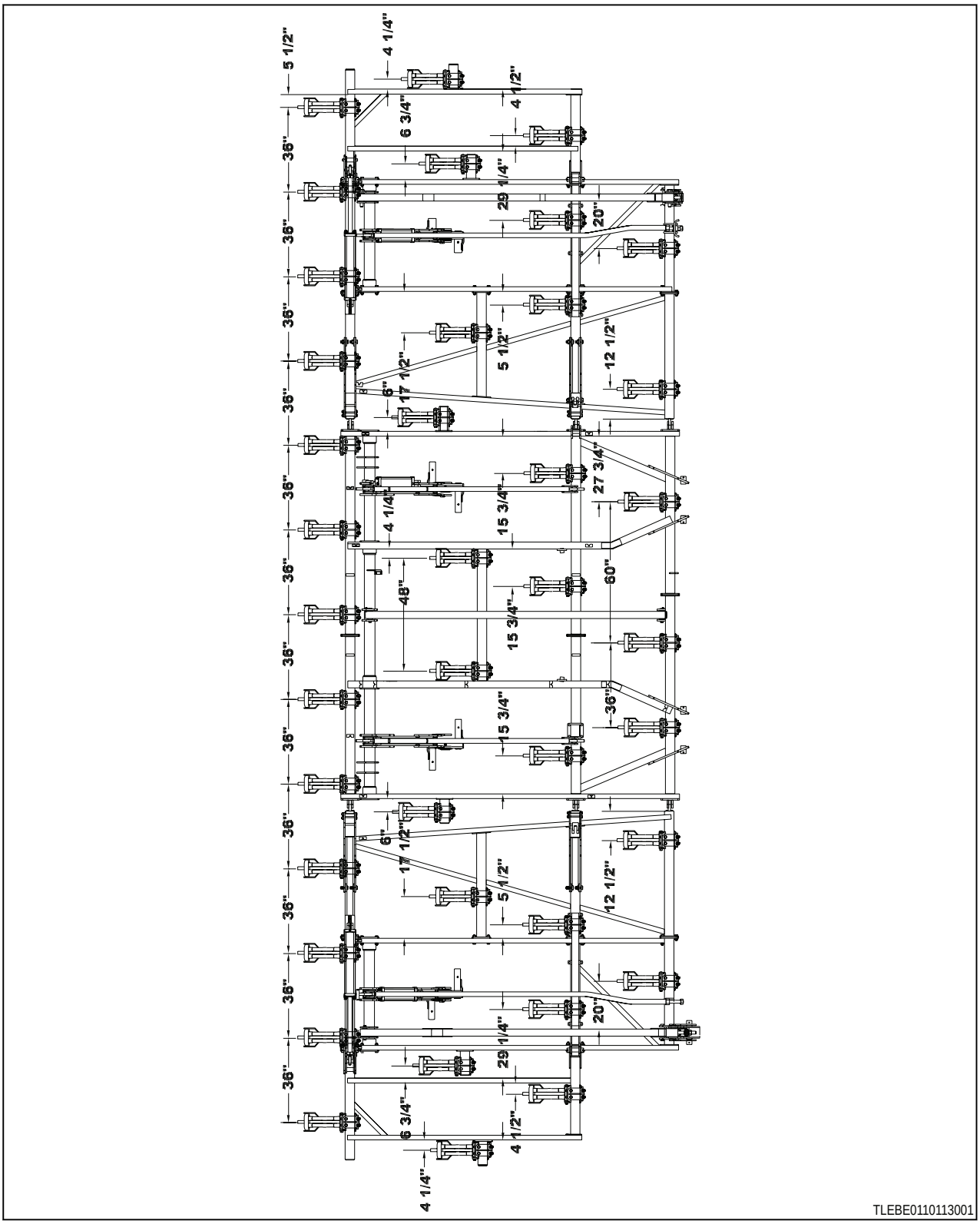


*Fig. 84*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 3/4" | 172 mm |
| 12 1/2" | 318 mm |
| 15 3/4" | 400 mm |
| 17 1/2" | 445 mm |
| 20" | 508 mm |
| 27 3/4" | 705 mm |
| 29 1/4" | 743 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.16 39 ft shank locations - 12 ft wing - 12 inch spacing

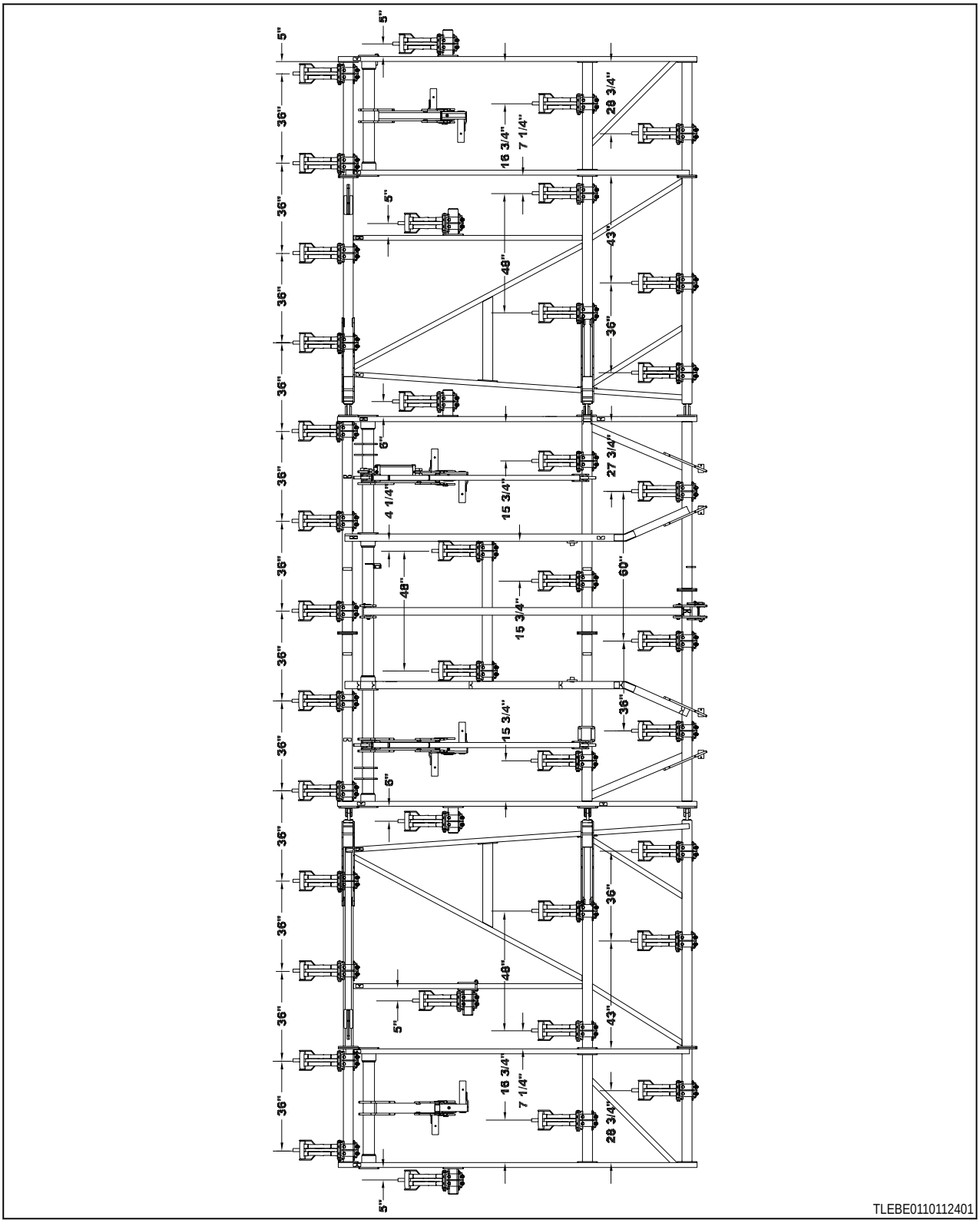


*Fig. 85*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 172 mm |
| 6" | 152 mm |
| 7 1/4" | 184 mm |
| 15 3/4" | 400 mm |
| 16 3/4" | 426 mm |
| 27 3/4" | 705 mm |
| 28 3/4" | 730 mm |
| 36" | 914 mm |
| 43" | 1092 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.17 41 ft shank locations - 12 inch spacing

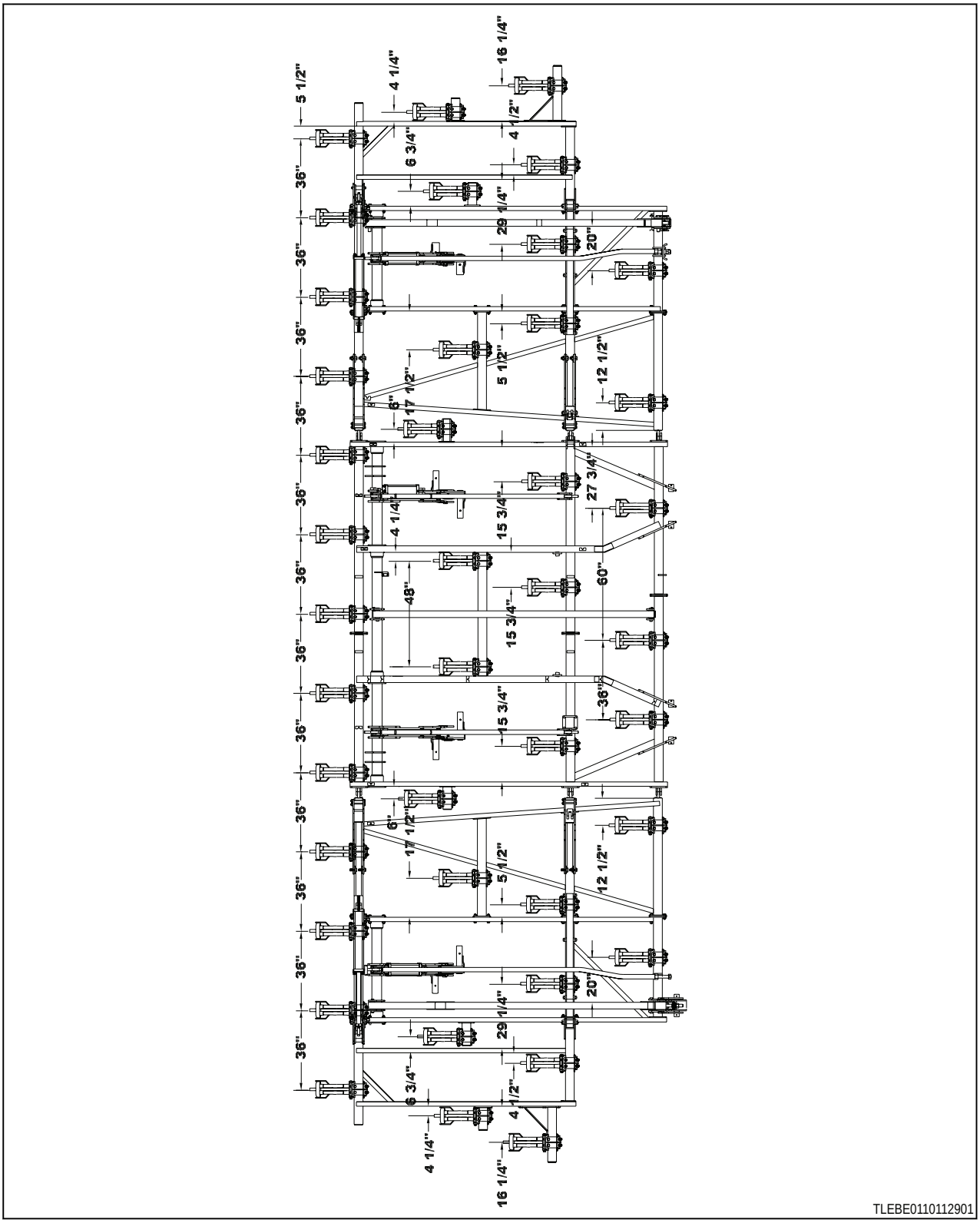


*Fig. 86*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 3/4" | 172 mm |
| 12 1/2" | 318 mm |
| 15 3/4" | 400 mm |
| 16 1/4" | 413 mm |
| 17 1/2" | 445 mm |
| 20" | 508 mm |
| 27 3/4" | 705 mm |
| 29 1/4" | 743 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.18 43 ft shank locations - 12 inch spacing

