



For Serial Numbers:

250C010 - 250C012

250C95051501 -
250C95052602

2250-0001 - 2250-0006

2252-0001 - 2252-0002

2253-0001 - 2253-0009

2250-0007 - 2250-0021

Model 250 Leveling System Operator Manual

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HILLCO 250 LEVELING SYSTEM ADJUSTMENTS

Note: Many of the following adjustments are interrelated. To achieve optimum settings follow the following priority list for adjustments --

- 1) Height Roller plunger Switches**
- 2) Header Trim Roller plunger Switches**
- 3) Leveling Limit Switches**

Leveling trip angles are not effected by the preceding adjustments and may be made at any time. Individual adjustments can be made if other adjustments are already properly set.

HEIGHT

FUNCTION:

The Hillco 250 Leveling System's swing arm style design relies on the main cylinders to support the weight of the combine. The absence of the traditional cross axle found on most leveling systems allows the combine to sit at a lower operating height and achieve a lower center of gravity than conventional designs. Though the combine height is monitored and adjusted automatically, the manual raise and lower switch allows the operator to raise or lower the combine above or below normal operating height. When manually raising or lowering the combine, the manual height control switch is used in conjunction with the manual level switch to "walk" the combine to a higher or lower position. The manual height switch adds or removes oil from the left main cylinder and the manual leveling function then transfers oil to the right main cylinder.

Since the machine is supported by the oil in the tops of the main cylinders, the combine operating height must be monitored and automatically adjusted to maintain proper height. This function is performed with the height roller plunger switches. The auto raise roller plunger switch senses a low operating height and adds oil to the top of the left main cylinder to raise the machine. The auto lower roller plunger switch senses a high operating height and removes oil from the top of the left main cylinder to lower the machine.

ROLLER PLUNGER SWITCH ADJUSTMENT:

(Refer to Figure #1) To adjust the raise and lower roller plunger switches, find a level place to park the combine, place all controls in the manual position, (trim, level, height) and position the combine so that both main cylinders are extended 10". To determine the length of extension, use a tape measure to measure from the face of the cylinder's packing gland to the paint line on the cylinder shaft. Adjust the right cylinder to 10" first using the manual leveling and then set the left cylinder position using the manual height switch. Double check both sides to ensure that each cylinder is extended 10". Check the right and left swing arm control cables to insure that the spherical rod end is threaded completely onto the end of the cable and the jam nut is locked against the rod end. Adjust the cable's bulk head mount at the swing arm cable mount standard so that when the bulk head nuts are tightened equal amounts of thread on the cable body are visible on each side of the bulk head nuts. Lower the feeder house on the combine and remove the cover on the control box (under the cab). Locate the middle and rear control rods that slide left and right in the plastic control rod bearings. The right hand swing arm cable should be threaded through a level limit switch contactor and into the rear control rod 1/2" and locked in place with the lock nut so that the 90° bend in the contactor is forward. Repeat the same procedure on the left hand swing arm and the middle control rod but

with its level limit switch contactor's 90° bend extending towards the rear of the machine. Using the bulk head mounts that mount each cable to the control box, adjust the position of the middle and rear control rods so that the rods extend through the right hand plastic control rod bearing 2-1/2". Lock the bulk head nuts to secure the rods in this position.

Locate the automatic raise roller plunger switch in the control box. The automatic raise roller plunger switch is the left hand switch on the rear most control rod. Push the rear control rod to the right and the middle control rod to the left to remove control cable slack. Loosen the mounting nut on the automatic raise roller plunger switch and position the switch so it just touches the engaging ramp machined in the middle control rod. Lock the switch in position using the mounting nut. Adjust the automatic lower roller plunger switch (right hand roller plunger switch on the rear control rod) so that it is 1/4" away from the engaging ramp machined in the middle control rod. Do not position the switch less than 1/4" from ramp.

To check the auto height roller plunger switches, lower the combine below normal running height and place the auto/manual height switch in the auto position. The combine should raise itself back to the desired operating height. Verify the height by measuring both cylinders for length of extension. The sum of the left and right cylinder extension should be 20" plus or minus 1/2". If not, repeat the setup procedure and move the automatic raise roller plunger switch closer to the engaging ramp to raise the machine or further away to lower the machine. Verify height again by measuring cylinder extension.

Note: If the control cables are readjusted during the height setup the left and right leveling limit switches must be readjusted. If the height roller plunger switch position on the control rod is the only adjustment made the leveling limit switches will stay properly adjusted. Follow leveling switch setup information for proper readjustment.

HEADER TRIM

FUNCTION:

The Hillco 250 Leveling System is equipped with master/slave hydraulic header angle control. As the combine levels left and right the right swing arm end cap pushes and pulls the master cylinder. The master cylinder is directly plumbed to the slave cylinder which is located on the underside of the transition area. Any movement of the master cylinder creates an identically opposite movement in the slave cylinder causing a rotation of the header. The master/slave header angle control can be overridden with manual or automatic header trim settings on the operator's console. Choose manual and the left/right header trim switch can be used to trim the header independently of the combine's position. Choose the automatic mode, and the header angle is monitored relative to the combine's position and adjustments are made automatically by the header trim roller plunger switches to ensure proper header angle.

HEADER TRIM ROLLER PLUNGER SWITCH ADJUSTMENT:

Note: The automatic header trim roller plunger switch adjustment is directly affected by the automatic height control roller plunger switch adjustment. Make sure the height adjustments are completed prior to making header trim adjustments.

(Refer to Figure #1) To adjust the left and right header trim roller plunger switches, first find a level place to park the combine, place all controls in the manual position, (trim, level, height) and position the combine so that both main cylinders are extended 10". To determine the length of extension, use a tape measure to measure from the face of the cylinder's packing gland to the paint line on the cylinder shaft. Adjust the right cylinder to 10" first using the manual leveling and then set the left cylinder position using the manual height switch. Double check both sides to ensure that each cylinder is extended 10". Using the manual header trim switch, rotate the header adapter so that it is exactly level with the feeder spout. Mount the header trim control cable to the mount on the front side of the transition's 4 x 4 cross tube. Center the mount on the threaded body of the cable. Thread the jam nut and spherical rod end onto the cable but do not tighten. Push the cable end into the cable and then, using a tape measure, pull the cable exactly 2-1/2" out (1/2 stroke for the 5" stroke cable). Adjust the spherical rod end on the cable end so that the stud on the rod end can be screwed into a threaded hole on the header adapter cable mount. (Any of the three holes may be used. Choose the hole that gives you the most thread engagement on the rod end). Tighten the stud into the mount. Mount the header trim control cable into the control box using the bulk head nuts and thread the control cable with jam nut into the front control rod 1/2" and tighten the jam nut. Using the bulk head nuts that secure each cable to the control box, adjust the position of the rod so that the rod extends through the right hand plastic control rod bearing 2-1/2".

Locate the header trim roller plunger switches that are located in the control box directly under the combine's cab. These switches are mounted to the front control rod and are actuated by the middle control rod. Loosen the mounting nut that holds each roller plunger switch in place and push the roller plunger switches as close together as possible and retighten the mounting nuts. Adjust the bulk head nuts so the roller plunger switches are evenly spaced away from the engagement ramps on the middle control rod.

Lower the combine below the normal operating height and engage the automatic height and leveling. After the combine adjusts its height and leveling for the terrain, place the height and level switches in the manual position. With a header on the combine and the auto/manual header trim switch in the automatic position, the header should be parallel to the ground. If the header is not parallel to the ground, adjustment of the header angle should be made at the transition end of the control cable. Place the auto/manual switch in manual and loosen the bulk head nuts that mount the control cable to its mounting ear and move the cable towards the high side of the header. Place the header trim in automatic and again check for position of the header to the ground. To achieve optimum settings for the header trim roller plunger switches, operate the combine in the field and observe header position. Make fine adjustments to header angle as necessary.

