Workshop Service Manual

# Air Spreader / Twin Bin - Four Bin

North America
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79035611A
NA
English

## Operation

Only operate machine while in operator seat. Seat belt must be fastened during operation. Only operate controls while engine is running.

Check for proper operation of all controls and protective devices while operating machine slowly in an open area.

Make sure no one will be endangered before moving machine.

Report any damage noted during operation and make any necessary repairs.

Do not drive machine near an overhang, edge of a cliff or near edge of an excavation.

If machine begins to sideslip on a grade, immediately dispose of load and turn machine downhill.

Take steps to avoid any ground condition that causes machine to tip.

A rollover can occur when working on hills, banks or slopes or when crossing ditches, ridges or other unexpected obstacles.

When possible, operate machine up and down slopes, avoid driving across slopes whenever possible.

Keep machine under control and do not overload beyond capacity.

Make sure towing devices are adequate for application.

Never straddle, or allow other personnel to straddle a wire cable.

Know maximum dimensions of machine.

When operating on icy roads, reduce travel speed.

After operating in muddy conditions, allow time for tires to reject debris and moisture before making high speed maneuvers. Wet, muddy tires impede machine's steering.

If stability of machine is noticeably reduced, reduce travel speed.

Select a gear that controls machine speed when descending a hill.

Downshift if braking is required to control machine speed. Never coast down a hill with transmission in neutral.

## Parking

Park on a level surface. If parking on a grade is necessary, chock machine's tires.

Move transmission control lever to park.

Before stopping engine, move throttle control lever to low idle. Run engine at low idle speed for five minutes to allow turbocharger to cool.

Stop engine.

Turn engine start switch to off and remove key.

Turn battery disconnect switch to off.

## Operator Station

Any modifications to inside of operator station should not project into operator space. The addition of a radio, fire extinguisher and other equipment must be installed so defined operator space is maintained.

Any item brought into cab should not project into defined operator space. A lunchbox or other loose items must be secured. Objects must not pose an impact hazard in rough terrain or in the event of a rollover.

## Crushing and Cutting Prevention

Ensure proper support when working under machine. Do not depend on hydraulic cylinders to hold machine up. An implement can fall if a control lever is moved or if a hydraulic line breaks.

Never jump across starter solenoid terminals to start machine, unexpected movement could result.

Never attempt adjustments while machine is moving or engine is running.

Whenever there are attachment control linkages, clearance in linkage area changes with movement of attachment.

Stay clear of all rotating and moving parts.

Keep objects away from moving fan blades. Fan blades will throw and can cut objects.

Always wear gloves when handling wire cable and never use a kinked or frayed wire cable.

When striking a retainer pin may cause personal injury. Make sure there are no personnel in area. To avoid injury to eyes, wear protective glasses when striking retainer pins.

Chips or other debris may fly off objects when struck. Make sure no personnel will be injured by flying debris before striking.

## WORK IN A CLEAN AREA

**FIG. 25:** Thoroughly clean work area, machine, systems and components before starting a job. Dirty and greasy areas create work hazards.

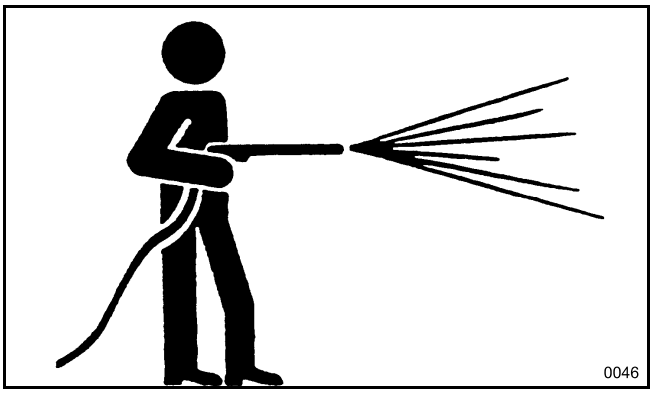


**FIG. 25**

## LIGHTING WORK AREA

**FIG. 26:** Light work area properly, adequately and safely.

Use proper safety lights with wire safety cages. Exposed bulbs can ignite fluids.

Catch draining fluids in proper containers.

Never use beverage containers that would mislead personnel to drink from them.

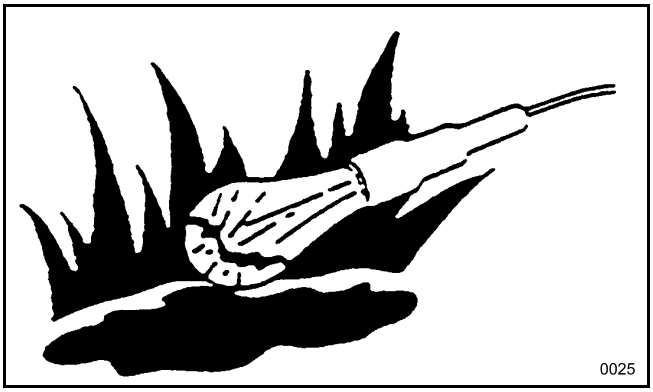


**FIG. 26**

## USE PROPER TOOLS

**FIG. 27:** Makeshift tools and procedures create safety hazards. Use only proper equipment and procedures.

Use power tools only to loosen threaded parts and fasteners.

Use only U.S. tools with U.S. fasteners and metric tools with metric fasteners.

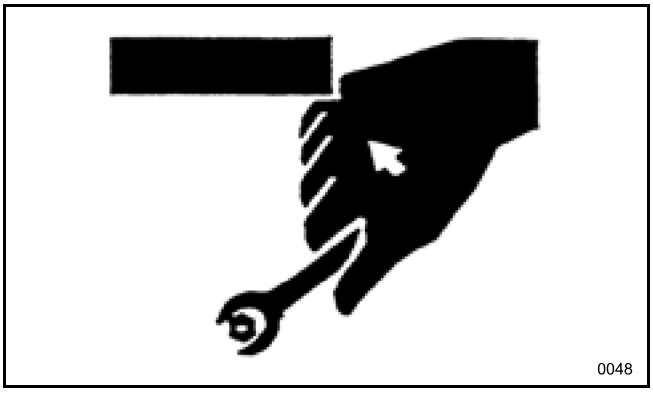


**FIG. 27**

## Replacement Filters

**FIG. 45:** Medium Pressure Filter (1) (3450 kPa (500 PSI) 10 micron

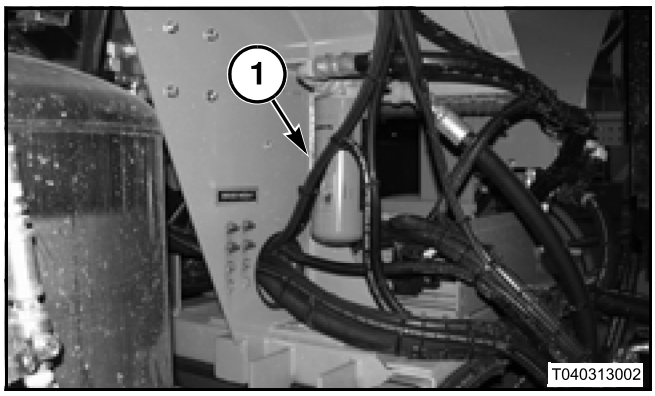


FIG. 45

**FIG. 46:** High Pressure Filter (1) 207 bar (3000 psi), 10 Micron - Located left front corner of system, below hydraulic reservoir.

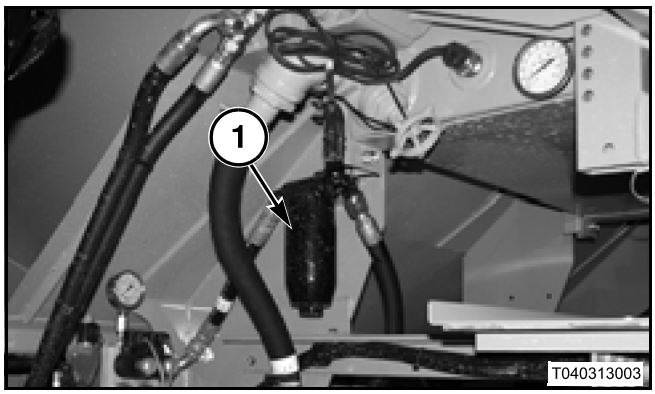


FIG. 46

## Hydraulic Oil and Filters

**WARNING: Do not open hydraulic tube lines or hoses that are under pressure. Release any pressure before performing maintenance or repairs. Do not use hand to check for leaks. Hydraulic oil under pressure can cause personal injury.**

Replace high pressure filter after first 50 hours of operation and every 250 hours thereafter.

- Replace hydraulic oil and filter every 1000 hours of operation or annually. Also replace hydraulic oil and filter if oil is dirty and after any major repairs.
- Replace filter again at 100 hours of operation after a maintenance procedure, or a component replacement.

## Hydraulic Pumps

**FIG. 47:** 8204/8244 Pump Configuration

Hydraulic Pump (Fans) (1)

Hydraulic Pump (2) (Meter Chains, Conveyors and Augers)

Air Bleed Plugs (3)

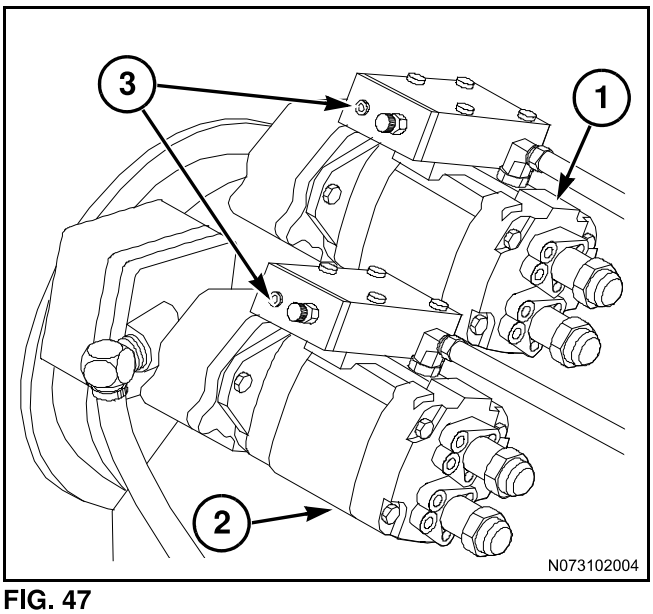


FIG. 47

# TORQUE SPECIFICATIONS

## TORQUE SPECIFICATIONS

**WARNING: Mismatched or incorrect fasteners can result in damage, malfunction or personal injury. Take care to avoid mixing metric dimensioned fasteners and inch dimensioned fasteners.**

Exceptions to these torques are given in the Service Manual, if necessary.

Prior to installation of any hardware, ensure that components are in near new condition. Bolts and threads must not be worn or damaged. Threads must not have burrs or nicks. Hardware must be free of rust and corrosion. Clean hardware with a non-corrosive cleaner.

Do not lubricate fastener threads except with rust preventive. Rust preventive should be applied by supplier of component for purposes of shipping and storage. Other applications for lubricating components may also be specified in Service Manual.

### Constant Torque Hose Clamps

Hoses will heat set due to extreme temperature changes. Heat setting can cause hose clamps to loosen. The constant torque hose clamp prevents this.

**FIG. 62:** Constant torque hose clamps are installed correctly under the following conditions:

- Screw tip (1) extends 6.35 mm (.25 inch) (A) beyond housing.
- Belleville washers are collapsed nearly flat after screw (2) is tightened to a torque of 11 Nm (8.1 lb/ft).