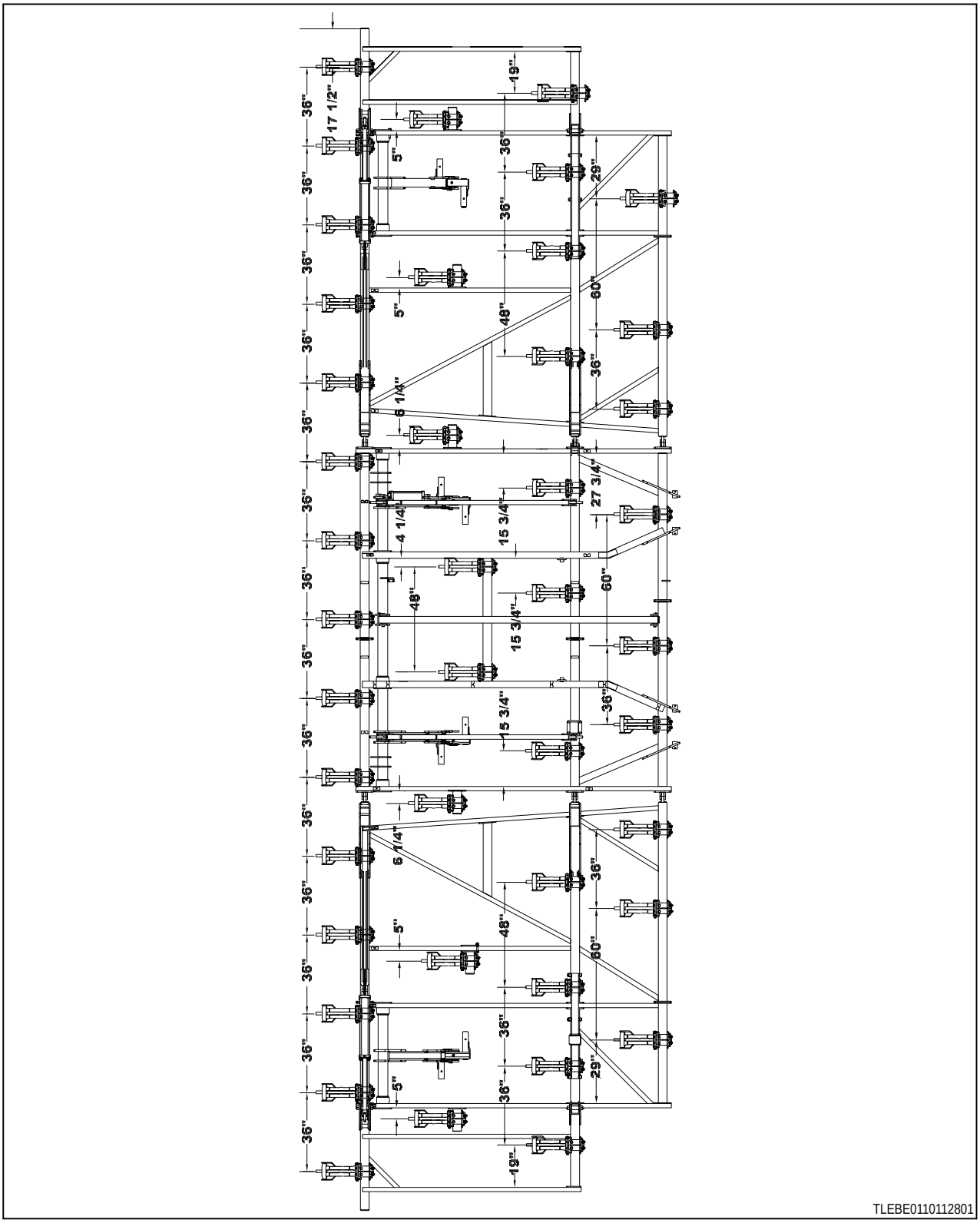


*Fig. 87*

| English measurement | Metric measurement |
|---|---|
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 6 1/4" | 159 mm |
| 15 3/4" | 400 mm |
| 17 1/2" | 445 mm |
| 19" | 483 mm |
| 27 3/4" | 705 mm |
| 29" | 737 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.19 45 ft shank locations - 12 inch spacing

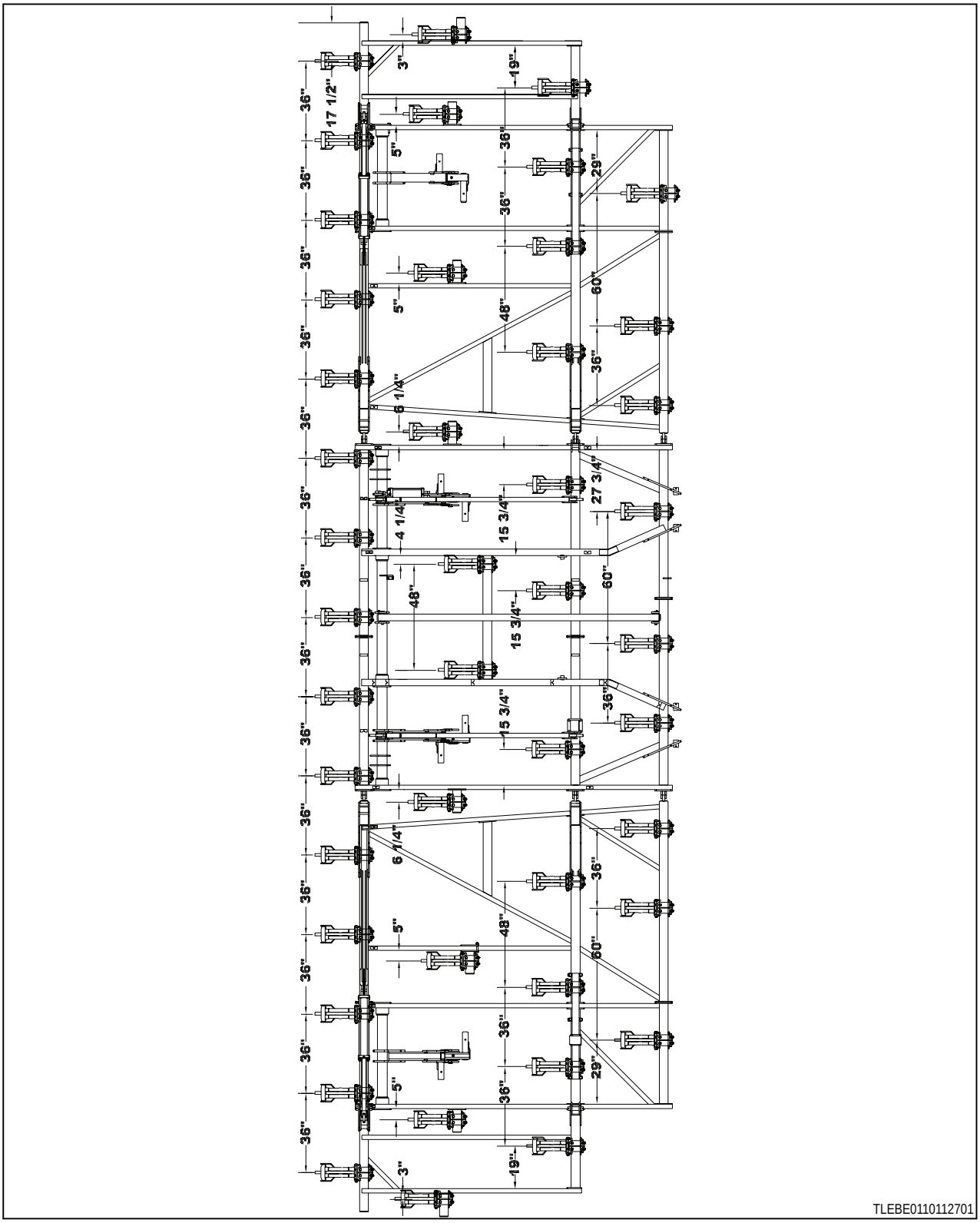


*Fig. 88*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 6 1/4" | 159 mm |
| 15 3/4" | 400 mm |
| 17 1/2" | 445 mm |
| 19" | 483 mm |
| 27 3/4" | 705 mm |
| 29" | 737 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

## 7.21.20 47 ft shank locations - 12 inch spacing

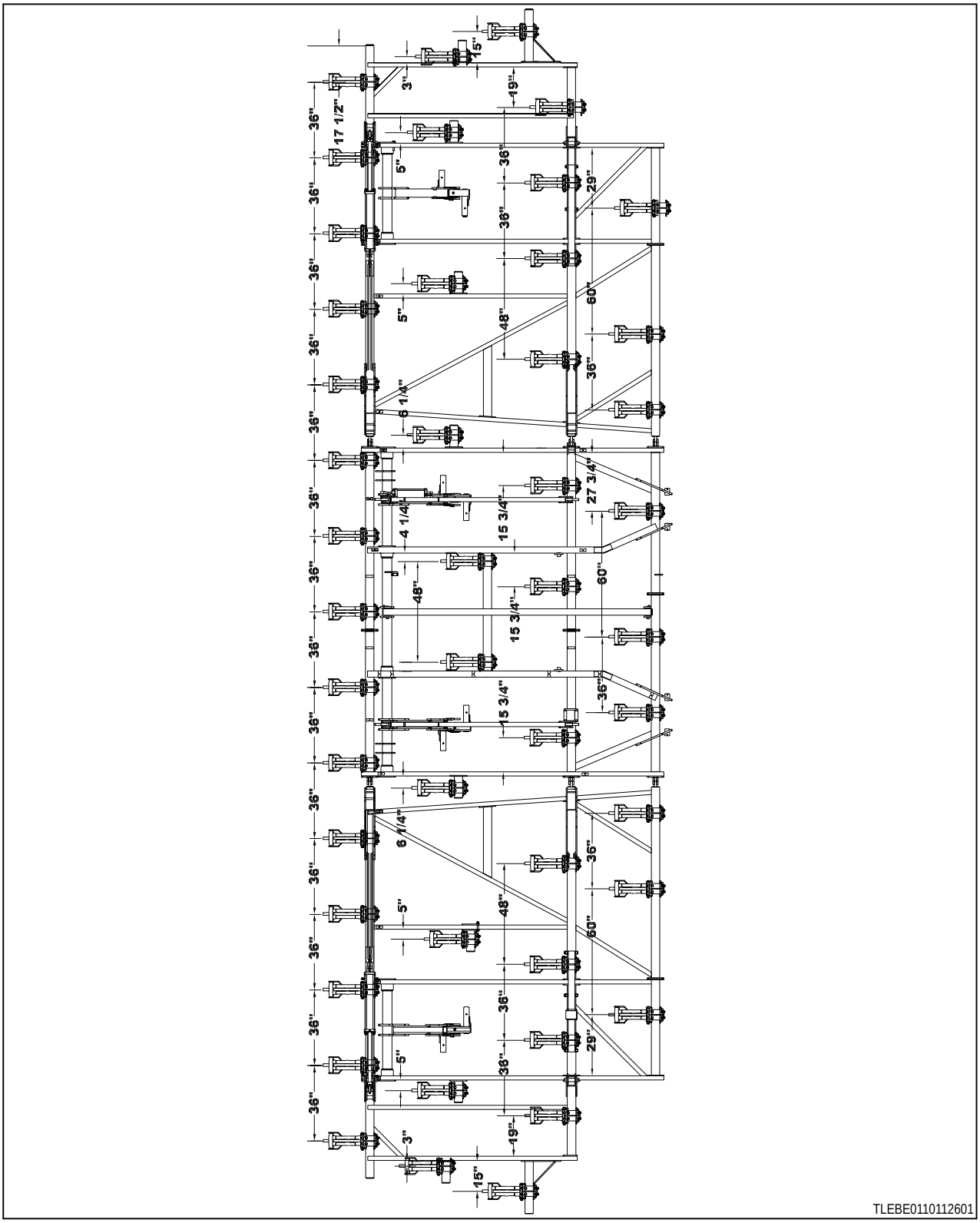


*Fig. 89*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 6 1/4" | 159 mm |
| 15" | 381 mm |
| 15 3/4" | 400 mm |
| 17 1/2" | 445 mm |
| 19" | 483 mm |
| 27 3/4" | 705 mm |
| 29" | 737 mm |
| 36" | 914 mm |
| 48" | 1219 mm |
| 60" | 1524 mm |