HEADER TRIM SPEED CONTROL ADJUSTMENT:

(Refer to Figure #3) Header trim speed control is easily adjusted using the flow control mounted in the header trim valve stack. The header trim control valve stack is the bottom stack on the hydraulic manifold. The flow control is located directly under the solenoid control valve (third section from the hydraulic manifold). The flow control is identifiable by the single lock nut and set screw that point rearward. To adjust the header trim control speed, release the lock nut and turn the adjusting screw clockwise to decrease speed and counter clockwise to increase speed. The standard setting is two turns out from full in. It is advisable to keep the header trim speed slow because it simplifies the header

trim adjustment. Excessive header trim speeds may lead to “hunting” of the header in the automatic header trim mode.

HEADER TRIM LEFT AND RIGHT RELIEF ADJUSTMENT:

(Refer to Figure #3) The header trim system is equipped with adjustable reliefs that determine the upward pressure necessary on the end of the header before the header yields to the force. Locate the relief valve in the bottom stack on the hydraulic manifold. The relief is identifiable by its dual adjustment screws on each end of the valve. The rearward facing adjustment screw adjusts the relief pressure for the left end of the header and the front facing adjustment screw adjusts the relief pressure for the right end of the header. To adjust the relief setting, loosen the lock nut and turn the screw clockwise to increase pressure and counter clockwise to reduce pressure. The reliefs are preadjusted at 1-3/4 turns in from start of spring pressure on the left relief and 1-1/2 turns in from the start of spring pressure on the right relief. The difference in adjustments is to offset the inches of area in the rod and butt end of the slave cylinder. *Excessive relief pressures may lead to extreme force being applied to the combine’s feeder spout and transition area. It is not recommended to change relief settings without first contacting Hillco.*

LEVELING

FUNCTION:

The Hillco 250 Leveling System is equipped with a two speed leveling system with manual control and automatic with manual override control. The system is designed to provide easy adjustability of trip angle and leveling speed. The low and high speed leveling controllers monitor combine chassis position relative to gravity and correct combine position with dual speed leveling. Adjustable flow control valves offer adjustability of high and low leveling speeds to customize the combine’s performance. The “L” low speed controller corrects combine position on leveling errors of 1-1/2 degrees by sending the leveling signal to the low speed leveling control valve on the manifold. The “H” high speed controller energizes the high speed leveling control valve on the manifold to combine with the low speed controller to correct combine leveling errors of 4-1/2 degrees or greater.

CONTROLLER ADJUSTMENT:

(Refer to Figure #1) Low Speed -- The low speed leveling is properly set if the combine returns to near level from both directions. If the combine appears to not level up evenly from both sides, the low speed controller (marked “L”) should be adjusted. To adjust, loosen the two lower mounting screws that mount the controller to the swinging mount plate. The bottom holes in the leveling controller are slotted to allow the controller to be rotated. Move the bottom of the controller in the direction you wish to move. Level combine to each side and return to level with the automatic leveling and again check for level. Repeat as necessary.

High Speed -- The high speed leveling is properly set if the combine shifts from high to low speed in approximately the same position from left and right. Because of the small trip angle difference between high and low speed leveling and the high response speed, it may appear that during testing on level ground there is no perceptible shift from high to low speed. This is common if the controllers are adjusted properly. However, if the combine has a long defined period of low speed leveling from one direction and not from the other, the high speed controller should be adjusted to balance the leveling response from both sides.

Note: The 1-2 degree low speed and 4-1/2 degree high speed trip angles can be internally adjusted in the leveling controllers. These trip angles have been preadjusted for maximum performance by Hillco and should not be readjusted with out first contacting Hillco for additional adjustment instructions.

SPEED ADJUSTMENT:

(Refer to Figure #3) Low Speed -- The low speed leveling control valve is in the 2nd valve stack from the top on the hydraulic manifold. Directly sandwiched below the solenoid valve directly on top of the aluminum manifold is the low speed flow control that controls the speed of the low speed leveling. This flow control is preset at 3.7 turns out from full in. To adjust the speed of the low speed leveling you must unscrew the small set screw that is offset in the face of the flow control knob. This screw prevents the control knob from moving after adjustment. Turn the knob counter clockwise to increase speed and clockwise to decrease speed. Retighten the lock screw when adjustment is completed. Increasing the speed of the low speed leveling will increase high speed leveling performance in severe hillside conditions but excessive speed will lead to jerkiness and possible hunting of the low speed leveling.

High Speed -- The high speed leveling control valve is in the top valve stack on the hydraulic manifold. Directly sandwiched below the solenoid valve directly on top of the aluminum manifold is the high speed flow control that controls the speed of the high speed leveling. This flow control is preset at 1/4 turn in from full out (maximum speed). To adjust the speed of the high speed leveling you must loosen the lock nut on the adjusting screw. Turn the screw counter clockwise to increase speed and clockwise to decrease speed. Retighten the lock nut when adjustment is completed. Decreasing the speed of the high speed leveling may be beneficial in mild rolling hills but maximum leveling speed is preferred for most conditions, especially severe terrain conditions.

LIMIT SWITCH ADJUSTMENT:

(Refer to Figure #1) The leveling system is equipped with left and right level limit switches that disable the automatic leveling when the combine reaches maximum leveling in either direction. These switches are preset to ensure that leveling stops when either main cylinder reaches its limit (fully extended or fully contracted). To locate these switches, remove the cover on the control box (directly under the cab). The level limit switches are located at opposite ends of the control box.

To adjust the level right limit switches, level the combine to maximum level right where the right main cylinder is completely contracted and the left main cylinder is fully extended (20" stroke). The rear and center control rods in the control box will be slid by the control cables to the right side of the control box. Adjust the contactor on the center control rod so that it is flush with the bent contactor on the rear control rod. To adjust the contactor on the center control rod, loosen the lock nut that locks the contactor screw in the end of the rod and turn the screw in or out. The contactors on the rear and middle control rods should be flush when all slack in the cables is pushed away from the limit switches. Next, loosen the limit switch hold down screws with a flat tip screw driver and move the limit switches against the contactors so they are centered on the two contactors and compressed 1/8" past the point the limit switches click. Tighten the hold down screws. Repeat this procedure on the level left limit switches.

To check the limit switch setting set the combine height below normal operating height and manually level left and right. The system pressure (shown on the gauge located by the hydraulic manifold) will drop from 2500 PSI to the 200 PSI standby pressure when the combine is at max. level. Repeat this procedure with the combine height above normal operating height.

HYDRAULIC

HYDRAULIC PUMP:

(Refer to Figure #2) Standby Pressure - This is the pressure at which the pump operates when all control valves are idle. This pressure can be monitored on the hydraulic manifold's main pressure gauge by starting the combine with all leveling system controls in the manual position and leaving all switches unactuated. The standby pressure should be set at approximately 350 psi. To adjust this pressure locate the adjusting screw and locking nut on the underside of the pump near the pressure and suction ports. You will find two such adjusting screws with the standby pressure being the adjustment screw closest to the nose (shaft end) of the pump. The adjusting screw will often be covered with a protective plastic or aluminum cap that can be removed with pliers or a screw driver. To make an adjustment, loosen the locking nut and turn the adjusting screw in (clockwise) for increased pressure and out (counter clockwise) for decreased pressure. Tighten the lock nut when adjustment is completed.

Compensator Pressure - The compensator pressure is the pressure at which the hydraulic system operates when any one or more of the control valves are actuated. The compensator pressure can be monitored by starting the machine and actuating a control valve while observing the hydraulic manifold's main pressure gauge. ***It is strongly recommended to use the header trim switch to bring the hydraulic pump up to compensator pressure. This eliminates movement of the main combine chassis which would occur if using the leveling or height adjustments.*** The desired compensator pressure is 2500 psi. To adjust this pressure, locate the adjusting screw and locking nut on the underside of the pump near the pressure and suction ports. You will find two similar adjusting screws with the compensator pressure being the adjustment screw closest to the pressure and suction ports on the pump. The adjusting screw will often be covered with a protective plastic or aluminum cap that can be removed with pliers or a screw driver. To make an adjustment, loosen the locking nut and turn the adjusting screw in (clockwise) for increased pressure and out (counter clockwise) for decreased pressure. Tighten the lock nut when adjustment is completed.

