

OPERATOR & MAINTENANCE MANUAL

Steffen Systems Bale Accumulators



Manufactured by Steffen Systems
2882 Howell Prairie Road Northeast
Salem, Oregon 97305 USA
Phone 503-399-9941 Fax 503-371-4779
www.steffensystems.com



Published January, 2024
Effective serial 1600 to current

1. MACHINE DESCRIPTION	4
2. WARRANTY	5
3. SAFETY	6
3.1 Signal Signal Words	6
3.2 Safety Rules	7
3.3 Safety Signs	8
4. OPERATORS INSTRUCTIONS	9
4.1 System Objective	9
5. EMERGENCY STOP	10
6. MAINTENANCE & SERVICING	10
6.1 Service Schedule.	11
6.1.1 Every 2000 bales	11
6.1.2 First 2000 bales, then thereafter every season	11
6.2 Adjustments	11
7. TECHNICAL INFORMATION.	12
7.1 Machine Specifications.	12
7.2 Setup Instructions	13
7.3 Installation Photos	14
7.3.1 Hitch Installation Drawing	15
7.4 Hydraulic Circuit	16
7.5 Wheel Clutch Assembly Drawing	17
7.6 Electrical Circuits	18
7.6.1 Model 850/1050/1250/1550/2250	18
7.6.2 Model 950	19
7.7 Parts List	20
7.8 Fault Finding	27
7.8.1 Feed chain does not rotate	27
7.8.2 Pushbar or tiebar does not activate properly	27
7.8.3 Tiebar does not activate after dumping	27
7.8.4 Tie bales catch far side of accumulator	28
7.8.5 Accumulator tires to dump with partial package	28
7.8.6 Accumulator does not dump	28
7.8.7 Dump chain doesn't stop after unloading	28
7.8.8 Bales fall out of the rear of the machine	29
7.8.9 Everything is stalled	29
7.8.10 Wheel clutch, tie bar or push bar extends by itself and locks	29

7.8.11	Wheel clutch, tie bar or push bar “floats” out of position	29
7.8.12	Bales get cut in half by push bar	30
7.8.13	Bales get caught in throat when turning	30
7.8.14	Bales slide around in accumulator	30
7.8.15	Tie bales roll on their sides when dumped	30
7.8.16	Tie bar extends and stays	30
7.8.17	All functions move but have no power	30
7.8.18	Other helpful items to check	31
8.	PLANT SAFETY ASSESSMENT & EVALUATION	32
8.1	Hazard Identification Checklist	32
8.2	Risk Assessment Table	35
8.3	Hazard Identification, Risk Assessment, Control and Revision	35
8.4	Hazard Identification	37
8.4.1	Hitch Point	37
8.4.2	Feed Chain	38
8.4.3	Feed Motor	38
8.4.4	Tie Arm	39
8.4.5	Hydraulic Cylinder	39
8.4.6	Push Arm	40
8.4.7	Hydraulic Cylinder	40
8.4.8	Retracting Push Arm	41
8.4.9	Dump Clutch	41
8.4.10	Drive Chain	42
8.4.11	Dump Chains	42
8.4.12	Dump Bar	43
8.4.13	Tires	43
9.	MACHINE SAFETY REVISION	44
10.	TRAINING NOTES	45
11.	APPENDICES	46

This manual must be read in conjunction with the manuals that are supplied with the tractor and baler to which the bale accumulator is attached.

1. MACHINE DESCRIPTION

The Steffen System bale accumulator is a hydraulic powered electronically controlled, automated piece of farm equipment that tows behind a standard hay baler to group bales of hay together and place the group on the ground.



2. WARRANTY

Limited Express Warranty

Your new bale accumulator carries a limited warranty against defects in materials and workmanship for a period of Twelve (12) months from the date of delivery.

This warranty does not apply to any unit or system or component which has been improperly installed, handled, abused, damaged in an accident, nor to any unit or system or component which has been repaired or altered by unauthorized personnel.

This warranty also does not apply if the equipment has not been used in accordance with the operator & maintenance manual supplied.

The warranty does not cover physical damage or deterioration due to normal wear and tear, nor are consumables such as hoses, chains, bearings etc covered.

Accurate records of all inspections, maintenance and servicing must be kept. Failure to comply will void warranty.

Warranty of proprietary branded equipment is the responsibility of the original equipment manufacturer (OEM).

Under no circumstances will the Owner be entitled to consequential or incidental damages. No responsibility will be taken for any other damage, inconvenience or other claims whatsoever.

Our liability under this warranty is limited to the repair and or replacement of the defect or defective part.

All warranty work on your bale accumulator will be performed at our workshop or by an authorized agent by mutual agreement. Labor costs is generally not covered in the event of a warranty claim.

3. SAFETY

READ THE INSTRUCTIONS IN THIS MANUAL IN CONJUNCTION WITH OTHER RELEVANT EQUIPMENT INSTRUCTIONS.

There is no occasion in which this machine requires a person to be in contact with any portion of it while the power is on and the machine is operating. Any part of this machine could cause bodily harm, injury or death at any time it is in operation.



THESE SYMBOLS WILL BE USED THROUGHOUT THIS MANUAL TO BRING ATTENTION TO SAFETY INSTRUCTIONS THAT NEED TO BE FOLLOWED FOR YOUR SAFETY.

3.1 Safety Signal Words

Note the use of the signal words *DANGER*, *WARNING*, and *CAUTION* with the safety messages. The appropriate signal word for each has been selected using the following guidelines:



DANGER:

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.



WARNING:

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



CAUTION:

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



SAFETY INSTRUCTIONS:

Indicates specific safety-related instructions or procedures.

3.2 Safety Rules

**WARNING****RISK OF SEVERE PERSONAL INJURY OR DEATH**

Do not attempt any type of maintenance or adjustment to this machine while it is in operation, or while the power is on. Turn off all hydraulics and electrical control prior to performing work or entering the machine.

- Read the operator and maintenance manual supplied with the machine.
- All safety procedures must be followed.
- All operation and maintenance requirements must be adhered to.
- Do not use this equipment for a purpose other than that for which it was designed.
- Do not attempt to operate if guards are removed, or if the machine is in an unsafe or defective condition.
- Safety guards are not to be tampered with or removed by the operator.
- Maintenance is to be carried out only after the machine has been turned off, park brake applied, power is off, hydraulics are off and pressure relieved by putting the tractor hydraulics into “float,” and all moving parts are stopped in the rest or lowered position.
- Only trained and approved personnel are to operate this equipment.
- The operator must not start machine unless all personnel have been accounted for and warned.
- The operator must not operate the bale accumulator unless the area around the machine is clear of unnecessary personnel and equipment (15 feet nominal clearance).
- No passengers are to be carried on this attachment.
- The bale accumulator must not be used to transport bales on public roads.

**WARNING****FIRE RISK.**

Poor housekeeping, cleaning and/or inadequate maintenance and inspection of this equipment could lead to a fire. Daily inspections are necessary.

**WARNING****FLUIDS UNDER HIGH PRESSURE ARE POTENTIALLY DANGEROUS IF A LEAK OR HOSE DETACHMENT SUDDENLY OCCURS.**

Fluids under pressure have sufficient force to penetrate the skin, causing serious personal injury. If injured by escaping fluid, obtain medical assistance at once. Serious infection can develop if medical treatment is not administered immediately.

3.3 Safety Decals



SAFETY INSTRUCTIONS

Safety Decal Information:

Safety decals are placed on the Accumulator for your safety and the safety of anyone who will operate the machine.

- Keep safety decals legible and free from obstruction.
- Replace any safety decals if they are missing or have become unreadable.
- If parts have been replaced or repaired without decals, new decals need to be applied.
- New safety decals can be obtained by contacting Steffen Systems.

Applying New Decal:

- Clean and dry the area where decal will be placed.
- Remove a small section of the split backing paper.
- Apply small section to desired location and press into place.
- Remove the remaining paper and smooth the rest of the decal into place.



SAFETY INSTRUCTIONS

Safety Decal Locations:

Decals should appear in the follow areas of the accumulator. If any are missing on your machine, contact Steffen Systems for replacement decal.



4. OPERATORS INSTRUCTIONS

4.1 System Objective

Sequence of events:

As bales leave the baler, the feed chain on the accumulator pulls them away so as to keep the baler from forcing bales into the accumulator. The rubber cords on either side keep the leading corners of the bales turned into the throat as the baler turns corners and the support deck of the baler hitch holds the weight of the bales until they are free of the bale chamber. As the bales enter the machine, the bale clear loop switch is held on by the incoming bale which in turn disables the trip switch in the rear. This is done so that the bales must fully enter into the boxed area before pushing them over, which keeps the push bar from cutting the bales in two.

Once the first two bales enter the box area, they trigger the trip switch, and then release the bale clear switch, the feed chain will stop, and the tie bar (Model 950 only) sweeps them 90 degrees to the rear of the machine and moves the dump bar to the rear corner of the box area. (All other models skip this portion and go directly to pushing straight). This dump bar now is acting as a tailgate to keep the bales in the box area.

Once the tie bar is fully extended, the tie bar limit switch is flipped clockwise 90 degrees, which breaks the circuit causing the tie bar to retreat. When the tie bar switch is flipped back to the home position, it turns on the feed chain and deactivates the select relay which in turn changes the electronics to straight push mode instead of tie mode.

The next two bales come with the same procedure, and the push bar extends this time rather than the tie bar. When the push bar is fully extended, the push bar limit switch is flipped 90 degrees, which sends the push bar back to its home position. When the push bar is nearly home, the push bar limit switch is flipped back, which turns on the feed chain again. This continues until the box area is full. When the box area is full, the push bar attempts to push but cannot move and builds pressure.

When this pressure exceeds the setting of the pressure switch (generally around 1500 psi) the pressure switch engages which releases the push bar and engages the wheel clutch. As the wheel clutch engages, the dump chain pushes the bales out onto the ground at a slightly faster rate than the ground speed. As the dump bar comes around, it trips the dump stop switch, which disengages the wheel clutch, and resets the electronics to go to the tie bar mode (Model 950 only).

Once this is completed, the cycle is complete and ready for the next group of bales.

5. EMERGENCY STOP



If there is an accident, or the machine malfunctions, stop the machine by turning off the hydraulics, turning the ignition key to the 'off' position, and apply the tractor park brake. In addition, turn off the "Power" toggle switch in the main control box in the cab of the tractor, or the emergency stop button on the accumulator.

Rectify any problems before re-starting the machine.

6. MAINTENANCE & SERVICING

ACCURATE RECORDS OF ALL INSPECTIONS, MAINTENANCE AND SERVICING MUST BE KEPT. Failure to comply will void warranty.



LOCKOUT BEFORE STARTING ANY REPAIR WORK

Maintenance is to be carried out only after the tractor has been turned off, hydraulics have had the pressure released by placing the tractor hydraulics in "float," park brake applied, and power is off.

When hydraulic components are refitted after repair or replacement they will contain air. This affected component will be difficult to control until the air is bled from the system. To bleed the air run the tractor at an idle and without a load operate the function full stroke in either direction several times with the manual toggle switches.

For best performance keep this machine clean and properly maintained.

6.1 Service Schedule.

6.1.1 Every 2000 bales:

1. Grease push bar pivots, 4 points.
2. Grease tie bar pivot 1 point (Model 950 only)
3. Clean off any material wrapped on feed chain drive sprockets

6.1.2 First 2000 bales, then thereafter every 10,000 bales or annually:

1. Grease dump shaft bearings with 1 pump only.
2. Grease feed shaft bearings with 1 pump only.
3. Grease wheel clutch hub.
4. Check wheel bearings tightness, the tire should rock less than 1/8".
5. Check setscrew torque on all sprockets.
6. Check setscrew torque on feed motor shaft coupling.
7. Check chain tension of both feed and dump chains.
8. Check that the feed paddle and dump bar connecting bolts are one half turn loose to allow movement.

6.2 Adjustments

1. Feed and dump chains should be snug but not tight. Feed chain should sag 1-2" when correctly adjusted. Dump bar should turn by hand the entire 360 degrees of rotation with no more than 200 lbs effort and have 1-1 1/2" of sag.
2. Tie bar and push bar limit switches should be set to allow for proper travel of the arms on the extensions stroke and should flip the limit switch roller back just prior to reaching the retracting end of the cylinder stroke. The push bar is adjusted by moving the 1/2" square lugs on the push arm forward or back to activate the switch at the proper time. The forward travel should stop with the push bar 1/2 - 1 1/2" past the feed opening. The tie bar has no adjustments other than on the switch arm itself.
3. Stop unload limit switch should be set to stop the dump bar before the rear of the machine. The incoming hay will normally push the bar back to the rear corner, which releases the switch. If it goes on by the rear corner and starts uphill, refer to troubleshooting guide.
4. The pressure switch should be set to trip when box is full. If it is too low, it will dump with only a partial load of bales, if it is too high, it will not dump at all and the tractor hydraulics will stall out. Adjust by twisting the black ring located to the left of the electrical box behind the red and purple wire - clockwise to raise the setting, one turn at a time.
5. The tie bar has its own speed control. Adjust the knob so the bar works at the desired speed. The control only affects the extension speed. Too fast will cause the tie bales to roll, the dump bar to travel past the lower rear corner, or the bales to pinch on the right side.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK.