# 7.22 Shank locations - 15 inch spacing

## 7.22.1 13 ft shank locations - 15 inch spacing

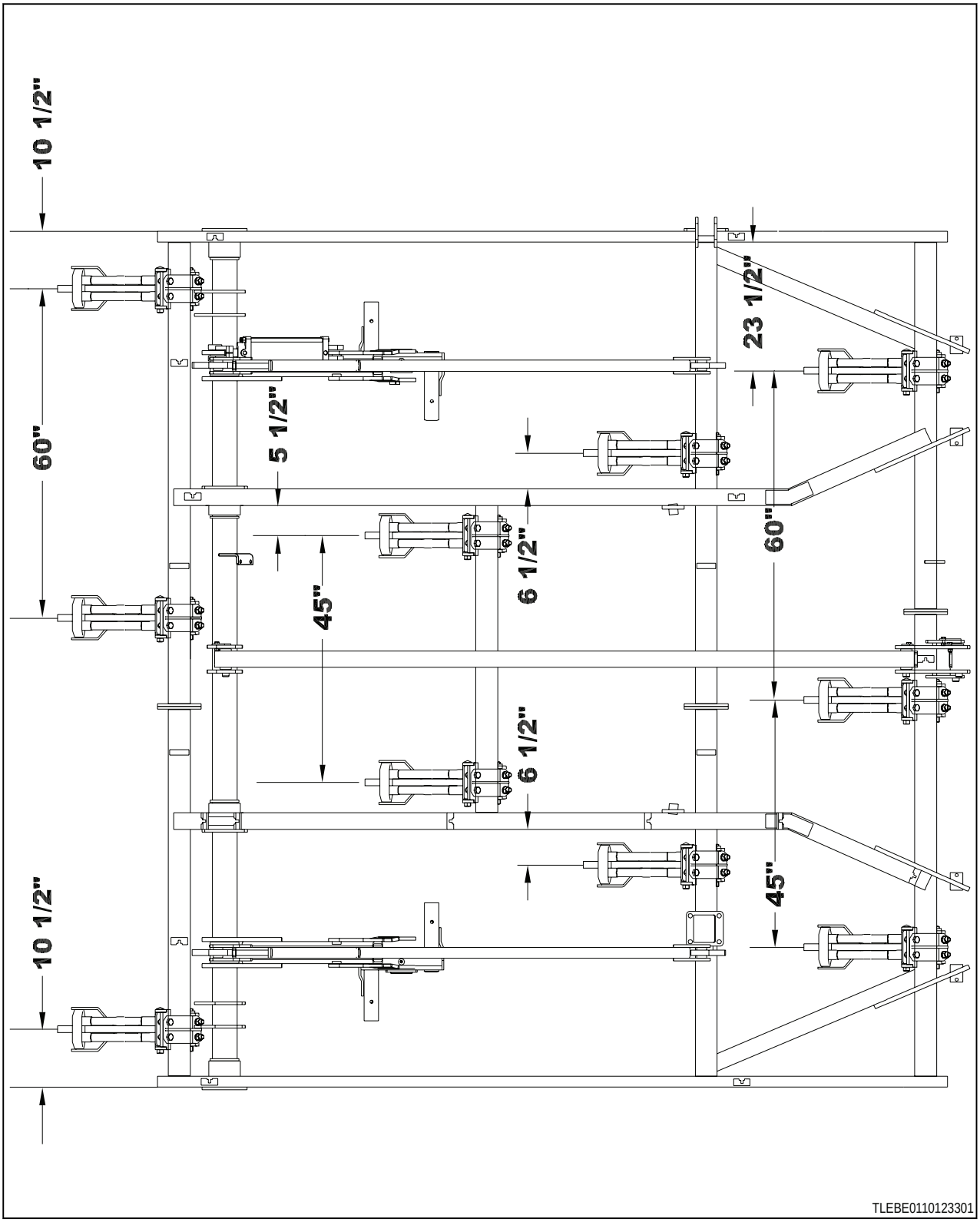


*Fig. 90*

| English measurement | Metric measurement |
|---|---|
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.2 15 ft shank locations - 15 inch spacing

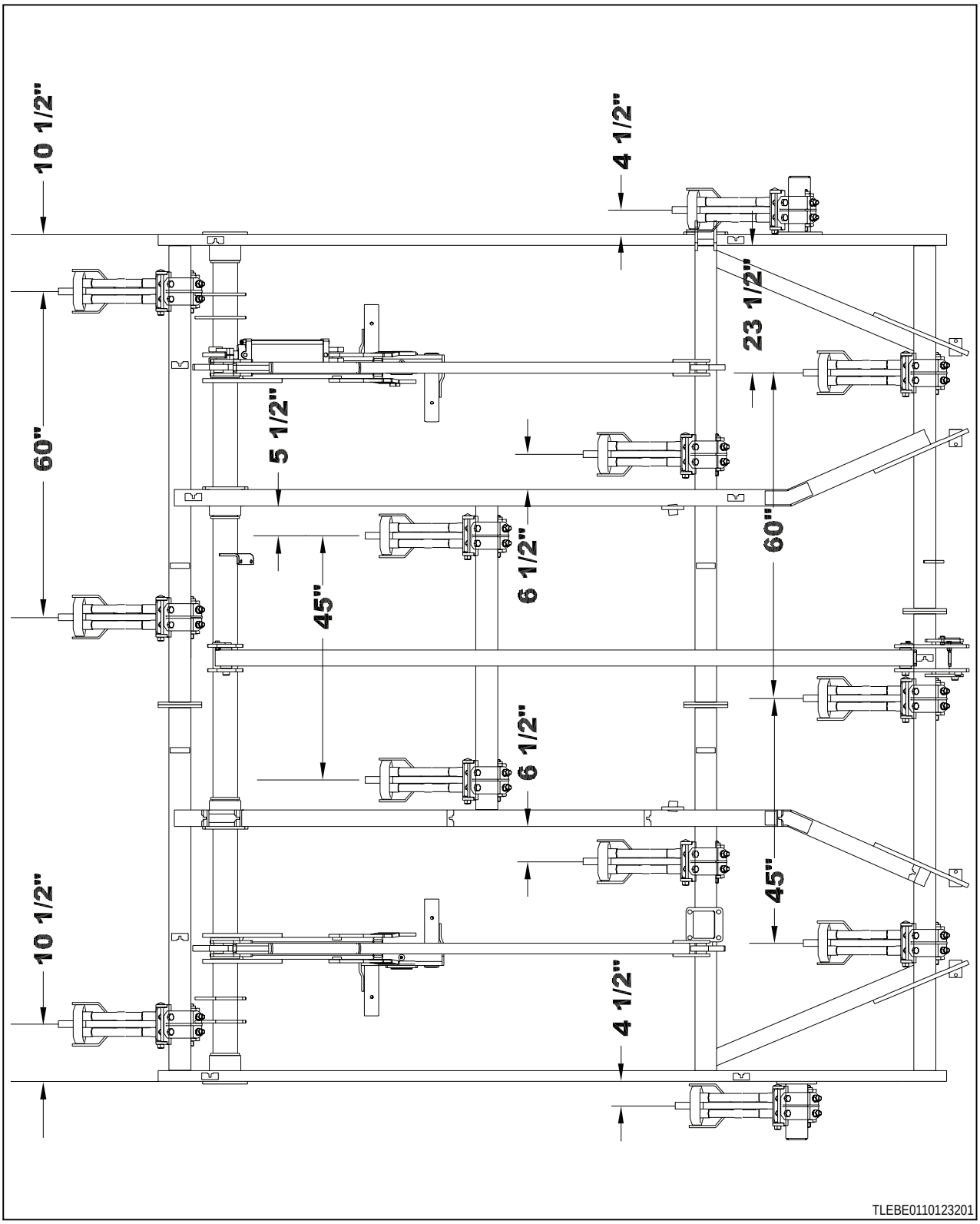


*Fig. 91*

| English measurement | Metric measurement |
|---|---|
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.3 17 ft shank locations - 15 inch spacing

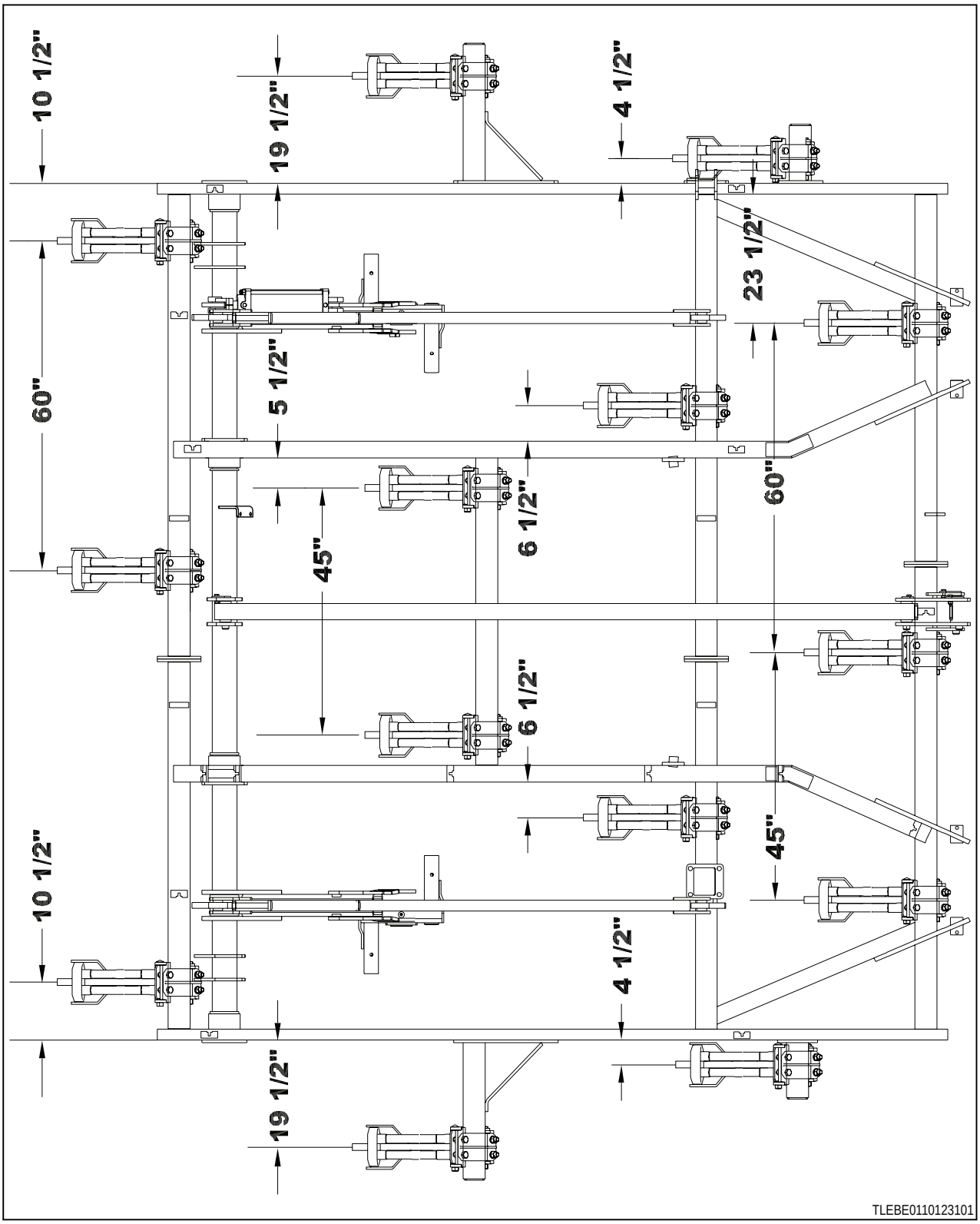


*Fig. 92*

| English measurement | Metric measurement |
|---|---|
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 19 1/2" | 495 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.4 19 ft shank locations - 15 inch spacing

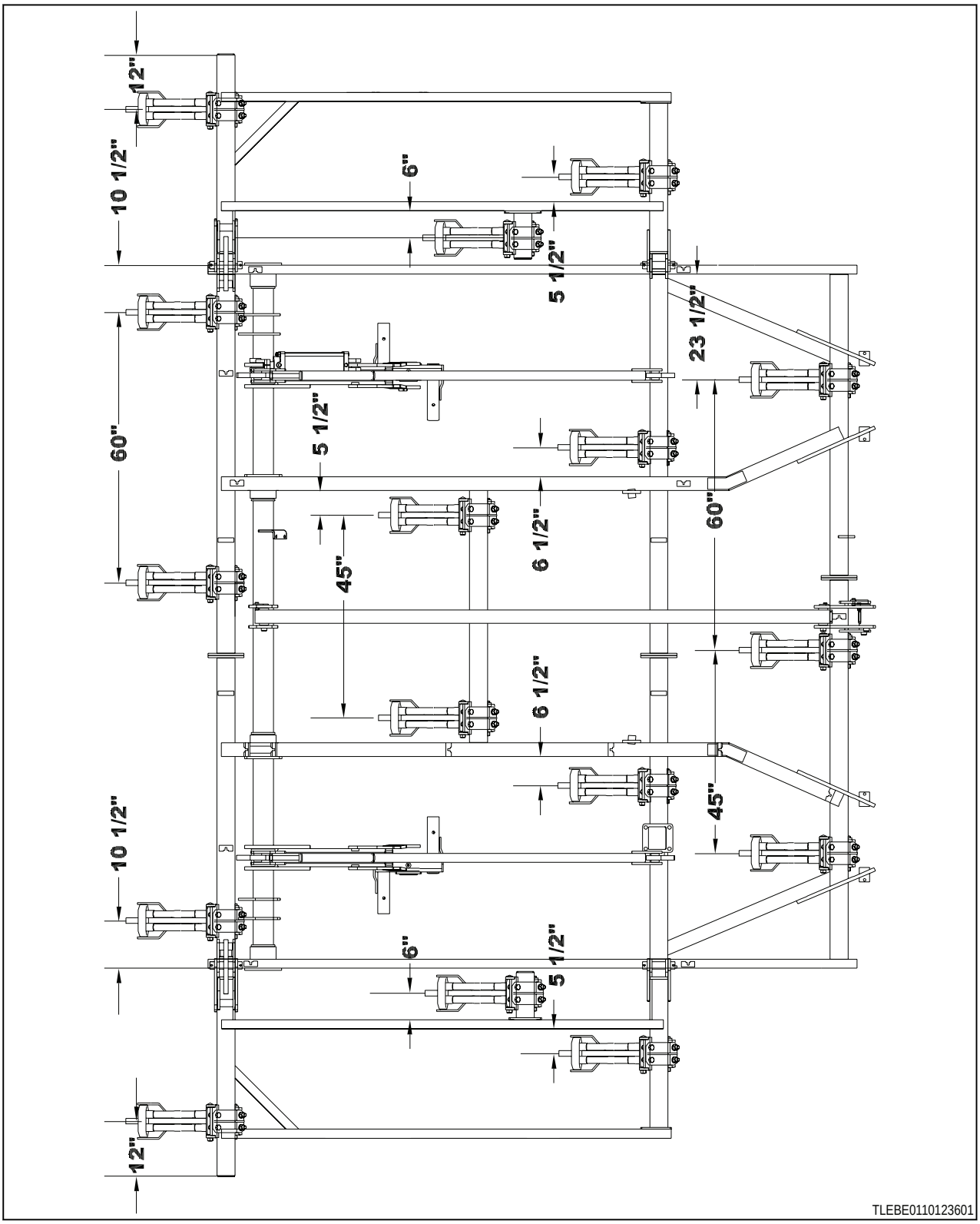


*Fig. 93*

| English measurement | Metric measurement |
|---|---|
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 12" | 305 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.5 21 ft shank locations - 15 inch spacing