VALVE STACK SETTINGS:

(REFER TO FIGURE #3)

HIGH SPEED STANDARD FLOW CONTROL: Back off the holding hex nut with a 13 mm wrench until it is at the end of the threads on the adjusting screw. Using a metric Allen wrench set the adjusting screw 1/4 turn in from all the way out. Retighten the holding hex nut to secure the adjusting screw at this setting.

LOW SPEED PRESS. COMP. FLOW CONTROL: Back off the set screw on the low speed flow control dial. Turn in the flow control dial until it stops. *Note: If the set-screw is not backed-off far enough it will not allow the flow control dial to be turned in all the way.* Turn the flow control dial 3.7 turns out from all the way in. Retighten the set screw to secure the flow control dial at this setting.

MAIN SYSTEM RELIEF: DO NOT ADJUST!

TRIM STANDARD FLOW CONTROL: Back off the holding hex nut with a 13 mm wrench until it is at the end of the threads on the adjusting screw. Using a metric Allen wrench set the adjusting screw at 2 turns out from all the way in. Retighten the holding hex nut to secure the adjusting screw at this setting.

LEFT HEADER TRIM RELIEF: Back off the holding hex nut with a 13 mm wrench until it is at the end of the threads on the adjusting screw. Using a metric Allen wrench, turn the adjusting screw out until it is loose. Retighten the adjusting screw by hand until you feel the relief spring applying pressure against the adjusting screw. Turn the adjusting screw in 1-3/4 turns from this point. Retighten the holding hex nut to secure the left header trim relief at this setting.

RIGHT HEADER TRIM RELIEF: Back off the holding hex nut with a 13 mm wrench until it is at the end of the threads on the adjusting screw. Using a metric Allen wrench, turn the adjusting screw out until it is loose. Retighten the adjusting screw by hand until you feel the relief spring applying pressure against the adjusting screw. Turn the adjusting screw in 1-1/2 turns from this point. Retighten the holding hex nut to secure the right header trim relief at this setting.

OPERATION

LEVELING:

The Left / Right Leveling Switch and the Auto / Manual Leveling Switch control the combine's leveling functions. Putting the Auto / Manual Leveling Switch into the Auto position will activate the automatic leveling system controlled by the high and low speed leveling controllers for continuous leveling. Putting the Auto / Manual Switch in the Manual position disconnects the automatic controls and activates the Left / Right Leveling Switch.

To manually control leveling put the Auto / Manual Leveling Switch in Manual then push the Left / Right Leveling Switch to the right to level the combine to the right or push to the left to level the combine to the left. As soon as the desired level is attained release the Left / Right Leveling Switch and the combine will remain in that position until the switch is pressed again.

When the Auto / Manual Leveling Switch is in the automatic position, pressing the Left / Right Leveling Switch will override the automatic system. In this condition as soon as the Left / Right Leveling Switch is released the automatic system will take over.

For normal field operation it is recommended that the Auto / Manual Leveling Switch be in the Auto position.

HEADER TRIM:

The Left / Right Header Trim Switch and the Auto / Manual Header Trim Switch control the combine's header trim functions. Putting the Auto / Manual Header Trim Switch into the Auto position will activate the automatic trim system controlled by the control rods for continuous header trimming. Putting the Auto / Manual Switch in the Manual position disconnects the automatic controls and activates the Left / Right Header Trim Switch.

To manually control header trimming put the Auto / Manual Header Trim Switch in the Manual position then push the Left / Right Header Trim Switch to the right to trim the right side of the header down or push to the left to trim the left side of the header down. As soon as the desired trim is attained release the Left / Right Header Trim Switch and the header will track in that position until the switch is pressed again. Since the master and slave cylinder are always connected together the header will always follow the leveling of the combine regardless of position of the Auto / Manual Header Trim Switch.

For normal field operation it is recommended that that Auto / Manual Header Trim Switch be in the Manual position. This gives the operator greater control over the header. The Auto position is provided if the operator is in a cutting condition where the visibility is poor making it difficult to adjust the header for irregular field contours.

HEIGHT:

The Up / Down Height Switch and the Auto / Manual Height Switch control the combine's operating height. Putting the Auto / Manual Height Switch into the Auto position will activate the automatic height system controlled by the control rods for continuous height control. Putting the Auto / Manual Switch in the Manual position disconnects the automatic controls and activates the Up / Down Height Switch.

To manually control the height, put the Auto / Manual Height Switch in Manual then push the Up / Down Height Switch forward to lower combine or push to the rear to raise the combine. As soon as the desired level is attained, release the Up / Down Height Switch and the combine will remain in that position until the switch is pressed again. *Note: The Up / Down Switch will only control the left side of the combine. Once the left side of the combine is at the desired height the Left / Right Leveling Switch can be used to raise or lower the right side of the combine.*

For normal operating conditions it is recommended that the Auto / Manual Height control switch be in the Auto position.

TRANSPORT AND SERVICING:

When the combine is being serviced or in transport, **always** place the Auto / Manual Trim, Leveling, and Height Switches in the **Manual** position.

HILLCO 250-LEVELING SYSTEM

HYDRAULIC ADJUSTMENTS

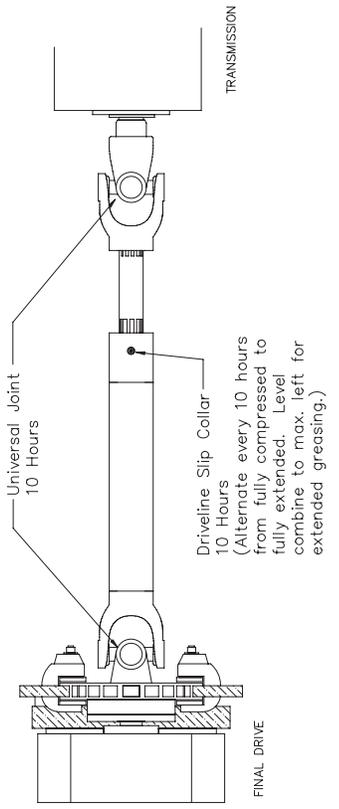
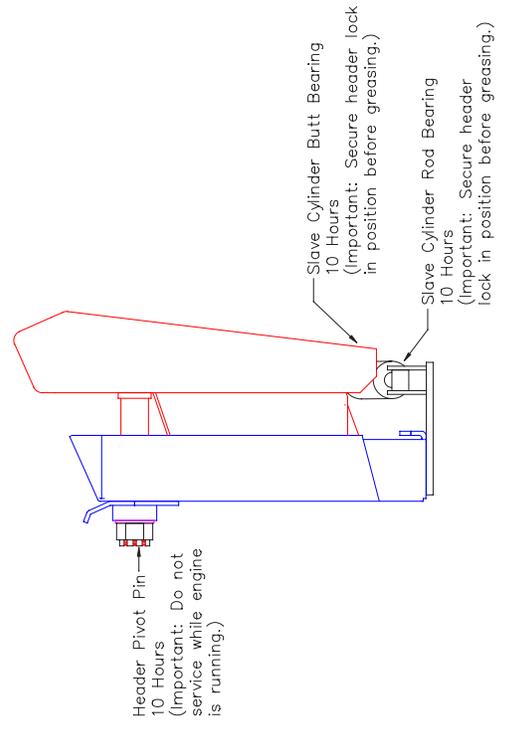
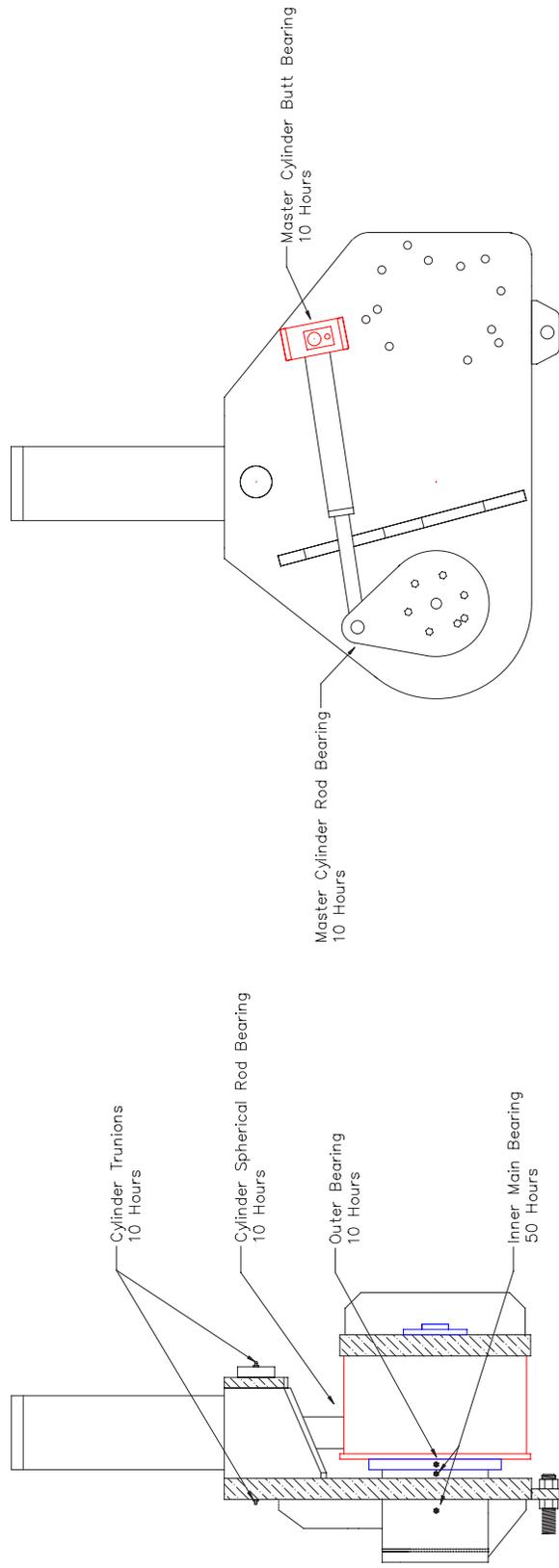
HYDRAULIC