7. Setup Instructions

1. Safely lift and block the accumulator high enough to install the right hand axle assembly axle. Bolt the supplied axle to frame with the (3) enclosed $\frac{1}{2}$ " x $3\frac{1}{2}$ " bolts. Bolt the supplied bale guide triangle to the frame directly in front of the right hand wheel using the (2) enclosed $\frac{3}{8}$ x 3" bolts. Install the tire and wheel. Remove the blocks and lower the accumulator back onto the tire.
2. Install the baler hitch (purchased separately or built by the end user) onto the baler chute, referring to the drawing in this manual. The height should be set so the rear of the accumulator is as close to the ground as is feasible to allow a smooth transition when dumping.
3. Connect the accumulator to the baler hitch and install the supplied rubber cords connecting them from the hooks on either side of the accumulator to the upper portion of the baler chamber. The supplied aluminum angles can be used if you need to create an anchor point on the baler. The purpose of these cords is to direct the leading edge of the bales into the accumulator throat during turns.
4. Mount the supplied grey flow control valve on the tongue of the baler as close to the tractor as practical, referring to the details in the owner's manual. If this is not installed near the tractor, the back pressure created by the long hose length on the return oil can cause issues.
5. Install the hydraulic hoses, paying careful attention to the routing to keep them from getting damaged. Use only the supplied hydraulic quick couplers to connect to the accumulator. Be certain that the return hose is of $\frac{1}{2}$ " size and connected to the larger quick coupler on the accumulator end and the Tee assembly on the flow control, also, the Tee assembly to the return connector on the tractor. Be certain that the pressure hose is of $\frac{3}{8}$ " size and connects to the smaller quick coupler on the accumulator and to the "CF" port on the flow control and from the "IN" port on the flow control to the pressure connector on the tractor.
6. Determine if your tractor is "open" or "closed" center hydraulics. If you are uncertain, generally if you have the ability to change the speed of the oil flow, it is considered a "closed" center, and if you do not, it would be an "open" center. The brass valve is set to "0" for open center from the factory, for closed center operation, remove the $\frac{5}{16}$ " lock bolt, turn the handle to "S," and install the lock.
7. Install the supplied 7 wire electrical cable along the hoses from the tractor, starting at the rear of the baler. Make sure the cable and hoses are routed so they do not get damaged, and use the supplied cable ties to anchor them as needed.
8. Mount the cab electrical control box in a convenient location in the tractor near the operator and connect the leads to the 12VDC power using black for positive and white for negative. This requires at least a 5 amp circuit so a cigarette lighter type plug is not adequate. It is okay to go directly to the battery if needed, however, you will need to disconnect that when not in use as it may drain the tractor battery.
9. Connect the hoses to the tractor remotes, and set any flow regulation devices on the tractor to full open. Check the tractor manual to see if the tractor has the option for hydraulic motor operation, and use that setting if it does. Confirm the lever on the supplied grey flow control is set between 3 and $3\frac{1}{2}$.

10. With the hydraulics off, turn on the power on toggle switch at the control box and release the emergency stop button at the accumulator electrical box by twisting it. With this electric power on, open the electrical box on the accumulator and press in on the blue button of the upper left relay marked "UR." That relay should light up and stay lit if the power is correct. If this does not stay lit, you do not have the power connected correctly.
11. Turn the electric power off in the tractor cab control box, start the tractor and slowly and briefly engage the hydraulic flow by pulling the tractor lever to the rear of the tractor (as pulling it forward can also allow it to go into a "float" position on many tractors which has no oil flow). Watch the movement of the push and tie arms as you engage the hydraulics. If the flow is reversed, the arms will try to extend. If it is correct, the arms will retract. To change flow direction, release the pressure in the circuit by stopping the tractor and moving the control lever into the float position to drain the pressure, then switch the hoses on the remotes. Once flow direction is established, the handle must be held in that position constantly to operate with a rubber cord or some other means.
12. Turn off the hydraulics, turn the electrical back on, then re-engage the hydraulics. The feed chain should start turning at about one foot per second. If it is turning considerably faster, check that the flow control is correctly plumbed with the "CF" port to the smaller quick coupler on the accumulator and set to 3-3 1/2".
13. Once this is established, the machine is ready for use. On the 950 models, when the power is removed, the circuit will revert to pushing only. To reset this, press the reset button on the control box and this will change the selection to tie on the first trip, then automatically will push the remainder of the cycle when the trip is hit by the bale.
14. The machine operates as follows. As bales leave the baler, the feed chain on the accumulator pulls them away as to keep the baler from forcing bales into the accumulator. The rubber cords on either side keep the leading corners of the bales turned into the throat as the baler turns corners. As the bales enter the machine, the bale clear loop switch is held on by the bale which in turn disables the trip switch in the rear. This is done so that the bales must fully enter into the boxed area before pushing them over. This keeps the push bar from cutting the bales in two.
15. Once the first two bales enter the box area, trigger the trip switch, and release the bale clear switch, the feed chain will stop turning, and the tie bar (Model 950 only) sweeps them 90 degrees to the rear of the machine and at the same time moves the dump bar to the rear corner of the box area to function as the tailgate. All other models skip this portion and go directly to pushing straight.
16. Once the tie bar is fully extended, the tie bar limit switch is flipped outward, which turns off the tie valve causing the tie bar to retract. When the tie bar switch is flipped inward to the home position, it turns on the feed chain and deactivates the select relay which in turn changes the electronics to straight push mode.
17. The next two bales come with the same procedure, and the push bar extends this time rather than the tie bar. When the push bar is fully extended, the push bar limit switch is flipped outward, which sends the push bar back to its home position. When the push bar is nearly home, the push bar limit switch is flipped inward, which turns on the feed chain again. This continues until the box area

is full. When the box area is full, the push bar attempts to push but cannot move and builds pressure.

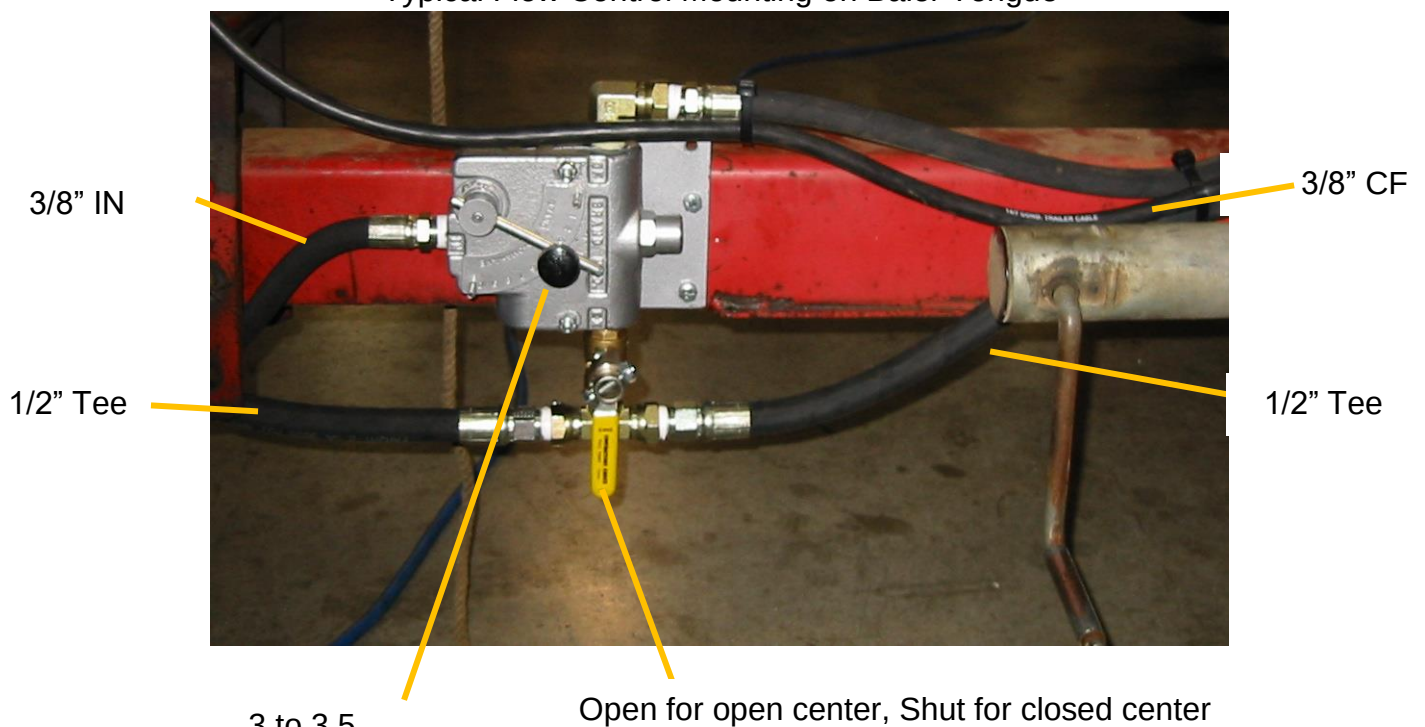
18. When this pressure exceeds the setting of the pressure switch (generally around 1500 psi) the pressure switch trips which releases the push bar and engages the wheel clutch. As the wheel clutch engages, the tire drives the dump chain which pushes the bales out onto the ground at a slightly faster rate than the ground speed. As the dump bar comes around, it trips the dump stop switch, which disengages the wheel clutch, and resets the electronics to go to the tie bar mode (Model 950 only). The dump bar does not have to stay on the limit switch or go fully to the rear, as the design requires the incoming bales to push it off to allow the proper operation.
19. Once this is completed, the cycle is complete and ready for the next group of bales.