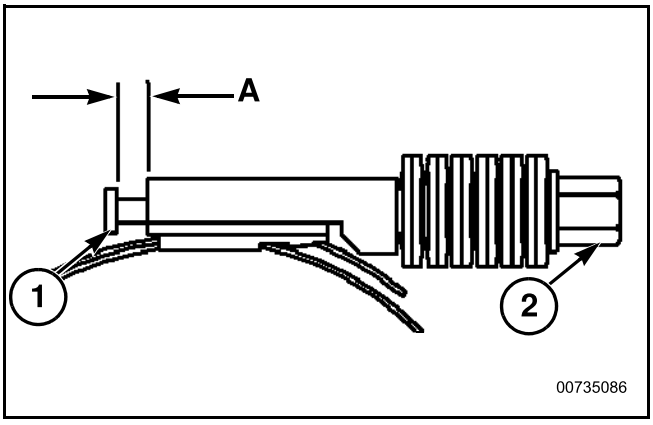


**FIG. 62**

# TerraGator®

## Air Spreader / Twin Bin - Four Bin Application System

## SERVICE MANUAL
## 79035611A

# 02 - System

### Contents

# CONVEYOR AND AUGERS

## CONVEYOR AND AUGER

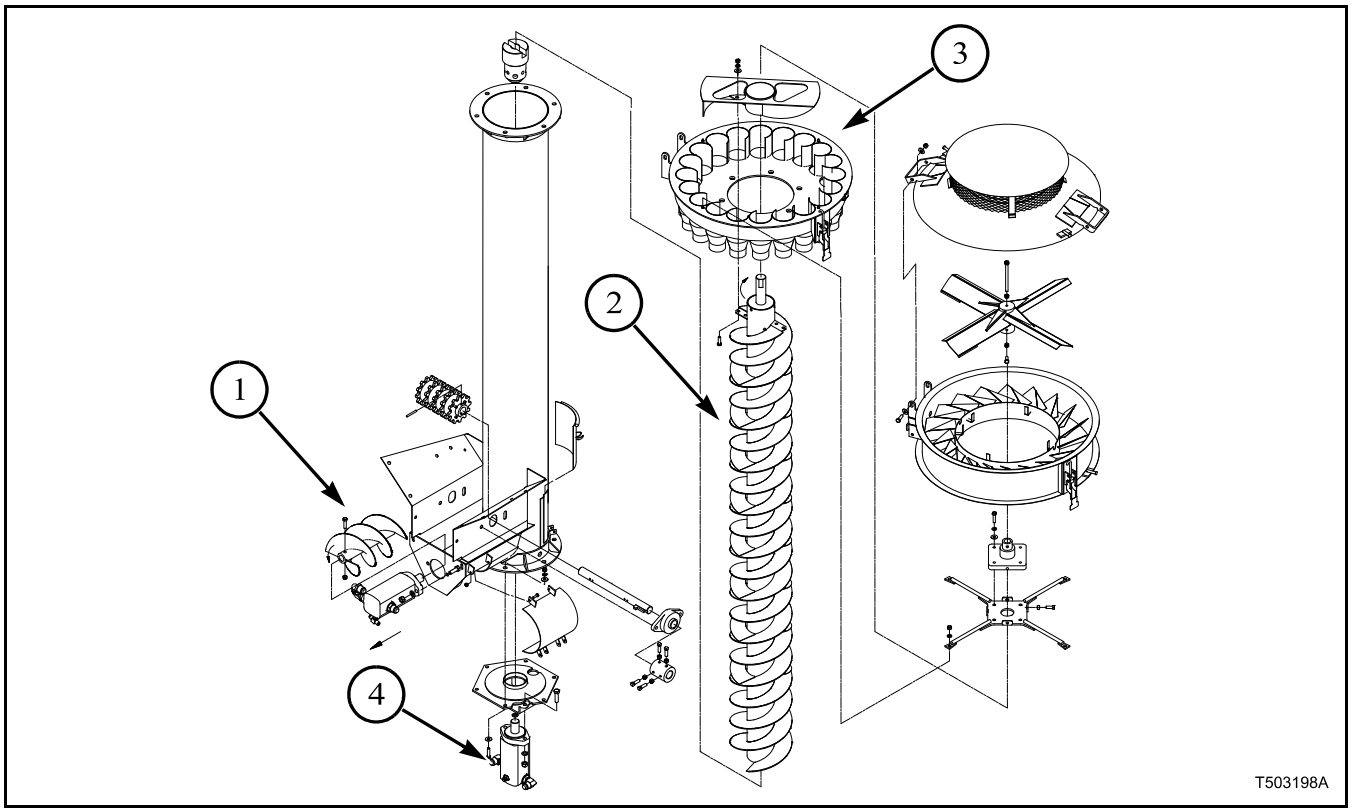


FIG. 1

FIG. 1: The standard Air Spreader and the Twin Bin/Four Bin Soilection both use a conveyor or “apron” chain to carry product to the horizontal auger (1), which carries it to the vertical auger (2). The vertical auger carries the product up to the distribution head (3) where it is evenly distributed to each of the twenty drop tubes. Hydraulic motors (4) are used to power these functions.

The two systems differ in the way the product is metered for the desired rate of application. The Air Spreader uses a hydraulic motor to vary the speed of a single conveyor chain, running inside the main box, and the preset height of an adjustable feed gate will vary the application rate. The Twin Bin/Four Bin conveyor chain travels at a constant speed of 150 rpm underneath the bins. The metering chain assemblies in the bottom of each bin drop product on to the conveyor chain. Varying the speed of the metering chain hydraulic motor changes the actual application rate

## Vertical auger removal & installation

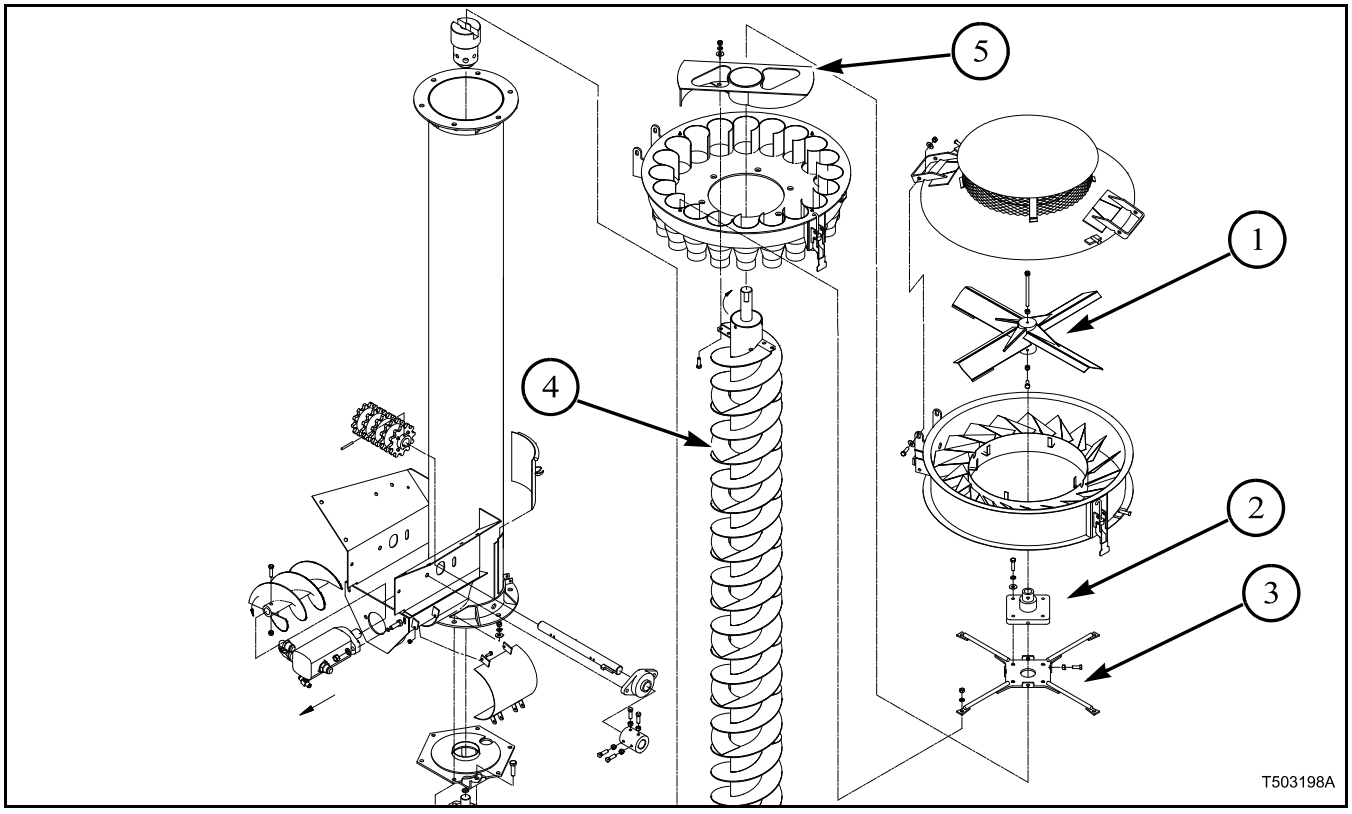


FIG. 11

FIG. 11: Remove stator fan (1), top bearing (2), and support bracket (3). Attach auger (4) with spinner weldment (5) to an overhead hoist capable of lifting 228.6 cm (90 in.) (length of auger) above the distributor head (5). Lift out the auger.

FIG. 11: Inspect the auger for any major kinks or bends in the flighting and to assure all sixteen baffles move freely between the flights

NOTE: The baffles are there to keep as much product as possible from moving back down the flighting when the auger is shut off.

Install by lifting auger above the distributor head and lowering it into the auger tube.

CAUTION: The vertical auger weighs about ninety pounds, and the edges of worn flighting can be extremely sharp. Attempting to remove auger by hand can result in injury.

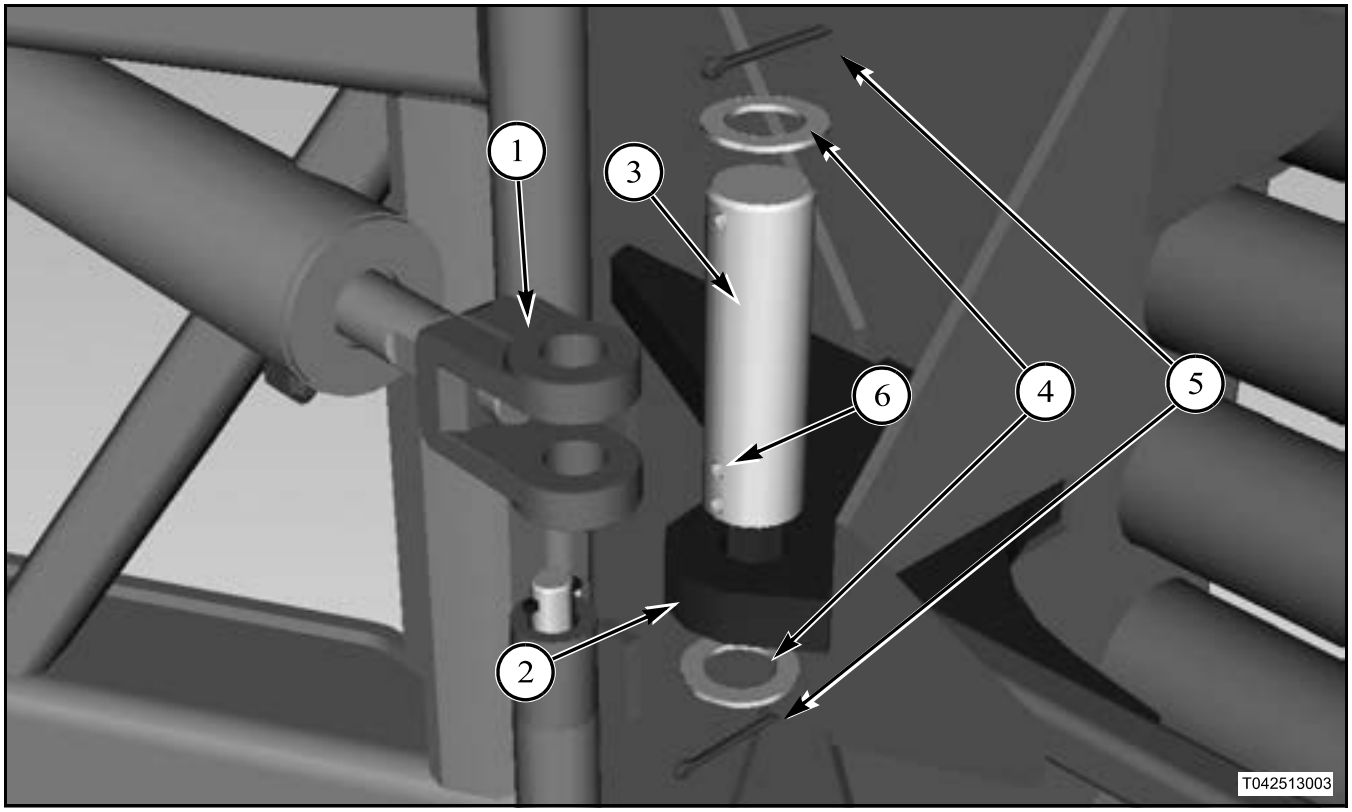


FIG. 5

FIG. 5: Align the boom cylinder clevis (1) with the boom cylinder mount (2) and install the cylinder pin (3). Install the washers (4) and cotter pins (5).