HYDRAULIC PUMP

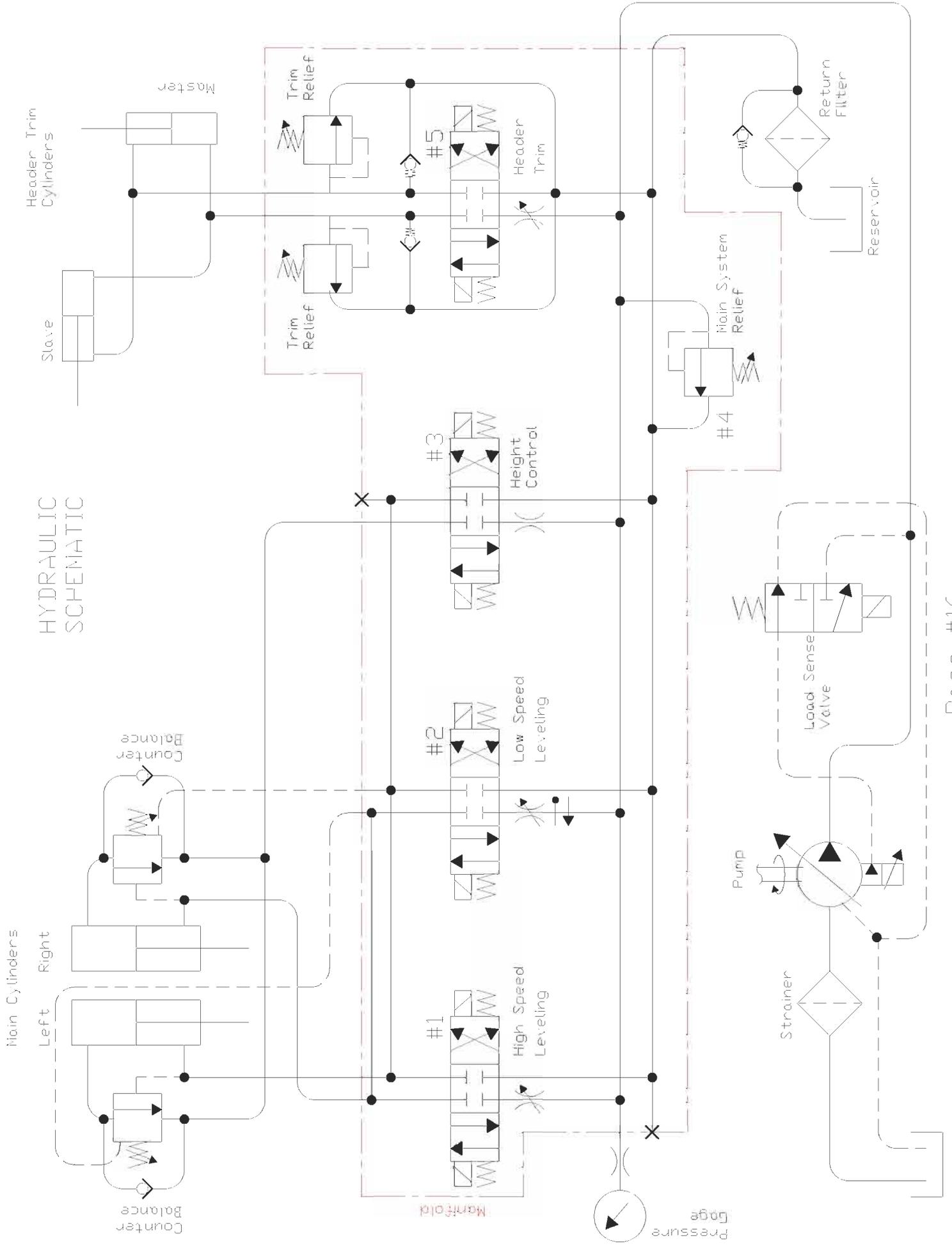
Standby Pressure - This is the pressure at which the pump operates when all control valves are idle. This pressure can be monitored on the hydraulic manifold's main pressure gauge by starting the combine with all leveling system controls in the manual position and leaving all switches unactuated. The standby pressure should be set at approximately 250 psi. To adjust this pressure locate the adjusting screw and locking nut on the underside of the pump near the pressure and suction ports. You will find two such adjusting screws with the standby pressure being the adjustment screw closest to the nose (shaft end) of the pump. The adjusting screw will often be covered with a protective plastic or aluminum cap that can be removed with pliers or a screwdriver. To make an adjustment, loosen the locking nut and turn the adjusting screw in (clockwise) for increased pressure and out (counter clockwise) for decreased pressure. Tighten the lock nut when adjustment is completed.

Compensator Pressure - The compensator pressure is the pressure at which the hydraulic system operates when any one or more of the control valves are actuated. The compensator pressure can be monitored by starting the machine and actuating a control valve while observing the hydraulic manifold's main pressure gauge. ***It is strongly recommended to use the header trim switch to bring the hydraulic pump up to compensator pressure. This eliminates movement of the main combine chassis, which would occur if using the leveling or height adjustments.*** The desired compensator pressure is 2500 psi. To adjust this pressure locate the adjusting screw and locking nut on the underside of the pump near the pressure and suction ports. You will find two similar adjusting screws with the compensator pressure being the adjustment screw closest to the pressure and suction ports on the pump. The adjusting screw will often be covered with a protective plastic or aluminum cap that can be removed with pliers or a screwdriver. To make an adjustment, loosen the locking nut and turn the adjusting screw in (clockwise) for increased pressure and out (counter clockwise) for decreased pressure. Tighten the lock nut when adjustment is completed.