7.1 Installation Photos

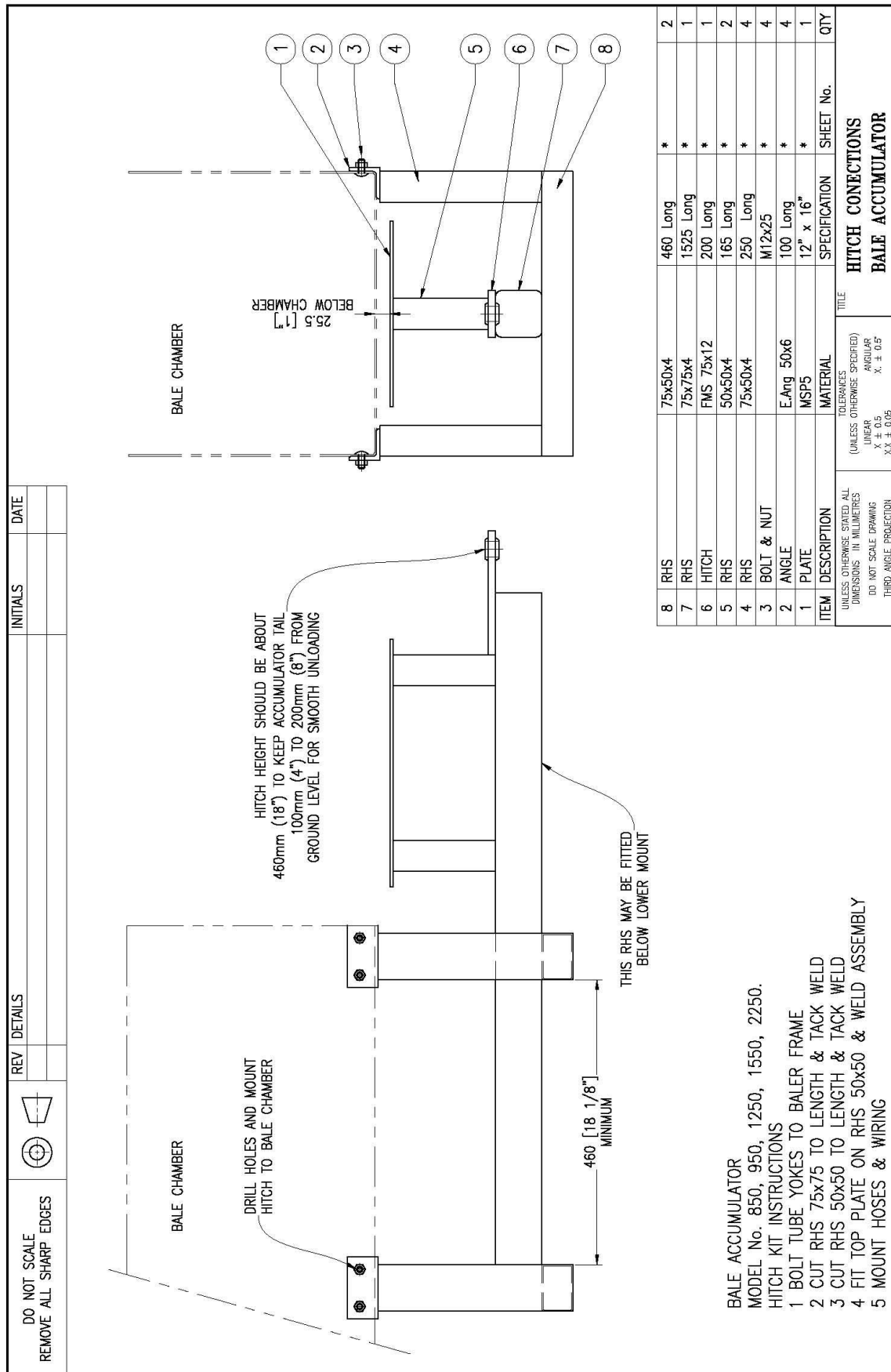
Typical Baler Hitch Installation



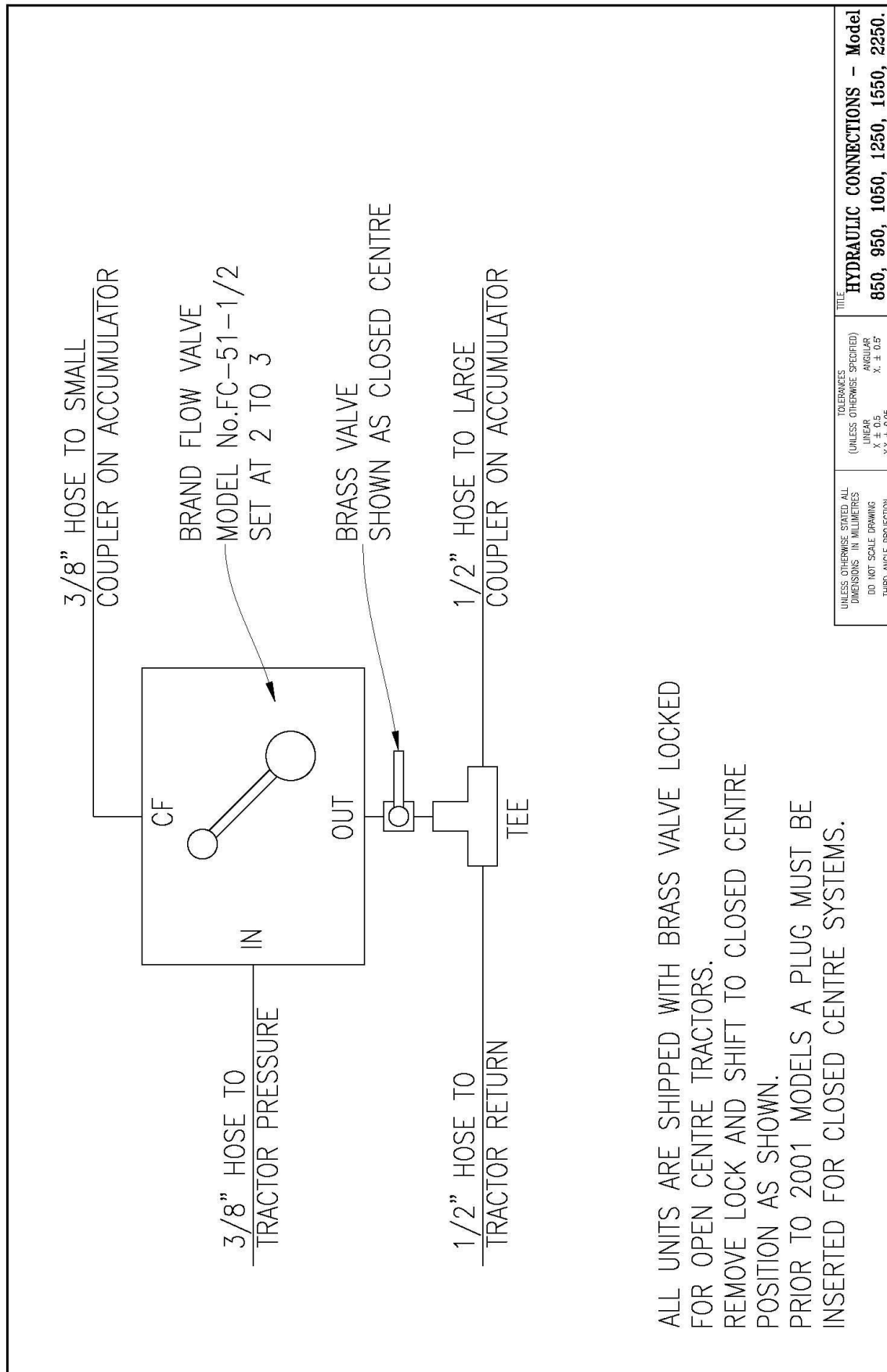
Typical Flow Control Mounting on Baler Tongue



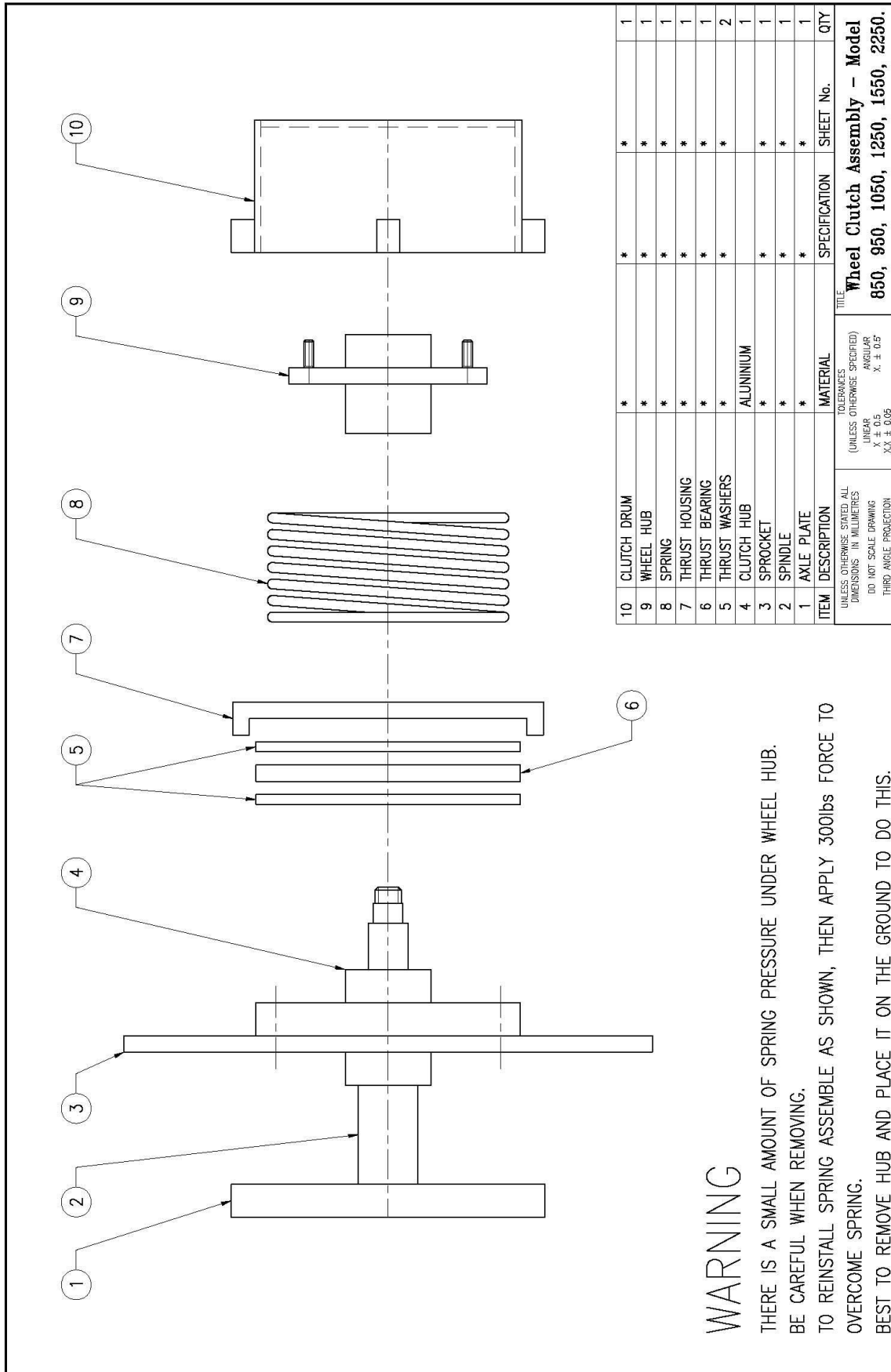
7.3.1 Typical Hitch Installation Drawing