NOTE: The boom cylinder pin must be oriented as above with the two holes to the bottom. Use only the top mounting hole (6) for the cotter pin.

Align the boom cylinder with the center section and install the cylinder pin (1). Install the washers and cotter pins in this location (3) for the center section side of the boom cylinder.

## Boom fold cylinder adjustment

FIG. 6: With boom in the open position and without the foam seal applied, adjust the boom cylinder clevis at the boom hinge joint (1) to achieve a gap of 0.06 to 0.18 inch (2) between the boom and the center section. With the booms closed and the cylinders completely collapsed, adjust if necessary so the booms rest freely in the cradles with no bending of the boom.

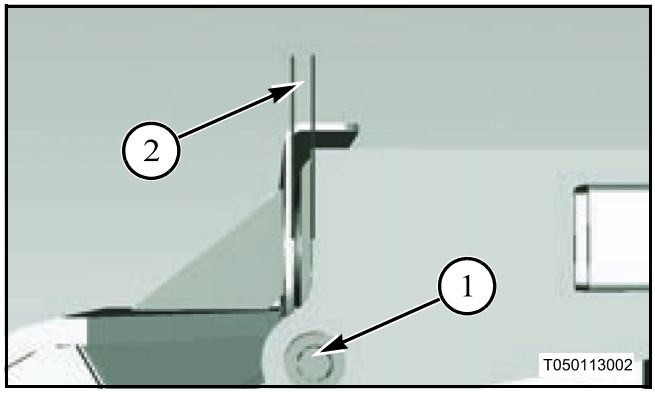


FIG. 6

## Air cylinders and airline configuration

The boom shut-off air cylinders are not rebuildable. Replace the air cylinder if the shaft seal leaks air, if it will not actuate under air pressure, or if air bypasses internally.

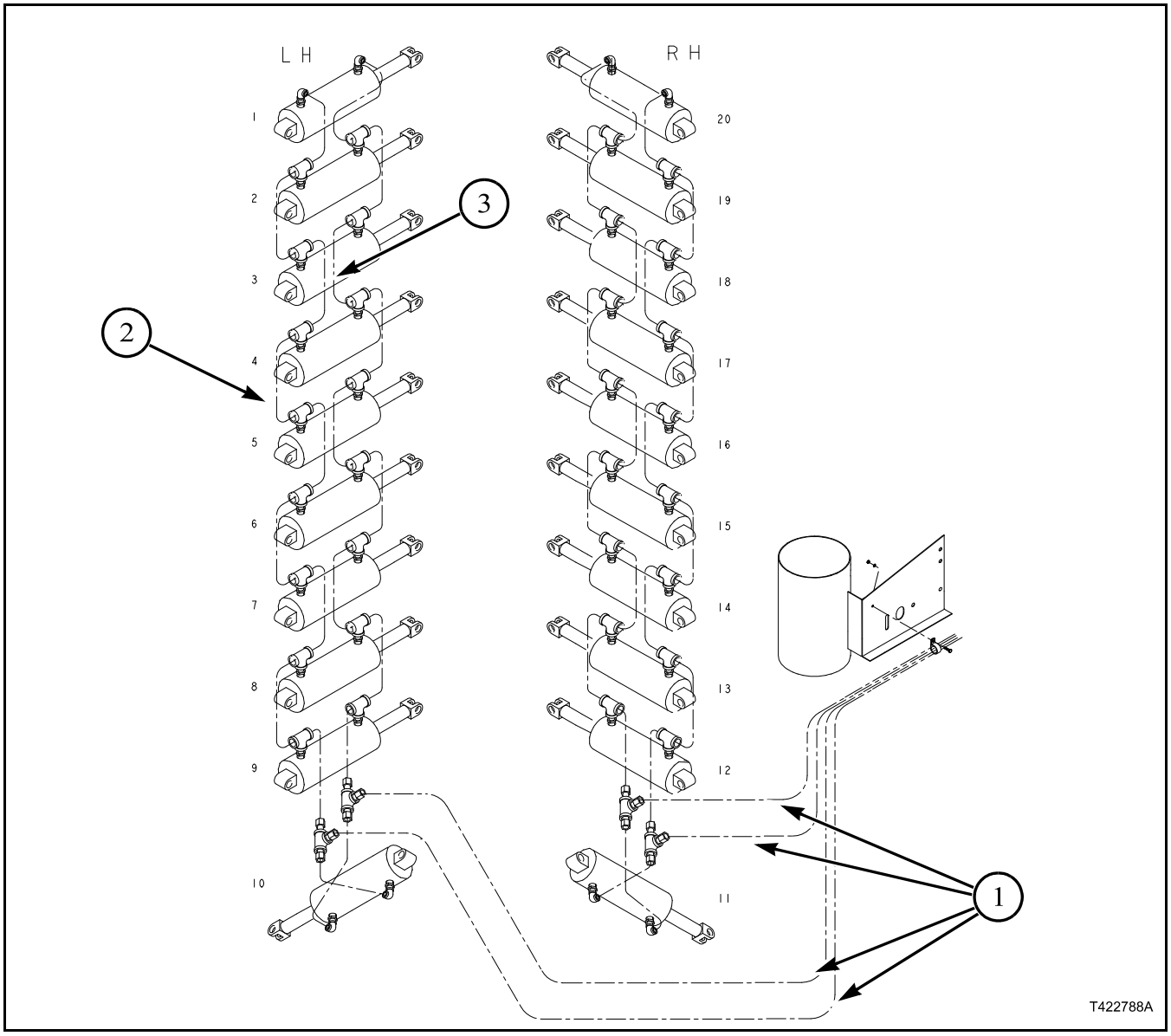


FIG. 16

FIG. 16: Four airlines (1) connect the air cylinders to the air box. The base end of all the left boom air cylinders are connected together (2) so that air delivered to the base end of the cylinders will shut off the left boom. The rod end of all the left cylinders are connected together (3) so that air delivered to the rod end of all the left cylinders will turn the left boom on. The right boom air cylinders are connected together the same as the left.

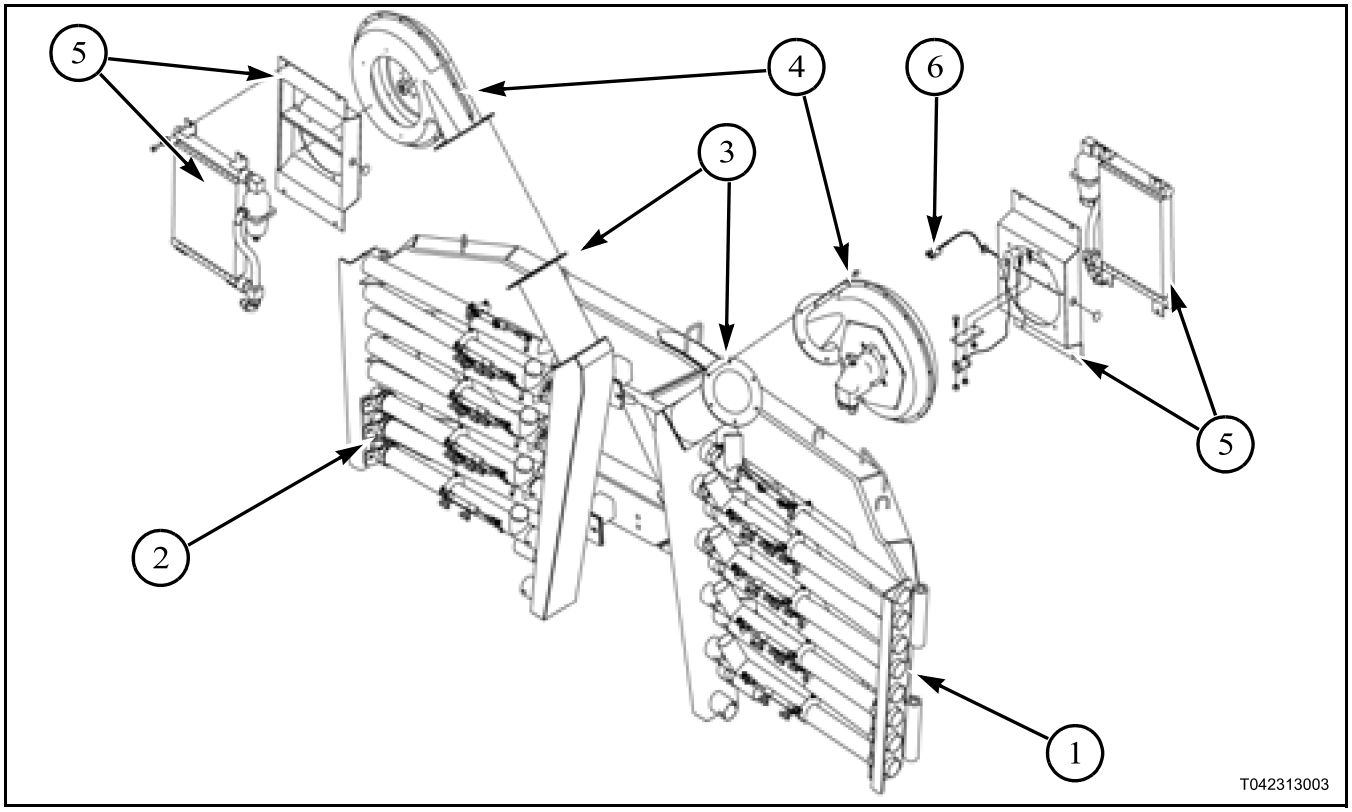


FIG. 27

FIG. 27: Install air manifolds with venturi tubes attached as a unit leaving 0.75-inch of the venturi tubes sticking out at the hinge area (1). Do not install the venturi tube lock assemblies (2) on the bottom three tubes until the booms are installed and folded out. Apply silicone sealant at the flange (3) and install both centrifugal fan (4) and oil cooler (5) assemblies. Connect wiring for fan speed sensor (6). (Right side fan only)