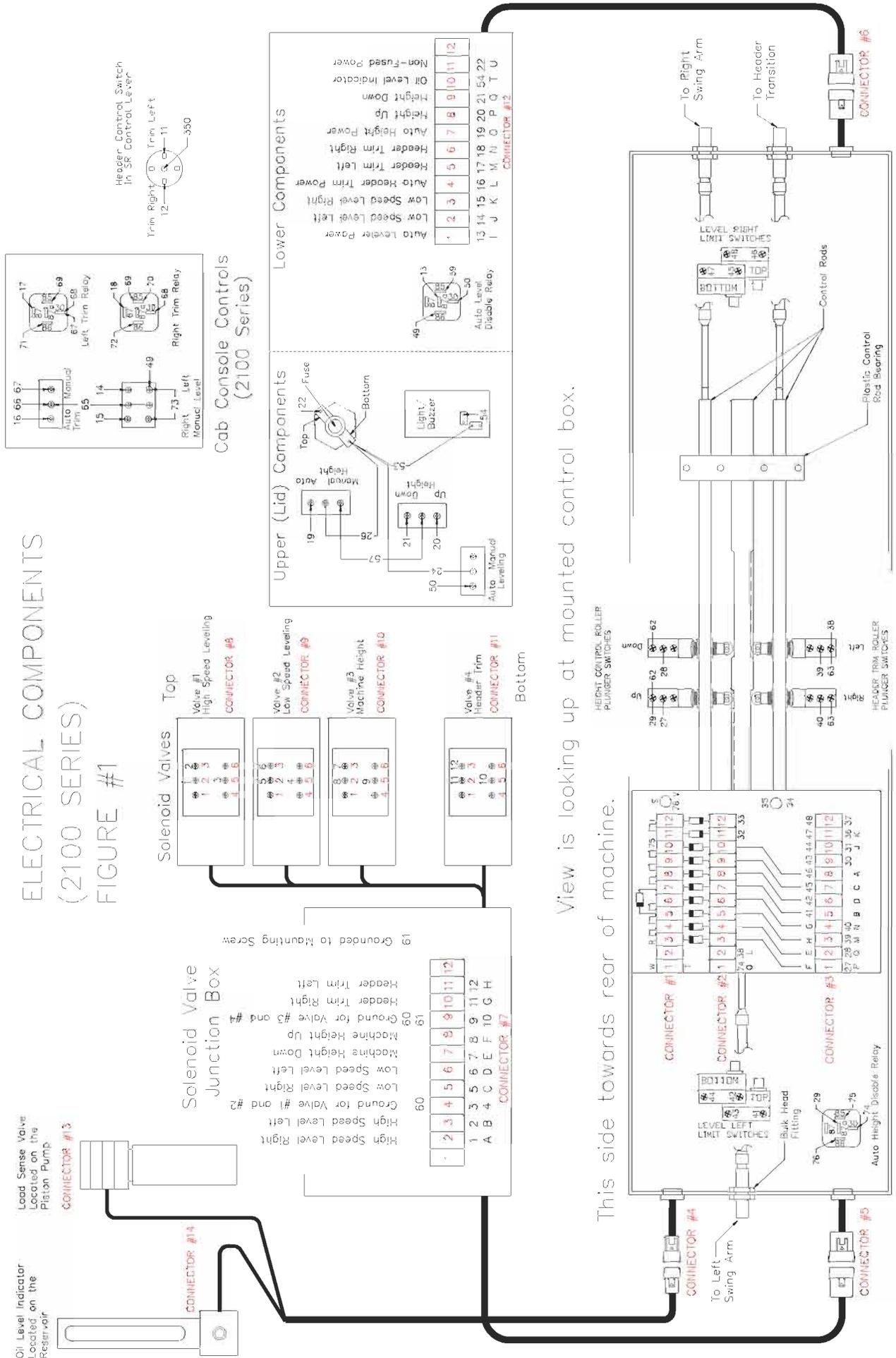
Hilco 250 Leveling System Lubrication Check Points