7.2 Hydraulic Circuit

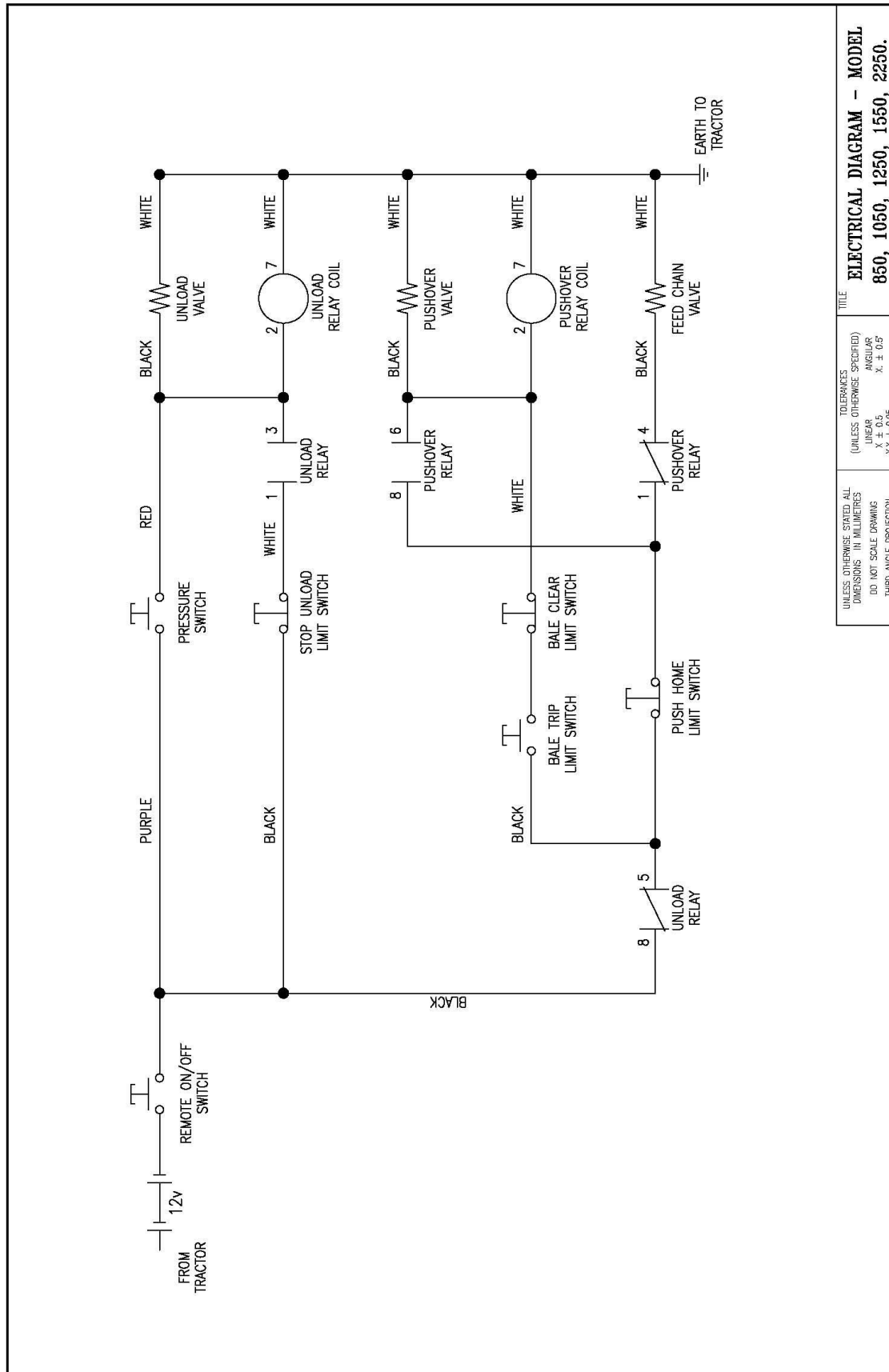


7.3 Wheel Clutch Assembly Drawing

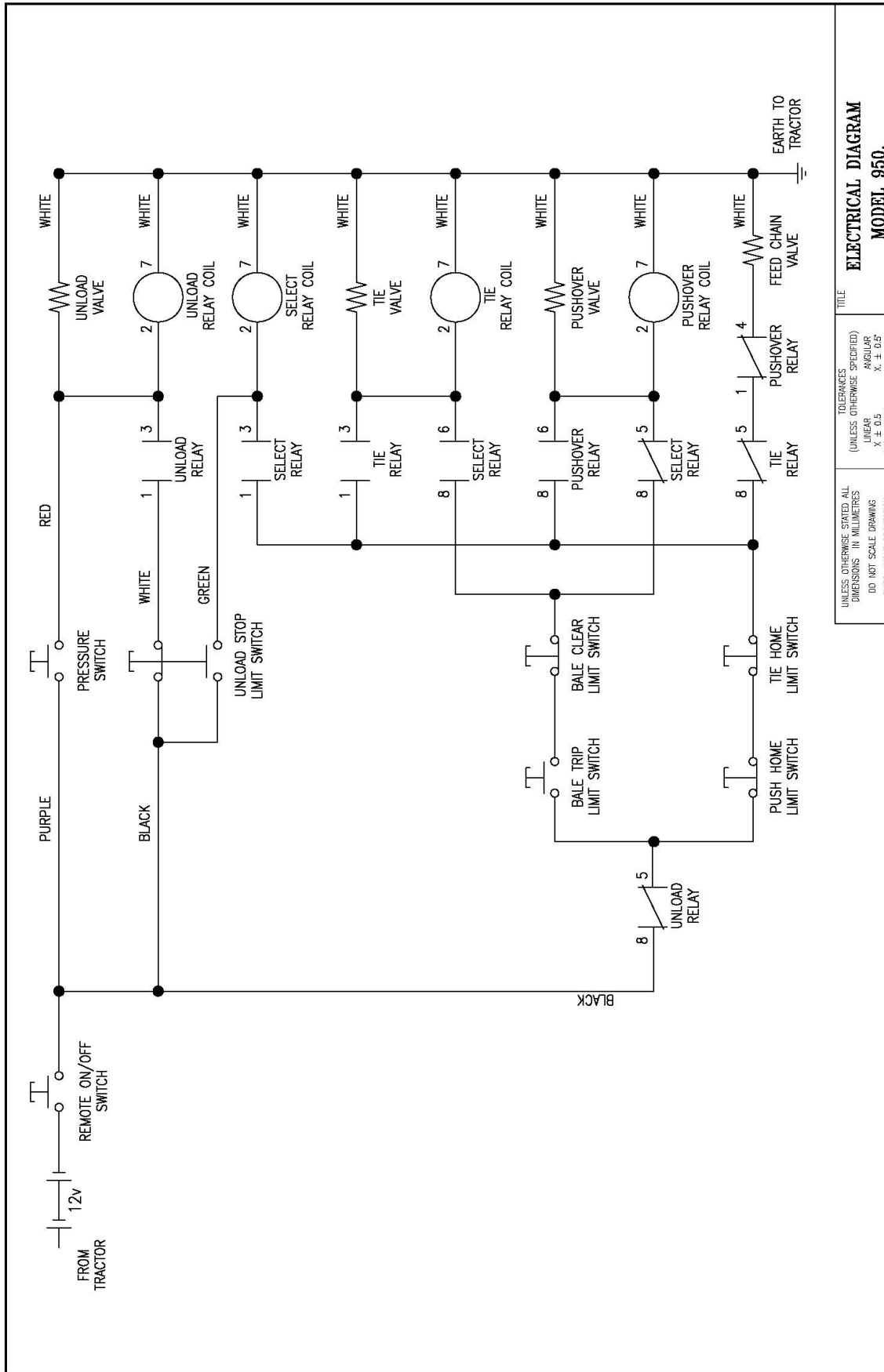


7.4 Electrical Circuits

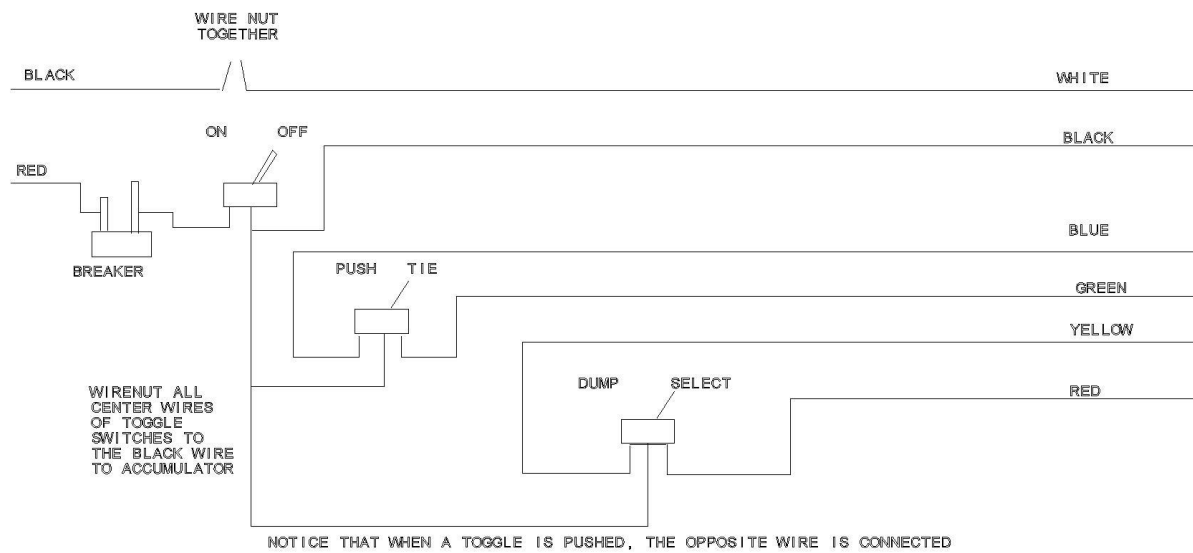
7.4.1 Model 850/1050/1250/1550/2250



7.4.2 Model 950



ACCUMULATOR CONTROL BOX WIRING



ODEL 950

wire#	Color:	cut length:	End #1	End #2
<u>1</u>	white	2-3/4"	SR7	UR7
<u>2</u>	white	2-3/4"	TR7	PR7
<u>3</u>	white	6-3/4"	SR7	TR7
<u>4</u>	white	3-1/2"	UR7	top RH ground
<u>5</u>	black	4-1/4"	UR8	RH switched
<u>6</u>	green	3-3/8"	PR6	RH push
<u>7</u>	blue	6"	TR3	RH tie
<u>8</u>	yellow	6"	SR2	RH select
<u>9</u>	red	4-1/2"	UR2	RH dump
<u>10</u>	black	7-1/4"	PR1	TR5
<u>11</u>	black	2-3/4"	PR8	TR8
<u>12</u>	black	5-1/8"	TR1	SR1
<u>13</u>	black	1-1/2"	TR1	TR8
<u>14</u>	black	10-1/2"	PR2	SR5
<u>15</u>	black	9-1/8"	PR2	PR6
<u>16</u>	black	8-3/4"	TR2	SR6
<u>17</u>	black	4-1/2"	TR2	TR3
<u>18</u>	black	4-1/2"	SR2	SR3
<u>19</u>	black	7-3/4"	UR2	UR3
<u>20</u>	black	10"	RH 12v	block terminal 2
<u>21</u>	black	13"	RH switched	block terminal 1

MODEL 850,1050,1250,1550,2250

<u>37</u>	white	4-1/2"	UR7	PR7
<u>38</u>	white	3-1/2"	UR7	top RH ground
<u>39</u>	black	4-1/4"	UR8	RH switched
<u>40</u>	green	3-3/8"	PR6	RH push
<u>41</u>	red	4-1/2"	UR2	RH dump
<u>42</u>	black	1-1/2"	PR8	PR1
<u>43</u>	black	6-1/8"	PR2	PR6
<u>44</u>	black	4-1/2"	UR2	UR3

950 CORD CONNECTIONS:

	cut	color:	#1 end	#2 end	box end:
Convey valve 20	31"	black white	1-1/2 tin 1-1/2 tin	7" fork 3-1/2" fork	PR4 GND
Dump valve 21	31"	black white	1-1/2 tin 1-1/2 tin	5-1/2" fork 4" fork	RH dump GND
Tie valve 22	36"	black white	1-1/2 tin 1-1/2 tin	9" fork 3-1/2" fork	RH tie GND
Push valve 23	36"	black white	1-1/2 tin 1-1/2 tin	8" fork 2-1/2" fork	RH push GND
Trip switch 24	115"	black white	1-1/2 tin 1-1/2 tin	10" fork 3" strip	UR5 Clear black
Tie switch 25	122"	black white	1-1/2 tin 1-1/2 tin	6" strip 10" fork	Push white PR8
Clear switch 26	70"	black white	1-1/2 tin 1-1/2 tin	3" strip 13" fork	Trip white SR8
Push switch 27	51"	black white	1-1/2 tin 1-1/2 tin	7-1/2" fork 5" strip	UR5 Tie black
Dump switch 28	40"	black white green	1-1/2 tin 1-1/2 tin 1-1/2 tin	4" fork 2-1/2" fork 11-1/2" fork	LH switchd LH select UR1

850,1050,1250,1550,2250 CORD CONNECTIONS:

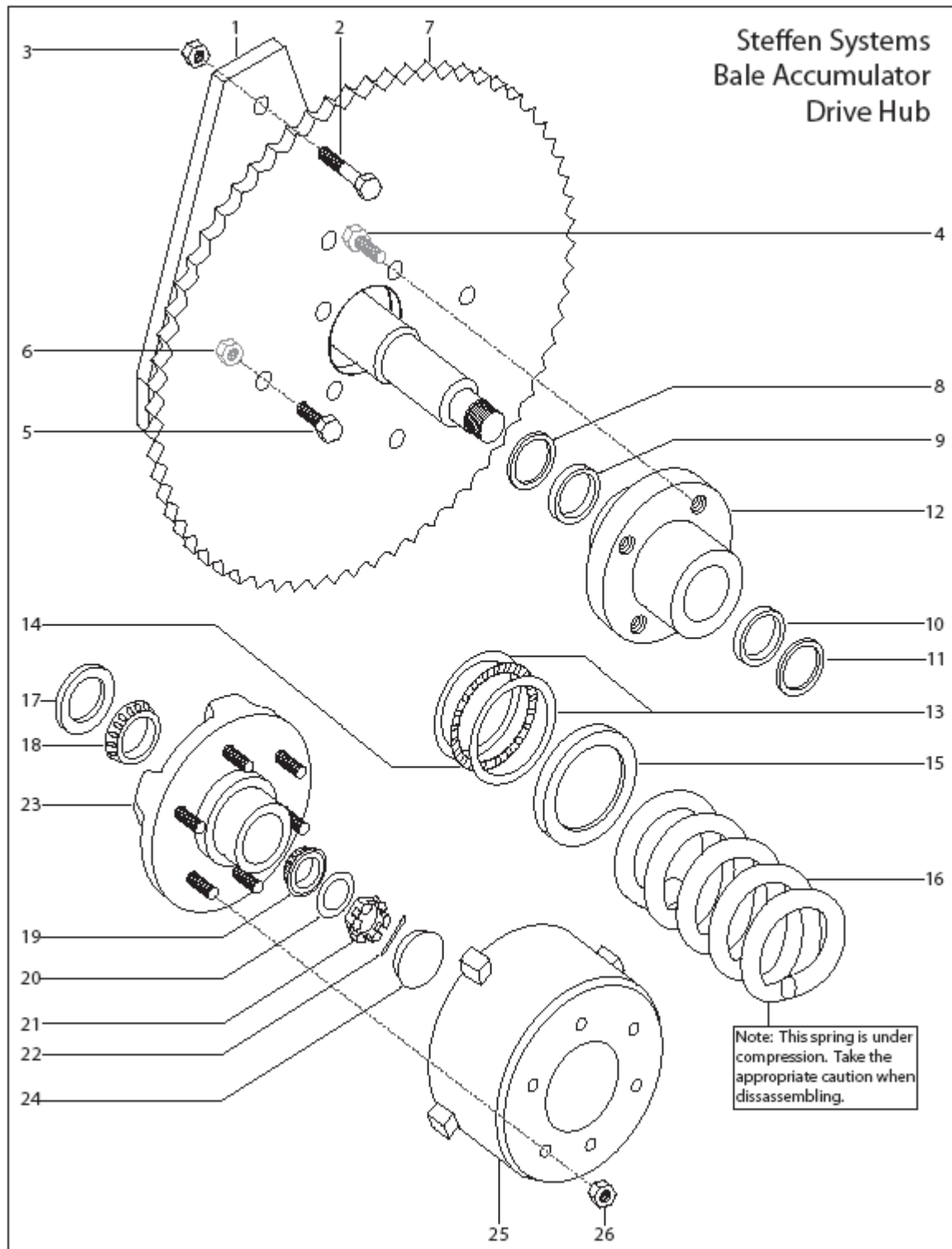
Convey valve 30	31"	black white	1-1/2 tin 1-1/2 tin	7-1/2" fork 3-1/2" fork	PR4 GND
Dump valve 31	30"	black white	1-1/2 tin 1-1/2 tin	6" fork 4" fork	RH dump GND
Push valve 32	35"	black white	1-1/2 tin 1-1/2 tin	7" fork 2-1/2" fork	RH push GND
Trip switch 33	152"	black white	1-1/2 tin 1-1/2 tin	10" fork 5" strip	UR5 Clear black
Clear switch 34	68"	black white	1-1/2 tin 1-1/2 tin	5" strip 11-1/2" fork	Trip white PR2
Push switch 35	59"	black white	1-1/2 tin 1-1/2 tin	7-1/2" fork 13" fork	UR5 PR1
Dump switch 36	40"	black white	1-1/2 tin 1-1/2 tin	4" fork 12-1/2" fork	LH switchd UR1

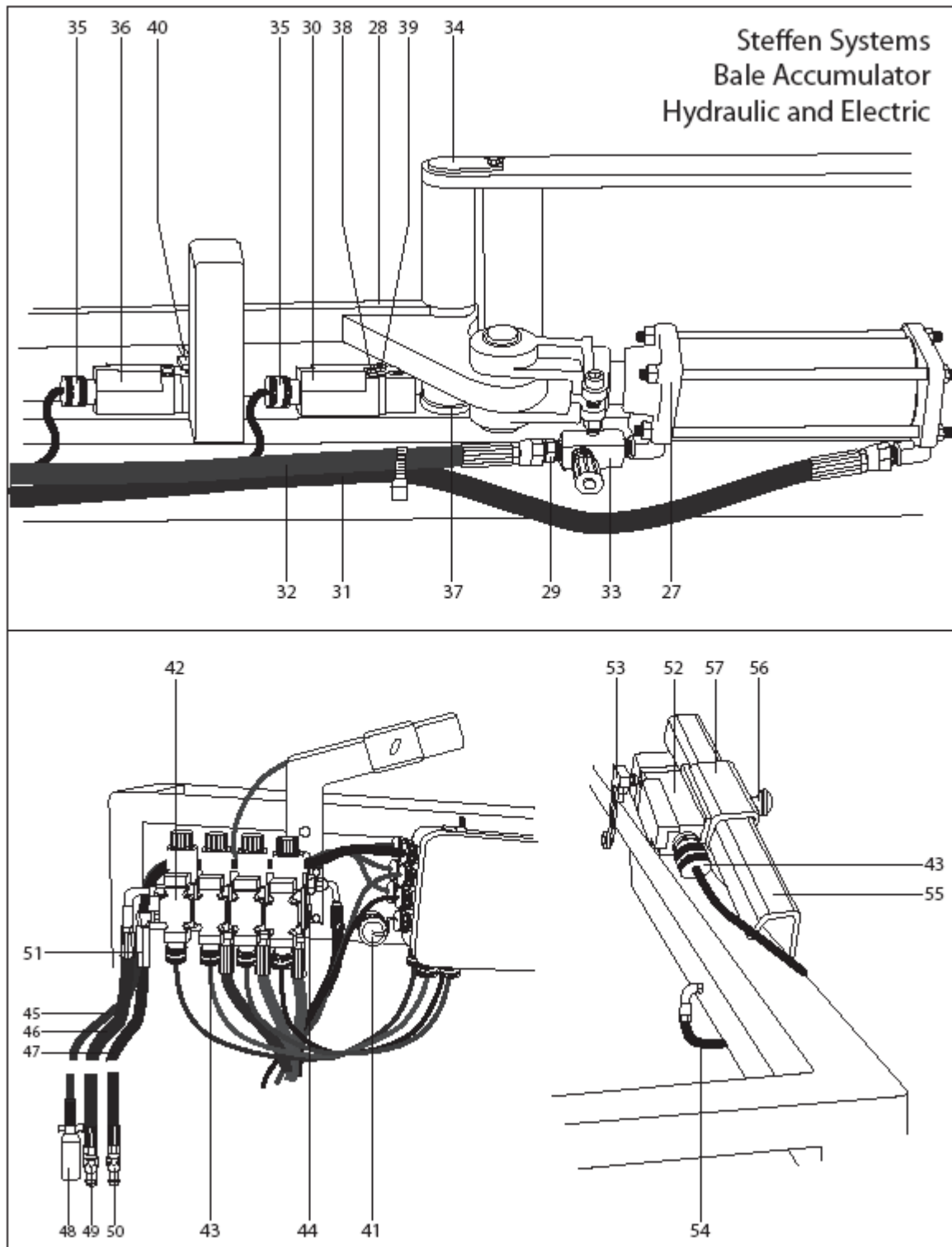
Connect Pressure switch red to LH dump, purple to LH switched