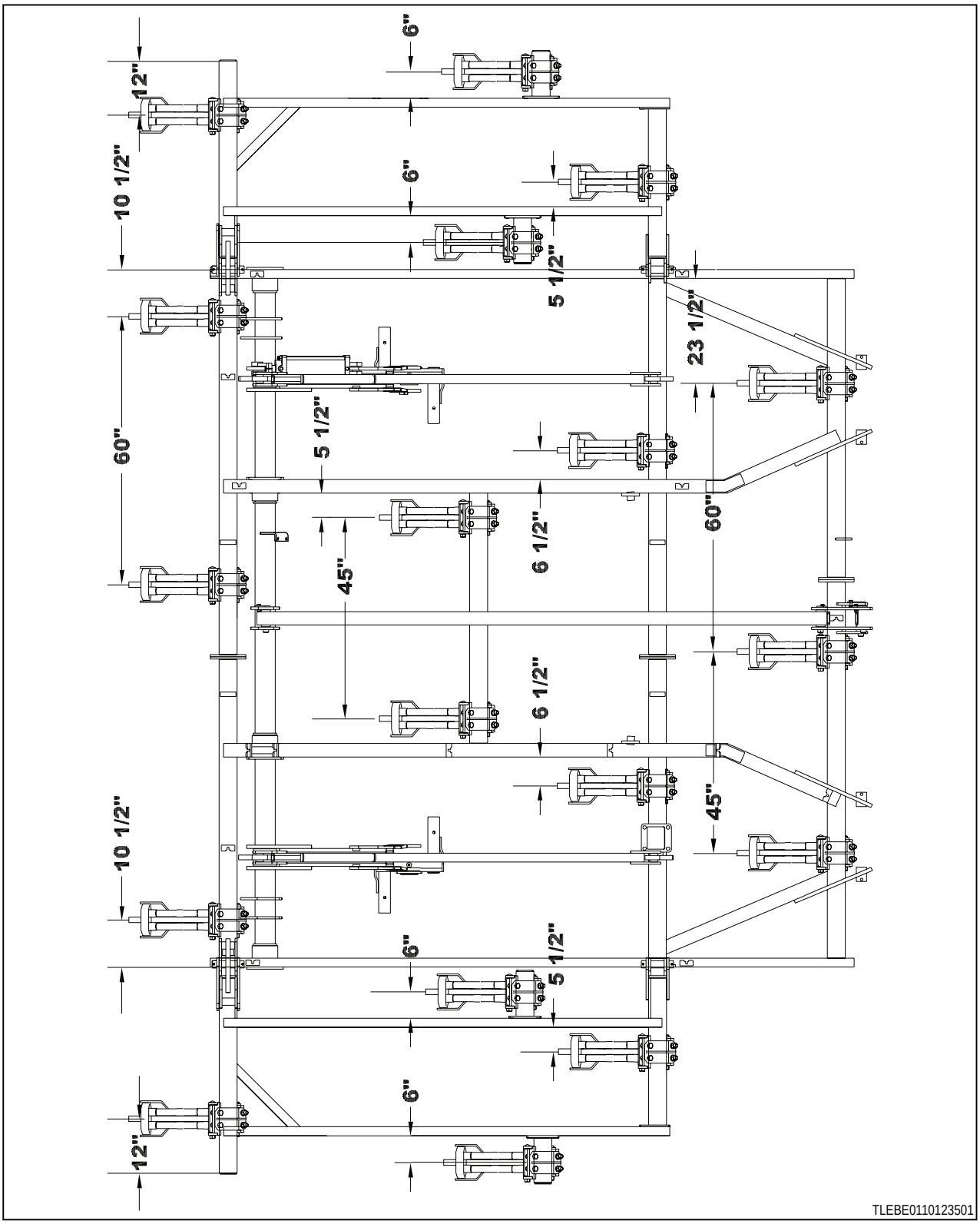


*Fig. 94*

| English measurement | Metric measurement |
|---|---|
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 12" | 305 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.6 23 ft shank locations - 15 inch spacing

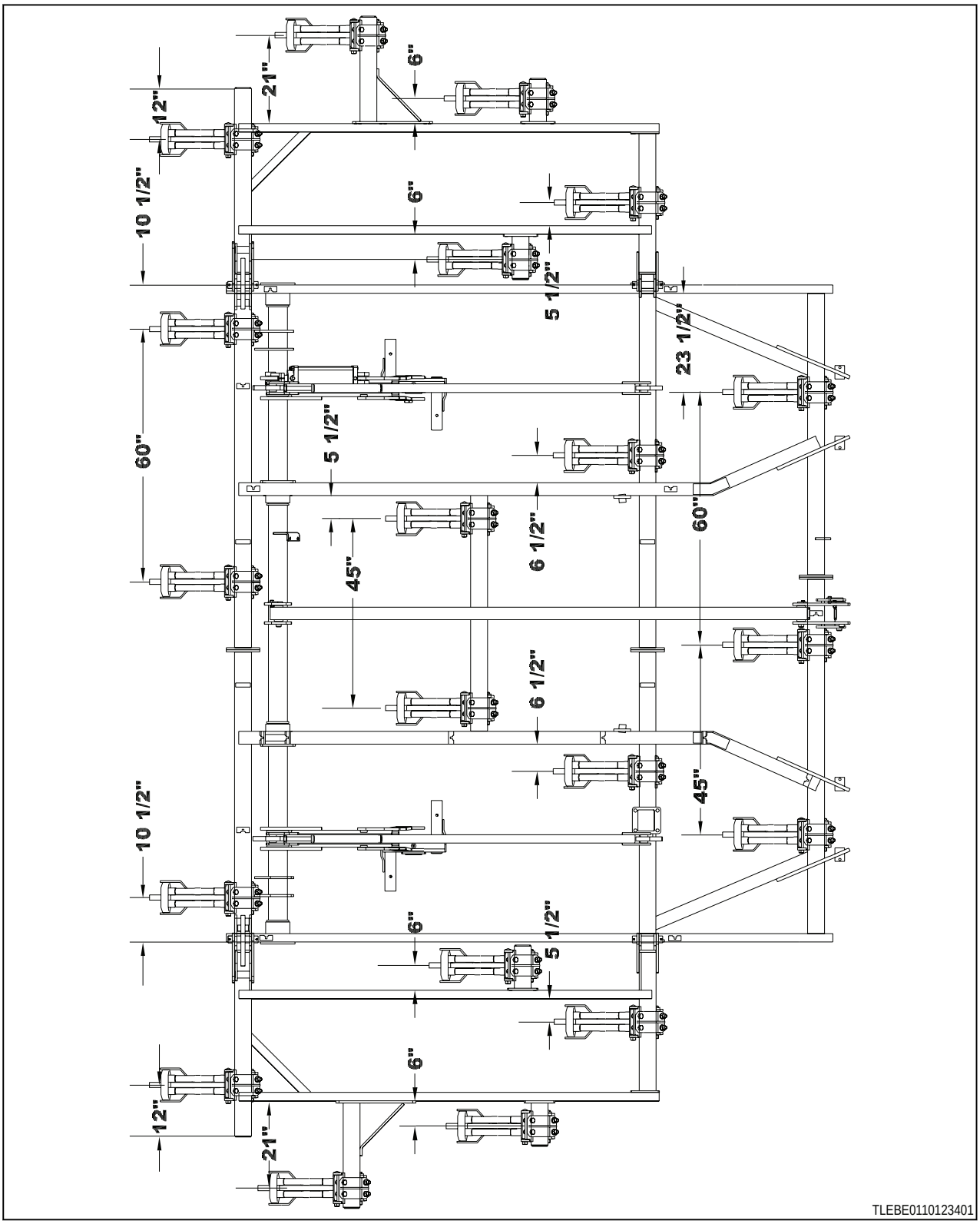


*Fig. 95*

| English measurement | Metric measurement |
|---|---|
| 5 1/2" | 140 mm |
| 6" | 152 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 12" | 305 mm |
| 20" | 508 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.7 25 ft shank locations - 15 inch spacing

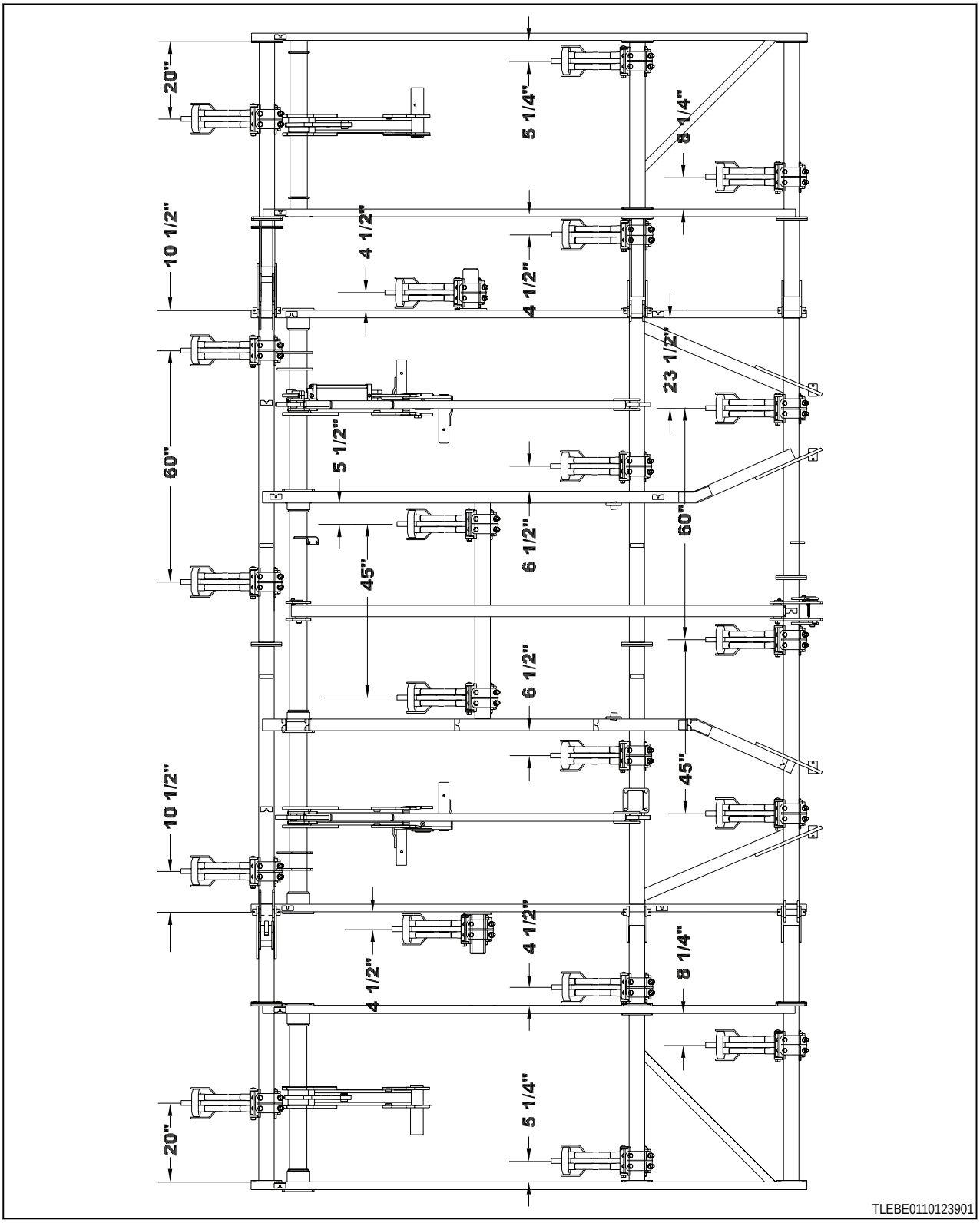


*Fig. 96*

| English measurement | Metric measurement |
|---|---|
| 4 1/2" | 114 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 8 1/4" | 210 mm |
| 10 1/2" | 267 mm |
| 20" | 508 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.8 27 ft shank locations - 15 inch spacing