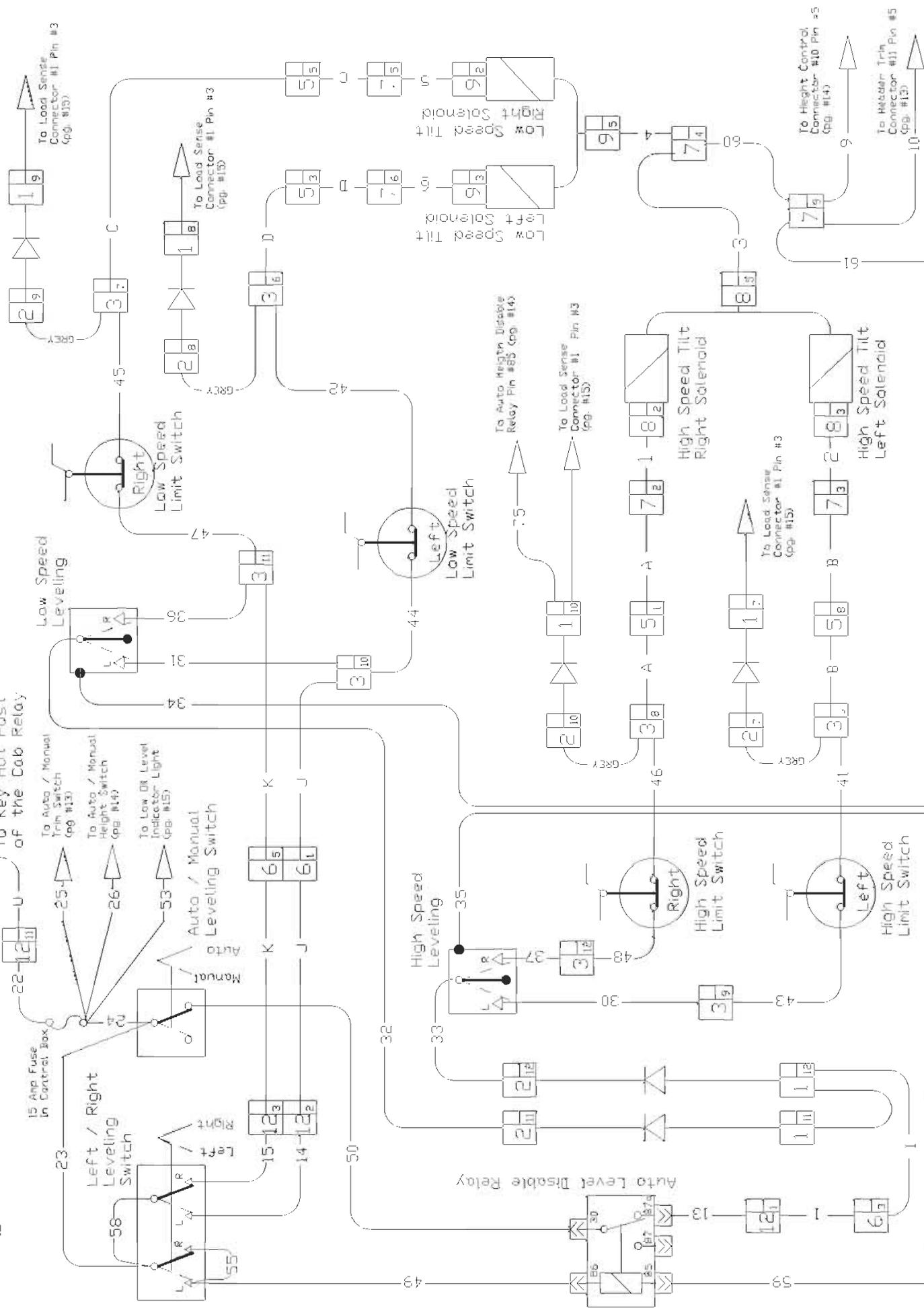
HYDRAULIC SCHEMATIC

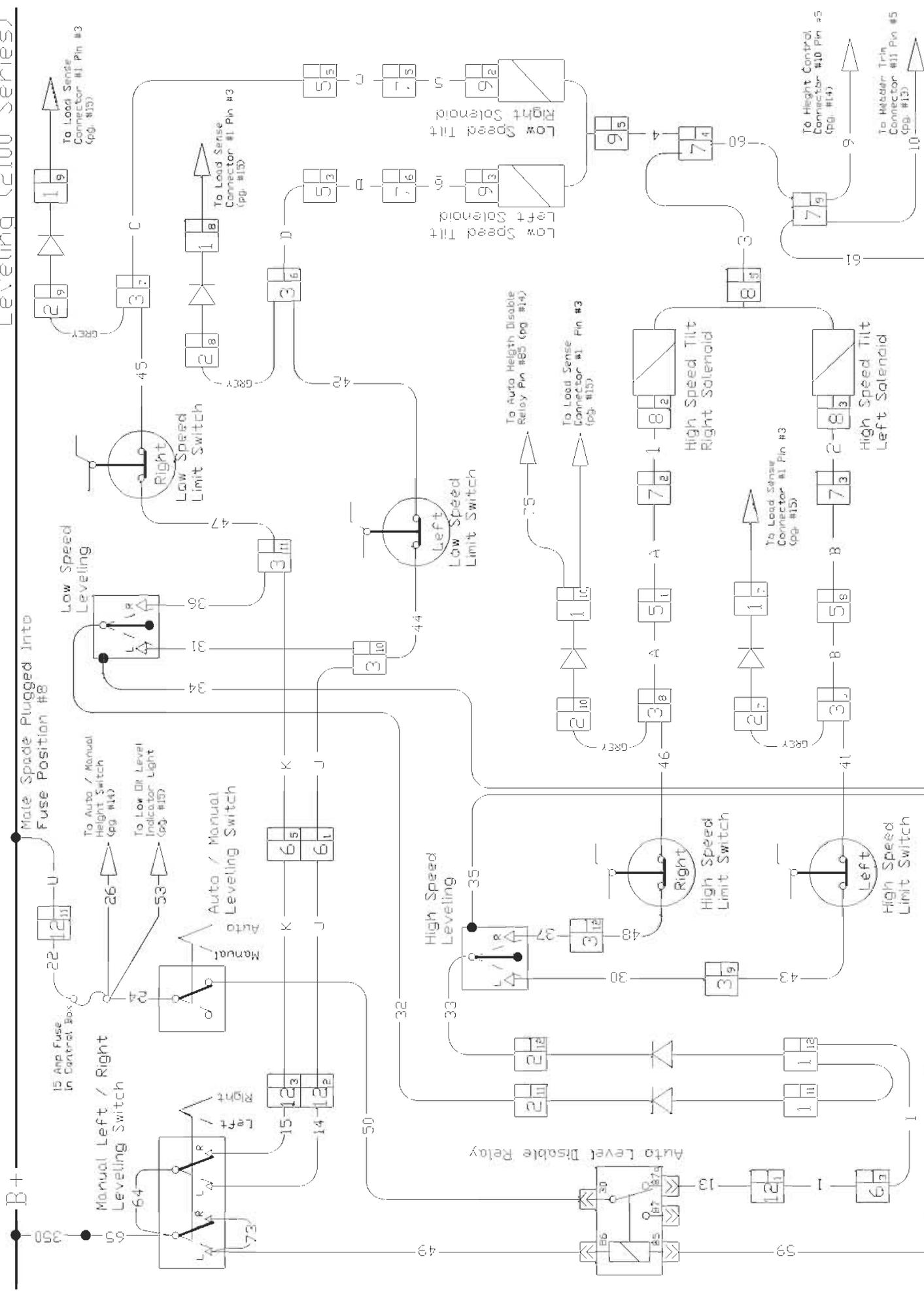


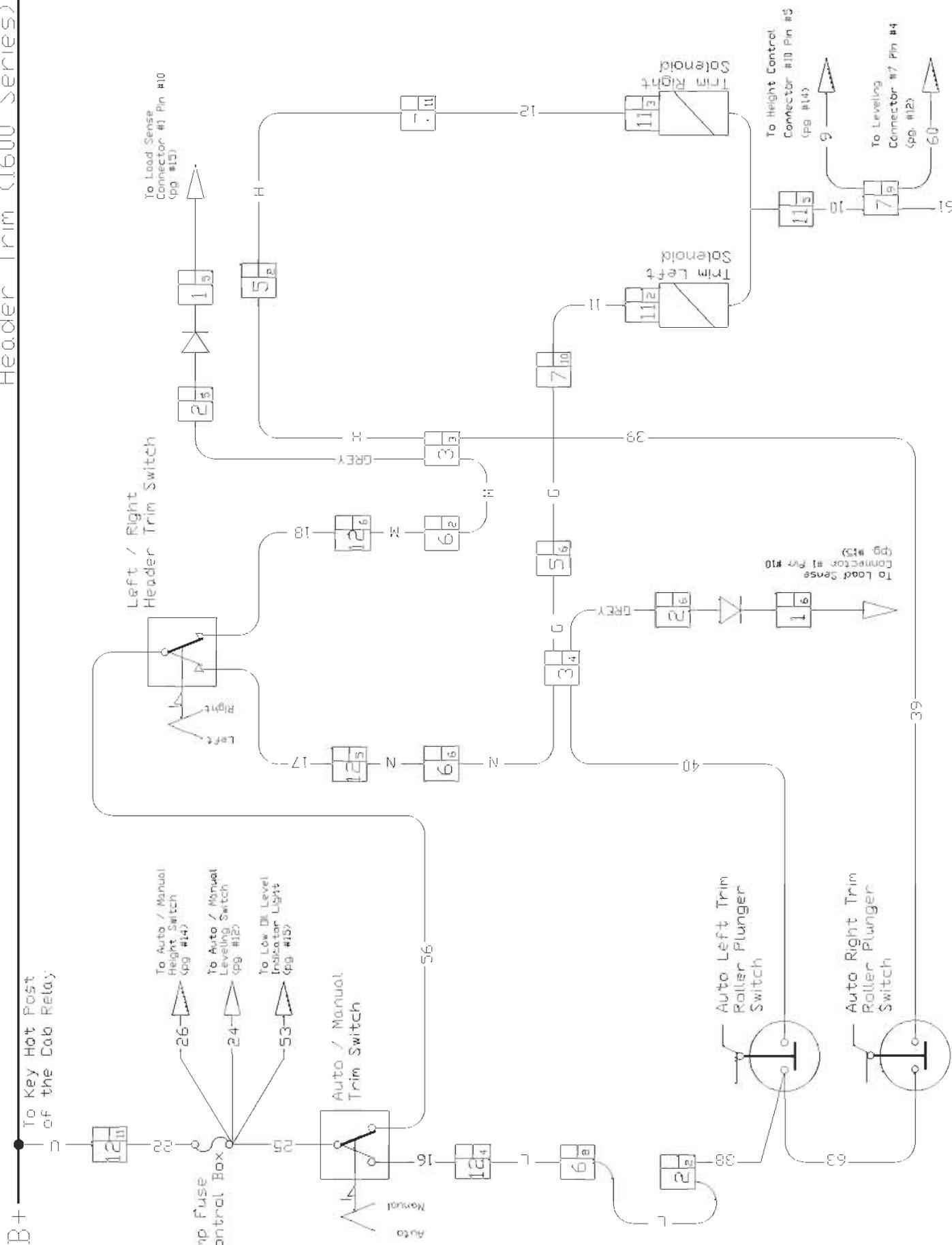
ELECTRICAL COMPONENTS (2100 SERIES) FIGURE #1