# TerraGator®

# Air Spreader / Twin Bin - Four Bin Application System

# SERVICE MANUAL
# 79035611A

# 05 - Hydraulics

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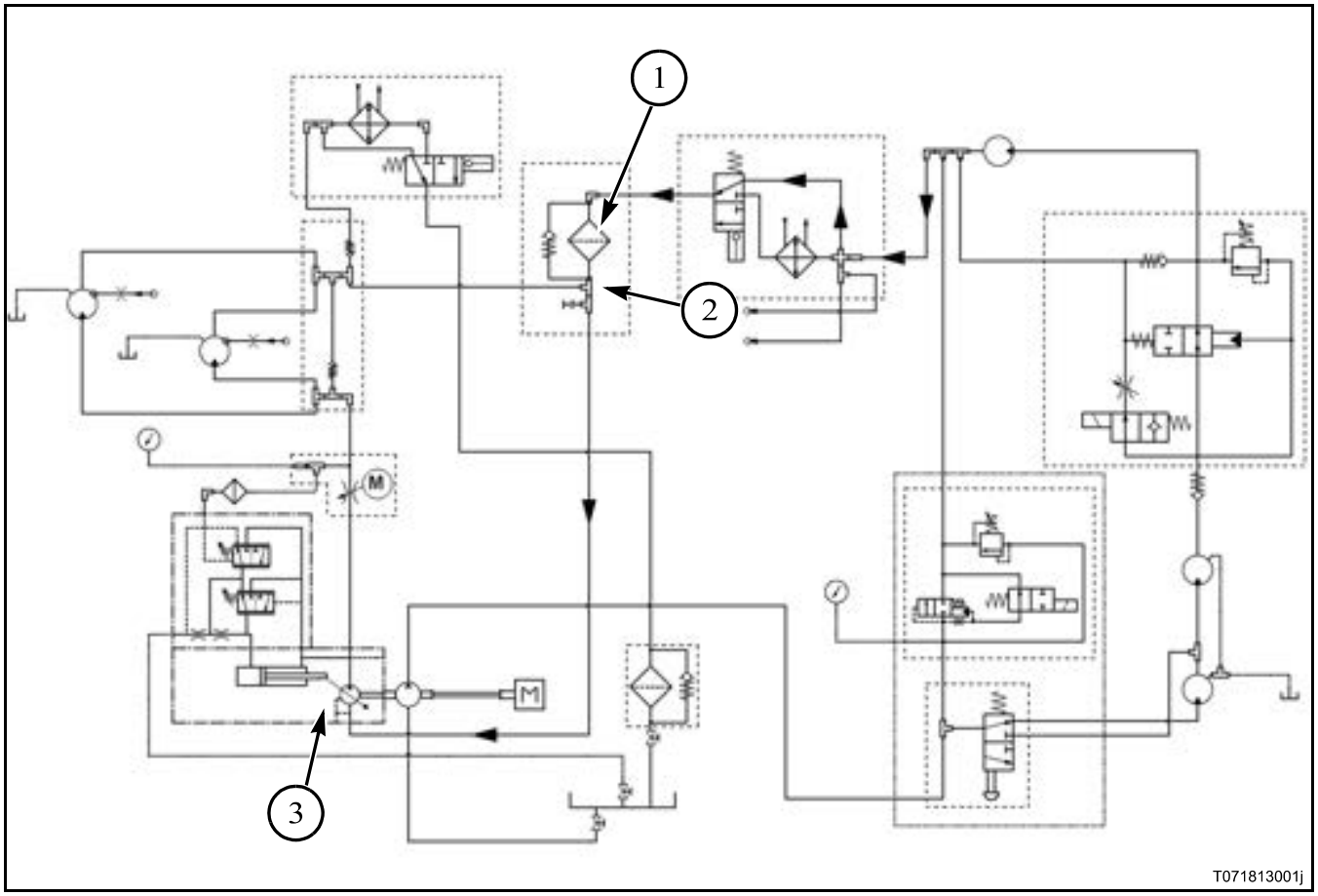


FIG. 11

FIG. 11: The fluid then passes through the high-pressure filter (1) to a tee (2) in the line between the outlet of the fans and the inlet of the variable displacement pump. The fluid is used to pressurize the inlet of the variable displacement pump (3) and used as “make-up” fluid to replace fluid lost through leakage in the fan circuit.

FIG. 12: The fan circuit uses a load sensing, pressure compensated, variable displacement pump. The compensator valve (1) controls the maximum pressure the pump is allowed to produce, and changes the pump's output flow whenever the load pressure changes or the ball valve (2) is moved. There is a spring in the load sensing flow compensator (3) which is preset to 280-PSI on the 7300/8300/8400 series and 170-PSI on the 9300. The pump will maintain this pressure differential between the internal pilot to the valve and the external pilot (5) or “load sense” line. This is called the circuit “standby pressure”.

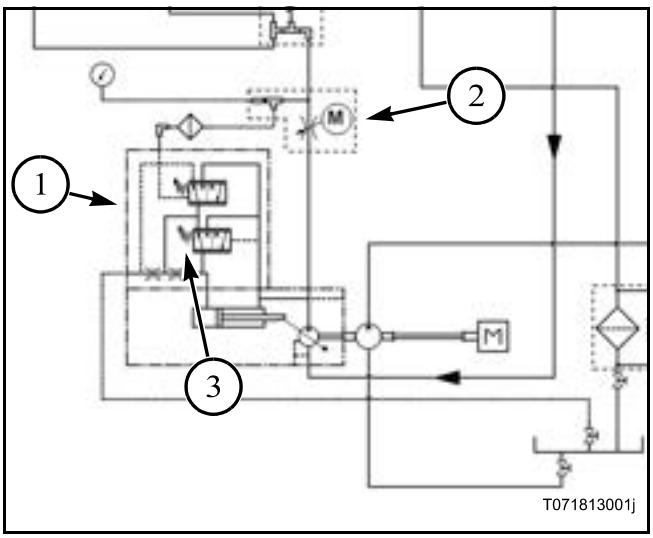


FIG. 12

## Installing Gear Pump

7300/8300/8400 Series

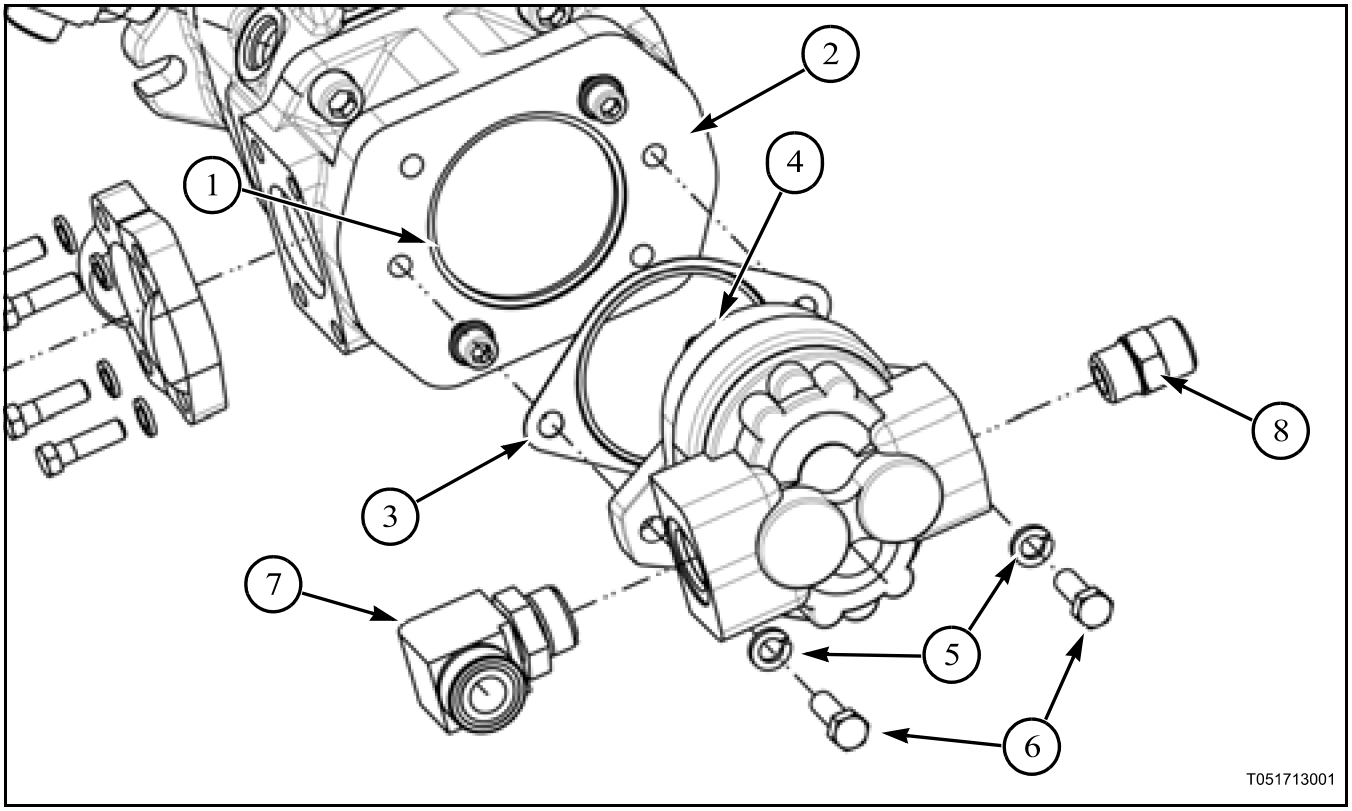


FIG. 25

FIG. 25: Verify the o-ring (1) is positioned in the opening of the variable displacement piston pump (2) and install a new gasket (3) on the pump mount. Align the splines on the gear pump (4) with the drive in the variable displacement piston pump (2) and install the pump lock washers (5) and tighten retaining bolts (6). Connect the previously marked hydraulic hoses to the gear pump suction (7) and pressure (8) fittings.

NOTE: Apply Loctite hydraulic sealant #545 or equivalent to all NPT fittings.

Refer to the Hydraulic System Bleed Procedure to remove air from the system.

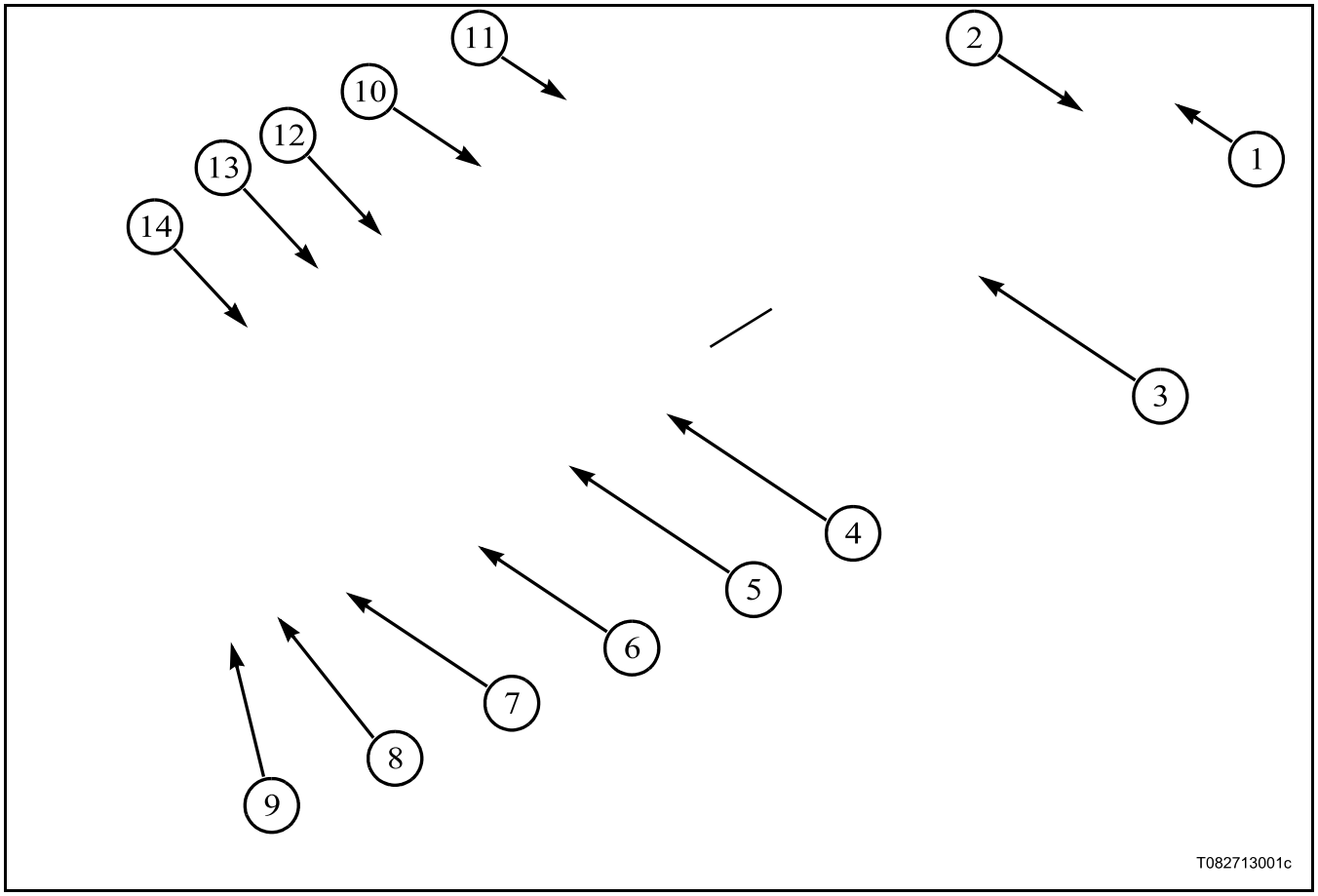


FIG. 38

FIG. 38: Reassemble the pressure side of the compensator as follows:

NOTE: All parts should be coated with clean hydraulic oil of the approved specification for the variable displacement pump prior to assembly.

a. Install the plug (1) with a new o-ring (2) into the pressure port of the compensator housing (3).

b. Install the pressure compensator spool (4), spring pivot (5), spring (6), spring pivot (7), and pressure rod (8) with new o-ring (9) into the compensator housing (3).

c. Install the pressure adjustment cap (10) with a new o-ring (11) into the compensator housing (3).

IMPORTANT: The pressure adjustment cap (10), pressure adjustment screw (12), set screw (13), and cover lock (14) should be installed as an assembly. They were not disassembled to retain the factory setting.

d. Tighten the plug (1) to 10 Nm (95 lbf in).

e. Tighten the pressure adjustment cap (9) to 50 Nm (480 lbf in).

FIG. 59: Mark and remove the hydraulic hoses from the motor. Cap the hoses to prevent contamination.

a. In from bypass valve

b. Case drain

c. Out to horizontal auger motor

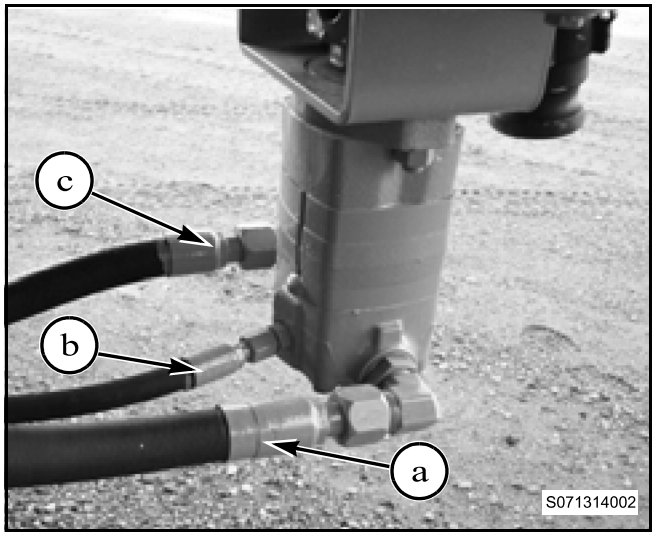


FIG. 59

FIG. 60: Remove the two nuts and lock washers (1) that secure the motor to the mount (2).

Remove the shim washers (3) and the spacer plate (4) from the top of the motor.

NOTE: Shim washers removed from the old motor will be used as the starting point with the new motor to adjust the distributor fan and impeller clearance.

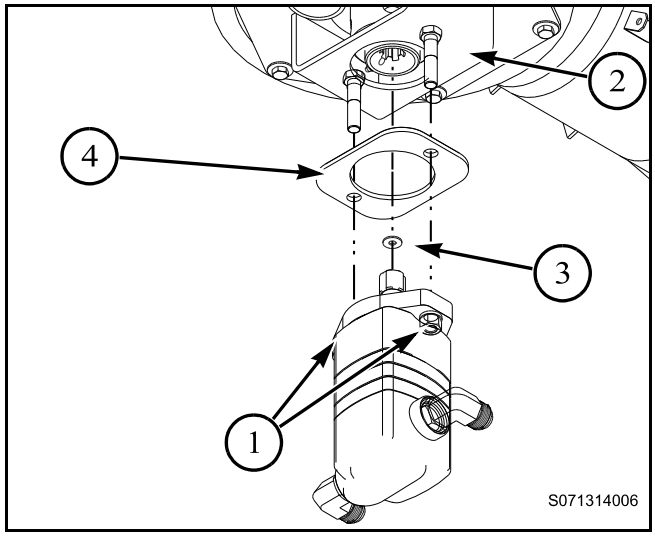


FIG. 60

## Installing Conveyor Motor

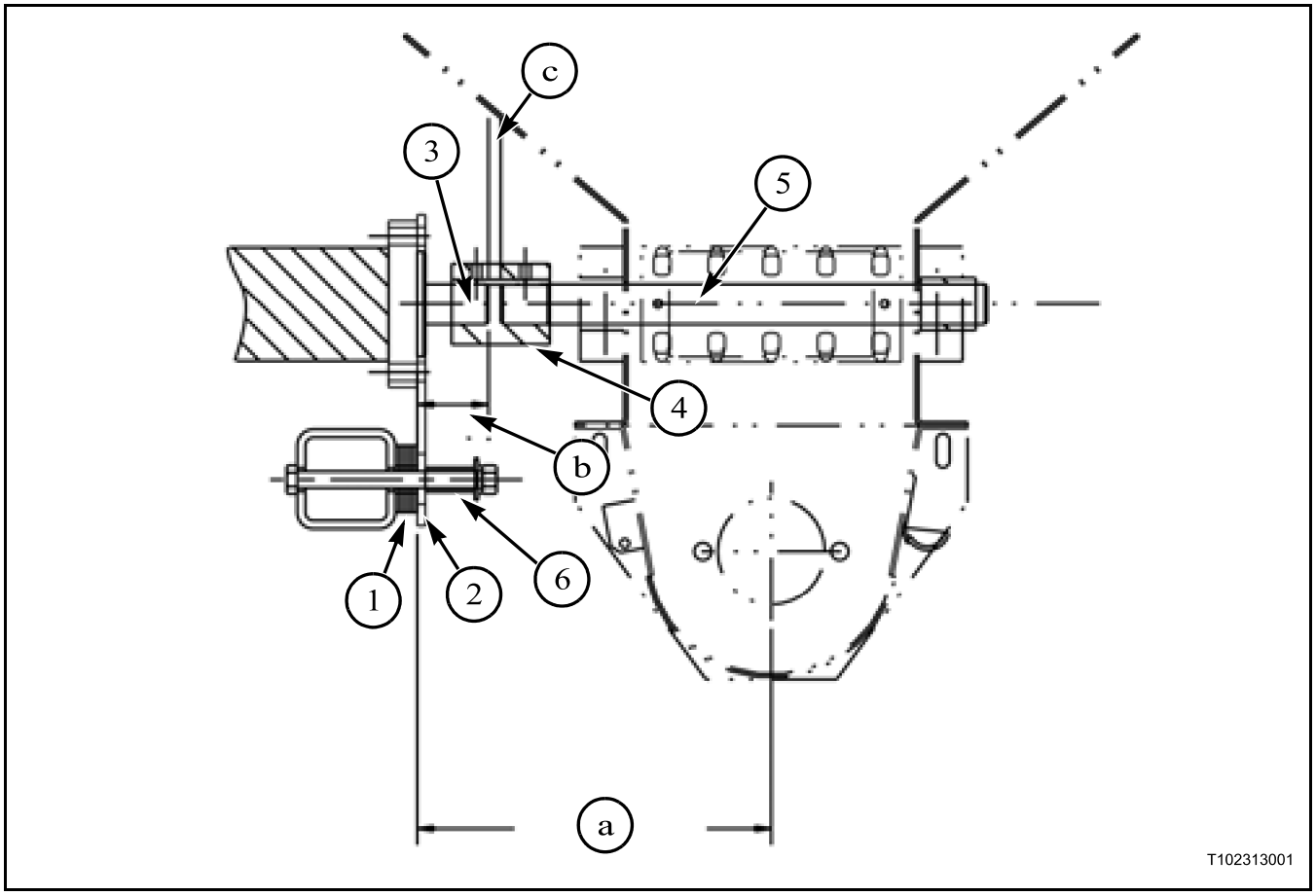


FIG. 77

FIG. 77: Adjust the torque arm washer stack (1) to achieve the following dimensions.

a. 27.51 cm (10.83 in)

b. 5.54 cm (2.18 in)

c. 9.65 mm (0.38 in)

IMPORTANT: Proper adjustment of the torque arm (2) is required to ensure the conveyor motor shaft (3) does not back out of collar (4), while maintaining the gap (c) with the roller shaft (5). It also allows the torque arm to float on its bushing (6) properly.

suction hose on the pump and allow the air to bleed from the suction hose. Start the machine and allow it to idle several minutes. Run the augers and bins to purge air from the auger/conveyor circuit then operate the fans at low speed to purge any additional air from the system.

## FAN CIRCUIT (AIRSPREADER AND TWIN BIN)

FIG. 94: Fluid from the auger/conveyor circuit enters the left-hand oil cooler assembly (1) at the tee on the bottom of the cooler. If the fluid is below 160°F it goes through the thermal valve (2) and bypasses the cooler. If the fluid is 160°F or above it goes through the oil cooler. Then the fluid goes through the high-pressure filter (3) to a tee in the line between the outlet of the fans and the inlet of the variable displacement pump. The fluid is used to pressurize the inlet of the variable displacement pump (4) and used as “make-up” fluid to replace fluid lost through leakage in the fan circuit.

The fan circuit uses a load sensing variable displacement pump. The compensator valve (5) controls the maximum pressure the pump is allowed to produce and changes the pump's output flow whenever the load pressure changes or the ball valve (6) is moved. There is a spring in the load sensing flow compensator (7) which is preset to 170-PSI, so the pump will maintain this pressure differential between the internal pilot to the valve and the external pilot or “load sense” line.

To regulate the fan speed, the operator moves a lever in the cab to open or close the manual ball valve. As the ball valve is opened the pump's outlet flow is increased which causes pressure to decrease on the internal pilot and increase on the load sense line. The load sense spool is forced away from the spring allowing more fluid through the valve. This forces the swash plate away from the neutral position increasing the pump's output flow (stroking up). As the ball valve is closed the pump outlet flow is restricted causing the pressure to increase on the internal pilot and decrease on the load sense line. The load sense spool is forced toward the spring allowing only a small amount of fluid through the valve. This forces the swash plate towards the neutral position reducing the pump's output flow (destroking).

IMPORTANT: Contamination in any spool or orifice of the compensator will inhibit the pump's ability to stroke up.

The four hoses attached to the pump are used for suction or inlet, pressure or outlet, load sense, and case drain.