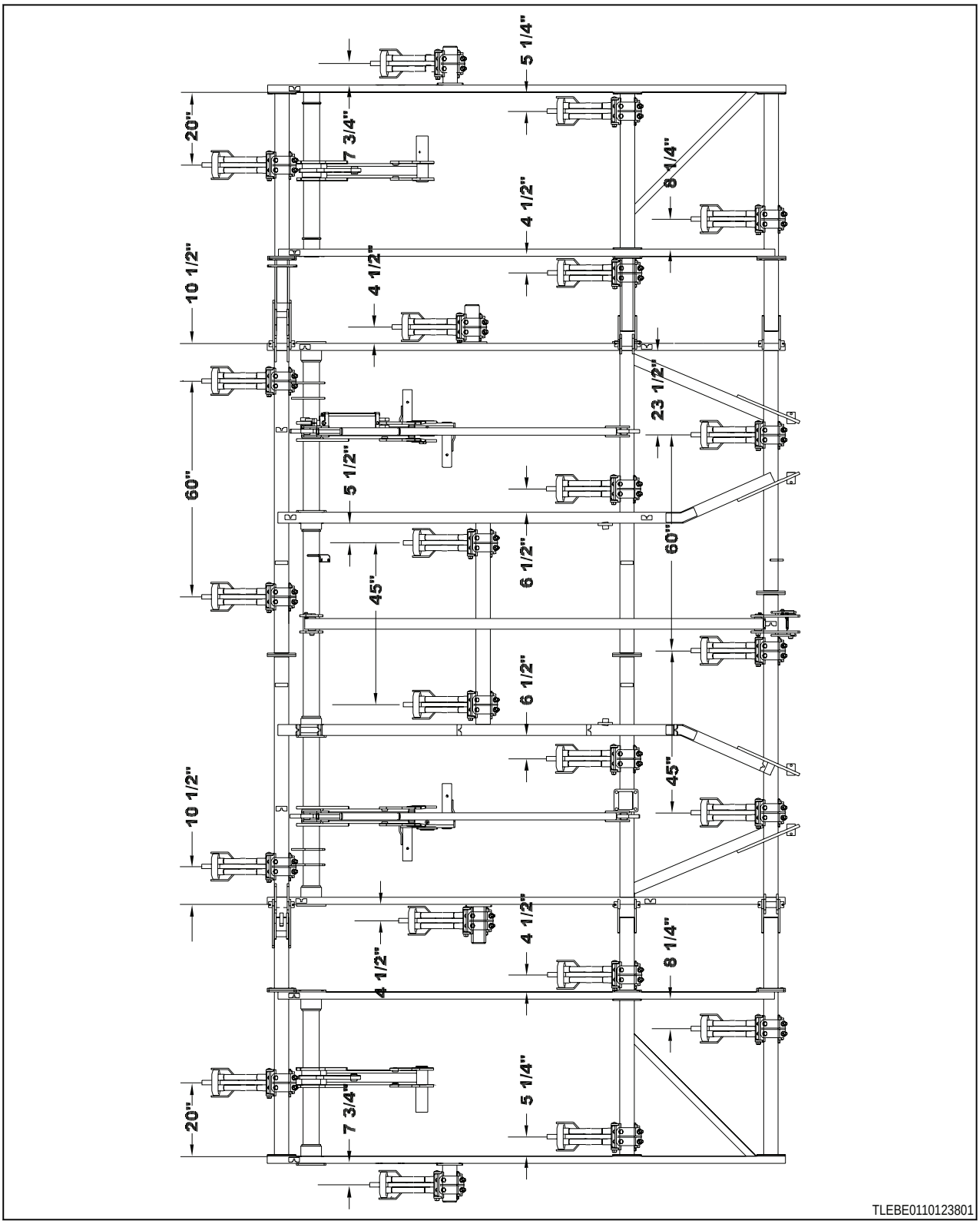


*Fig. 97*

| English measurement | Metric measurement |
|---|---|
| 4 1/2" | 114 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 7 3/4" | 197 mm |
| 8 1/4" | 210 mm |
| 10 1/2" | 267 mm |
| 20" | 508 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.9 29 ft shank locations - 15 inch spacing

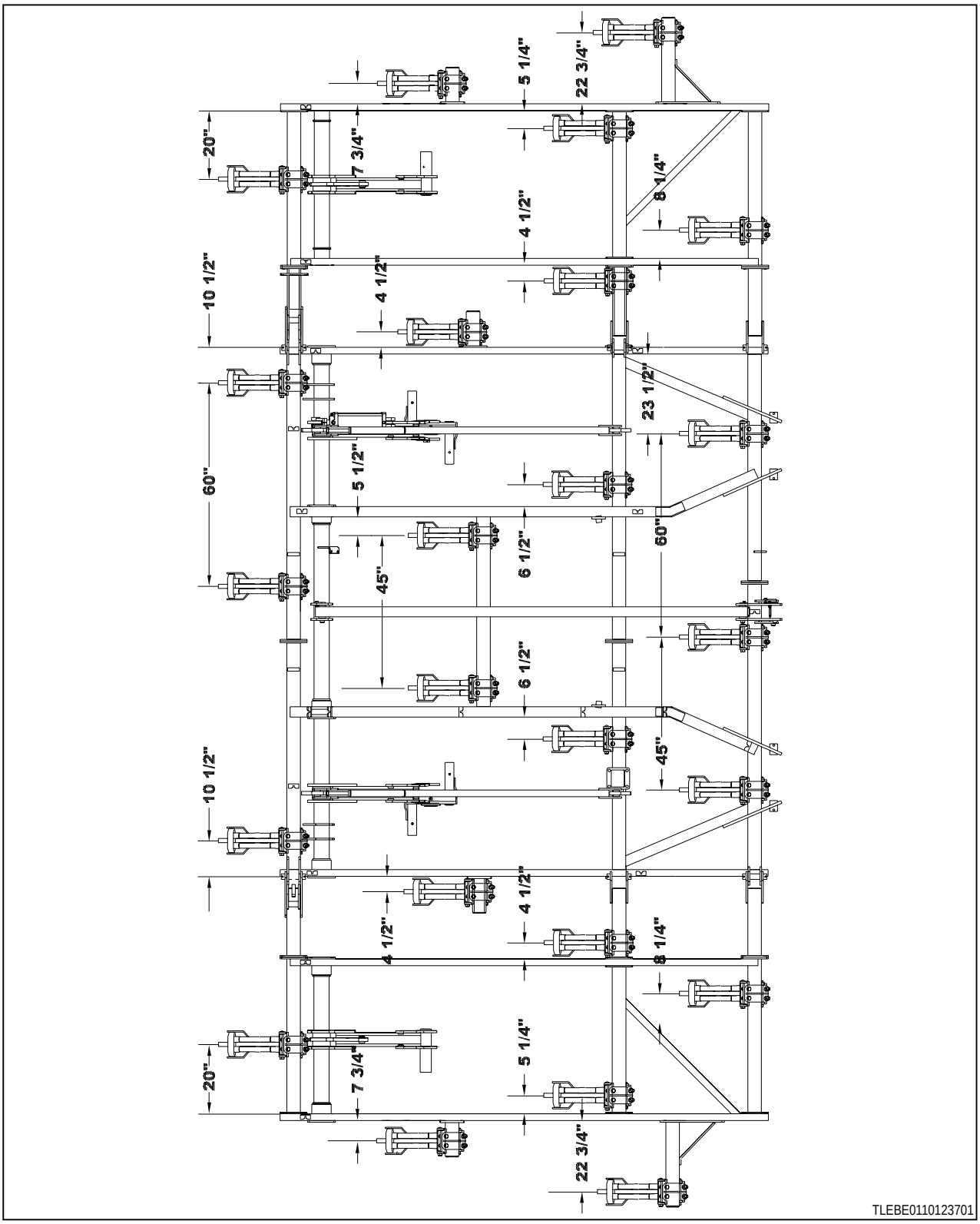


*Fig. 98*

| English measurement | Metric measurement |
|---|---|
| 4 1/2" | 114 mm |
| 5 1/4" | 133 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 7 3/4" | 197 mm |
| 8 1/4" | 210 mm |
| 10 1/2" | 267 mm |
| 20" | 508 mm |
| 22 3/4" | 578 mm |
| 23 1/2" | 597 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.10 31 ft shank locations - 15 inch spacing

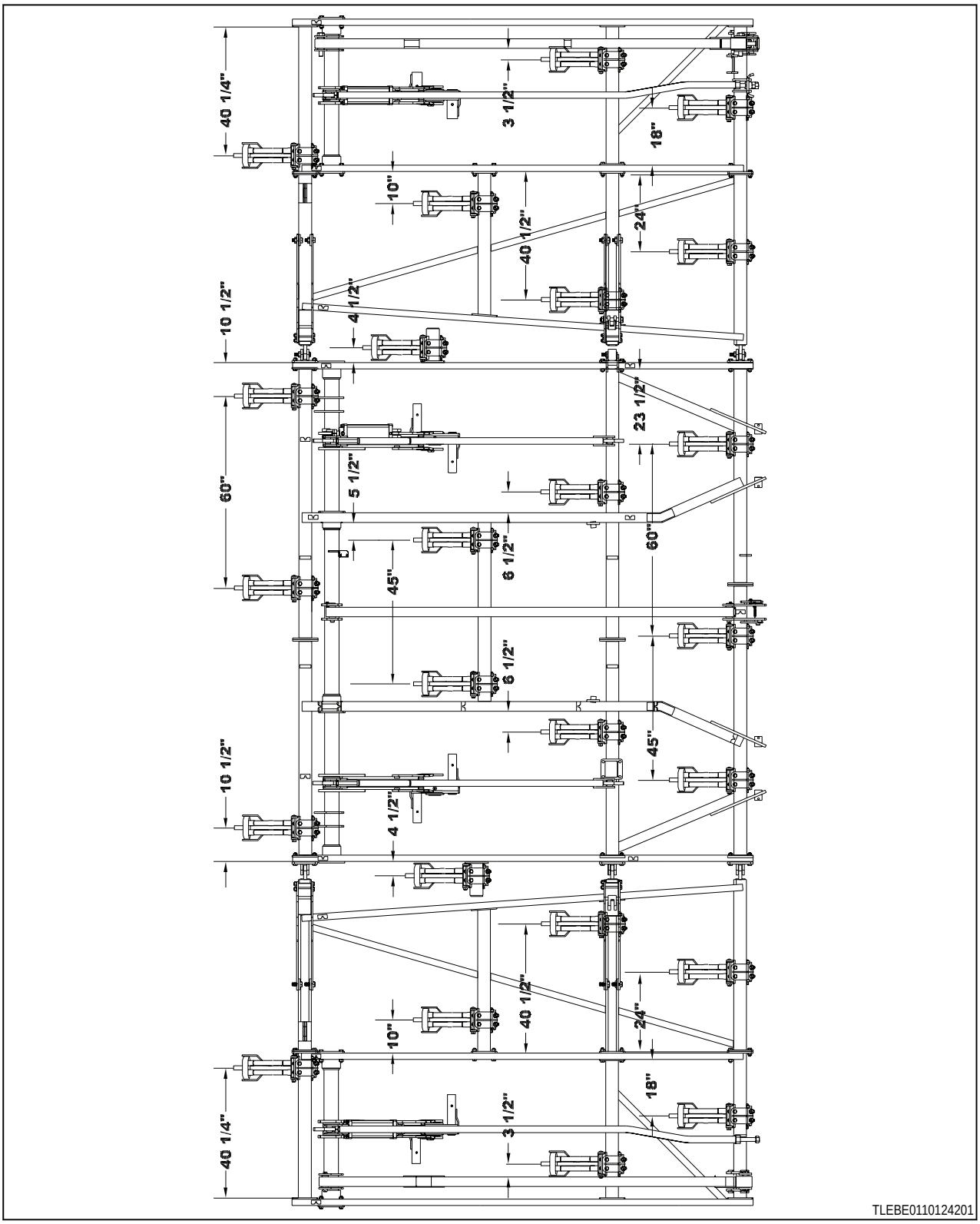


*Fig. 99*

| English measurement | Metric measurement |
|---|---|
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 18" | 457 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 40 1/4" | 1022 mm |
| 40 1/2" | 1029 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.11 33 ft shank locations - 15 inch spacing