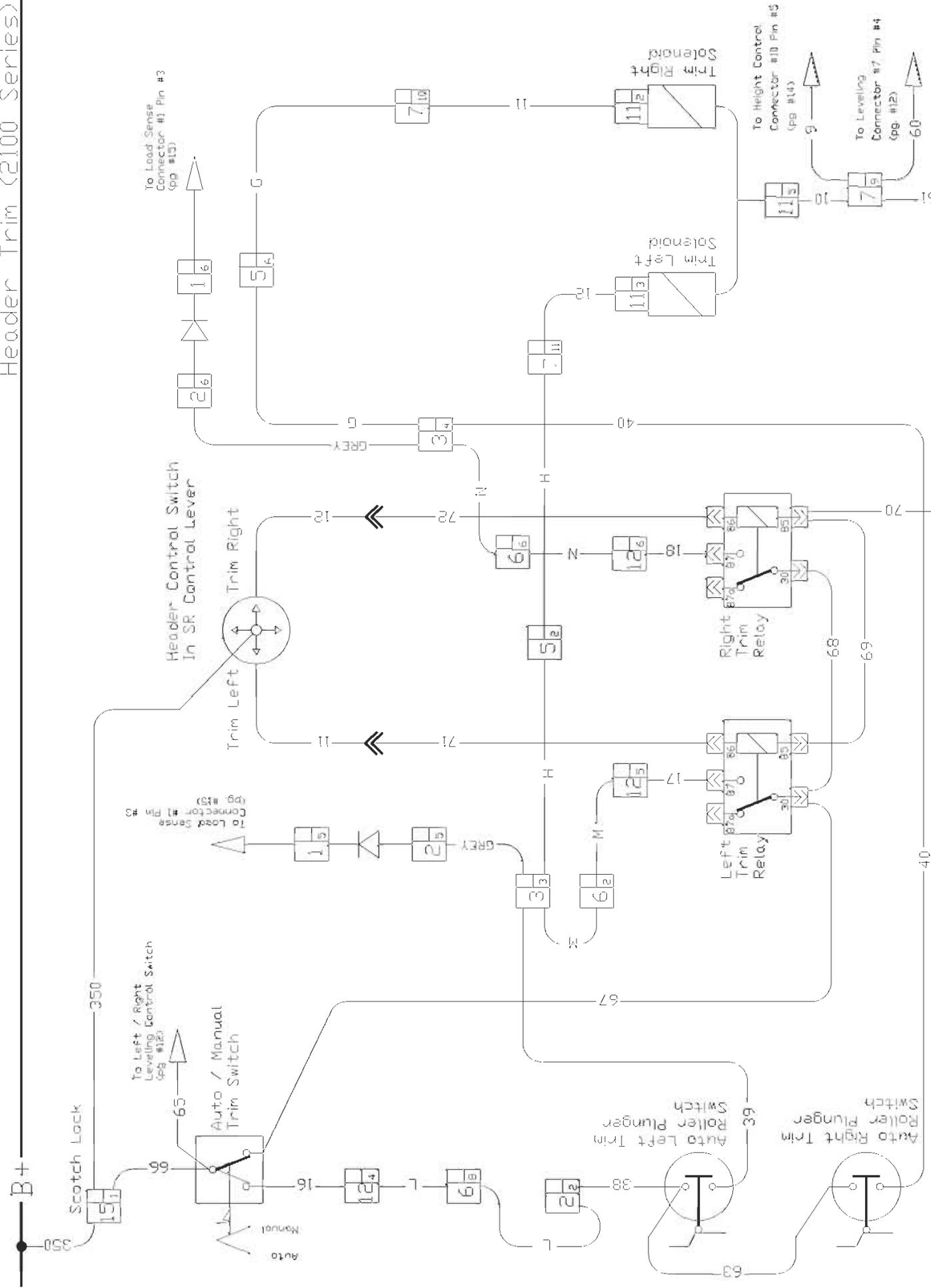


B+ To Key Hot Post of the Cab Relay









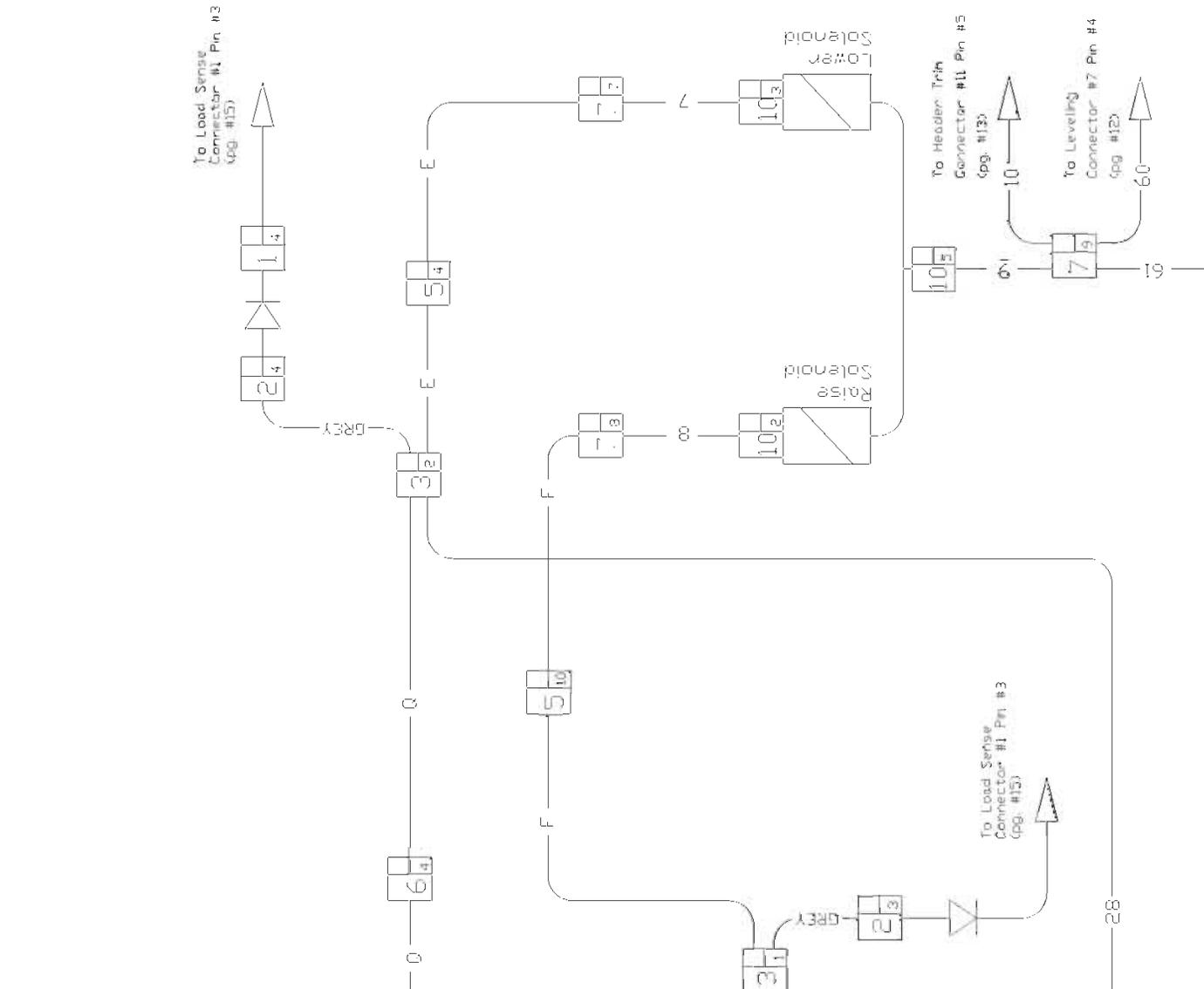
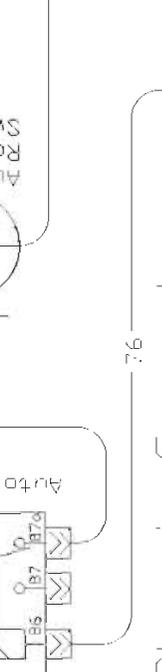
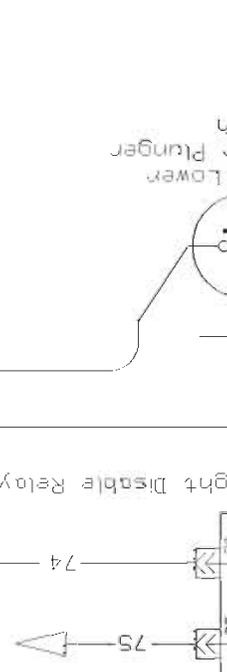
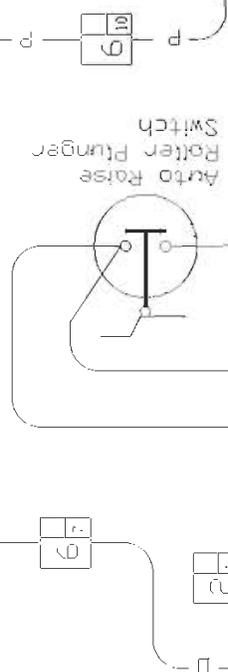
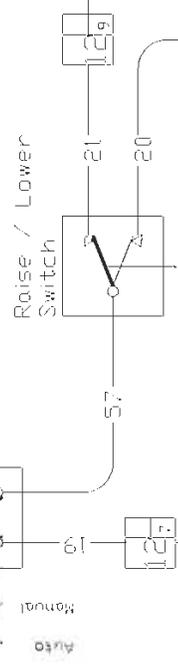
B+ ———— To Key Hot Post of the Cab Relay