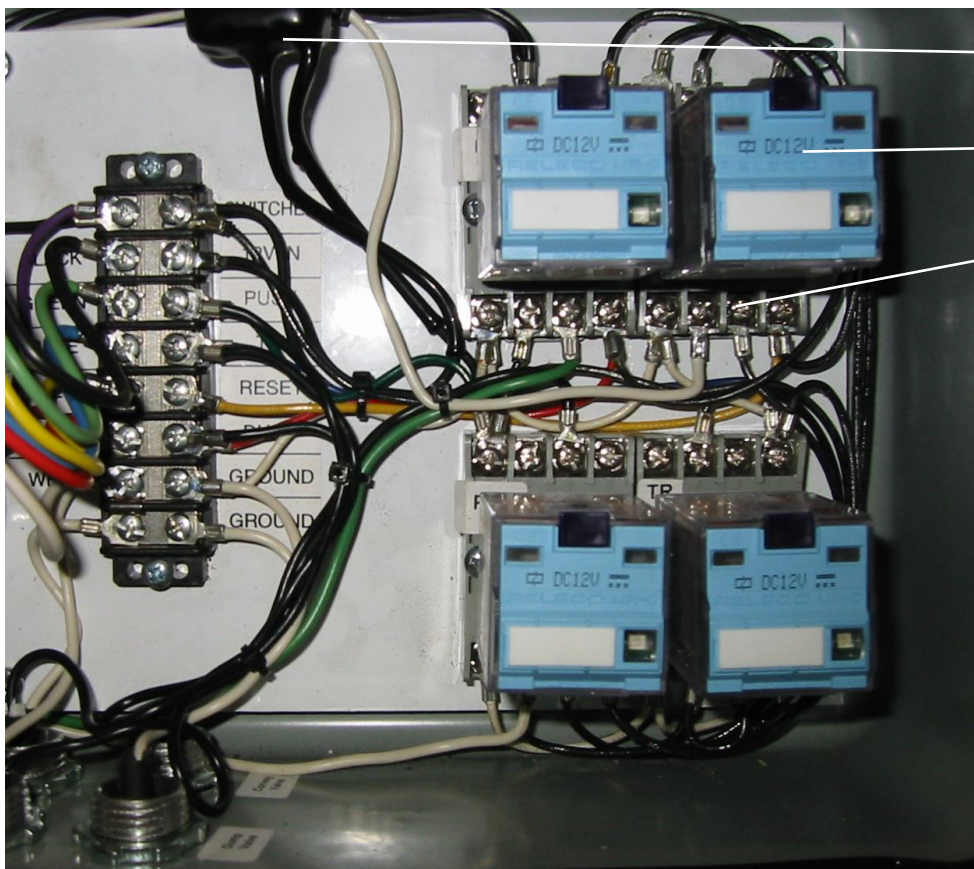
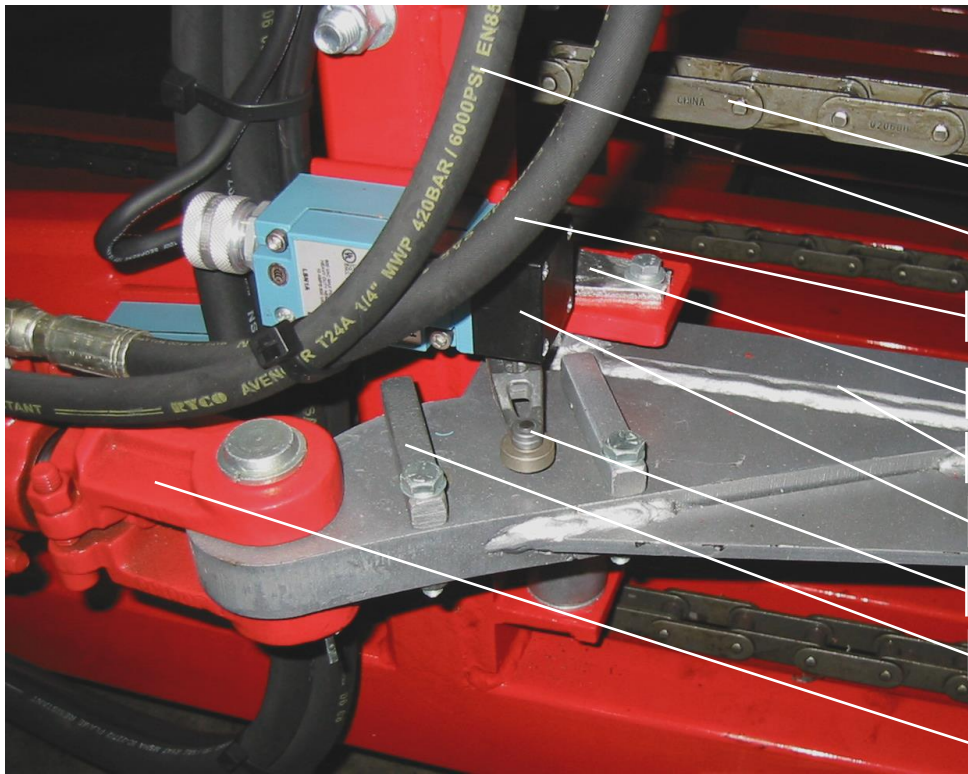
7.5 Parts List

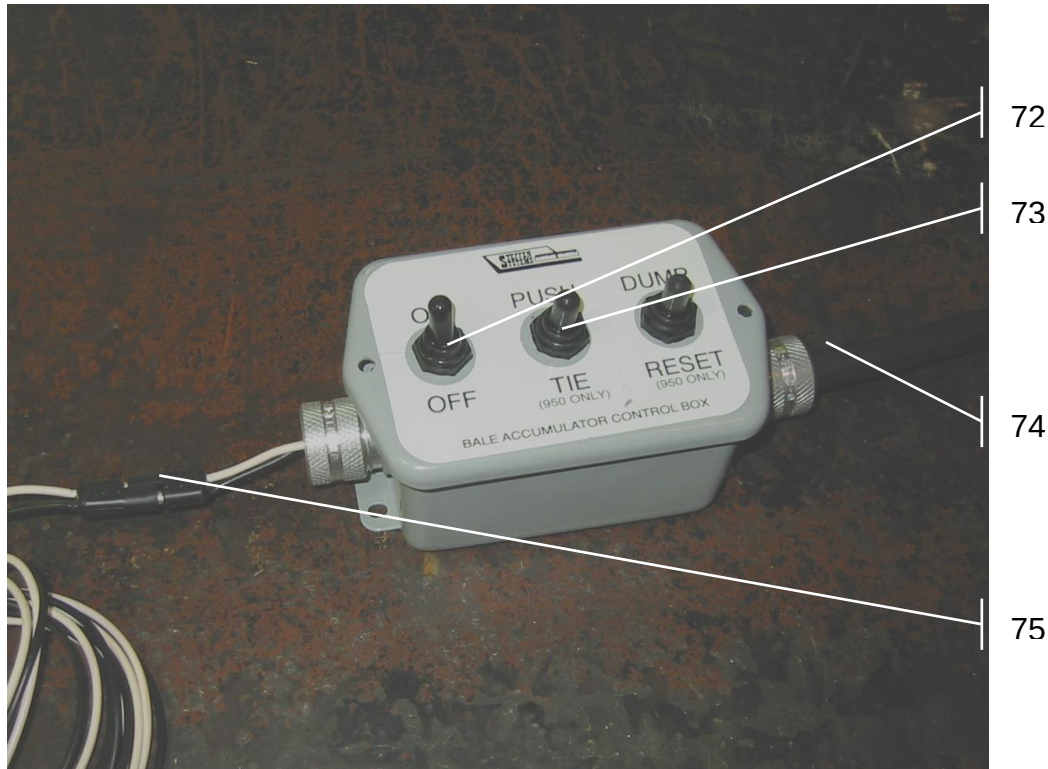
BALE ACCUMULATOR PARTS LIST

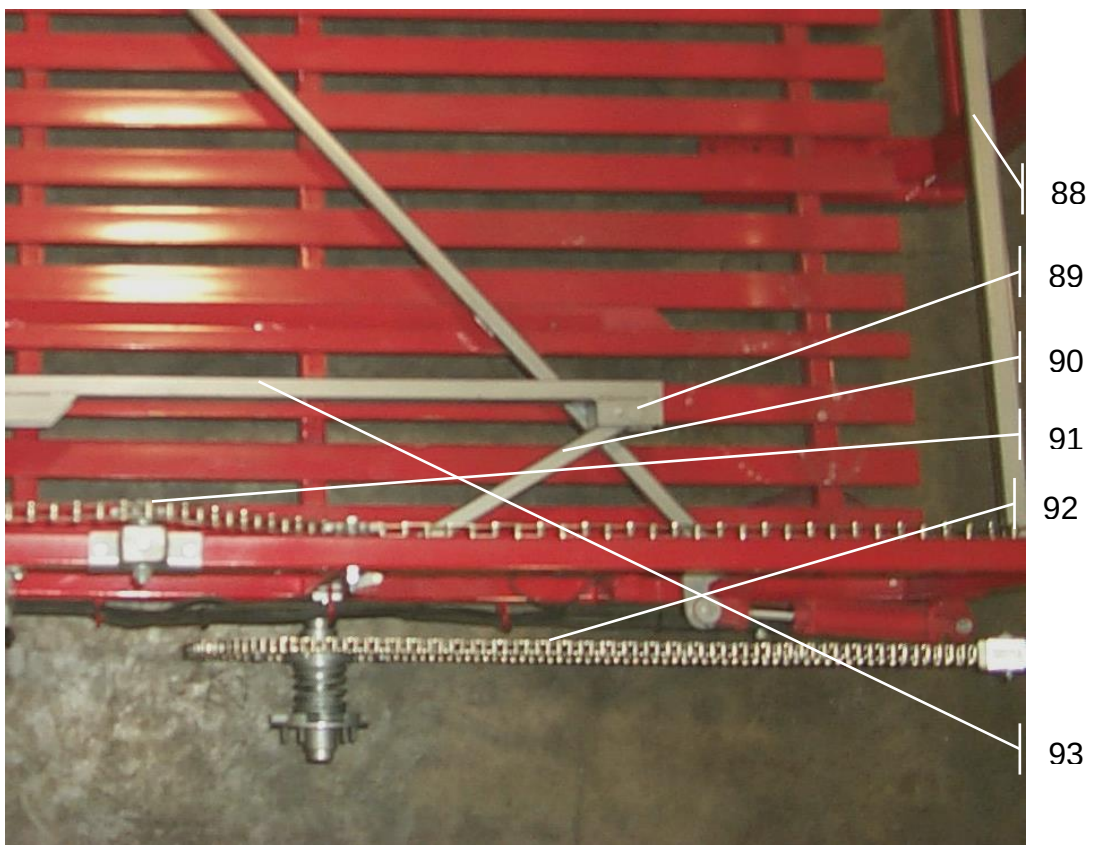
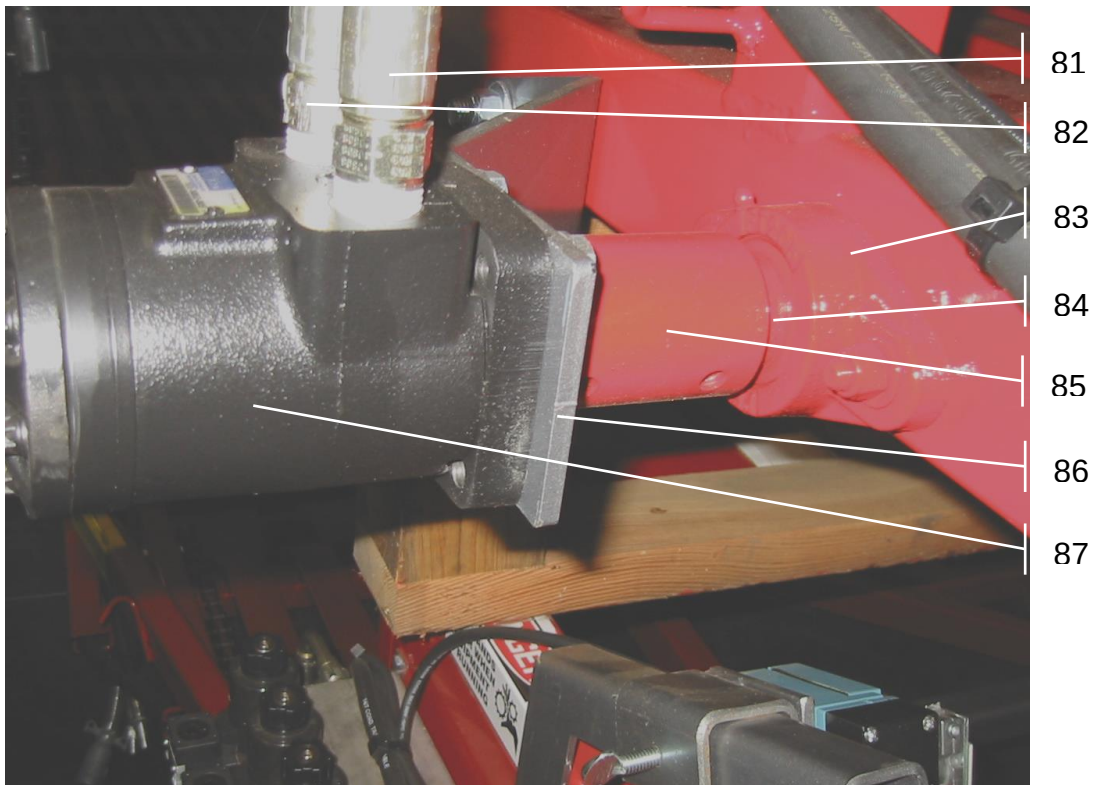
Model 850/950/1050/1250/1550/2250