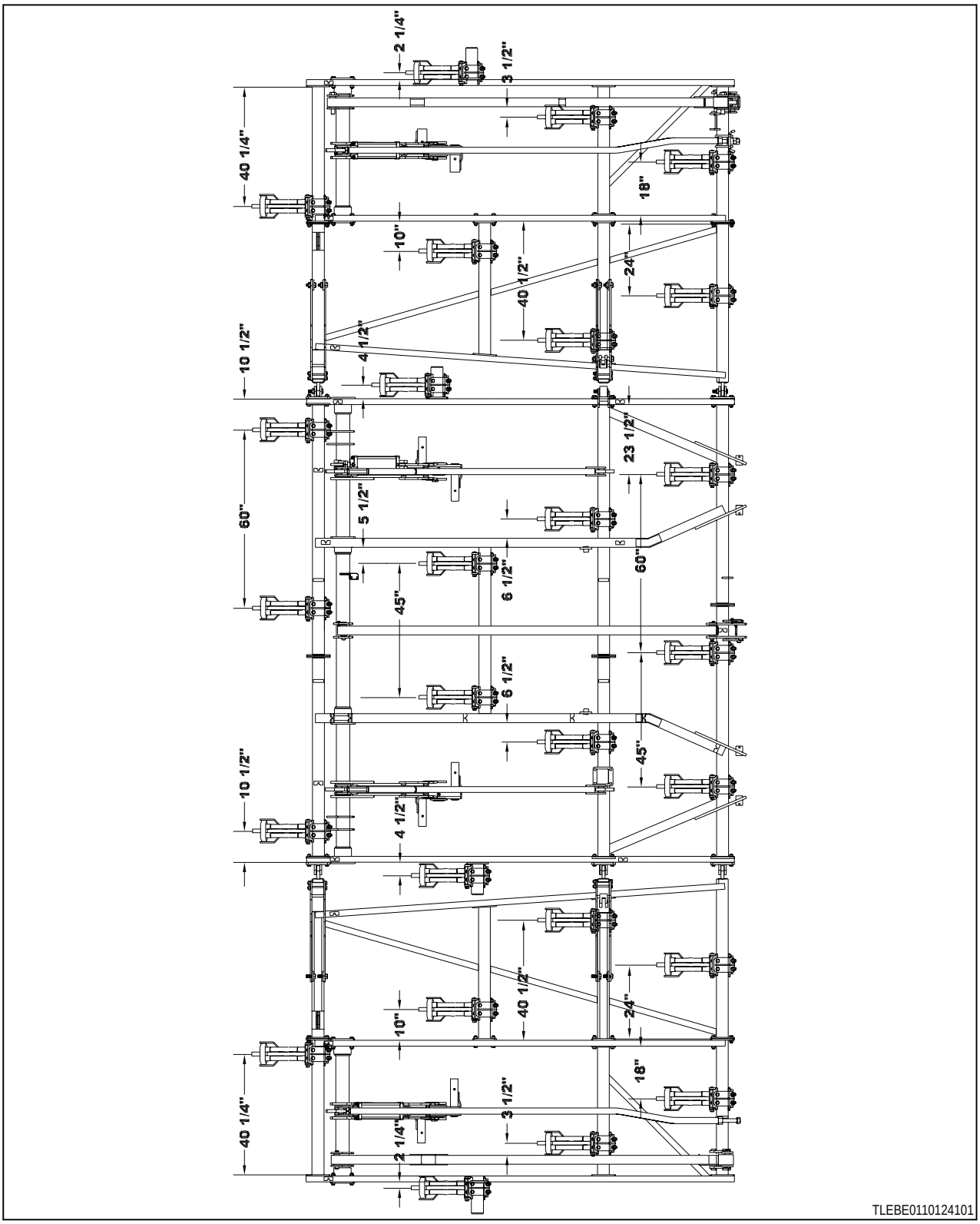


*Fig. 100*

| English measurement | Metric measurement |
|---|---|
| 2 1/4" | 57 mm |
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 18" | 457 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 40 1/4" | 1022 mm |
| 40 1/2" | 1029 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.12 35 ft shank locations - 15 inch spacing

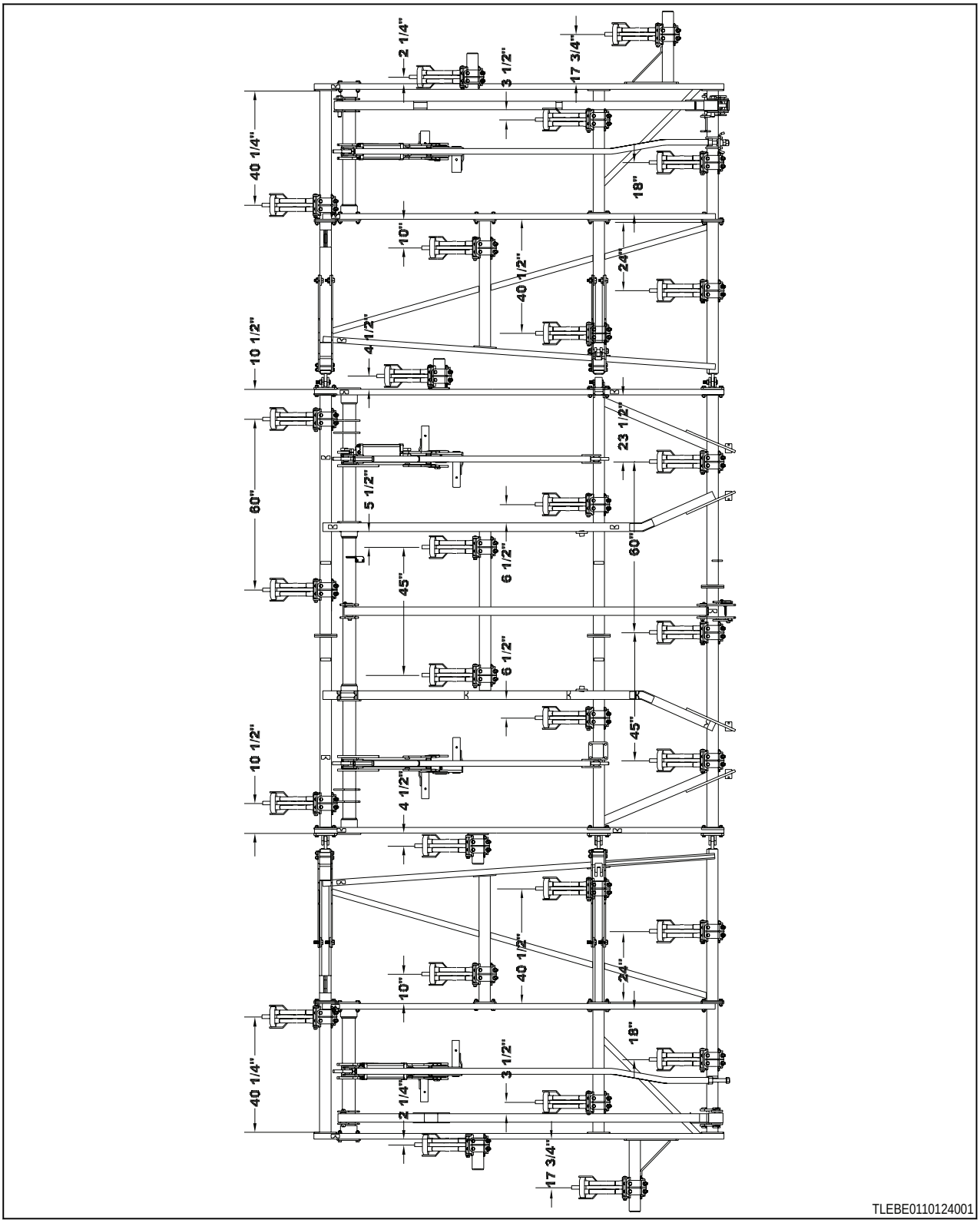


*Fig. 101*

| English measurement | Metric measurement |
|---|---|
| 2 1/4" | 57 mm |
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 17 3/4" | 451 mm |
| 18" | 457 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 40 1/4" | 1022 mm |
| 40 1/2" | 1029 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.13 37 ft shank locations - 9 ft wing - 15 inch spacing

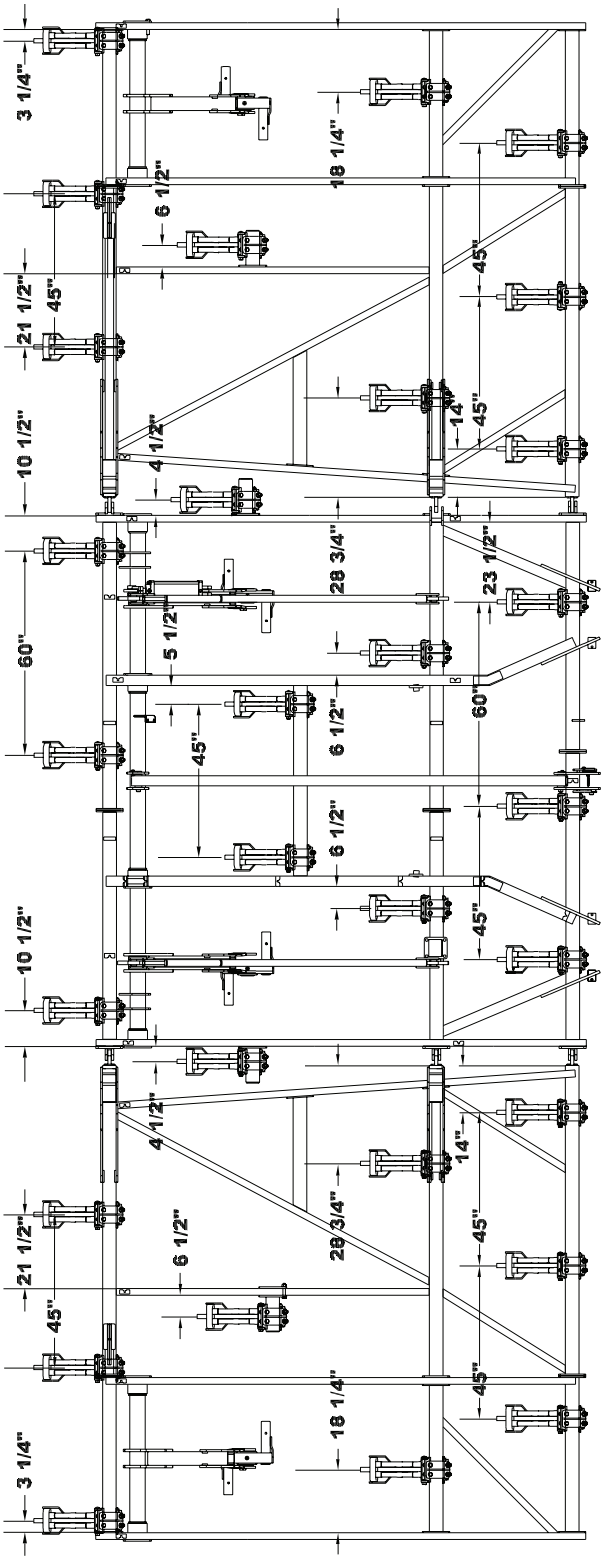


*Fig. 102*

| English measurement | Metric measurement |
|---|---|
| 3 1/4" | 83 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10 1/2" | 267 mm |
| 14" | 356 mm |
| 18 1/4" | 464 mm |
| 21 1/4" | 540 mm |
| 23 1/2" | 597 mm |
| 28 3/4" | 730 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.14 37 ft shank locations - 12 ft wing - 15 inch spacing

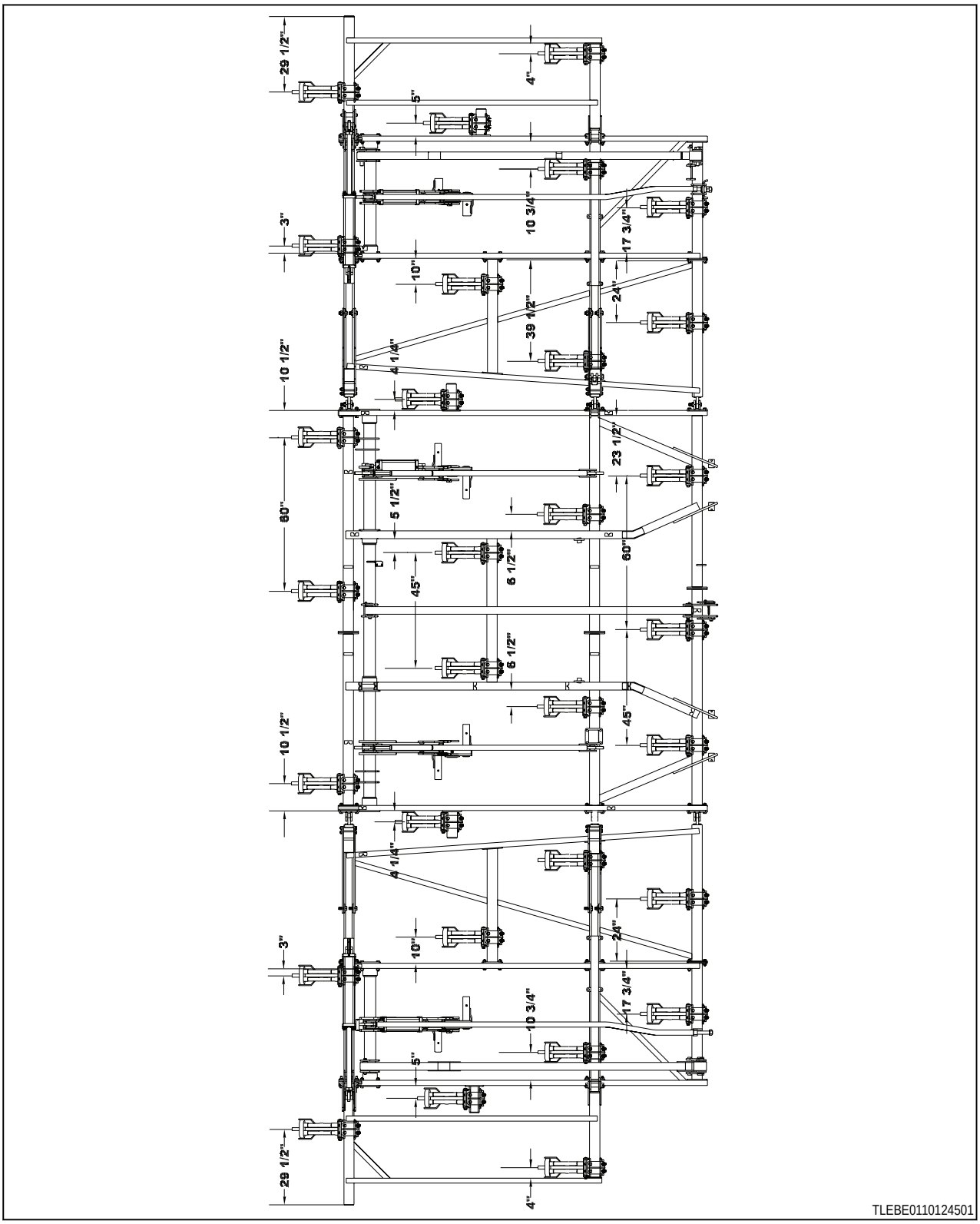


*Fig. 103*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 4" | 102 mm |
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 10 3/4" | 273 mm |
| 17 3/4" | 451 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 29 1/2" | 749 mm |
| 39 1/2" | 1003 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.15 39 ft shank locations - 9 ft wing - 15 inch spacing