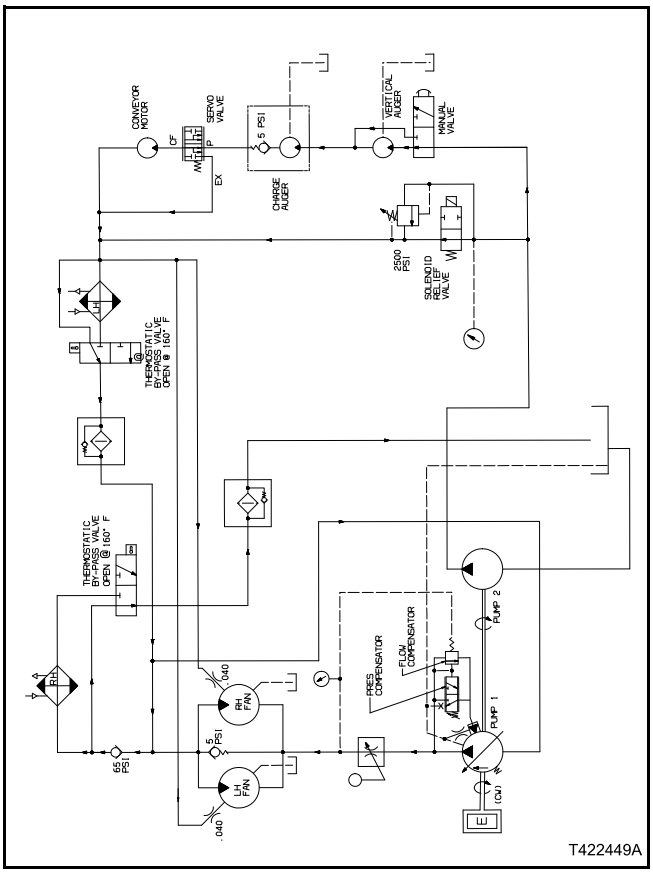


FIG. 94

# TerraGator®

## Air Spreader / Twin Bin - Four Bin Application System

## SERVICE MANUAL
## 79035611A

# 06 - Electrical

## Contents

R610

## BOOM FOLD IN POWER CIRCUITS

### Description

Short to ground in boom fold in power circuit.

Failure Mode Indicator

R610 - Short to ground in boom fold in power circuit.

**Schematic**

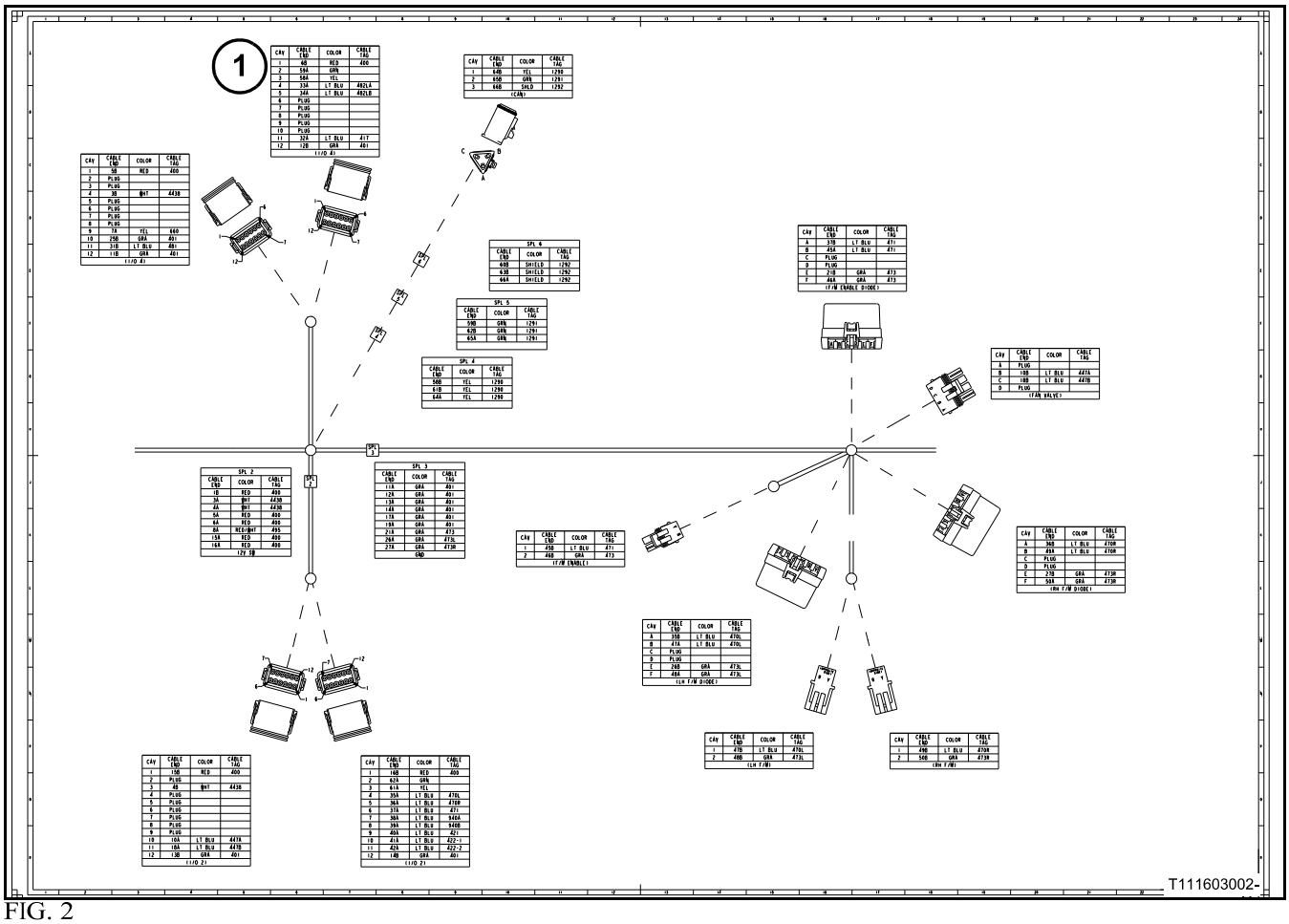


FIG. 2

FIG. 2: Boom Fold In/Out Schematic.

R627
HEAD RINSE ON POWER CIRCUITS

## Description

Open load in head rinse power or ground circuit.

### Failure Mode Indicator

R627 - Open load in head rinse power or ground circuit.

### Schematic

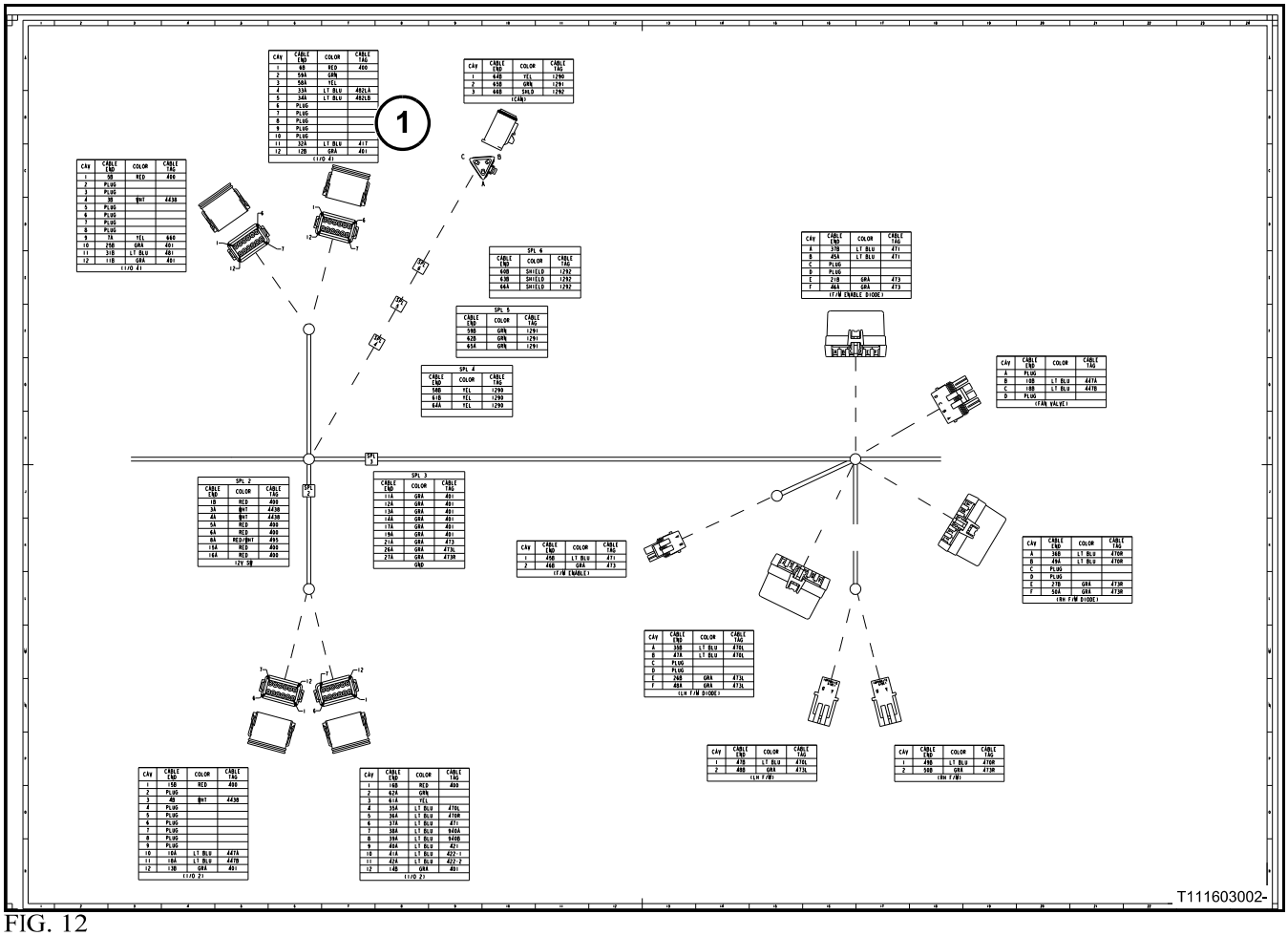


FIG. 12

FIG. 12: Product Control / Master Apply Schematic.

(1) I/O Module 4 J2

FIG. 17: Foam Marker Schematic.

(1) I/O Module 2

(2) Left-Hand Foam Marker Diode Pack

(3) Right-Hand Foam Marker Diode Pack

(4) Left-Hand Foam Marker

(5) Right-Hand Foam Marker

(6) Foam Marker Enable

(7) Foam Marker Diode Pack

## Diagnosis and Solution

1. CHECK LEFT-HAND FOAM MARKER CIRCUITS FOR OPEN.

   a. Turn key start switch and disconnect switch to OFF position.

   b. Disconnect I/O module 2 J3 (1), right-hand foam marker (5), left-hand foam marker (4), foam marker enable (6), left-hand foam marker diode pack (2), right-hand foam marker diode pack (3) and foam marker enable diode pack (7) connectors.

   c. Insert jumper from right-hand foam marker (5) contact A to B.

   d. Insert jumper from right-hand foam marker diode connector (3) contacts A to B.

   e. Measure resistance from I/O module 2 J3 connector (1) contact 4 to right-hand diode pack (3) contact E.

   Expected Result:

   Resistance is less than 5 ohms.

   Results:

   - YES - Resistance is less than 5 ohms.
   - NO - Resistance is greater than 5000 ohms. Harness has failed.

   Repair: Repair or replace harness.

   STOP.

R636
ROLL TARP

## Description

Short to ground  in the roll tarp close circuit.

### Failure Mode Indicator

R636 - Short to ground in the roll tarp close circuit.