Item No	Part No	Description
1-24	S9500	Wheel clutch assembly complete
8-11	S9501	Wheel clutch seal kit
17-19	S9502	Wheel bearing set
15	S9503	Thrust bearing housing
13-14	S9504	Clutch spring thrust bearing and washer
12	S9505	Aluminum clutch piston
1	S9506	Axle with mount plate drive side
7	S9507	Drive sprocket 84 tooth
23	S9508	Wheel hub 6 on 6.5 bolt pattern (5x5.5 bolt pattern, 1973-2003)
25	S9509	Drive hub with lugs 8"
	S9510	Tire and wheel assembly LH RH
2		1/2x3-1/2 bolt
3		1/2 nylon insert nut
4		1/2x1 bolt
5		1/2x1 socket head cap screw
6		1/2 nylon insert jam nut
20		Axle washer
21		Axle nut
22		Cotter key
24		Dust cover
26		Lug nut
16	S9511	Clutch return spring
92c	S9512	Plastic drive chain tensioner assembly
92	S9513	Drive chain #60
92a	S9514	Drive chain master link #60
92b	S9515	Drive chain offset half link #60
44	S9516	Hydraulic manifold 4 station, only Model 950
44a	S9517	Hydraulic manifold 3 station, all other models
42	S9518	Nachi single solenoid valve
41	S9519	Pressure switch – Barksdale
87	S9520	Feed chain hydraulic motor
33	S9521	Tie bar cylinder flow control with adapters
27, 68	S9522	2"x6" cylinder push or tie, all Models except 2250
27a	S9523	2"x8" cylinder push only Model 2250
29		1/4" male pipe x #6 male JIC adapter
	S9524	Brand FC-51-1/2 flow control
50	S9525	3/8" male quick connector, pressure hose
	S9526	3/8" female quick connector, pressure hose
49	S9527	1/2" male quick connector, return hose
	S9528	1/2" female quick connector, return hose
47	S9529	3/8" pressure hose to baler
46	S9530	1/2" return hose to baler
81	S9531	3/8" feed motor pressure hose
82	S9532	3/8" feed motor return hose
61	S9533	1/4" push bar extend hose
62	S9534	1/4" push bar retract hose
	S9535	1/4" dump clutch hose
31	S9536	1/4" tie bar extend hose
32	S9537	1/4" tie bar return hose
54	S9538	1/4" pressure switch hose
72-75	S9539	Cab control box with 27 foot cord + 7 wire
69, 72	S9540	2 position toggle switch with boot
73	S9541	3 position toggle switch with boot
	S9542	Circuit breaker – 20 A
74	S9544	7-wire control cable only, tractor end 27 foot long

45	S9545	7-wire control cable only, accumulator end 12 foot long
48	S9546	7-wire male connector
74a	S9547	7-wire female connector with boot
35, 43	S9548	Aluminum cord connector
70	S9549	Relay 12 VDC
71	S9550	Relay base
36, 52	S9551	Dump. Trip or Clear switch LSA1A
30, 65	S9552	Tie or Push switch LSN1A
80	S9553	Loop arm for Clear switch LSZ-61
40	S9554	Straight black rod for Trip switch LSZ-68
39, 66	S9555	Solid roller arm for Tie or Push switch LSZ-51B
53	S9556	Adjustable arm for Dump Stop switch LSZ-52D
38		10-32x1-3/4 socket head capscrew
67	S9557	Pushbar switch lug
85	S9558	Feed chain shaft coupler 1" solid
77b	S9560	Dump or Feed chain cross bolt 5/8x4-1/2
	S9561	Dump chain adjuster bolt 6" long
60, 91	S9562	Dump chain 10 foot section (4 required per unit)
	S9563	Dump chain master link C2060H
	S9564	Dump chain offset half link C2060H
	S9565	Dump chain side bar link with 5/16" holes
	S9566	Dump shaft bearing
	S9567	Dump shaft main sprocket 19 tooth
	S9568	Dump shaft drive sprocket 13 tooth
	S9569	Dump drive shaft Model 850, 950, 1250
	S9570	Dump drive shaft Model 1050, 1550, 2250
88	S9571	Dump bar. Model 850, 950, 1250
	S9572	Dump bar. Model 1050, 1550, 2250
77a	S9573	Feed chain adjuster bolt 10" long
79	S9574	Feed chain section (6 required per unit)
79a	S9575	Feed chain master link C2060H
79a	S9576	Feed chain offset half link C2060H
78	S9577	Feed chain paddle mounting link C2060H A-1 with 5/16" hole
83	S9578	Feed shaft bearing 1"
83a	S9579	Feed shaft main sprockets 15 tooth
84	S9580	Feed shaft. specify model
76	S9581	Feed paddle. all models except 2250
	S9582	Feed paddle. Model 2250
77, 91	S9583	5/8" bore idler sprocket. 15 tooth
	S9584	1/2" bore idler sprocket. 15 tooth
63	S9585	Push bar long pivot pin
89	S9586	Push bar short pivot pin
63b	S9587	Push bar pivot bushing 1x3/4x3/4
34	S9588	Tie bar pivot pin
37	S9589	Tie bar pivot bushing 1-1/4x1x3/4
	S9591	Bungie cord kit
64	S9592	Push bar front link with cylinder ear
90	S9593	Push bar rear link
28	S9594	Tie bar complete
93	S9595	Push bar complete, Model 950
	S9596	Push bar complete, 850 1050 1250 1550
86	S9597	Feed chain motor mounting bracket
	S9598	Hydraulic mounting adaptor for pressure switch
55		Dump stop switch mount
56		3/8x1 thumbscrew
57		Dump stop switch slider mount
51	S9599	Check valve with adapter for pressure line

7.6 Fault Finding

7.6.1 Nothing is working on the accumulator:

1. Check for proper electric power coming from the tractor. You can use an electrical tester to confirm the power by placing the common probe of the tester on the white wires on the bottom left of the terminal block, and the positive probe of the tester on the purple wire on the top left of the terminal block. There must be a minimum of 11 volts DC for the system to operate correctly. If the power is correct, you can press the blue button on the top left relay inside the electrical box, and it will light up and stay lit up as well as the hydraulic valve for the dump clutch will be energized and the red triangle indicator light will be on. The connections at the 7 wire plugs at the rear of the baler and the plug connecting the cab control box to the tractor power are the most likely place to have a break in the power
2. If the ground wire (white wire in the cable to the tractor) is not properly connected, the machine may work occasionally, but not consistently. The system uses an isolated ground, so all testing must be made using the white wire as the negative
3. You may have a short in the cable running to the cab control box. If you disconnect the larger green, blue, yellow, and red wires that come from the cab control box from the left side of the terminal strip (leaving the smaller wires on the screws that were under them), and leave only the large black and white connected, this will remove the possibility of the shorted cable or toggle switches from the circuit. The machine will run automatically with only the black and white connected
4. Check that the hydraulic flow is properly connected. If it is properly connected, you will be able to operate the push bar manually from the toggle switch in the cab and it will make a cycle
5. Check that all the relays are properly plugged in, they are all the same part number so they can be moved around to any location in the box

7.6.2 All functions are extending at the same time:

1. The hydraulic return hose has come unplugged or is restricted causing back pressure. Turn the tractor off, push the hydraulic control handle on the tractor into the float position, and check that all hoses have the pressure released and are connected properly
2. The hydraulic control handle in tractor is not completely activated causing restriction, tie it fully into position
3. The hydraulics are improperly connected, refer to the start up guide in this manual for the proper hydraulic plumbing directions



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

7.6.3 The feed conveyor chain does not rotate:

1. Check for the red triangle indicator light on the farthest right hydraulic valve, if this is on, then the problem is mechanical or hydraulic. If this light is off, then the problem is electrical.
2. The electrical can be checked by a simple test. With the hydraulics off and the electrical power on, open the cover on the accumulator electrical box and press the blue button on the top left relay. This should light up and stay lit up, as well as should energize the hydraulic valve for the dump. If this does not light up, then the power from the tractor is not getting to the electrical box. You can use an electrical tester to confirm the power by placing the common probe of the tester on the white wires on the bottom left of the terminal block, and the positive probe of the tester on the purple wire on the top left of the terminal block. There must be a minimum of 11 volts DC for the system to operate correctly.
3. The push bar and tie bar (950 only) must both be fully retracted and both limit switches flipped to the home position. This allows the power path to flow to the righthand conveyor valve to power the conveyor. A simple way to check this is to manually rotate the dump stop limit switch towards the baler to activate it, and if the conveyor runs while the limit switch is being held, then stops when released, it confirms that one of the bar limit switches is not registering in the home position. Check the adjustments of the switches to be sure they are both flipped correctly. These two limit switches are unique in that they are maintained either left or right until moved to the opposite direction.
4. Check that hydraulic flow is present from the tractor, and that all connections are fully plugged in and the control handle is pulled in the proper direction. If the hydraulics are correct, you will have the ability to operate the push bar manually from the toggle switch in the cab.
5. Check for mechanical binding. The chain may have jumped a tooth, or there may be foreign material wrapped on the shaft preventing movement. This can be repaired by loosening the front feed chain adjuster bolts and releasing enough slack on the chain to remove the debris, or to realign the chain on the feed drive shaft so the paddles are parallel to the frame

7.6.4 The push bar does not operate properly:

1. If the push bar starts its cycle, but does not complete the full travel, there may be a system voltage problem. Check the voltage with a tester measuring the same method as in 7.6.1 above as 11 volts DC is required for the system to work properly.
2. If the push bar does not travel far enough, check the adjustment of the limits switch lugs. The outward lug rotates the limit switch when the bar is extended, and the inward lug rotates the limit switch to the home position when retracting, which in turn supplies power back to the conveyor chain
3. Check the elevation of the push bar in relation to the roller on the limit switch. The push bar should not come in contact with the rivet holding the roller in place or it may prematurely active the limit switch



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

4. Check if the cable to the tractor or the toggle switch is shorted out by removing the green wire from the left side of the terminal strip at the accumulator box. . This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit

7.6.5 The push bar does not activate:

1. If the push bar does not operate, there may be a system voltage problem. Check the voltage with a tester measuring the same method as in 7.6.1 above as 11 volts DC is required for the system to work properly.
2. Check the function of the rear trip switch. With the hydraulics off, cycle the electricity and then leave the electricity on. Use a tool or stick to activate the trip switch. This should energize the lower left relay
3. If this does not energize the relay, then check the bale clear limit switch loop to be sure it is not stuck in the 'on' position. It should operate freely and click when activated. This switch deactivates the power to the rear trip switch when tripped to prevent bales from getting trapped in the front of the box area
4. The lower left relay may have failed, replace it with a new one, or switch it with another in the box as they are all the same part number
5. Check the condition of the cable to the trip limit switch
6. Check the condition of the cable to the bale clear limit switch, if this has not been secured properly with the hoses, it can become pinched in the push bar cylinder when it is retracted
7. Exchange the relay with another one from a different function to see if the problem follows the relay

7.6.6 The tie bar does not operate properly (950 only):

1. If the tie bar starts its cycle, but does not complete the full travel, there may be a system voltage problem. Check the voltage with a tester measuring the same method as in 7.6.1 above as 11 volts DC is required for the system to work properly.
2. If the tie arm extends but does not retract, check the tie limit switch adjustment. Also check that the dump stop limit switch is releasing after the dump cycle is complete which normally happens when the bales enter the machine and push the dump bar off the limit switch
3. If the tie bar does not travel far enough, check the adjustment of the limits switch lugs. The outward lug rotates the limit switch when the bar is extended, and the inward lug rotates the limit switch to the home position when retracting, which in turn supplies power back to the conveyor chain
4. Check the elevation of the tie bar in relation to the roller on the limit switch. The tie bar should not come in contact with the rivet holding the roller in place or it may prematurely active the limit switch
5. Check if the cable to the tractor or the toggle switch is shorted out by removing the blue wire from the left side of the terminal strip at the accumulator box. This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

7.6.7 The tie bar does not activate (950 only)

1. If the tie bar does not operate, there may be a system voltage problem. Check the voltage with a tester measuring the same method as in 7.6.1 above as 11 volts DC is required for the system to work properly.
2. Check the function of the rear trip switch. With the hydraulics off, turn on the electricity, and then press in the blue button on the top right relay Use a tool or stick to activate the trip switch. This should energize the lower left relay
3. If this does not energize the valve, then check the bale clear limit switch loop to be sure it is not stuck in the 'on' position. It should operate freely and click when activated. This switch deactivates the power to the rear trip switch when tripped to prevent bales from getting trapped in the front of the box area
4. The lower left relay may have failed, replace it with a new one, or switch it with another in the box as they are all the same part number
6. Exchange the relay with another one from a different function to see if the problem follows the relay

7.6.8 Tie bar function does not activate after dumping (950 only):

1. Adjust the dump stop switch slider to closer to the tractor. If the black rod trip switch is held on by the bales after the dump stop switch is activated, the tie bar will activate with no bales, resulting in skipped tie bales
2. Check if the trip switch is getting caught in the push bar mechanism during operation. If this switch is tripped anytime after the dump stop switch is activated, it will activate the tie bar with no bales
3. Check if the cable to the tractor or the toggle switch is shorted out by removing the yellow wire from the left side of the terminal strip at the accumulator box, but leaving the white wire below it on the screw. This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit
4. Check the dump stop switch arm length to be sure the dump bar is contacting it as it passes for a minimum of 1 second
5. Adjust the dump chains tighter as the dump stop switch may not be triggered long enough to activate tie sequence if the chains are bouncing by the limit arm
6. Check for low voltage, as shown in 7.6.1



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

7.6.9 Accumulator tries to dump with partial package

1. The pressure switch setting is too low, adjust it higher by turning the black knurled ring clockwise about 2 turns at a time similar to closing a faucet. This is located to the left of the main electrical box and has a purple and red wire coming out of it
2. The push bar may be extending past its limit switch and is bottoming the cylinder stroke prior to the limit switch being tripped. Adjust the switch arm lug to the proper position so the limit switch flips over when the arm is about 1" past the opening of the throat of the machine. Too short of a travel will allow bales to block the throat, too long of a travel will cause the dump to engage prematurely
3. Check if the cable to the tractor or the toggle switch is shorted out by removing the red wire from the left side of the terminal strip at the accumulator box, but leaving the smaller red wire below it on the screw. This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit
4. Check that the trip limit switch is not getting stuck on, which causes the circuit to stay engaged
5. The pressure switch wires may be shorted, disconnect the smaller red wire of the pressure switch from the terminal block to remove it from the circuit to test. If this is the problem, then it will not dump at all

7.6.10 Accumulator does not dump

1. The pressure switch setting is too high, adjust it lower by turning the black knurled ring clockwise about two turns at a time similar to opening a faucet. This is located to the left of the main electrical box and has a purple and red wire coming out of it.
2. The pressure switch is damaged or plugged with foreign material and may need to be replaced. This can be tested by turning off the hydraulic power, leaving the electrical power on, then use a jumper wire and jumper between the purple wire on the top left terminal block and the red wire on the left side of the terminal block. When connected, the top left relay should light up indicating the remainder of the system is functioning correctly.
3. Check if the cable to the tractor or the toggle switch is shorted out by removing the red wire from the left side of the terminal strip at the accumulator box, but leaving the smaller red wire below it on the screw. This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit
4. Exchange the relay with another one from a different function to see if the problem follows the relay
5. The dump chain is bound up, resulting in the tire sliding rather than turning chain. Check for proper drag on dump chain by rotating the dump chain by hand the full 360 degrees of rotation with less than 200 lbs. of pull
6. The hay is too wet or heavy, creating more friction on the deck that the tire has traction for unloading.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