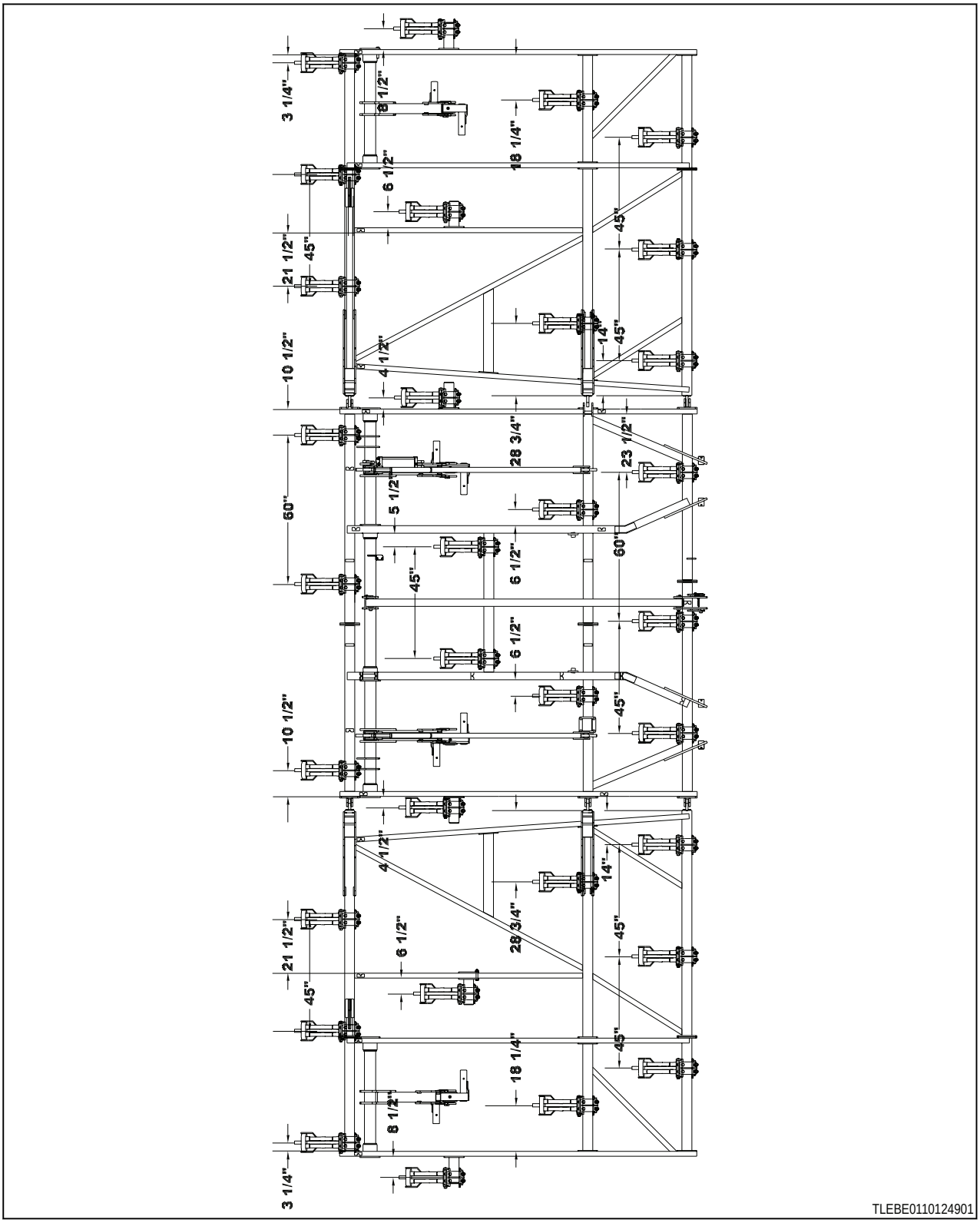


*Fig. 104*

| English measurement | Metric measurement |
|---|---|
| 3 1/4" | 83 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 8 1/2" | 216 mm |
| 10 1/2" | 267 mm |
| 18 1/4" | 464 mm |
| 21 1/4" | 540 mm |
| 23 1/2" | 597 mm |
| 28 3/4" | 730 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.16 39 ft shank locations - 12 ft wing - 15 inch spacing

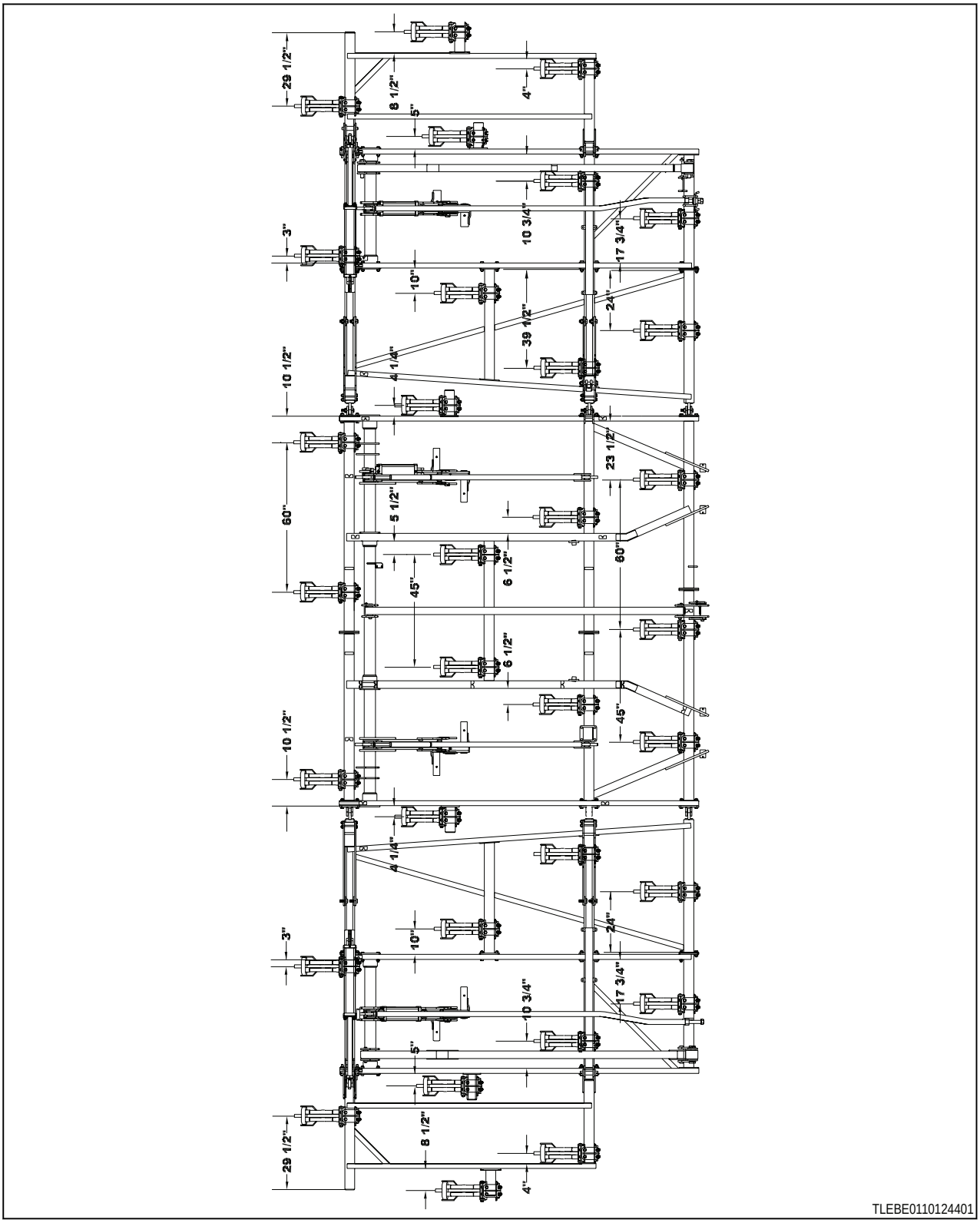


*Fig. 105*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 4" | 102 mm |
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 8 1/2" | 216 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 10 3/4" | 273 mm |
| 17 3/4" | 451 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 29 1/2" | 749 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.17 41 ft shank locations - 15 inch spacing

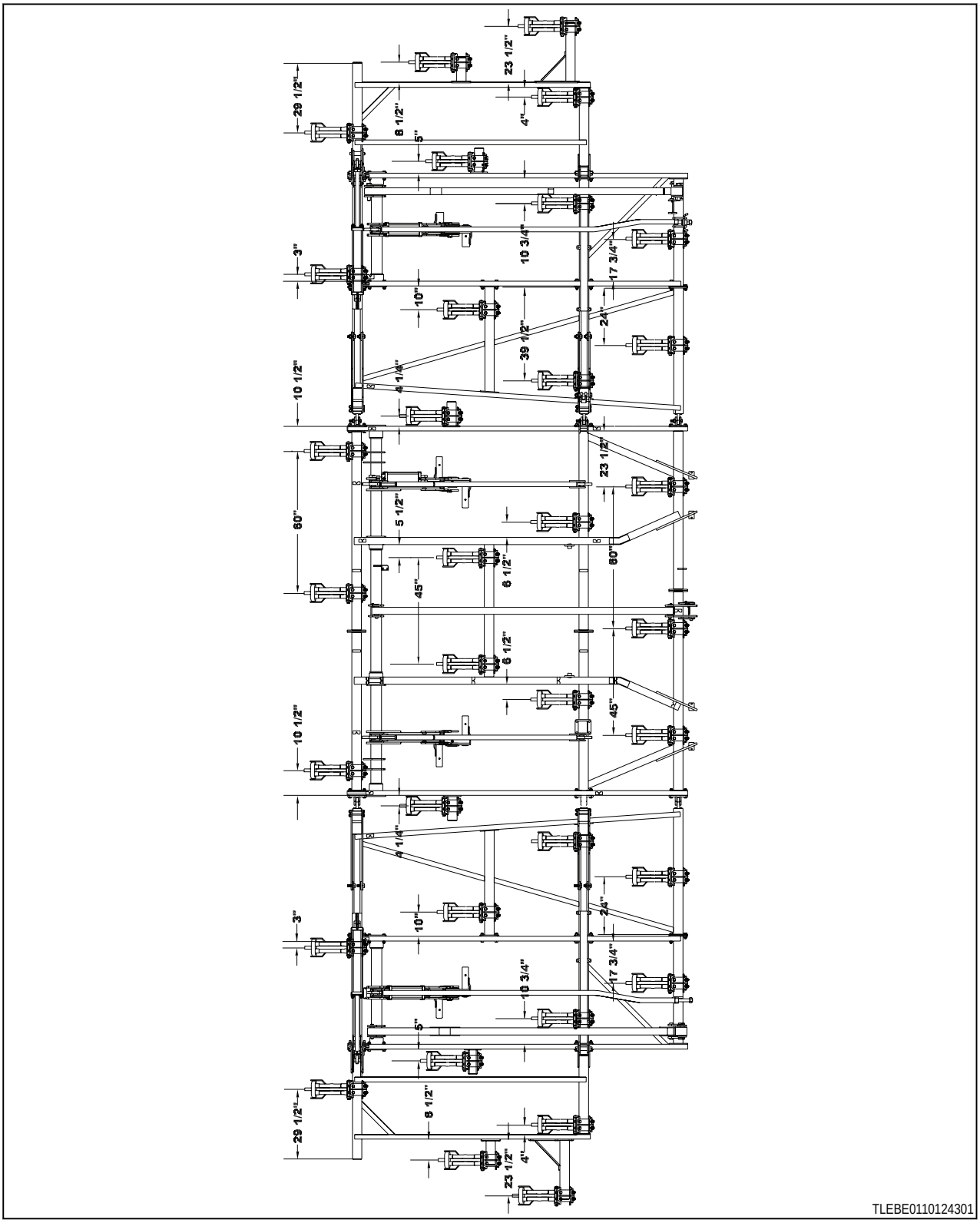


*Fig. 106*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 4" | 102 mm |
| 4 1/4" | 108 mm |
| 5" | 127 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 8 1/2" | 216 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 10 3/4" | 273 mm |
| 17 3/4" | 451 mm |
| 23 1/2" | 597 mm |
| 24" | 610 mm |
| 29 1/2" | 749 mm |
| 39 1/2" | 1003 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.18 43 ft shank locations - 15 inch spacing