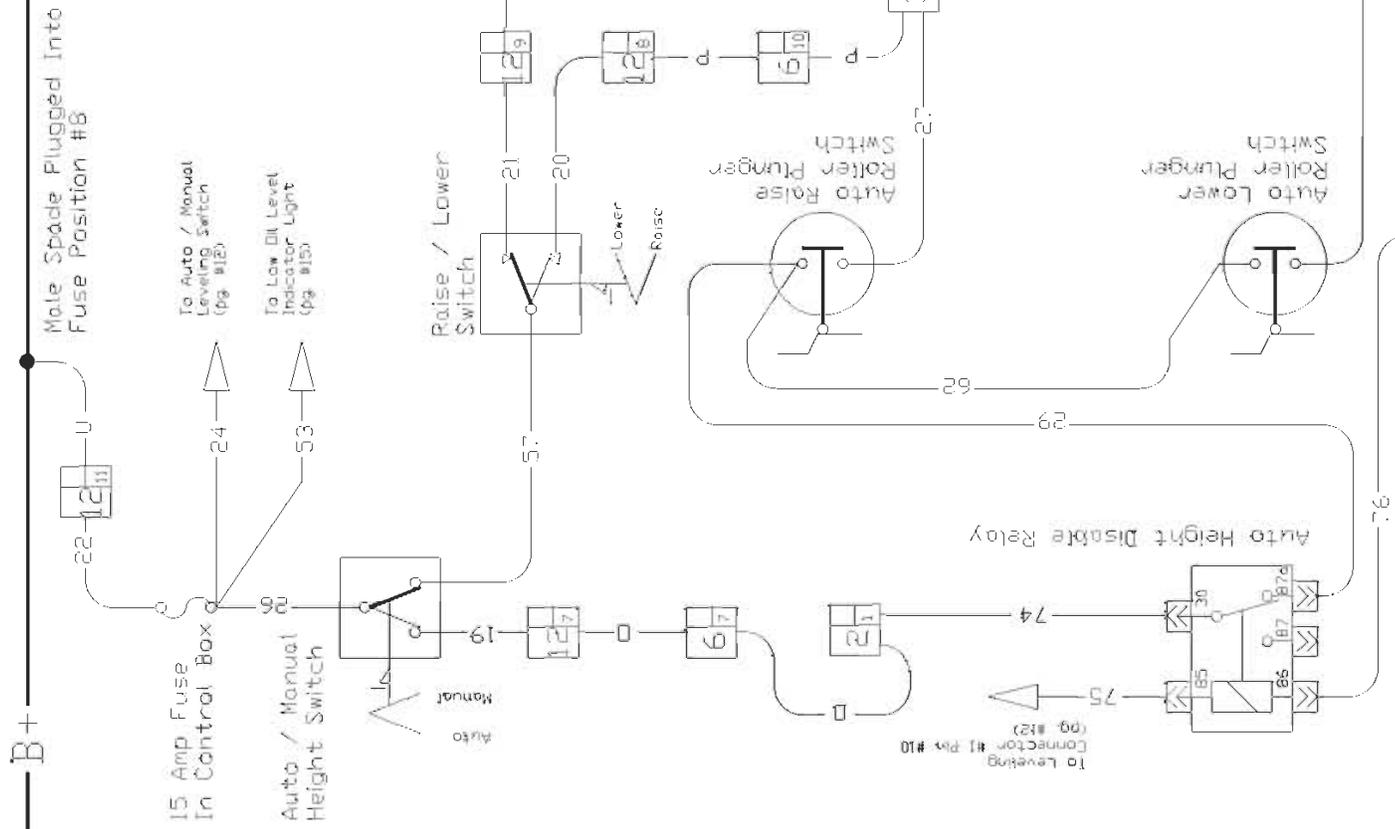
15 Amp Fuse In Control Box ———— 22 ———— U ———— 12 11

Auto / Manual Height Switch ———— 25 ———— To Auto / Manual Trim Switch (pg. #13)

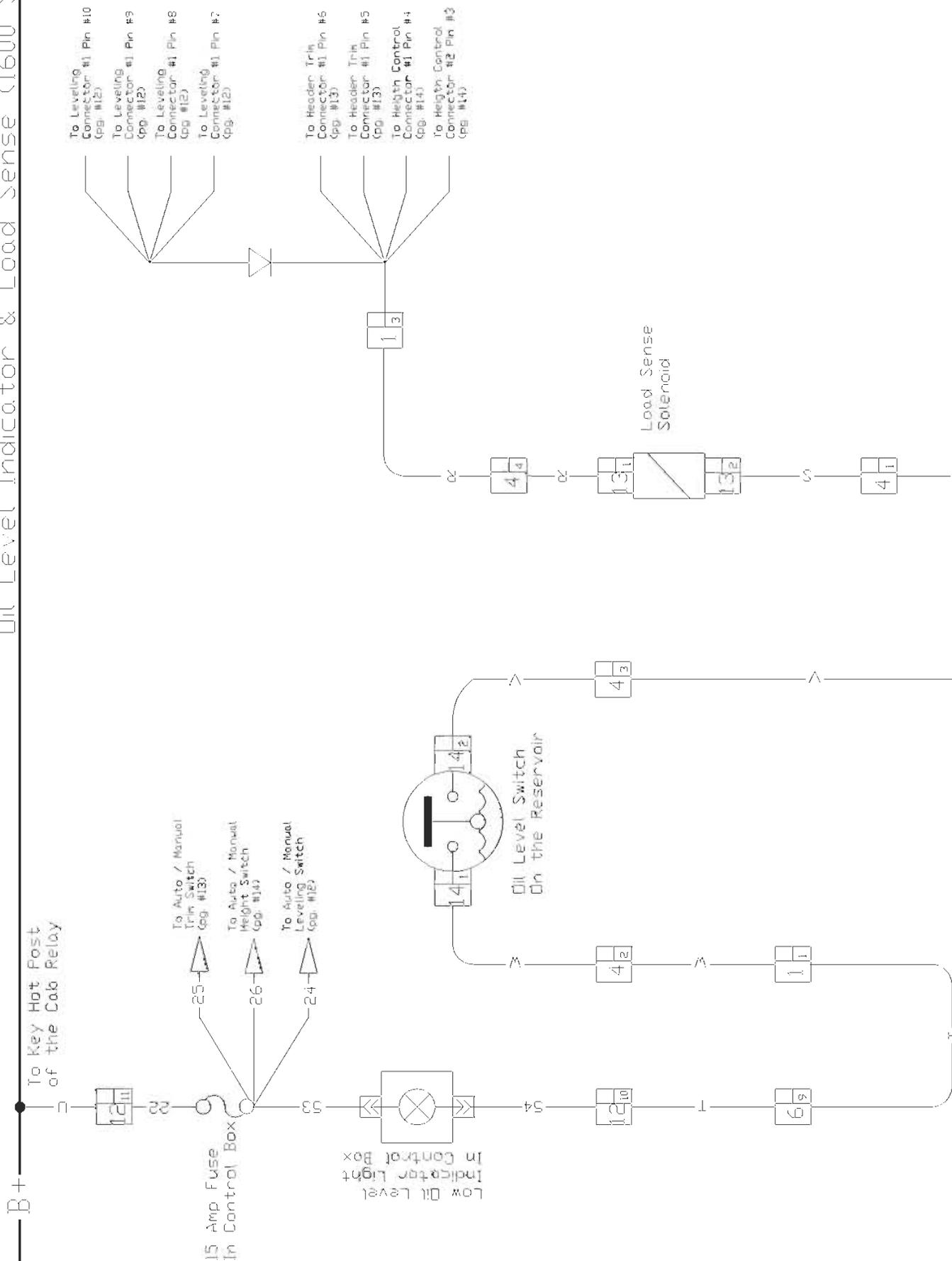
Auto / Manual Height Switch ———— 24 ———— To Auto / Manual Leveling Switch (pg. #12)

Auto / Manual Height Switch ———— 53 ———— To Low Oil Level Indicator Light (pg. #15)





Oil Level Indicator & Load Sense (1600 Series)



Oil Level Indicator & Load Sense (2100 Series)