7.6.11 Dump chain doesn't stop after unloading

1. The dump stop limit switch is being missed by the dump bar, check the tension of the dump chain or adjust length of stop unload switch to contact the dump bar longer
2. Check for back pressure problems by manually activating the clutch from the toggle switch in the tractor, and then turn the electrical power off and the clutch should immediately release if the return oil path is correct
3. Check if the cable to the tractor or the toggle switch is shorted out by removing the red wire from the left side of the terminal strip at the accumulator box, but leaving the smaller red wire below it on the screw. This will not affect the automatic operation, just the removes the manual toggle switch and the cable from the circuit
4. Check that the dump clutch return spring is in good condition, if this is broken, the clutch may not release
5. In some cases, the wheel bearings in the drive axle may be loose, resulting in a mechanical binding of the wheel. Adjust or replace them as needed

7.6.12 Dump clutch chatters in and out:

1. Check that the dump stop limit switch isn't stuck on
2. Check that the wires are correct in the dump stop limit switch and are not pulled out

7.6.13 Tie bales are catching the far side of accumulator

3. Check the bale length and shorten the bales to the proper length of 36-38"
4. Check the speed of the tie bar. If it is too fast, it can throw the bales, slow this down by turning loosening the lock screw on the flow control knob on the tie bar cylinder and turning it clockwise until the desired speed is selected, then tighten the lock screw again
5. Check if the spear tabs are broken off of tie bar tip allowing bales to slide
6. Check that the dump chain is too tight or bound up, it must move freely the entire rotation with no more than 200 lbs of pull

7.6.14 Bales fall out of the rear of the machine

1. Check for back pressure problems by manually activating the clutch from the toggle switch in the tractor, and then turn the electrical power off and the clutch should immediately release if the return oil path is correct
2. Adjust unload stop switch so the dump bar stops between 12-24" from the tail of the machine. The incoming bales will move the dump bar to the rear as they come in.
3. In some cases, the wheel bearings in the drive axle may be loose, resulting in a mechanical binding of the wheel. Adjust or replace them as needed.
4. Tighten dump chain to keep it from travelling too far by inertia



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

5. The tie arm is too fast, throwing the dump bar past its desired stopping position, slow the arm travel as described above
6. As a last resort, you can remove one of the spacer washers at the lower rear idler sprocket. This creates a pinch point as the dump bar reaches the corner, causing it to stop, but may also cause it to bind too much

7.6.15 Bales get cut in half by push bar

1. The bale clear switch is broken or bent down, allowing the push bar to activate prematurely. Replace or repair as needed
2. The bale length is too long, forcing bales into the accumulator, shorten the length
3. Field conditions are rough, allowing bales to jump in the air and miss the limit switch

7.6.16 Bales get caught in throat when turning

1. Rubber cords are missing on throat of accumulator.
2. Bales are overly misshapen.

7.6.17 Bales slide around in accumulator

1. If you are on steep terrain or extremely rough conditions, the bales may slide around inside the box area. More of the anti skid tape can be added if desired to improve this. If the bales are bouncing enough to leave the deck, it is difficult to control them
2. Ground conditions are too rough, slow down travel speed.

7.6.18 Tie bales roll on their sides when dumped

1. Check the hitch elevation. The top of the rear tubes in the accumulator should be as close the ground as possible
2. If the ground is very uneven or you have a thick stubble, it is difficult to keep the bales in the correct position

7.6.19 All functions move but have low hydraulic power

1. The machine is designed for only one function to be operating at a time, and always one. If the feed chain hydraulic valve is stuck on, it will take the power away from the other functions. Most likely there is dirt in the valve jamming the movement. This condition can be seen if the light is off on the feed conveyor hydraulic valve, but the chain is moving. Replace the valve or sometimes you can purge it by using a small Philips screwdriver and with the hydraulic power on, push down on the indentation on the top of the valve and plunge it multiple times with about 50lbs of force to attempt to get the foreign material to pass through the valve



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

7.6.20 Other helpful items to check

1. Check that all electrical wires are tied up and not in a position to get pinched or cut off, by the turning of the machine, or in the area by the push bar cylinder
2. Make sure hoses are routed in a manner that they cannot get pinched or kinked.
3. The shape of the bales can make a big difference in the consistency of the machine. It is important to keep control of weights and lengths and shape of the bales.
4. Excessive field speeds may cause erratic functioning of the machine. Slow travel speed to the appropriate speed for the field conditions



WARNING *ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK*

8. PLANT SAFETY ASSESSMENT & EVALUATION

8.1 Hazard Identification Checklist

HAZARD	YES /NO	DESCRIPTION
A. ENTANGLEMENT		
1. Can anyone's hair, clothing, gloves, necktie, jewelry, cleaning brushes, rags or other materials become entangled with moving parts of the machine, or materials in motion?	Yes	There are many moving parts ie. chains, sprockets & other pinch points on the machine.
B. CRUSHING		
1. Can anyone be crushed due to:		
a. material falling off the machine?	No	
b. uncontrolled or unexpected movement of the machine or its load?	Yes	The machine is fully automatic, functions can activate at any time.
c. lack of capacity for the machine to be slowed, stopped or immobilized?	Yes	If the machine is incorrectly attached to the baler or tractor.
d. the machine tipping or rolling over?	No	
e. parts of the machine collapsing?	No	
f. coming in contact with moving parts of the machine during testing, inspection, operation, maintenance, cleaning or repair?	Yes	The machine is fully automatic functions & chains can engage at any time.
g. being thrown off or under the machine?	No	
h. being trapped between the machine and materials or fixed structures?	Yes	If vision is blocked for the operator of the machine.
i. other factors not mentioned		
C. CUTTING, STABBING & PUNCTURING		
1. Can anyone be cut, stabbed or punctured due to:		
a. coming in contact with sharp or flying objects?	Yes	The machine is fully automatic, functions can activate at any time.
b. coming in contact with moving parts of the machine during testing, inspection, operation, maintenance, cleaning or repair of the plant?	Yes	The machine is fully automatic functions & chains can engage at any time.
c. the machine, parts of the machine or work pieces disintegrating?	Yes	Due to lack of maintenance or regular checks.
d. work pieces being ejected?	No	
e. mobility of the machine?	Yes	If vision is blocked for the operator of the machine.
f. uncontrolled or unexpected movement of the machine?	Yes	The machine is fully automatic functions & chains can engage at any time.
g. other factors not mentioned?		

D. SHEARING		
1. Can anyone's body parts be sheared between two parts of the machine, or between a part of the machine and a work piece or structure?	Yes	The machine is a hydraulic powered machine. The push arm & the tie arm are exposed when in operation.
E. FRICTION		
1. Can anyone be burnt due to contact with moving parts or surfaces of the machine?	No	
F. STRIKING		
1. Can anyone be struck by moving objects due to:		
a. uncontrolled or unexpected movement of the machine or material handled by the plant?	No	
b. the machine, parts of the machine or work pieces disintegrating?	No	
c. work pieces being ejected?	Yes	As the machine ejects its load.
d. mobility of the machine?	No	
e. other factors not mentioned?	No	
G. HIGH PRESSURE FLUIDS		
1. Can anyone come in contact with fluids under pressure, due to plant failure or misuse of the machine?	Yes	Hydraulic hoses may wear or become loose.
H. ELECTRICAL		
1. Can anyone be injured by electrical shock or burnt due to:		
a. the machine contacting live electrical conductors?	No	
b. the machine working in close proximity to electrical conductors?	No	
c. overload of electrical circuits?	No	
d. damaged or poorly maintained electrical leads and cables?	No	
e. damaged electrical switches	No	
f. water near electrical equipment?	No	
g. lack of isolation procedures?	No	
h. other factors not mentioned?	No	
I. EXPLOSION		
1. Can anyone be injured by an explosion of gases, vapours, liquids, dusts or other substances, triggered by the operation of the plant or by material handled by the machine?	No	

J. SLIPPING, TRIPPING OR FALLING		
1. Can anyone using the machine, or in the vicinity of the machine, slip, trip or fall due to:		
a. uneven or slippery work surfaces?	Yes	In a field situation the ground may be uneven or slippery.
b. poor housekeeping, eg. garbage in the vicinity of the machine, spillage not cleaned up?	No	
c. obstacles being placed in the vicinity of the machine?	No	
d. other factors not mentioned?	No	
2. Can anybody fall from a height due to:		
a. lack of proper work platform?	No	
b. lack of proper stairs or ladder?	No	
c. lack of guardrails or other suitable protection	No	
d. unprotected holes, penetrations or gaps?	No	
e. poor floor or walking surfaces such as the lack of a slip resistant surface?	No	
f. steep walking surfaces?	No	
g. collapse of the supporting surfaces?	No	
h. other factors not mentioned?	No	
K. ERGONOMICS		
1. Can anyone be injured due to:		
a. poorly designed seating?	No	
b. repetitive body movement?	No	
c. constrained body posture or the need for excessive effort?	No	
d. design deficiency causing mental or psychological stress?	No	
e. inadequate or poorly placed lighting?	No	
f. lack of consideration given to human traits and natural limitations?	No	
g. other factors not mentioned?	No	
L. SUFFOCATION		
1. Can anyone be suffocated due to lack of oxygen, or atmospheric contamination?	No	
M. HIGH TEMPERATURE OR FIRE		
1. can anyone come into contact with objects at high temperature?	No	
2. can anyone be injured by fire?	No	

N. TEMPERATURE (thermal comfort)		
1. can anyone be injured or suffer ill-health due to exposure to high or low temperature?	No	
O. OTHER HAZARDS		
1. Can anyone be injured or suffer ill-health from exposure to:		
a. chemicals?	No	
b. toxic gases or vapours?	No	
c. fumes?	No	
d. dust?	No	
e. noise?	No	
f. vibration?	No	
g. radiation?	No	
h. other factors not mentioned?	No	

8.2 Risk Assessment Table

CONSEQUENCE	PROBABILITY			
	frequent	probable	occasional	remote
catastrophic	HIGH	HIGH	HIGH	HIGH
fatal	HIGH	HIGH	HIGH	MEDIUM
critical	HIGH	HIGH	MEDIUM	LOW
marginal	HIGH	MEDIUM	LOW	LOW
negligible	MEDIUM	LOW	LOW	LOW

8.3 Hazard Identification and Control

HAZARD	RISK ASSESSMENT	RISK CONTROL SHORT TERM	RISK CONTROL LONG TERM
A-1	Low	Read and understand the operator's manual	Permanent safety guards fitted and safety signs in place
B-1B	Low	Operator to isolate machine & apply handbrake before attempting any service or maintenance work	Read and understand the operators manual.
B-1C	Low	Correct coupling when attaching the machine to the baler.	Use only the correct hitch mount and install correctly, refer to the operators manual.
B-1F	Low	All power to the machine must be off and oil supply stopped before any	Read and understand operators manual. Permanent safety guards fitted and safety signs in place.

		maintenance to be carried out.	
B-1H	Low	Only a trained operator to operate the machine.	Read and understand operators manual. No personnel near machine when operating.
C-1A	Low	Read and understand operators manual.	Permanent safety guards and safety signs in place.
C-1B	Low	Read and understand operators manual.	Regular maintenance & daily checks to be carried out.
C-1C	Low	Regular daily checks and maintenance	Read and understand operators manual.
C-1E	Low	Only a trained operator to operate the machine.	Read and understand operators manual. No personnel near machine when operating.
C-1F	Low	Only a trained operator to operate the machine	Fixed safety guards and safety signs in place.
D-1	Low	Only a trained operator to operate the machine.	Fixed safety guards and safety signs in place.
F-1C	Low	Read and understand operators manual.	Only a trained operator to operate the machine. No personnel near machine when operating.
G-1	Low	Read and understand operators manual.	Regular maintenance & daily checks to be carried out.
J-1A	Low	Operator is always seated in the tractor when the machine is operating.	Only a trained operator to operate the machine.

8.4 Hazard Identification

Be aware that it has areas that can cause bodily harm or death if these safety precautions are not followed. As with any powered piece of machinery, ALWAYS TURN OFF POWER TO THE DEVICE PRIOR TO APPROACHING IT, SERVICING IT, OR ANY OTHER PROCESS WHICH MAY ALLOW AN INDIVIDUAL TO COME IN CONTACT WITH ANY PART OF IT. This will help ensure your safety and the safety of those around you.

Following is a list of areas which have been identified as a potential hazard and the type of hazard that could occur. This list is organized in order from front to rear of the machine.