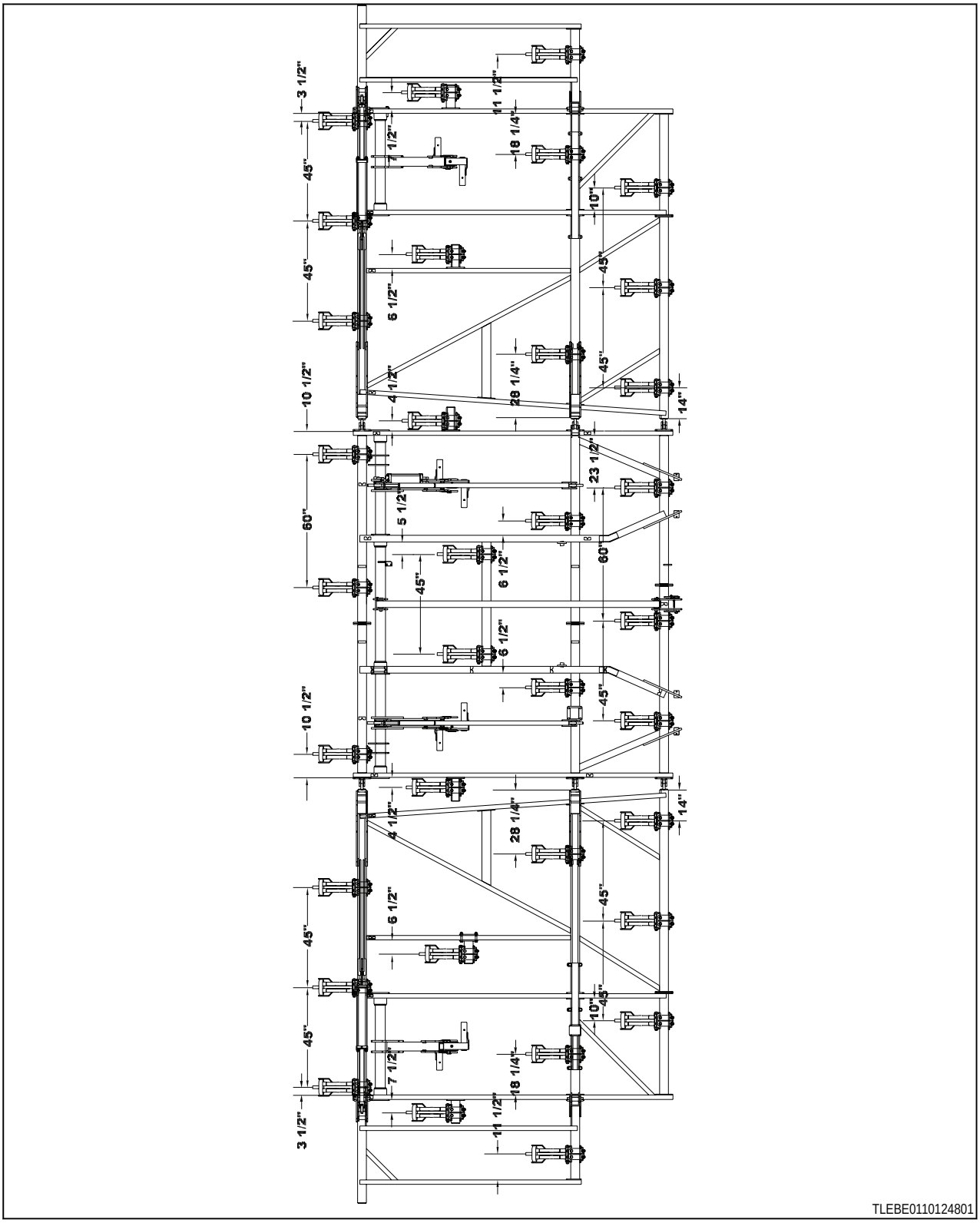


*Fig. 107*

| English measurement | Metric measurement |
|---|---|
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 7 1/2" | 191 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 11 1/2" | 292 mm |
| 14" | 356 mm |
| 18 1/4" | 464 mm |
| 23 1/2" | 597 mm |
| 28 1/4" | 718 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.19 45 ft shank locations - 15 inch spacing

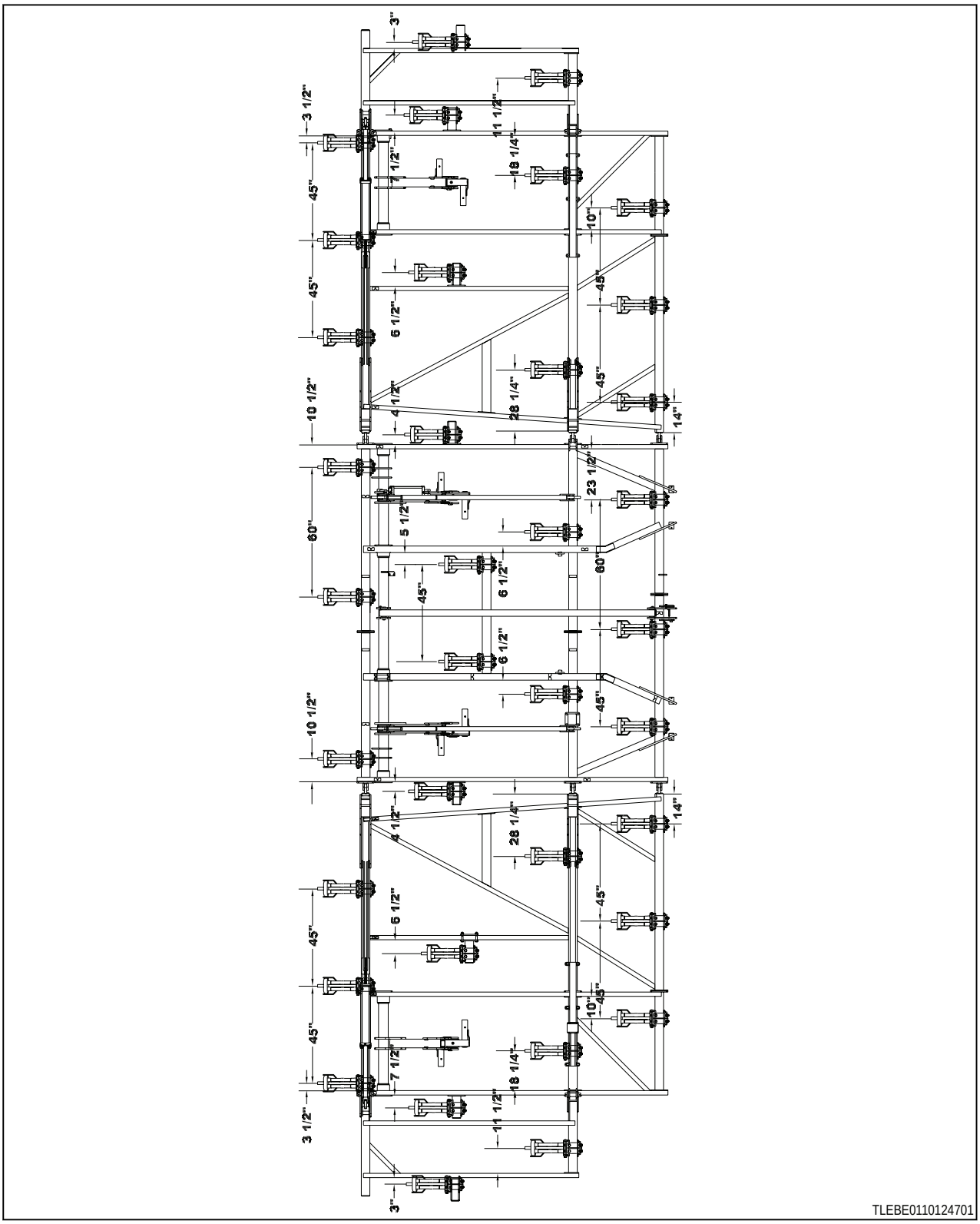


*Fig. 108*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 7 1/2" | 191 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 11 1/2" | 292 mm |
| 14" | 356 mm |
| 18 1/4" | 464 mm |
| 23 1/2" | 597 mm |
| 28 1/4" | 718 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

## 7.22.20 47 ft shank locations - 15 inch spacing

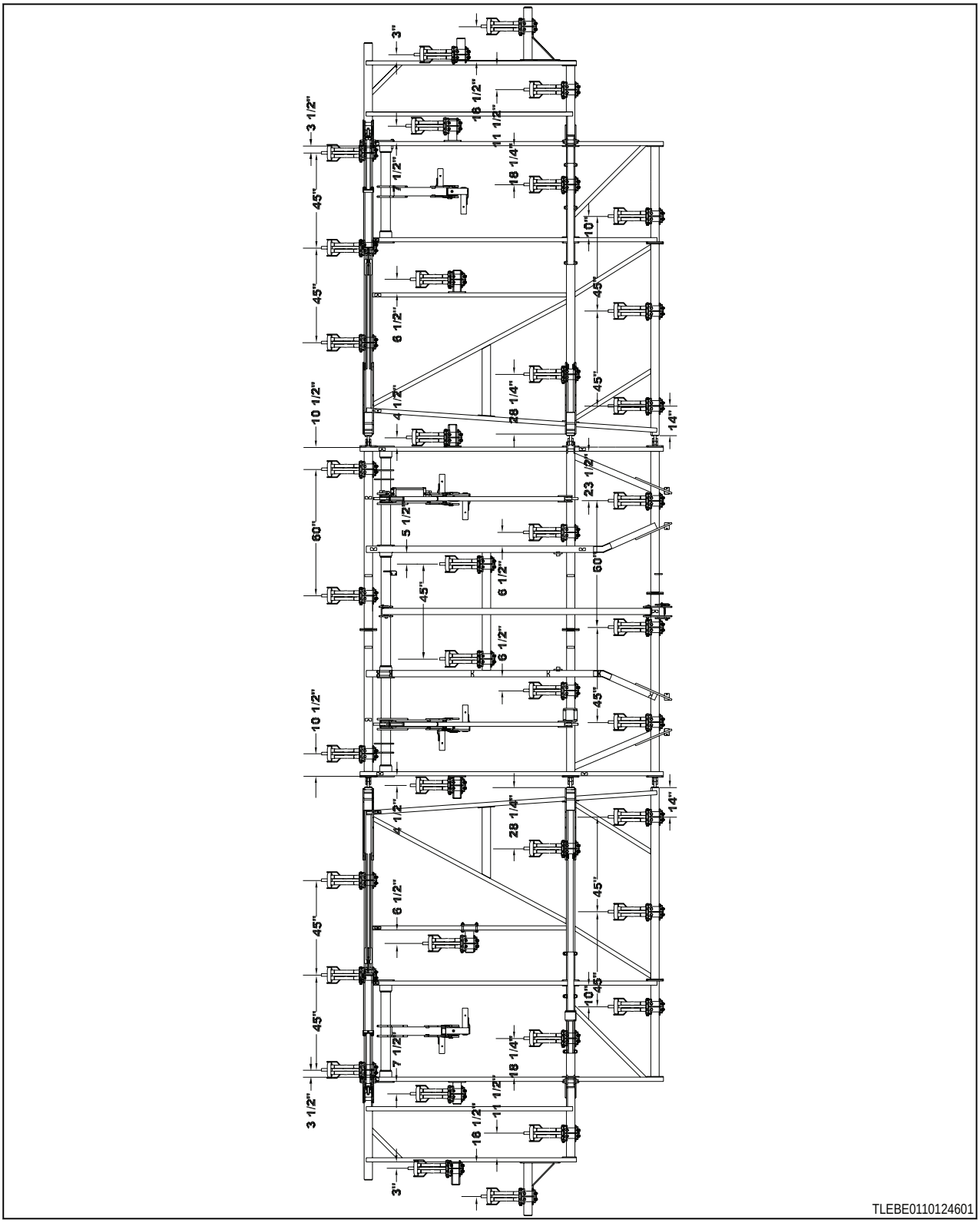


*Fig. 109*

| English measurement | Metric measurement |
|---|---|
| 3" | 76 mm |
| 3 1/2" | 89 mm |
| 4 1/2" | 114 mm |
| 5 1/2" | 140 mm |
| 6 1/2" | 165 mm |
| 7 1/2" | 191 mm |
| 10" | 254 mm |
| 10 1/2" | 267 mm |
| 11 1/2" | 292 mm |
| 14" | 356 mm |
| 16 1/2" | 419 mm |
| 18 1/4" | 464 mm |
| 23 1/2" | 597 mm |
| 28 1/4" | 718 mm |
| 45" | 1143 mm |
| 60" | 1524 mm |

# Index



## A

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