### Schematic

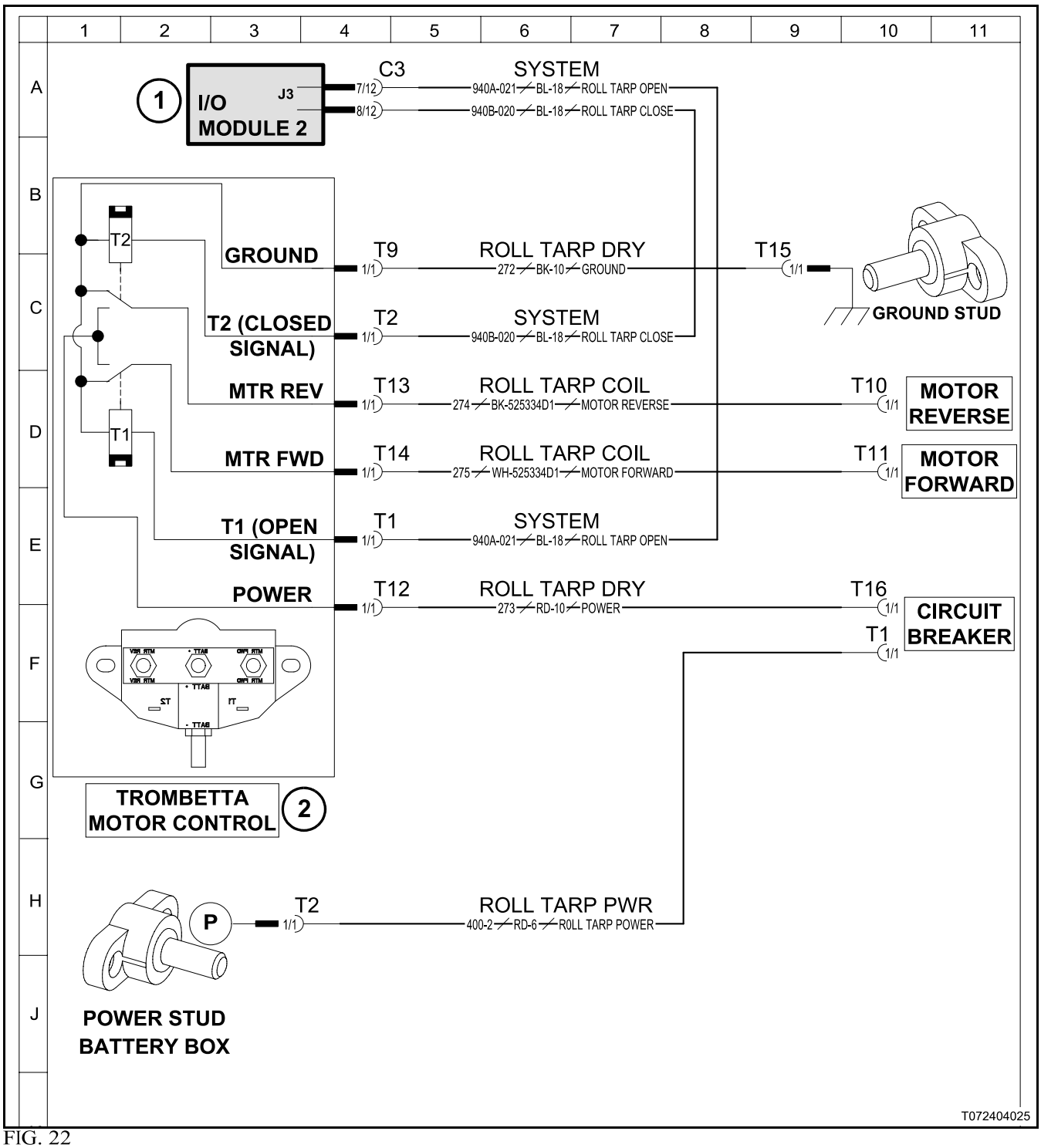


FIG. 22

FIG. 22: Roll Tarp Schematic.

(1) I/O Module One J2

(2) Trombetta motor control

R640

# PRODUCT CONTROL / LEFT-HAND APPLY POWER CIRCUITS

## Description

Short to ground in left-hand apply power circuit.

### Failure Mode Indicator

R640 - Short to ground in left-hand apply power circuit.

### Schematic

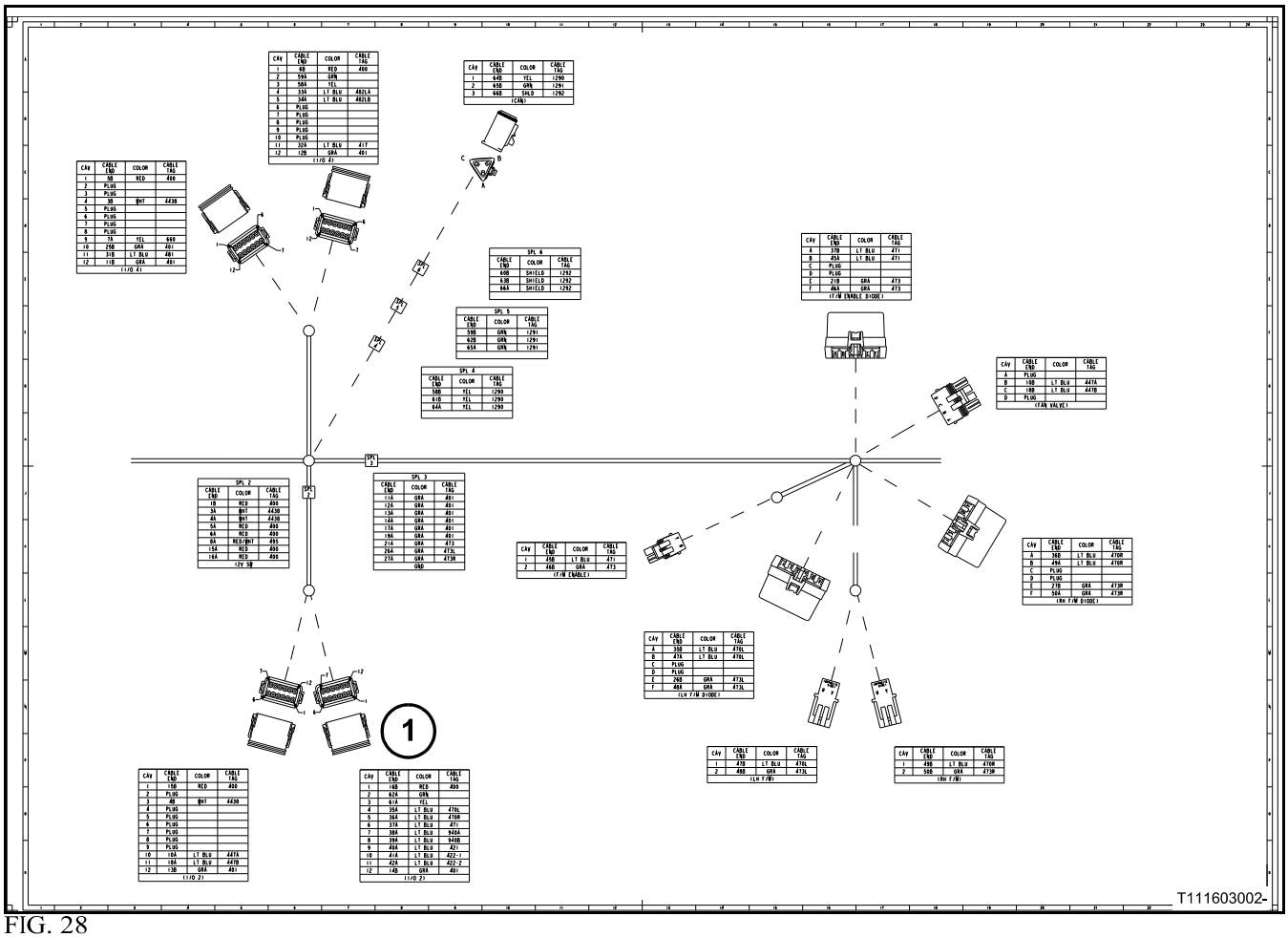


FIG. 28

FIG. 28: Product Control / Master Apply Schematic.

(1) I/O Module 2 J3

(2) Section one and two dump valves four pack relay module

R846
PARK LIGHTS

## Description

Short to ground in park light power circuit.

### Failure Mode Indicator

R846 - Short to ground in park light power circuit.

### Schematic

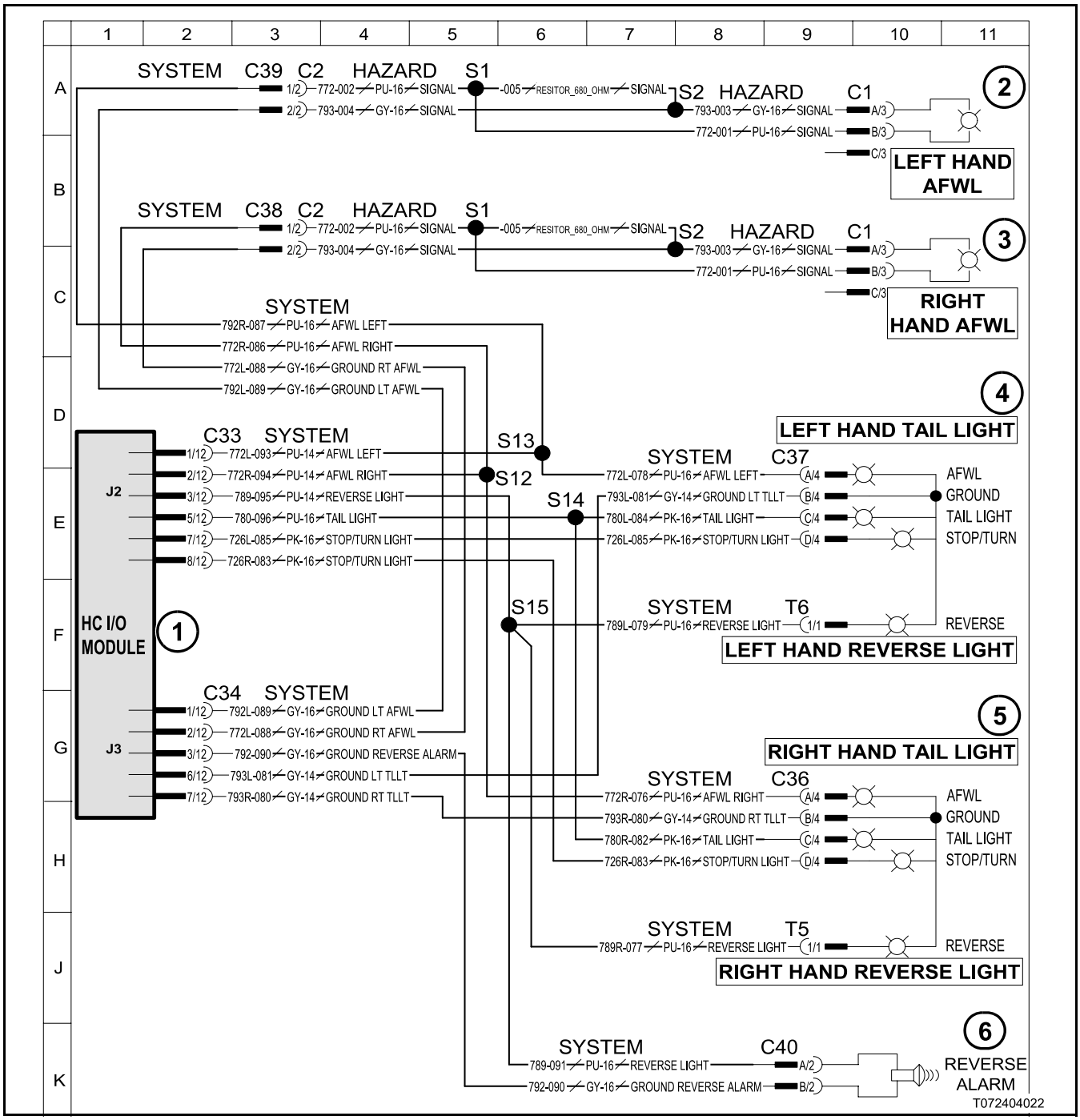


FIG. 38

FIG. 38: System Hazard Warning Lights Schematic.

R850
REVERSE LIGHT CIRCUITS

## Description

Short to ground in reverse light and backup alarm circuit.

### Failure Mode Indicator

R850 - Short to ground in reverse light and backup alarm circuit.