8.4.1 Hitch Point



Hitch Point

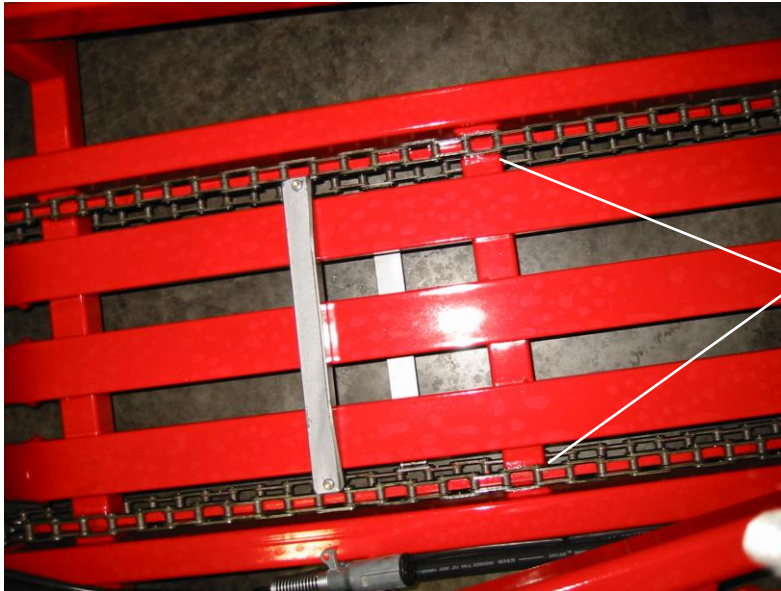
The hitch area pivots as the machine is being moved through the field. There is a potential pinch point at this pivot primarily for the fingers or hands. Stay away from this hitch point while the machine is in motion.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

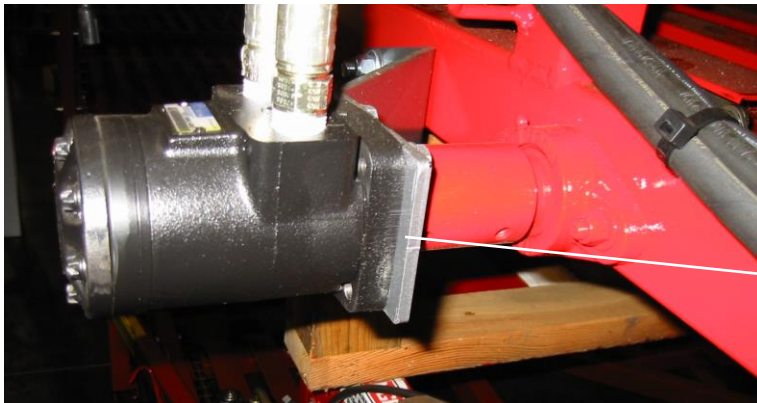
8.4.2 Feed Chain



Feed Chains

On the front edge of the feed chain, two idler sprockets are located, one on either side of the frame. Either of these have a pinch point as the chain passes through them. On the rear edge of the feed chain, two drive sprockets are located. These also have a pinch point where the chain passes. The chain itself has three paddles, which force the bales into the machine. As these paddles come around the leading edge of the center frame, there is a serious pinch point in which there is an opening which gets smaller as the paddles progress. Keep all body parts, especially fingers and feet away from these areas anytime the machine has power to it or is moving.

8.4.3 Feed Motor



Feed Motor

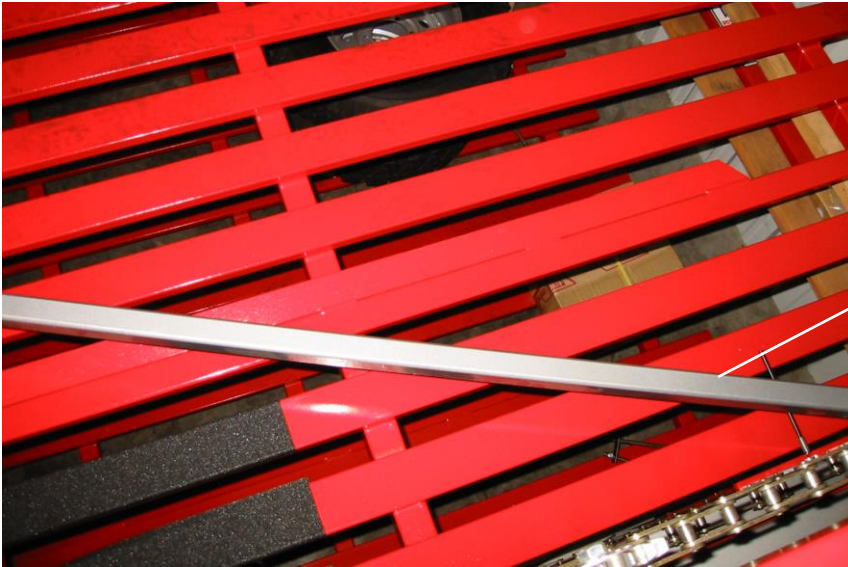
The feed motor is located in front of the tire on the control side of the machine. There is a danger point as the shaft rotates. Keep away from this shaft to avoid injury.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

8.4.4 Tie Arm



Tie Arm

This arm is the lower of the two powered arms, which place the bales into their positions. There are two potential hazard areas. The first is a pinch point when the arm is retracted. There are several areas along the length of the arm which have limited clearance between the arm and the frame. Any of these areas could be a potential pinch point.

8.4.5 Hydraulic Cylinder



Hydraulic Cylinder

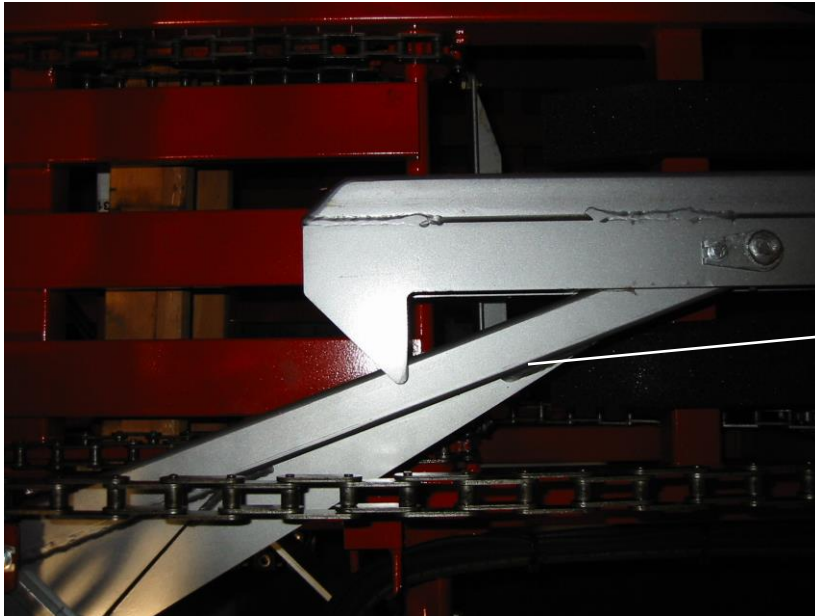
The hydraulic cylinder which drives this arm also creates two potential pinch points as it pivots. Also, as the arm moves during its operation any contact with the bar at that time could result in bodily injury.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

8.4.6 Push arm



Push Arm
Link

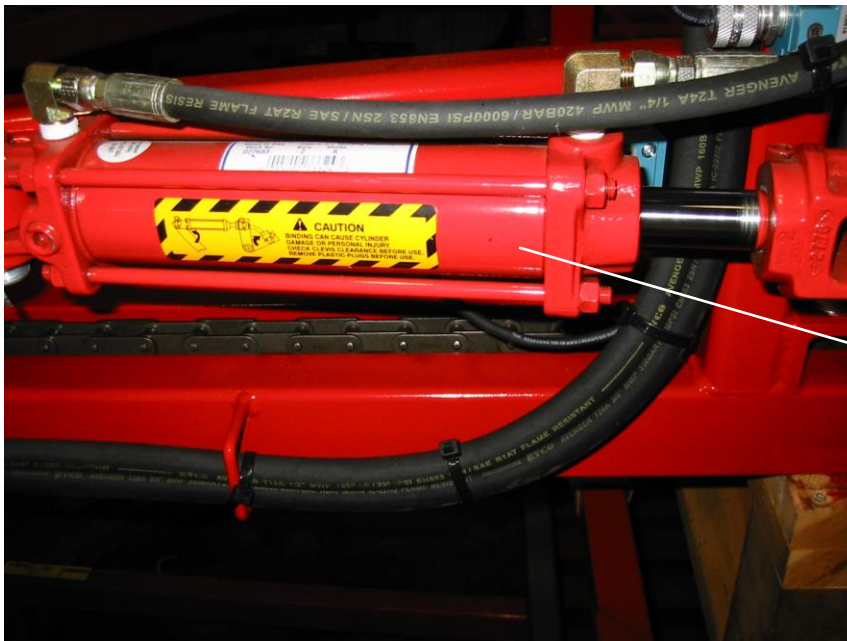
The push arm has a pair of links which pivot as the push arm is being moved. These create four specific pinch points, one located at each pivot. Do not come in contact with any of these points any time the machine is operating.



DANGER

THIS ARM IS POWERFUL ENOUGH TO INJURE.

8.4.7 Hydraulic Cylinder



Hydraulic Cylinder

The hydraulic cylinder which powers this arm also has pinch points located at its pivots.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

8.4.8 Retracting Push Arm



Retracting
Push Arm

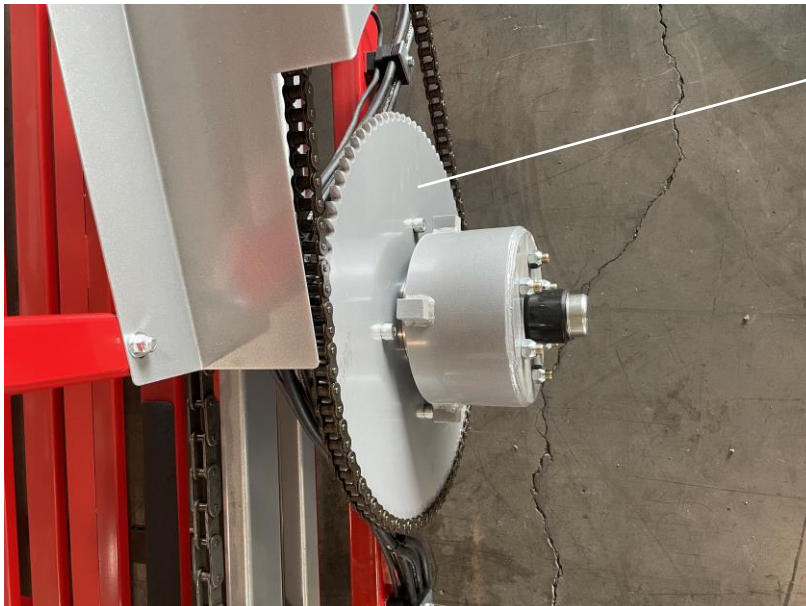
Other potential pinch points on this arm are located at the front corner as it approaches the frame during full extension, and as the arm retracts, the tapered bale guide at the front edge of the arm could also create a pinching hazard. There is a potential crushing hazard as this arm activates.



DANGER

THIS ARM IS POWERFUL ENOUGH TO INJURE.

8.4.9 Dump Clutch



Dump Clutch

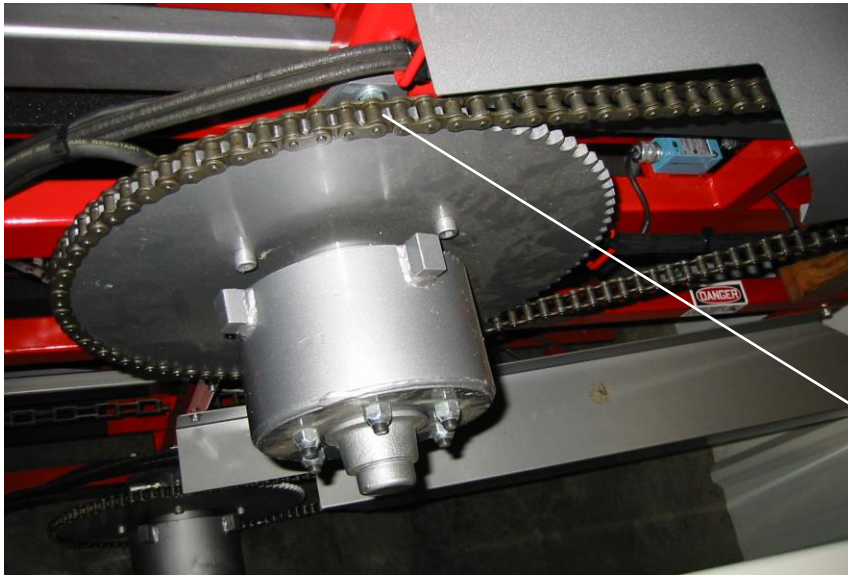
The dump clutch is the large sprocket located on the drive wheel. During the dump cycle this sprocket engages toward the tire. This creates a potential crush point between the tire and the sprocket.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

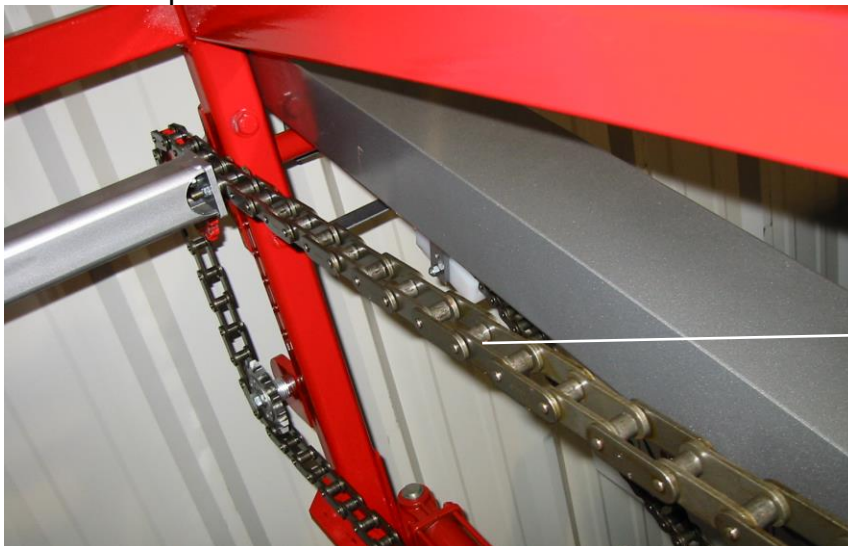
8.4.10 Drive Chain



Drive Chain

The drive chain is located between the tire and the dump shaft. As with any powered chain, there are potential pinch points located at any point at which the chain comes in contact with the sprockets. The plastic chain tensioner also creates a potential pinch point as it can move during the chain operation.

8.4.11 Dump Chains



Dump Chains

There are two dump chains, one located on each side of the machine. They are connected to the two dump bars, which propel the finished package out of the machine. These chains move only when the machine is moving, but are powerful. Each of these chains has six sprockets, and one guide all which have potential pinch points as the chain passes through them.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

8.4.12 Dump Bar



Dump Bar

The dump bars can create a crush point as they pass near any of the frame structure while moving.

8.4.13 Tires

The tires are rolling as the machine is moving through the field. Take caution to stay away from them as they move. Potential crushing could occur if any body parts were trapped under them.



WARNING

ALWAYS TURN POWER AND HYDRAULICS OFF BEFORE ATTEMPTING ANY SERVICE WORK

9. MACHINE SAFETY REVISION.

10. TRAINING NOTES

11. APPENDICES