### Schematic

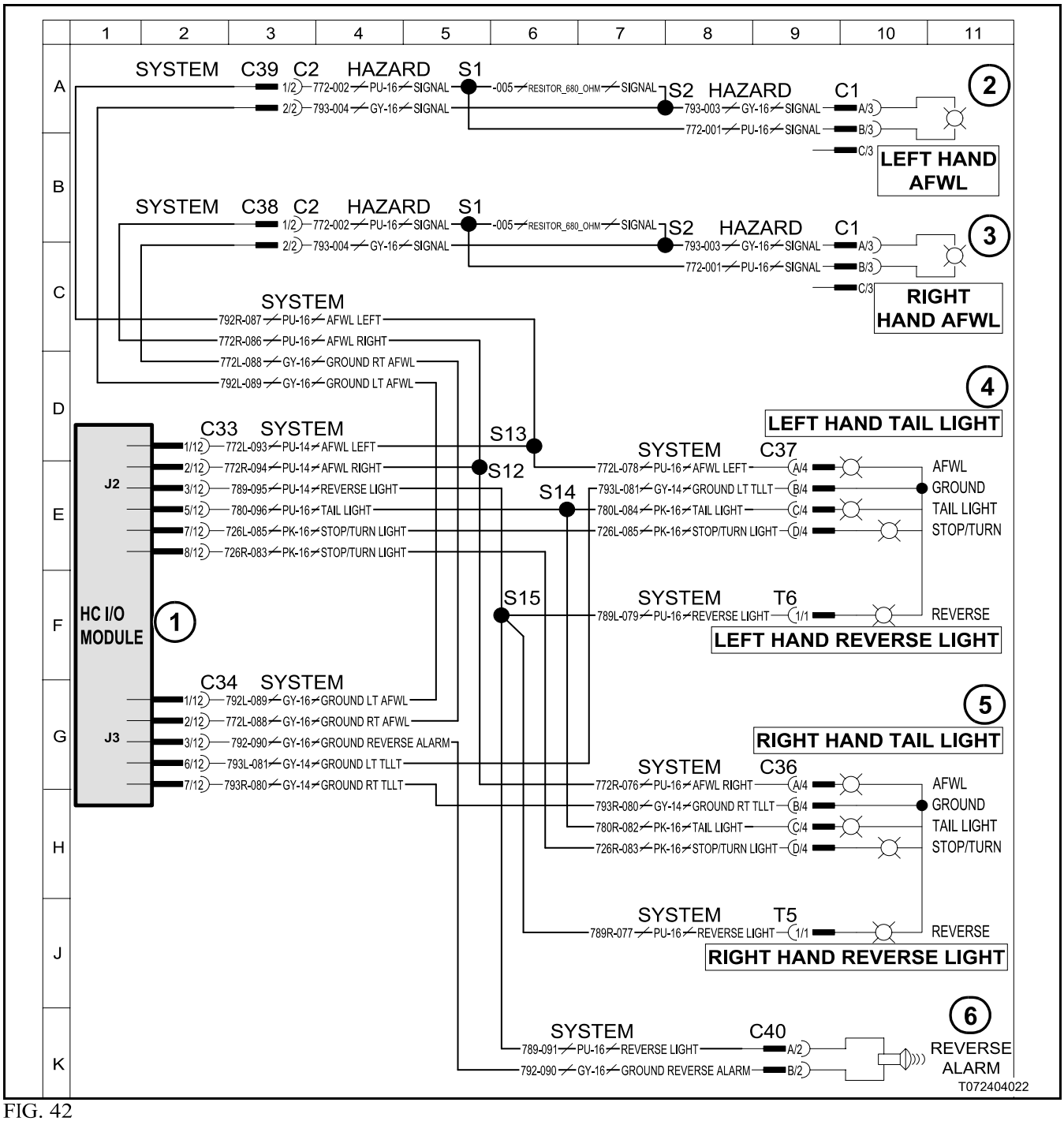


FIG. 42

FIG. 42: System Hazard Warning Lights Schematic.

(1) System I/O Module 7
(2) Left-Hand AFWL Light
(3) Right-Hand AFWL Light
(4) Left-Hand Turn Signal Light
(5) Right-Hand Turn Signal Light

# R854
# SYSTEM RIGHT-HAND AMBER FLASHING WARNING LIGHT CIRCUITS

## Description

Short to ground in right-hand system hazard warning light circuit.

### Failure Mode Indicator

R854 - Short to ground in right-hand system hazard warning light circuit.

(2) Left-Hand AFWL Light

(3) Right-Hand AFWL Light

(4) Left-Hand Turn Signal Light

(5) Right-Hand Turn Signal Light

(6) Reverse Alarm

## Diagnosis and Solution

1. CHECK SYSTEM TURN SIGNAL LIGHTS CIRCUITS FOR OPEN.

   Turn key start switch and disconnect switch to OFF position.

   Disconnect connectors System I/O Module 7 (1), Left-Hand Turn Signal Light (4) and Left-Hand AFWL Light connector (2).

   Insert jumper from between Left-Hand Turn Signal Light (4) contact D to contact B .

   Measure resistance at System I/O Module 7 (1) pin 7 to frame ground.

   Expected Result:

   Resistance is less than 5 ohms.

   Results:

   - YES - Resistance is less than 5 ohms.
   - NO - Resistance is greater than 5000 ohms. Harness has failed.

   Repair: Repair or replace harness.

   STOP.

SCHEMATICS

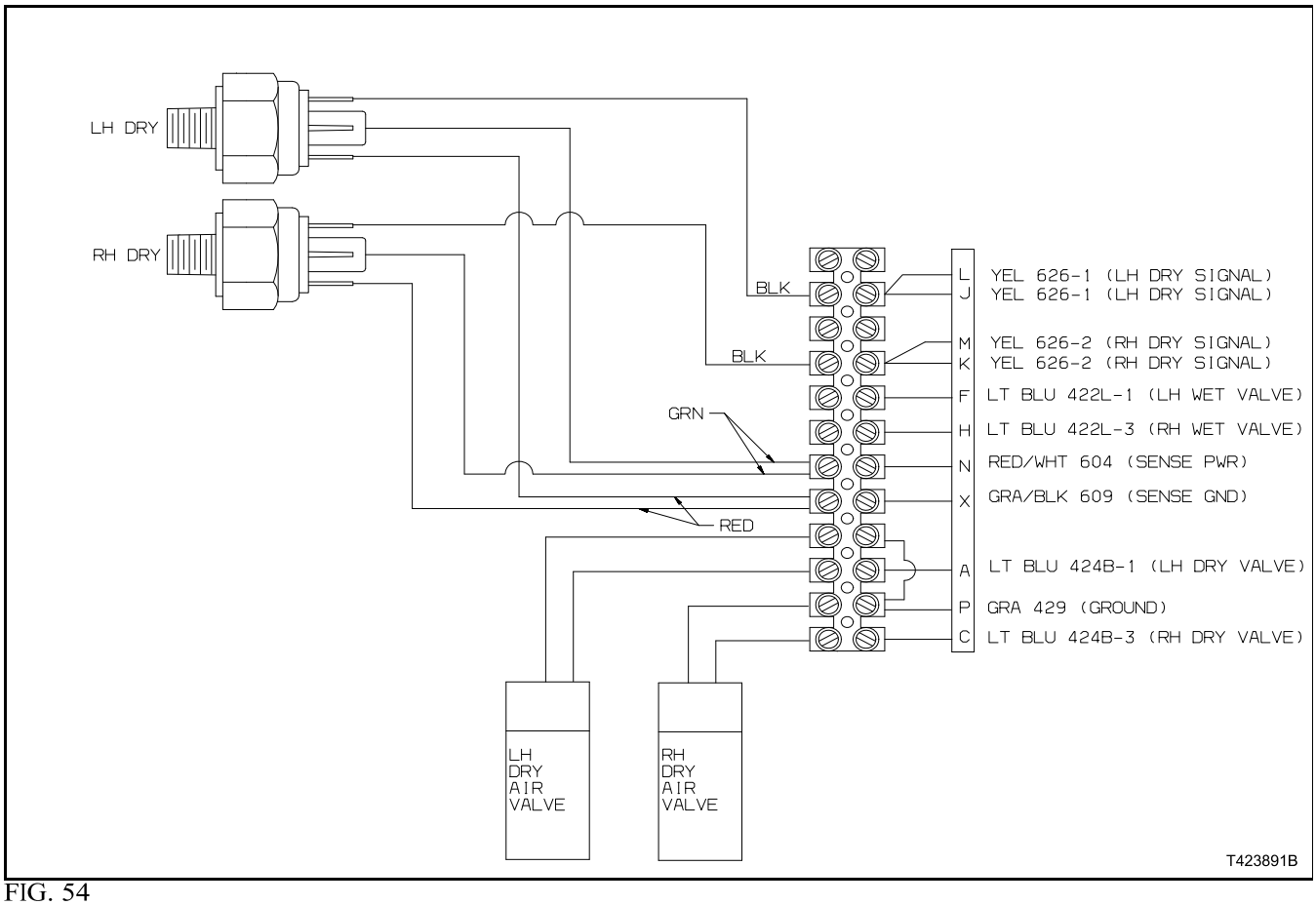


FIG. 54

FIG. 54: Inside Air box schematic

# GRANULAR CO-APPLICATION SYSTEM

## DESCRIPTION

The granular co-application system can be used to meter a variety of dry granular herbicides, small seeded crops and some small granule micro nutrients. The system is actually two separate systems, bin-1 on the left side and bin-2 on the right side, which can be operated separately to apply the same product or different products at different rates, if desired. The product goes onto the conveyor chain and through the augers to the distribution head and out the booms.

The system has three main components: the granular bins, the metering wheels and drive, and the electric control system.

IMPORTANT: System performance and accuracy relies on accurate calibration of the product metering and inputs to the control system, along with proper preventative maintenance procedures. Use caution when applying any micro nutrient or dry chemical product without a carrier product from the main bin(s). Product misapplication may result.

## GRANULAR BINS

### Description

FIG. 1: Two stainless steel hoppers (1) mount inside the Air Spreader box. Each hopper contains 25 cubic feet. The hoppers raise the overall box height 5 inches, but reduce the main product bin capacity by 25 cubic feet. Each hopper also includes an inverted V near the bottom to reduce packing of material against the metering wheels. The hoppers have an access opening on top, with a lid for filling and cleaning. Screens are inside each bin to collect foreign material.

IMPORTANT: The granular bins require a carrier product from the main bin to assure even granular product distribution across the booms.

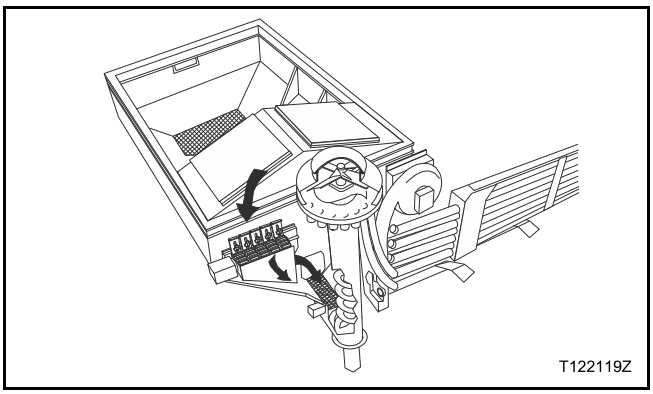


FIG. 1

## METERING SYSTEM

There are two separate metering systems. Each system contains five pairs of metering wheels, metering cups, a drive shaft, and five shut-off doors (2). There are two metering wheel selections provided for each system. The "Hi-Rate" (yellow) wheels deliver 5 pounds per acre to 40 pounds per acre. The "Low-Rate" (black) wheels meter from 2 pounds per acre to 10 pounds per acre. These rates are for a single bin so they could be doubled it both bins are operated at the same time. A 12-volt motor through a sealed gear reducer drives each metering screw assembly.